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Putting a Leash on Spam

> "It is significant that VSNL, the single largest ISP in India, has finally decided to take some steps to control spam"

VSNL recently announced that it would not allow any mail that does not originate from a VSNL e-mail identity to be sent via their SMTP servers in India.

This will mean that subscribers to the VSNL Internet service who are not using the e-mail account they were provided with when they signed up will need to start looking for another way to send e-mail. If you use an e-mail service other than that of VSNL, you had better hope it provides you with a server for outgoing mail. Users of Web-based e-mail services really won't be affected.

But for VSNL subscribers this is a good thing!

The primary reason that VSNL, or any other ISP for that matter, has had to do this is spam. ISPs all over the world have been making serious efforts to reduce spam originating from their servers for quite a while now and VSNL has finally decided to follow suit.

Advances in technology have made the electronic transmission of information increasingly easy. This has encouraged the indiscriminate use of e-mail by marketers to push information about their products to unsuspecting consumers.

The sending of unsolicited e-mail via open relay servers like the one that VSNL has maintained since it began providing Internet services in India, has become a nuisance in more ways than one. On the one hand, you are forced to deal with meaningless advertising messages filling your mailbox and keeping you from the ones that are really important. On the other hand, spam also clogs the networks and consumes bandwidth, which is pretty scarce for Internet users in India anyway.

While it is significant that VSNL, the single largest ISP in India, has finally decided to take some serious steps to control spam, this can only work if all other ISPs in the country take similar action. This has to be backed up with legislation that will penalise the bulk mailing by organisations or individuals using ISP resources.

Perhaps this kind of legislation will follow in the near future, and hopefully it wont be just another paper tiger.

Karan Manral

Karan Manral
Assistant Editor
karan_manral@jasubhai.com

C**g**NTENTS

Products reviewed

Mindmatters
Enjoy eBooks and whitepapers

58
14 e-mail services examined

Arena
Check out cool games

40
The Internet of the future

68
Speed burst with dual modems

104, 118
24 monitors and 20 graphics cards tested

---

digit interactive

ON THE CD

Mindware

RESOLVE
TROUBLESHOOTING
FAQs on Linux

WORKSHOP
Hands-on: A video workshop on how you can backup data

E-PAPERS
Working with PDFs and eBooks

SOFTWARE
DEVELOPERS
ULTRAEDIT-32
A text and hexadecimal editor with column-mode editing, insert and overstrike modes, drag and drop support and more

OCTOPOD FOR C++
A visual multicompiler IDE with a graphic designer similar to VB for attractive layouts
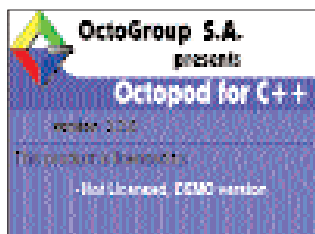
CONTEXT V0.96.2A
A small, fast and powerful text editor featuring unlimited open files, unlimited editing file size length, multilingual support and more

GRAPHICS
COFFEECUP FIRESTARTER
This software lets you create Flash effects for your Web site with more than 50 ready-to-use features, MP3 sounds, a built-in sound editor and more

IMAGEWALKER
This software lets you manage your image files visually with features such as Web page creation, thumbnail generation and printing, batch image conversion and more

HOME
PARABEN'S DIET TRACKER
You can accurately track the diet that is right for you using a food database of almost 6000

Software on CD

Mindware
DEVELOPERS
FreePiXCL (Freeware), Microsoft Windows Installer (Freeware), Microsoft Data Access Components RTM (Freeware)

GRAPHICS
CoffeeCup GIF Animator 5 (Shareware), Icon Collector Graphics Editor (Shareware), Image Printer (Demo), PictureXchange (Shareware), VCW VicMan's Photo Editor (Freeware)

HOME
DVD Profiler (Freeware), Easy Desktop Publisher (Shareware), Paraben's Calendar Creator (Trial 15 days), Shuffle Game (Freeware), TypingMaster Games (Freeware)

IN MAGAZINE
Adobe LiveMotion (Trial),

■ contents

food items with nutritional information supplied by the USDA

SHOPPING LIST!
Chalk out a more productive day by planning your tasks and even record recipes and ingredient lists

INTERNET
OCTOPUS 3.1
This software allows you to split a file and download parts of it separately

REGET FREE
A free, fast, award winning utility that resumes broken downloads from both HTTP and FTP servers

IN MAGAZINE
MACROMEDIA DIRECTOR v8.5
A full-featured multimedia authoring tool featuring enhanced 3D content and application tools, Flash 5 integration and more

ADOBE GOLIVE 5.0
This software provides you with industrial-strength design, production and management features for professional, dynamic and database-driven Web sites

OFFICE
PARABEN'S FLOWCHARTER
Become a pro at flow chart design with an easy-to-use interface, templates, shapes and symbols and even import your own graphics and images as Web page graphics

UPDATES
NETSCAPE 6.1
The latest update to the Netscape browser suite with

enhanced features such as one-click searching from the address bar, integrated download manager and automated online form filler

UTILITIES
AD-AWARE
This software scans your memory, registry and hard drives for spyware modules, registry keys, files and folders

BOSS KEY
Hide browsers and folders at the click of a hot key

IN PRINT
TEST DRIVE
Detailed reviews of tested products

PRICEWATCH
Computer component prices

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Complete, free course from
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Playware

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ARENA
GAMES
LEADFOOT
Five 4WD sports trucks, three buggies and some close racing and jostling with other vehicles is what you have here!

SURGE
Music by Absolute Bliss, Caption Paradox, Groove Extreme and trailers of the latest movies

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SITEMAP
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NEWSLETTERS
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◆ How to contact us

EDITORIAL
Products for Test/Review
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Contact Vaibhav Kapoor, Content Co-ordinator, Multimedia *(cdcontent@jasubhai.com)* for inclusion of software on Digit Interactive. A write-up detailing the features of the software, complete loading instructions and a letter certifying that the product is original must accompany the software. The software must also have the complete address, telephone number and e-mail of the developer.

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◆ Advertisers index

NEWS PULSE

hypethesis

Anonymizer

▲ **What is it?**

The Anonymizer's Privacy Button is a product of Anonymizer Inc, a San Diego, California-based company. It is a browser button that helps prevent tracking of user where-abouts by Web sites. The button prevents Web sites from collecting information such as browsing habits by placing cookies on your computer.

▲ **What is unique about this technology?**

The Anonymizer's Privacy Button is a one-click soft-ware tool, which resides on your toolbar and protects you while you are online by blocking access to informa-tion such as your IP address, location, your software con-figuration and browsing habits by sites you visit. Thus, it helps you retain your privacy.

▲ **Where can you get it?**

www.anonymizer.com

Go fishing on the Net!

Peer-to-Peer technology (P2P) is continuously adding new dimensions to its application. Scientists at DALi (Distributed Artificial Life) have come up with mobile agents that would enable a fish to swim across computer screens all over the Internet using P2P tech-nology. The company has creat-ed some 20 varieties of such artificial life forms with Java.

An algorithm determines the motion of the extremely realistic fish. Right-clicking on a particular fish will tell you more about the path that it has travelled on the Internet. This proj-ect is attempting to develop Java-based multiplayer g a m e s , that will w o r k across all platforms.

So check out the next fish that flows into your system. It could be one of those exotic species from Iceland.
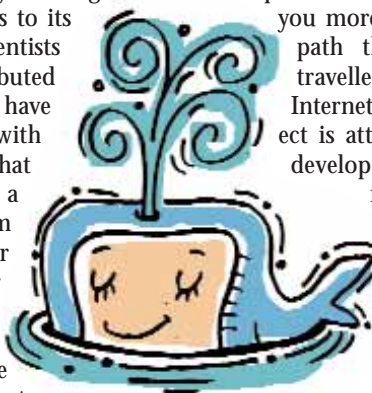
Tiny Norwegian village goes entirely wireless

We may soon have the world's first and only entirely wireless broadband community. A remote village called Modalen in Norway is the site of an experiment in which residents are being equipped with televi-sion set-top boxes that will let them use their TV for sending e-mail, shopping, video-con-ferencing and downloading music and videos from the Internet. The village is docu-menting its efforts hoping to gain entry into the *Guinness Book of World Records.* A group of companies including broad-band service provider Nera, software maker PCTVnet and Cisco are using this as an opportunity to showcase some of their latest technologies.

Play the ball in the correct court

Most Internet businesses nowadays seem to be in a bit of trouble. However, this has-n't stopped big names like Real and Hitachi from start-ing new Internet gaming ven-tures. Game development and distribution has tradi-tionally been the preserve of a few companies but this has been changing.

Real seems to have fol-lowed Microsoft into the game portal space with the launch of RealArcade.com. This site offers several games free for a trial. Hitachi is another new entrant trying to take over the Japanese market by launching game portals targeted at broadband users. Their Web site is going to be a combined effort along with Lycos (Japan), Media Works and Battle Top. Both, Real and Hitachi, believe in the potential that exists in the segment and are seriously looking for these game por-tals to help them generate revenue. Good times coming up folks!

Usa.net offers paid 'FREE' e-mail access!

Like almost everybody who logs on to the Internet even once in a while knows, Usa.net is now a paid service. However, during the process of transi-tion, a technical glitch made accounts accessible to almost anyone. All you needed to do was enter the username for the account that you wanted to access followed by any pass-word and voila! You were in. Both the paid and unpaid accounts were accessible in this manner until the company finally managed to fix the problem with their servers.

Illustrations: Farzana Cooper

SNAPSHOT

75 million
Europeans will use Inter-net banking by 2005

Asia/Pacific to top Net usage
by 2003

Source: *www.datamonitor.com*

◆ Dell discontinues Linux desktops ◆ OpenGL v1.3 specification released ◆ Israeli security company Midbar introduces copy-protected

Computing Big-bang theory

Man's unending quest to understand the mysteries of the universe is now aided by Britain's biggest supercomputer based at the University of Durham.

This £1.4 million machine records data from billions of observations made on the behaviour of cosmic objects spread all across the universe. The data is then processed at ultra high speed to predict the formation and evolution of galaxies and solar systems. The analysis of the supercomputer is then compared to various cosmic theories to find a plausible explanation for the evolution of the universe.

The supercomputer is being operated and maintained by the Institute of Computational Cosmology (ICC).

The supercomputer consists of an integrated cluster of 128 Ultra-SparcIII processors, 24 processor SunFire mid-frame servers, 112 Gigabytes of RAM and 7 terabytes of data storage, which allow it to perform 10 billion operations per seconds. This would take most human beings around a million years of continuous calculation to complete!

quicktake

Build a more secure enviroment with PKI technology

▲ **What is PKI technology?**
This is a technology, which involves building Public Key Infrastructure around the world. That means a network of trust that will spread across the world and will be used by organisations such as banks, governments and others. It includes digital certificates and validation. The digital certificates and PKI are governed through a protocol called OCSP, which issues certificates on PA technology. Currently there are around 60 international banks using this technology to implement their businesses across the world. This technology is not proprietary and you can enjoy these services from other vendors as well such as Sun and IBM.

▲ **What's your focus area in India?**
In India we are part of Global Telecom Systems and are here to implement security solutions for Indian companies. We are currently focusing on all security aspects—from firewall to PKI. In matters of security, legal contracts, enforcement and cryptography all work together and it is we who are providing them. We cover business risks validation and security in data transfers.
When large volumes of data are transferred the network needs to be synchronised and we provide and maintain security for it. Our products work on a Java-based platform and is independent of the OS. It is customised and is served at the backend by an Oracle database.

Peter Williams
EXPERT
PKI Technology

Redalert

Sircam virus
To Sir with love
A W32 class virus called Sircam is creating havoc around the world by randomly sending personal messages from address books on infected machines. The rogue message is usually in the form of an e-mail attachment either in English or Spanish with a varying subject line. It could be "Hi! How are you? I send you this file in order to have your advice. See you later. Thanks" or "I hope you can help me with this file that I send" or somewhat similar. Your problems begin when you open the attachment. Opening it copies the worm to hidden files—SCAM32.EXE in the Windows/System directory and SIRC32.EXE—to the Recycled Binfolder. It also modifies a couple of registry keys.

Code Red worm
Red hot worm
Experts claim that this worm has already caused more than $1.2 billion worth of damage to networks around the world. This worm was first recognised in mid-July and is programmed to infect computers specifically on the 1st and 28th of every month. Though it lies dormant for the rest of the period, it can cause considerable havoc with infected computers on a network with incorrect internal time and date settings. The Code Red worm takes advantage of a hole in Microsoft's Internet Information Server (IIS) Web server software and in Cisco servers.

There is speculation that the virus is the handiwork of the Chinese as some of the Web pages that were defaced had the line 'Hacked by Chinese'. The Netherlands-based Dutch group 29a has claimed authorship to a second variant of the Code Red virus. But the variable nature of the virus makes it hard to trace its origin. At last count there are at least two more variants doing the rounds—Code Red II and Code Red III—which could be even more harmful.

Bye, bye CDs

InterTrust, the company that specialises in Digital Rights Management (DRM) software, and Data-Play, a startup, are on the verge of releasing a new product, which they claim would eventually replace the CD. This would be a part of a portable media distribution platform for protected content such as music. Music distribution companies like Universal, EMI and BMG are all planning to release pre-recorded music on DataPlay digital media for use in multiple consumer electronic devices. This new media would be able to hold about 11 hours of music, which is much greater than current CD capacities. The blank media would be priced at between $5 and $10 while pre-recorded ones will be priced more or less equivalent to the current CD price. The companies hope that markets would soon get used to the new media, and adopt it because of the greater capacity. Users would have to upgrade to devices that are compatible with the DataPlay media.
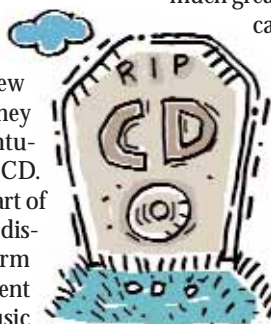
CDs ◆ Napster to charge subscription fees ◆ IBM PC turned 20 on August 8 ◆ Smart Tags might return in post-XP versions of

realitybites

> *"The Radeon 8500 clearly positions ATi as the technology and perform- ance leader providing an unequalled visual experience for games"*
>
> **Rick Bergman,** senior vice pres- ident, marketing, ATi, at the launch of the company's latest generation Radeon 8500 graphics chip

Message to nVidia: Ready or not…here we come

> *"As far as we know…currently the Pentium 4 chipset doesn't violate any patents. Therefore, we feel we have the right to bring it to the market"*
>
> **Richard Brown,** Via's director of marketing while announcing shipments of its Apollo P4X266 chipset for the Pentium 4

If someone has a problem with that, I guess we'll see them in court

> *"If Palm can take advantage of Be's strengths, it will help to put it in a stronger competitive position with Pocket PC"*
>
> **Alex Slawsby,** IDC analyst com- menting on Palm's acquisition of the technology assets and intellectual property of software maker Be

If this doesn't work, Palm is going to be in deep, deep, trouble

Read it fast, else you won't read it

Rosettabooks have launched a time-based e-book which would be available for the readers only for a few hours from the time of purchase. Campaigning for their new product, the company is offer- ing Agatha Christie's mystery novels in a time-based permit edition for $1 (for a 10 hour reading). After the permitted time the book would be unavailable and the reader will not be able to read the con- tent. The books are released in association with Adobe and digital distribution service provider Reciprocal.

The customer could buy either a rented version or a permanent version of the book for himself. The inven- tion paves the way for flexible pricing and purchase options for the retailer and the con- sumers, respectively. Let's hope the books content don't expire before they reach us, as it happens with some of the medicines that we receive.

Shooting star

Microsoft's new licensing model for the OfficeXP suite ssems to have put off some of its existing customers such as the Central Scotland police. The increase in costs that Offic- eXP would involve has encour- aged them to make a transition to StarOffice, the free office suite from Sun Microsystems. With over 1,000 users, this means a huge saving for the cops. Microsoft insists that there has been a misunder- standing of its licensing terms and hence has advised its cus- tomers to consult their resellers before they make the decision to shift over to other software. For the StarOffice suite, how- ever, this signals good times.

thermometer

Hot
The IBM PC
With all the hype that marked its 20th anniversary

Kodak
As Microsoft ensures that Kodak's cameras and software will work with Windows XP

Cold
AMD
As IBM drops the Athlon and Duron chips from desktops in North America

M-commerce
Despite all the hype surrounding it, M-commerce has still years to take off

thumbnail

Source: www.nua.com

Revenue Generated via Online Gambling

A comparison of revenues generated via online gambling and through the Internet
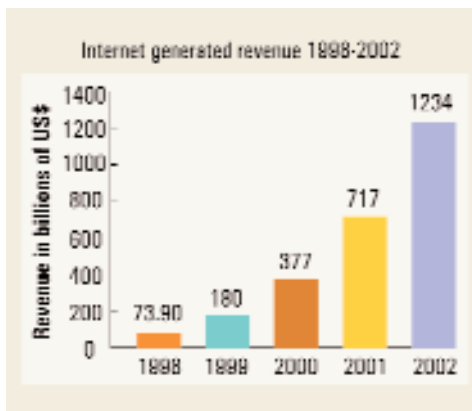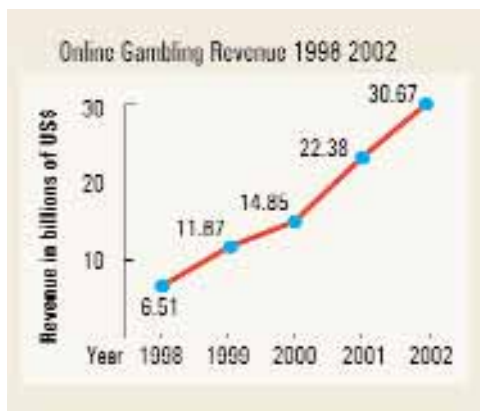
Windows ◆ Code Red hits Hotmail, FedEx servers ◆ RedHat branches into e-commerce software ◆ AOL, MSN trail in customer satisfaction

18 digit

September 2001

metrics

▶ 30 million

GSM users in India by 2005

According to Cahners In-stat , worldwide revenue for streaming media services by 2005 will be over

▶ $5 billion

Source: www.gartner.com & www.nua.com

Park yourself on the bench

You might have heard about benching in the US. But this is a park bench with a difference. Here, you can sit down, relax and surf the Net at ease in the gardens of Suffolk, UK. The bench is powered by MSN and is free for a three month trial period. All you have to is plug your laptop to the modems concealed beneath the arm rest of the bench and power up to surf the Net. The innovative concept is called cyberseat. Its open for anyone with a laptop or a palm using the industry standard Wifi Wireless connections. There is a similar service run in the town of Penkridge. It has a cyber park in which 20 users can surf at the same time. This is an approach to bring in future technologies into the ancient gardens. So, where do the lovers move now?

Keyboard without keys

Keyboards are becoming increasingly innovative, sexy, ergonomic and easier to use. Following on the heels of compact keyboards for handhelds is a soft keyboard from Fingerworks that has absolutely no keys. It can replace either your keyboard, mouse, or be used as a hand gesture recognition panel. Furthermore, it occupies about the same space as your regular keyboard. Equipped with a futuristic touch panel, the FingerBoard is designed to reduce the strain and injury associated with carpal-tunnel syndrome. Common tasks such as copy, cut, paste and more can be executed with

a series of preprogrammed gestures. You can also train the FingerBoard to your preference and define the operations that need to be performed. (Just hope that it catches the gesture of the right person at the desk and doesn't feed any erroneous data if someone standing behind you does something!)

The FingerBoard does not require any additional software installations. Besides, the keyboard is slightly inclined keeping ergonomics in mind so you do not have to strain your hands. For all of you who want to avoid the carpal tunnel syndrome, FingerBoard is for you.

Who is?
Ankit Fadia

▲ *The name is familiar?*
Ankit Fadia is just any other teenager—he loves music, watches *X-Files* and is a great fan of Bill Gates. This 20-year-old has written a book *The Unofficial Guide to Ethical Hacking* that has received rave reviews. He believes in a tit-for-tat policy and recommends that rather than being bogged down by hackers and their activities, you must understand how they work and try and protect oneself.

▲ *What is* The Unofficial Guide to Ethical Hacking *all about?*
This book examines how a hacker works, the techniques involved, networking, security and other related issues and provides a number of hints and techniques relating to hacking.

▲ *Where can you know more?*
To expand your knowledge of viruses and Trojans, and know more about him just visit http://hackingtruths. box.sk.

tomorrows technology

SMS + fun = EMS

Net usage can be fun and more so considering that it offers a means of communication at extremely inexpensive rates. Its popularity as a mode of sending messages has increased with the provision of SMS (Short Messaging Services). But if you are searching to increase your fun quotient, then you should look forward to the launch of Enhanced Messaging Service (EMS). This is an advanced text-messaging system that is based on existing SMS standards.

EMS technology will let you to send and receive longer messages complete with animations, pictures, music, besides allowing mobile phone users to download and exchange screen savers, images and complex ring tone melodies from the Internet.

The EMS standard, which comes from Ericsson and is supported by Alcatel, Siemens, and Motorola, is an open standard in messaging services. The same group that was responsible for the standardisation of SMS, 3GPP (3rd Generation Partnership Project), is also responsible for making EMS an accepted standard.

survey ◆ *Quake 4* announced at QuakeCon 2001 ◆ Intel takes 2 GHz Xeon to Hollywood ◆ Samsung announces DDR333 DRAM Chip

20 digit

September 2001

Lin-ex?

Dear Sir,
I want to share an experience that a friend of mine had recently. We are currently studying in the second year of our MCA course. He bought a Compaq Presario system and since we have Unix as a practical subject we decided to install Linux on the machine so we could get a feel of the operating system. After having partitioned his drive, he happened to contact his dealer for the sound and video card driver CD for Windows. At this point, the dealer informed us that we should not load any OS other than Windows, which was provided on the system. He also claimed that the company would 'suspend' the warranty on the PC for one year if we insisted on using anything other than Windows. He insists that my friend does not have the right to install another OS. What do we do about this situation?

VENKATESH
Via e-mail

digit
Dear Venkatesh,
Anyone who has bought a branded computer should be able to expect assistance from the manufacturer/vendor at all times. While it is understandable that the terms of warranty do have some exceptions, mostly related to hardware, it would be absurd to say that installing Linux would disqualify you from availing of the warranty on the hardware that you have purchased.

In addition to this, after buying a branded PC, you should be able to expect support and drivers for Linux, especially since it has been around for 10 years now and is reasonably popular.

Compaq has clarified to us, however, that while they do not provide support for problems related to the usage of Linux on their Presario products, the warranty on the hardware will still be valid even if someone decides to install Linux (or another non-Windows OS) on it.

A taxing situation

Dear Karan,
In a recent comparison test of anti-virus software that was conducted by your Test Centre, I found the price of Norton Antivirus 2001 listed as Rs 1,600. I decided that I needed to buy the software and subsequently called the vendor listed in the magazine. However the vendor quoted a price of Rs 2,500 which he claimed included Octroi and other taxes. Please provide the readers with the final price inclusive of all taxes or at least mention what taxes are extra because without this the prices are extremely misleading.

ROHINTON
Via e-mail

digit
Dear Rohinton,
This has clearly been an oversight on our part. While providing the prices inclusive of all taxes for all products is not possible for us to do—because these vary from place to place—we shall make it a point to specify wherever extra taxes are applicable.

Talking through an old hat

Hi,
This is in response to the feedback that you had in Dialog in August, on the article 'The Promised Goal' which was carried in an earlier issue of Digit. While I agree with the students when they say that their Labs are using outdated hardware and software and that their curriculum is outdated, I am worried by the attitude of engineering students who think that they only need to know what is hot on the market. I think people need to concentrate more on the fundamentals of development, which would help them upgrade themselves for modern platforms. My advice would be for engineers to get rid of this 'labourer' mentality and use their heads instead of just their hands.

ANUPAM AROHI
Via e-mail

Dear Karan,
That was a nice article by Manu Khanna ('The Promised Goal', July 2001). While I agree with your views on the state of computer education in our graduation colleges, I think that this is just the tip of the iceberg. After my B.Sc. I joined an MCA course hoping to get a nice degree in computers and expecting excellent course materials. What I got instead was Pascal and C in the first semester, COBOL in the second and C++ in the third. What else do you ask? Well, 8085/86 architecture, data structures and graphics (only algorithms), and the others including Economics, Accountancy, etc. Is this the best course structure that an MCA student can expect? Eventually, after spending lakhs of rupees, we stand nowhere. You have conveniently stated that "…the system at the PG level is more comprehensive and up-to-date…". You mention somewhere that AICTE and NBA conduct evaluations of the course structures and what not. You could conveniently praise them so, because you've only seen the brighter side like the Punjab University, Mumbai University, etc in the metros or big towns. But in the smaller universities the situation is similar to what you have described in the general graduation colleges and engineering colleges. Am I wrong in feeling cheated?

MITHUN KUMAR
Via email

digit
Dear Anupam,
You are absolutely right when you say that only someone with strong fundamentals can be successful in the long run. However, I think that you will agree that they can only take you so far. While strong fundamentals can provide an excellent platform for you to move ahead there are other skills that you do need to develop. Even someone with great fundamentals will find himself at a disadvantage if he is not able to adapt himself and increase his knowledge, say learn more about new programming languages and platforms. The point is that after spending a decent amount of money and more importantly *three* years of your time you expect that you have more than just the fundamentals. Even if the course does not provide *all* the knowledge that is necessary to help students to be successful, it is necessary that the institutions consider it their goal to do so. From what we have seen and heard it is clear that very few are striving to do this.

Callous about it

To Digit,

There is a matter that I would like to bring to your notice. In December 1999, the Information Kerala Mission (IKM) formed by the government for computerisation of the local bodies in Kerala recruited Data Mechanic Trainees (DMTs), Technical Assistants, etc through a series of practical assessment tests and written tests. After a 17-day training session, which required us to give up our existing jobs, our services were utilised in the Panchayat-Nagarpalika Election 2000 for publication of results on the Internet.

On July 1, 2001 the IKM issued us short-term termination order due to the non-availability of computers in local bodies even after a sanction of Rs 30 crore by the Planning Commission, Government of India. Having already lost our previous jobs, we now find ourselves unemployed.

Despite the talk of an economic crisis, the computerisation of the Registeration, Revenue and Secretariat departments has begun without completing the computerisation of local bodies, which is still in its first stage despite crores of Rupees being spent from the Union fund.

It is strange that while on one hand the Kerala government promises to bring the state to the forefront of Information Technology and provide jobs to 15 lakh youth in the state, on the other side 1,000 people have been rendered jobless. I think that the various parties are just using IT as a political ploy and hundreds of youth all over Kerala are paying the price.

RAJEEV P.
Via e-mail

digit

Dear Rajeev,

The governments of several states do seem to have gone overboard in their enthusiasm to promote IT. Each of them seems to be hell bent on making their own state the IT capital of India.

While this enthusiasm has resulted in progress being made by several states towards the much-touted goal of e-governance, many of these projects are doomed, at least in part, by the lack of proper planning and implementation.

Tux talks

Karan,

I read the comparison test of Linux distributions that was carried in the August issue. I remember Digit carrying a similar comparison a while back. I cannot see the point in these articles being repeated every few months and I attribute it to the fact that Digit is short of Linux fanatics! This is not enough to satiate the appetite of us Linux lovers who also happen to be Digit lovers.

I think that you are doing dis-service to this community because it gives the impression that there isn't much to write about actual applications.

I think that it is time you guys moved from the 'basic distribution comparison' phase to the 'what's under the hood' phase! Why don't you review applications like Abiword or StarOffice for Linux, and show people how to install/configure/tweak and finally use the software? Or show them how to connect to the net via the GUI and the console. There is a lot more that can be written about like networking, firewalls, network gaming, and a lot of other stuff that a Windows 98 machine and in some cases even an NT/2000 machine cannot do without additional application software.

IMTIAZ
Via e-mail

digit

Dear Imtiaz,

You are right. We have reduced the amount of stuff that we do on Linux in the magazine over the last year or so. But that has mostly to do with the fact that there don't seem to be enough Linux fanatics in India. As for reviews on applications such as Abiword and StarOffice for Linux, and workshops and other Insight articles on Gnome and networking, we have done these in the past.

The main reason for the lack of emphasis on Linux is that most of our readers feel that Linux is not for them. Until that changes, and we'd like to see this happen, our coverage of Linux will probably be limited.

G o o f Ups

■ Sorry…we goofed. Nikhil's sharp eyes have spotted our mistake. Report card in the August issue of Digit carries a review of the Palm M105, but the picture alongside it is that of the Palm Vx.

■ Shauvik Chatterjee has pointed out that the correct URL of the company that has created Reason, the sound editing software featured in Test Drive in the August 2001 issue of Digit is www.propel

Notice any goof-ups? Write to goof@jasubhai.com

Short Bytes

C for ?

Hi Digit,

I'm in a real fix! I've got a question I need help with: What is the full form of COMPUTER?! My teacher asks our class the same question every day and we are all speechless. Please send us the answer so that we can turn the tables on her for a change.

UDIT MADAN
Via e-mail
This is really embarrassing. None of us has a clue. Does anyone out there have any suggestions?

News in the mail

Hi Karan,

I think that Digit should start a newsletter service, which readers can register for, that automatically mails us information about the forthcoming issue of Digit.

BALACHANDAR
Via e-mail

Hot stuff

Dear Digit,

I am totally bowled over by the cool looks and editorial content of the new Digit. Do you guys have Glenn McGrath in your editorial team?

As the issue number increases, I can see that the magazine and CDs are getting cooler and cooler.

SANDEEP PRABHU
Via e-mail

What a shape!

Dear Sir,

I have a couple of ideas about how you can make Digit better. First, don't change the cover because that's really cool.

However, I do have a suggestion for the CD. All CDs kind of look the same, which is really boring. Why not make yours in the shape of fruits or something really unique?

RITESH AKHAURY
Via email

If you have suggestions on how to make Digit better, come participate in the reader survey at http://www.thinkdigit.com/survey/betterdigit

Free-mail or Paid e-mail?

With many e-mail services going 'paid' what do these service providers have to say to justify their actions? *Anil Patrick R.* and *Dipayan Choudhary* speak with the respresentatives of two prominent e-mail service providers

We think that a company that continues to give free services will not be considered serious in its commitments. People are willing to pay for premium services. We have seen this in practice and we can now confirm that it is the serious user who knows

Sunjeev Swarup
Senior Manager,
123India.com

move on to a paid model because it allows us to provide advanced features to our users. In fact, hits have actually gone up after we announced the new paid services as compared to previous months. This tells us that we are now taken seriously and are considered as a long-term player by those who come to view our site.

Even advertisers are happy

"It is the serious user who knows the value of the service and this helps us become very user-focused"

Paid e-mail services are not going to work as long as there are free, reliable e-mail services available. A customer will pay for an extra service or for any value-added services, for example, extra disk space or spam free e-mail. But for a basic service, the paid model is not going to work at all. When these same services are available free of cost, why

disturbing while some actually gain information from the ads that they view.

Do the sites offering paid e-mail services have any service for which people are willing to pay? If they have, then there would be some users who would shift from free to paid

Rajesh Sawhney
COO,
Indiatimes.com

"When these same services are available free of cost, why should one pay for it?"
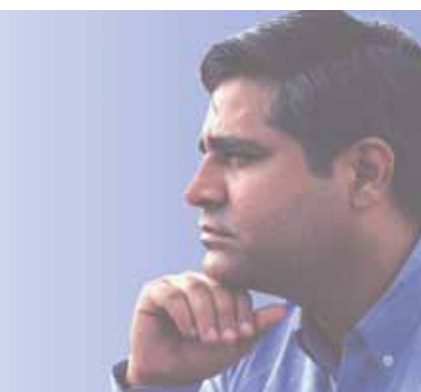
the value of the service and this helps us become very user-focused. We get to know each of the users personally in order to provide customised services. The free service we earlier offered was more like a sample service, where you became confident that users were obtaining value for money before you started charging fees.

In our case, we are confident that the services we are giving are actually of value to users.

Lots of users wanted live stock quotes from us and were willing to pay for these. Instances like these forced us to

with the model we have adopted. This is because of the fact that they get to know the demographics of our users clearly. The consumer we have with us is one who has already shown his willingness to purchase things on the Internet. This helps advertisers target the premium segment of our site, which is a very attractive proposition for them too.

At the end of the day, every business wants its users to pay for the services it provides and we have started charging for our services because we felt that they are good enough to be charged for.

should one pay for it?

We have multiple sources of revenue and we are providing the e-mail service because users of our portal need it. We are doing this also in order to have a customer build-up and, may be at a later date, sell other services to them. The problem that other services face is that with the failure of the advertisement revenue model, they do not have alternative business models. As a result, they have had to shift to a 'pay for e-mail' model. Besides, right now, the market is not mature for these advertising-free e-mail services because most users do not find ads

services, but I can't say how much the drop in the number of users would be. These services won't be able to sustain themselves with the low number of users. We are in a very thin-margin business and the vanilla e-mail offering is not going to work, as the market is not developed enough for this. We are still at a very early stage of the business.

Indiatimes is providing free services and our revenue model is such that we would continue to provide free e-mail services to the people. We are sure that our model can sustain us and we see no reason to go paid.

On the right track

Prevention is better than cure. And it certainly makes sense to spend on averting train collisions than on compensation after tragedy strikes. Focussing the spotlight on Indranil Majumdar, inventor of the RACAS

VIDYARAMANAN S.

You might say that Indranil Majumdar, born into a family of physicians, has a natural instinct to save lives, and this has probably led to his inventing the Railway Collision Avoidance System (RACAS 2001), the first of its kind in the world.

Majumdar had his professional training in Electronics and Communications Engineering from the Institution of Engineers and has been working in this field for more than 16 years now. Going nostalgic about his childhood, he remembers that he was always inspired by inventors such as Einstein, Franklin, J.C. Bose and Edison. And in the same spirit, he is always trying something new.

Indranil Majumdar, CEO, Fox Radio

> "I am not looking for money, I crave technical excellence"

Starting his career as an apprentice in the Birla Industrial and Technological Museum in 1985, Majumdar has had a rising career graph and today he is the CEO of Kolkata-based Fox Radio. He has a long list of awards which include the Motorola Discover an Inventor, 1998 prize and the Exceptional Service Award from the Disaster Preparedness and Emergency Response Association (DERA), the US, for his amateur radio disaster communications operation when Orissa was hit by a super-cyclone in 1999. All these years of experience have been a training ground of sorts for him.

However, when he received a call from Texas Instruments on July 29, 2001, informing him that he had won their Analog Design Challenge for his RACAS, he thought it was just someone pulling a prank on him.

RACAS incorporates a variety of high performance power management, interface, RF logic and microcontroller products. Existing collision systems deployed in developed nations such as Germany and Japan involve a routing system that is backed up by an efficient network management system.

RACAS, Majumdar says, is a unique system to avert collisions. The Indian Railways at present has only a traffic management system and no collision aversion system and RACAS can fill in this lacuna. He claims that RACAS, when programmed to suit the existing system of rail network, reduces the possibility of train collisions to nil.

The cost of implementing such anti-collision systems is far less than what the government spends on compensation in case of an accident. According to Majumdar, the full prototype and complete installation and testing would require at least 12 months. The inventor believes prevention is better than cure. He says that although we would all have reason to rejoice that we have a life saving invention from India, the real joy would be to see RACAS being put into effect to prevent any more railway disasters. "I am confident that given a chance to prove its worth, I can make RACAS talk", he says. Majumdar says that his collision aversion system is the fruit of his long-cherished desire to invent something that would serve society. Obviously, he would need the help of the Indian government in implementing this life saving system on the Indian rail network. Is anyone out there listening?

Majumdar, when not busy inventing, is an active member of the American Radio Relay League, IEEE (USA), IEEE Communications Society and IEEE Antennas and Propagation Society. He is also a ham and is a life member of the Amateur Radio Society of India.

"Not all people are ambitious, but some have a vision and they are out there to fulfil it," says Majumdar. He is neither ambitious nor does he seek monetary benefits, but he does believe in holding up the banner of technical excellence. His vision is to convert Fox Radio into a research and design centre and has plans to channel a part of the Texas Instruments award money of $100,000 towards this effort. ▪

E Y E S   S P I E S

"Every move you make, I'll be watching you"…catchy lyrics from the music group, the Police, but what if technology made it possible for someone to be watching you without your ever knowing it?

ANIL PATRICK R.

The cell phone was the means by which Neo's friends watched over him—every step of the way—in *The Matrix*. And in *Charlie's Angels*, all the bad guys had to do was listen to the cell phone signals and use the global positioning system to track down the elusive Charlie. Now if someone were to tell you that this could happen in real life, you'd probably dismiss it as heightened imagination laced with technology, right?

Well, that's where you are wrong. Spying has become more complex and widespread than the old-fashioned way of planting bugs or tapping phone lines.

How safe are you being 'mobile'?

Wireless technology offers several advantages, and the most prominent advantage is the mobility it confers on you even as you stay connected to the communication and information sources.

The ubiquity of mobile devices such as mobile phones, PDAs vouches for this.

However, wireless devices also make you vulnerable as far as privacy is concerned. It's very easy for someone to spy on the conversations you have on your mobile. In fact, for someone who knows how, it's even easier than tapping into a landline. The threat of hacking into wireless networks is so widespread that the term 'whacking' been coined to represent it (*see box, 'The Ghosts in my Mobile' to find out how and where security breaches take place*).

The basic mode of hacking into wireless networks is almost the same, irrespective of whether it is a cellular network or a corporate wireless network. The basic apparatus that a wireless hacker (or whacker) uses consists of a transmitter/receiver to tune into the wireless network. The transmitter/receiver is connected to an antenna and a PC, which is loaded with

software to determine the frequency of available networks. Yet another piece of equipment that the whacker uses for snooping is a GPS system, which is usually connected to the PC and helps map available networks.

So what's the big deal? Well, all these pieces of equipment are mobile. The PC a whacker uses could be a laptop, and car batteries can power the transmitter/receiver setup. Besides, no one will take a second look at a car with an antenna on the roof and a whacker could cruise all around the city listening to everything without anyone noticing him.

But wait, it's not time yet to start looking over your shoulder every time you say those sweet nothings to your significant other over the mobile phone.

Though there is a very real chance that your privacy could be compromised, whacking is more likely to be used for military or industrial espionage than to snoop on individuals.

Although corporate wireless networks are not very common in India, they soon will be. Getting access into wireless LANs is easier because of the inherent weaknesses in the 802.11 or the Wi-Fi standard that is used for it. Wireless LAN devices make use of the Wired Equivalent Protocol (WEP) for encryption which has several chinks in it's armour that make it possible to access it even with off-the-shelf equipment such as wireless LAN cards.

Many of the software that are available for hacking wireless LANs have search engines built into them. These search engines help a snoop find the nearest available wireless access point that he can get at. Some of the software even allows the user to search mobile access points with the name of the service provider as the keyword.

The history of phreaking (breaking into phone lines) speaks of 'war dialling', wherein crackers used to dial up every phone number in the directory to find a number they could crack into. Cracking into wireless LANs have led to the formulation of a term called 'war driving', which involves scouting the streets around target corporate and industrial networks with a PC, which has a wireless LAN card, in search of available access points.

Most wireless LANs can be cracked even without the use of cracking tools. Just think about it—anyone with a PC and a wireless key-

Infographics: Jaya Shetty

Eavesdropping on a Wireless Network

1. Wireless network's firewall
2. User (Part of the wireless network)
3. Wireless network
4. Access of network by authorised user
5. Authorised user
6. Unauthorised crack by hacker
7. Cracker accessing the network utilising the security gaps

The Ghost in your Mobile

Mobile or cellular phone networks make use of the GSM (Global System for Mobile communications) standard. Most of the communication over the mobile network takes place 'on air'. The first level in signal traffic takes place between the user's handset and the nearest cellular base station. This base station then connects to a core network for the carrier. Security breaches often occur at this point between the base station and the core network. Although there is encryption of signals at the air interfaces between the user and the base station, snoops got over this hurdle (a weak one) a long time back. This was an easy hurdle to cross as there is protection only for the air interface and it is not very strong. The GSM network, taken as a whole, has too many loopholes.

E-commerce over a wireless network too is risky if you are using WAP. In WAP, the core network using a wireless application protocol gateway accesses data on the Internet. The gateway temporarily decrypts the data. Data decryption takes place using WTLS (Wireless Transport Layer Security) which is the security layer in WAP. It is then encrypted back into a form your mobile phone can understand. This encryption is done by SSL (Secure Socket Layer). Now, there is a span of time after the decryption and before the encryption, during which the data is unprotected. At this point of time, it becomes easy to break into the WAP gateway and hackers can forge messages as well as intercept them.
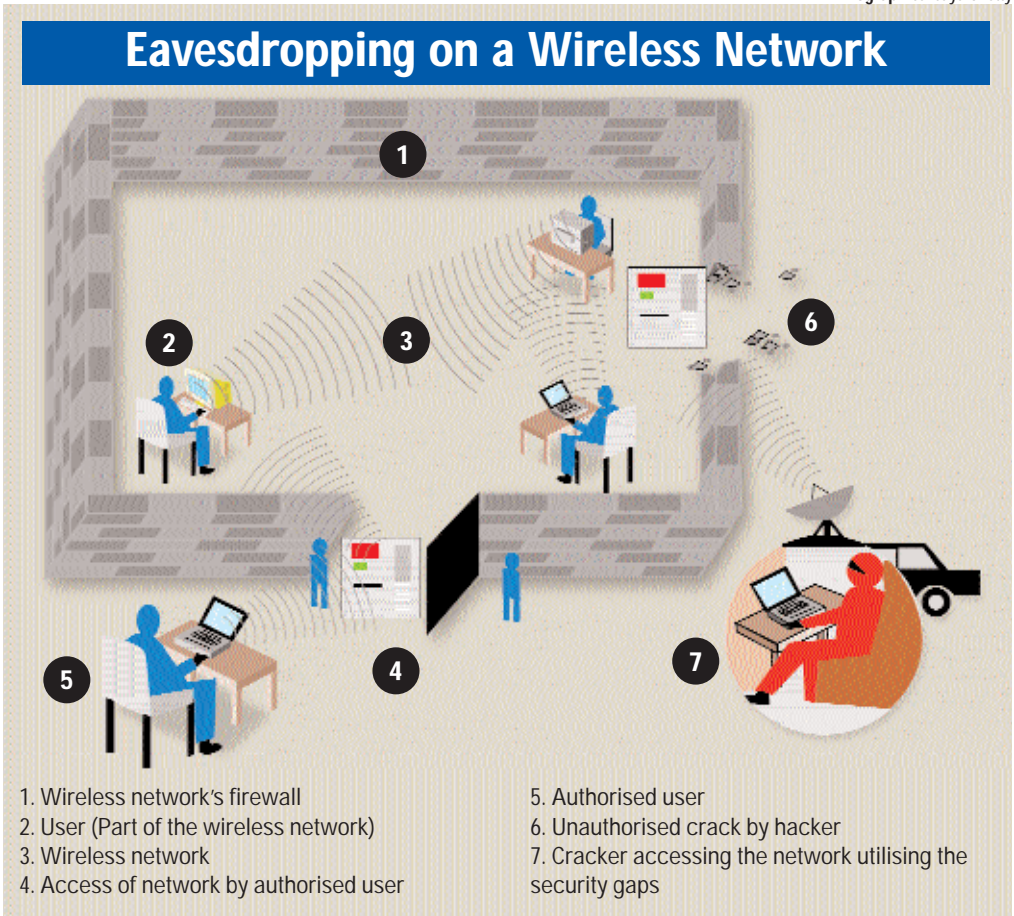
A Face in a Million

Ybor City in Tampa in the US is using a facial recognition system to track down criminals despite severe protests by residents concerned about misuse of this technology to invade the privacy of individuals. This technology was also used at Super-bowl XXV, one of America's biggest sporting events.

This technology compares 80 nodal points on the face with images stored in a database. This kind of spying is more reliable for identification than other methods of biometrics such as iris scanning, and finger print scanning, which have to be done with the user's knowledge. Facial recognition is accurate because every face has its own unique characteristics, the same as fingerprints. All that is needed is a hidden camera to capture images of people. The comparison takes only 5-10 seconds to complete and you are notified if there is at least an 85 per cent match.

Think of it this way: people with evil intentions can pick you out even in a crowd within 5 to 10 seconds and you won't even come to know of it. Are the days of having a quiet walk by yourself gone?

board or a wireless LAN card can take a look at your home or company data.

Making the conneX-ion

Whacking is not limited to just listening to signals from the wireless network. Signals can also be picked up from wireless equipment. For instance, many of the wireless keyboards available today make use of a transmitter/receiver arrangement for data communication. These keyboards do not have any unique connection code for each unit. This means someone else using the same model with modifications to extend the range of his keyboard can look at what you are doing and even gain control of your PC.

So if you are the proud owner of a wireless keyboard, take care! There might be someone watching every single letter you type.

Even the radiation from your computer's monitor could be reconstructed to see what you are up to. TEMPEST is a technology that allows a hacker to do this and more. Using this technology, it is possible to spy on information transmitted by satellite, microwave signals and radio signals. And that includes cellular phones as well. The spy can be located even a couple of kilometres away and yet listen or see what you are up to.
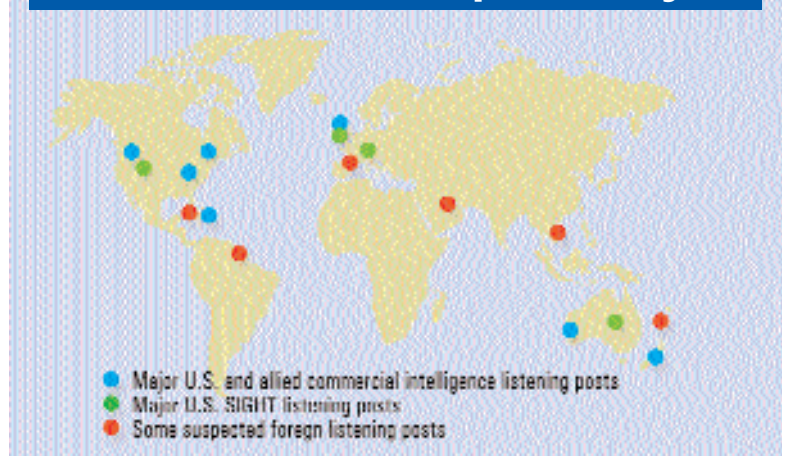
The technology used in TEMPEST makes use of the fact that all electronic devices emit electromagnetic radiation. Much of the radiation that a device emits may be due to a certain task it is doing at that particular instance. This technology intercepts the radiation and converts it into a form that a human can understand.

For instance, in order to pry into a particular computer, all that needs to be done is to lock on to the frequency of emissions and process it line by line to see what's happening on the screen. In fact, it is possible to reconstruct what is happening on a computer screen from about 1 km away.

Even reconstruction of what is stored in the target PC's memory and hard disk is possible. However, the spy has to be closer to the target to be able to do this. To add to all of this, you cannot detect a person using TEMPEST to spy on you as the only thing he does is listen in.

Originally developed by the US government's

Echelon Network: Suspected Layout

● Major U.S. and allied commercial intelligence listening posts
● Major U.S. SIGINT listening posts
● Some suspected foreign listening posts

NSA (National Security Agency), TEMPEST has been around since the 1950s. TEMPEST equipment is available in the US and although exports outside the US are prohibited, there's no way to determine if smuggled units are available outside the US or not.

Echelon—spying unlimited

But TEMPEST is way behind when it comes to spying technologies as compared to Echelon. The latter is a spying network and is of great concern to people in all fields—industrial, military, or individual. Echelon can intercept as many as 3 billion communications everyday. It can spy on phone calls, faxes, e-mails, downloads, microwave, cellular, satellite communications—the list goes on.

Started way back in 1947, Echelon is operated by the intelligence agencies of five countries—the US, the UK, Canada, Australia and New Zealand. The US government, however, has not yet acknowledged the existence of this network. It was only after Australia and New Zealand acknowledged its existence that the general public got to know that Echelon is not a figment of some writer's imagination in a spy thriller.

Originally developed purely for military espionage, it is now believed that Echelon is used for spying on organisations, businesses and individuals. One of the primary ways it operates is via ground-based radio antennae and satellites to spy on satellite transmissions.

It is believed that Echelon is also capable of being used for live tapping of cables in several places. Internet communication is intercepted using 'sniffer' devices at key junctions of the Net. All the data collected by these various means are then run through powerful computers, which scan them for important data. 'Dictionary' is the term used to denote these computers that search ➡

IBM's Idea of Snoop-free Viewing

Traditional CRTs (Cathode Ray Tubes) make use of vertical and horizontal deflection coils to guide an electron beam so that an image is displayed on the screen. These deflections cause the CRT to emit radiations of varying frequency.

The main problem with these radiations is that they can be picked up by equipment specially designed for this purpose.

IBM has come out with a new CRT technology that uses permanent magnets instead of deflection coils to guide the beam.
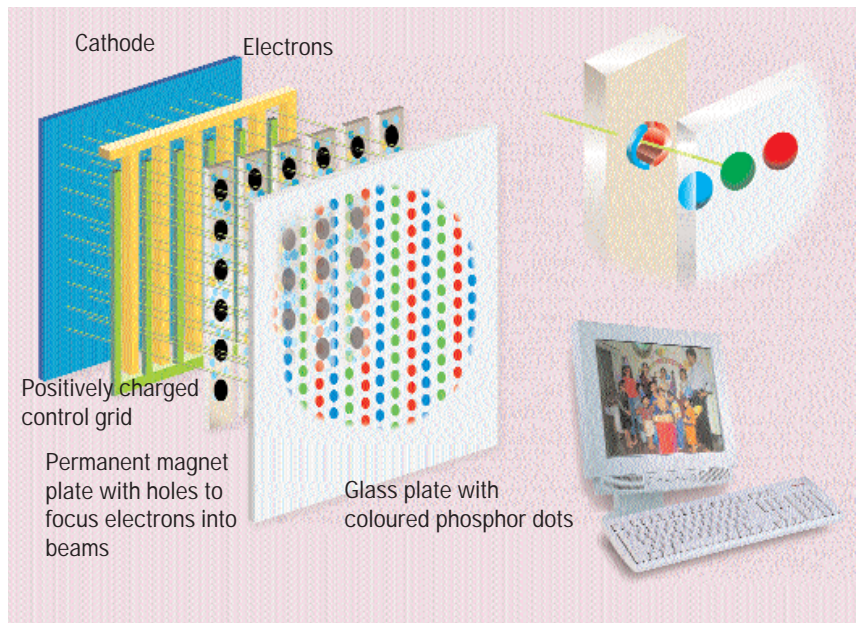
This display is made up of precision-aligned layers and is much cheaper than present day LCD displays. A flat cathode plate in the back of the display generates the stream of electrons. These electrons are focused into an electron beam by a charged control grid, much like a lens focuses light.

Now comes the major difference. A permanent magnet plate with small holes comes between the grid and the phosphorescent screen. The strong magnetic field inside each of the holes makes the electrons spin very fast, which converts the stream of electrons into focused beams. The beam then falls on the phosphorescent screen, which consists of red, green, and blue phosphor dots. As the beam is controlled by the magnets and grids, each electron hits one of the three dots and colour images are generated.

IBM claims that its new CRT technology emits only steady magnetic fields. The plus point is that the fields remain the same throughout the CRT's operation. These magnetic fields cannot be converted into data, unlike conventional CRT emissions.

Spies are not able to decipher these radiations since they are constant throughout the operation of the monitor.

Cathode   Electrons

Positively charged control grid

Permanent magnet plate with holes to focus electrons into beams

Glass plate with coloured phosphor dots

for keywords, addresses, names and so on to find compromising information.

Spying—can it be prevented?

Before you start eyeing all wireless devices with extreme suspicion, lets take a step back and see how real is the threat of such snooping as far as individuals are concerned. To what extent have these technologies developed and infiltrated our lives through devices that most of us use without a second thought?

Well, the truth is that with the advent of systems such as the Global Positioning System (GPS) and biometrics, the day is not too far when you can, theoretically speaking, be tracked wherever you are, whatever you do. Your mobile phone can help pinpoint your location.

Mobile tracking is already done by police agencies as well as other law enforcement agencies. And this information could be used by, say, companies to build a bank of your tastes, likes and dislikes to better tailor their personalised marketing strategies.

But that time is still a far way off, at least in India. As of now, such technologies are primarily used for military espionage and increasingly now to sneak up on corporate rivals to defeat their strategies

But if you are still feeling paranoid, you can take some simple steps to prevent people from spying on you. For instance, you can install a personal firewall on your system to thwart attempts at cracking into it or at least make it difficult for hackers. Use encryption programs such as PGP to encrypt your mail and hard disk data. If you have to handle sensitive data, it would be advisable to avoid using mobile phones or even landlines for that matter. Use them only if there is no other alternative. In fact, avoid using wireless devices and networks when you are handling important information—at least until 802.11 has advanced to a state where it can be called secure. Also, there are several devices such as TEMPEST shielding equipment as well as shielded devices which provide you protection from spying technologies.

No technology is secure, but you can prevent it from wrecking havoc in your life by being aware and taking some precautions. So keep your cool, stay informed, and don't get bugged!

SET YOUR
SIGHTS
ON 'EM

MP3 players, digital cameras,
a light-weight mobile phone, and
a speaker set for the PC

← ### AIWA XP-SP321
Your sports companion

This 48 second EASS 3x CD player with Digital Synthesized Tuner is sleek and portable. It's your ideal companion on your exercise routine. Apart from providing music to set the pace, Aiwa's advanced Electronic Anti-Shock System (EASS) technology helps guard against sound skips due to external vibrations. What's more, the built-in exercise monitors in its Cross Trainer series headphone stereos and radios tell you when you've reached your target distance or calorie burn.
Web site: http://www.aiwa.com/Catalog00/Products2.asp?id=234

↑
Motorola Timeport 260
Get mobile

This cool looking mobile is just 130 mm in length and weighs 108 g. It has triple band (GSM 900, 1800, 1900) and is GPRS enabled. It is a WAP-enabled instrument with SMS, voicedial, voicectrl, voicerec and fax services.
**Web site:
http://uk.mobile.yahoo.com/h/s/motorola/timeport260.html**

Intel Pro PC Camera →
Video into your PC

With the Pro PC camera you can easily import video from your VCR or camcorder to your PC. This camera is capable of capturing both photo and video images at a resolution of 640x480 and 24-bit colour. You can capture the images as JPG, BMP and FPX. You can also enjoy a full-motion video of up to 30 frames per second!
Web site: www.intel.com/pccamera/pro_cam.htm

September 2001

MPIO-X64 MP3 Player
Small is beautiful
This dinky little Internet MP3 player contains 64 MB of on-board memory, stereo earphones, a CD-ROM driver, a parallel port cable, operating manual and battery. It has all the standard play, pause, next track and fast forward modes. Not enough? You can also select random play, repeat and equalize with a four-mode equalizer.
Web site: www.mpio.com

Sony DCR-PC9 Mini DV Handycam camcorder
A neat package
Weighing just 1 pound 1 ounce, Sony's lightweight DV Handycam camcorder, with its 10x optical/120x-digital zoom and a 0.25–inch, 680-pixel CCD imager, is recognised for its ability to render high-quality digital video. The camcorder combines expanded battery capacity, MPEG movie capability and USB connectivity. It features Carl Zeiss optics, a precision colour viewfinder and a 2.5-inch Precision SwivelScreen LCD display with Touchscreen controls—an all-in-one tiny package.
Web site: www.sony.com

Fuji Instax
Instant magic
Capture the world in your 4.5x11x12 cm mini camera! The Fuji Instax generates instant, high-quality, credit card sized prints. It comes with a built-in flash, focuses from 60 cm to infinity and is supported by two shutter releases for easy landscape and portrait shooting modes. And oh…you need not spend a single penny on your first film, it's provided absolutely free of cost!
Web site: http://www.iwantoneofthose.com/fuji_instax.htm

Motorola Talkabout 200 Twoway Radio
Something to talk about
This lightweight radio weighs only 200 g and includes a lighted display screen. The radio has a simple push talk button, has over 304 channels and can receive and transmit up to a range of 2 km. It is water and shock resistant and its features include instant voice transmission to any number of users and a large, easy-to-read screen showing channel, code and status.
Web site: http://www.motorola.com/ GSS/CSG/direct_emea/ consumer/ radios_TA200.html

Destination:

NextGen Internet

Faster, higher, better…does it end with broadband, or can we expect more from the Internet of tomorrow?

The World Wide Web has made a significant impact on our lives. A single mouse-click takes you to far off places. Every flight with the Internet has been a delightful experience right from accessing information to enjoying the wonders of the brilliant applications that have given the Internet their magical touch of inter-activity, mind-boggling designs, zapping speeds and so much more.

But for anyone who uses the Internet frequently there are several frustrations related to Internet usage. These are primarily due to the lack of reliability of the connections. It is a little difficult to imagine how the much-touted broad-band applications are going to turn out when you are having trouble getting a simple Web page to load on your PC. Forget that Pentium 4 CPU. What's really needed is a major upgrade of the

Internet infrastructure. Which brings us to the main question. What is the Internet going to look like in the foreseeable future?

The current Internet infrastructure is capable of carrying over a billion bits of data per second. While this might seem a lot at first glance, the rate at which Internet usage is currently increasing ensures that supply will soon outstrip demand.

So, what is expected of the next generation of the Internet? For most researchers who are working on the problem the wish list would include more bandwidth, greater reliability, always-on connectivity, integrated services and a single medium for the transfer of data, video or voice.

The connection?

At this point in time the highest connection speeds available to home-users in India are through DSL

or cable lines that give us, realistically, about a maximum of 10 Kbps download speeds. While service providers abroad do offer connectivity at much higher speed, optical fibre to the home is the Holy Grail Internet users aspire for.

When optical fibre was first introduced, it seemed to be too expensive for use in homes. However, the demand for voice/data/video bandwidth has grown along with developments in laser technology, which will accelerate the progress towards the day when optical fibre becomes a cost-effective as well as high-speed transport medium for home users. The increased use of optical fibre is mostly due to advances in production methods, which has reduced the price while increasing availability of optical elements.

Strands of optical fibre will probably be the only backbone connection for neighbourhood gateways and will carry all voice and data traffic directly into and out of our homes. With the increasing complexity of existing voice, data and video communications infrastructure, it seems practical to merge all the traffic into a single converged network that will work for everything. Optical fibre networks, which has the potential to carry up to 100 terabits per second, is the ideal solution in this situation.

While the use of optical fibre is currently limited to corporate users and some private networks, eventually consumers will be able to get direct connections to high-speed networks.

Technologies such as DWDM (Dense Wave Division Multiplexing) together with new developments in laser technology such as NECSEL (Novalux Extended Cavity Surface Emitting Laser) are going to further increase the capacity of the Internet backbones by making more efficient use of existing optical network technology. Network congestion, a problem currently faced by ISPs all over the world at peak usage times, would also be alleviated to some extent by the presence of multi-gigabit-bandwidth optical fibre backbones between ISPs, intra-country backbones and inter-country backbones.

Video @ Home

The same single cable into your home that provides you with blazing fast Internet access will also change the way you watch television. Video-on-Demand (VOD) systems provide access to a large quantity of video information over computer networks. Viewers can submit a request to the VOD system over the Internet and view audio and video streams in the comfort of their homes. The audio-video content is provided by streaming the data from a media file server to your computer. This would run off a distributed storage system that has a capacity of many terabytes of digital material. A Digital Asset Management (DAM) system forms a major part of any VOD network and allows the organisation and retrieval of a variety of different data types.

Technologies such as multicasting will power VOD and HTDV-quality live broadcast, which will also be delivered to you off the Internet. This involves using networks in a smarter manner, thus making higher performance levels possible. Here, instead of one server sending multiple streams of the same data to locations on the Internet, a single stream of data is replicated to different locations. This can help relieve congestion considerably at the server end, especially for bandwidth-hungry applications such as streaming video.

Greater reliability

One problem that is faced on existing networks is reliability or quality of service (QoS).

Applications such as video on the Internet require all the packets of data that it is made up of to arrive at the same time. When this does not happen you end up with output that is of unacceptable quality. Because the network is unable to distinguish between different kinds of data, all packets of information are treated similarly. So a packet containing e-mail data is given the same priority as more demanding applications such as high-resolution video. Whenever network congestion takes place, these data packets are eliminated/lost indiscriminately. Also, there's never really a guaranteed connection with the Internet. QoS technology, when implemented in routers, will help address some of these concerns because it allows prioritisation of packets to advanced applications and will allow them to be pushed through the network faster than, say, a simple e-mail. This 'customisation' of information flow will lead to a more reliable network. In time this will mean that ISPs will offer you connections with a speed and QoS guarantee, unlike today when you just have to live with what you get.

As our dependence on technology continues to increase, a large number of devices that make life simpler will require to be connected to the network all the time. These devices, along with the increasing number of computers that make up the Internet, will require a huge number of constant (or static) IP addresses. IPv6 (**www.ipv6.org**) is an upgrade to the existing Internet Protocol (IPv4) that will overcome the limitations that the small address space and other limitations of IPv4 cause. It uses a 128-bit address field instead of the 32-bit field used by IPv4, which would make enough unique addresses available for the countless intelligent devices that are expected to log onto networks over the next few years. Other changes include improvements that make it possible for new machines entering a network for the first time to configure themselves automatically. IPv6 is also designed to improve upon IPv4's security (with IPSec), reliability and network management.

Gateways to other networks

Transferring voice over data networks has become a preference for both corporate and public network planners. This allows considerable

Internet2: A Case Study in Progress

The Internet2 project is a consortium consisting of 180 universities in the US, that are working in partnership with both industry and the government to deploy advanced network technologies and develop applications that will run on them. Members of the Internet2 project are connected either directly or via GigaPoPs, which are high-speed access points located in different parts of the US, to the very high performance Backbone Network Service (vBNS) and the Abilene network. The latter is another high-performance network developed and operated by Internet2, Cisco Systems, Nortel Networks, Qwest Communications and Indiana University.

The Abilene network is operating initially on 2.4 Gbps backbone links but researchers are working on pushing this to 9.6 Gbps and beyond. The minimum connection speed for users of Internet2 is 155 Mbps, which is about 3,000 times faster than dial-up Internet connections. Applications such as broadcast-quality video streaming and distributed instruction scenarios have been tested for the first time on this

The Abilene Network
Internet2

Source: www.qwest.com

closed network. Abiline and a few other networks in different parts of the world are the only places that you can get a real-life peek into the Internet's future.

1/3 rd Strip AD

Voice XML

This is an emerging Web-based markup language for representing human-computer dialogues. It allows the development of applications that support the use of telephones and similar voice-based devices to access content, including Internet content, with speech commands. It makes use of improvements in computer-based speech recognition and text-to-speech synthesis and the growth in the capabilities of the Web.

VoiceXML is similar in nature to HTML but requires the use of a voice browser with audio output and input. The VoiceXML Forum, a consortium of over 300 companies, has introduced the VoiceXML 1.0 specification, which will now be further developed by the World Wide Web Consortium (W3C).

The typical VoiceXML browser will run on a specialised voice gateway node that is connected both to the PSTN and the Internet. It can be used for information retrieval, e-commerce, telephone services and perhaps most importantly for future unified messaging applications.

cost savings and it involves the convergence of voice, fax, video and data communication services over IP networks. But while the present telephone infrastructure exists, it is necessary to ensure that data can flow from one type of network to another. The most practical interim solution is for service providers to set up voice gateways that would integrate with the existing data networks.

VoIP or voice over Internet protocol is a technology that a lot of us are already familiar with. This allows us to make voice calls over the Internet. Services offered by Web sites such as Net2Phone have allowed people to make telephone calls via computers, either to other computers or to conventional telephone instruments. Here, the voice data travels from your PC through the regular telephone network into the Internet. It then re-enters the analog telephone network before terminating at the recipient's PC or telephone.

Unified messaging, which involves the access of voice, fax, and regular text messages as objects in a single mailbox, is another application that requires the flow of information across heterogeneous networks. The messages can be viewed either with a regular e-mail client or by telephone. PC users can open and play back voice messages while fax images can be viewed, stored or printed. Access to the same mailbox is possible by telephone and e-mail notes in text form are converted into audio files by speech-to-text conversion software and played back. VoiceXML (**www.voicexml.org**) is a Web-based, HTML-like markup language that will allow developers to build applications that make this kind of information retrieval possible.

Looking ahead

With the rapidly evolving Internet there will be reduced restrictions in communication. Already the world has come closer without the globe shrinking. But the virtual tour does not end as yet. There will be more encounters with newer technologies and developments in the silently developing parallel world. Who knows, the next technology being discussed could be the functioning of the Internet in the outer space network systems and interacting with our neighbouring aliens!
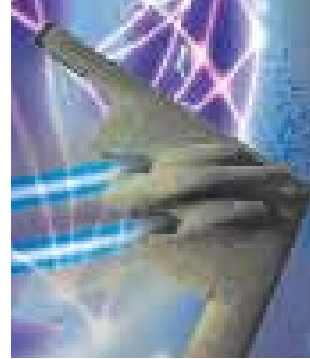
Certified to
ADMINISTER

If you are an ace programmer and a perfectionist
besides, then a certification in database administration should
be right up your ally. So go ahead and take the controls in your hand
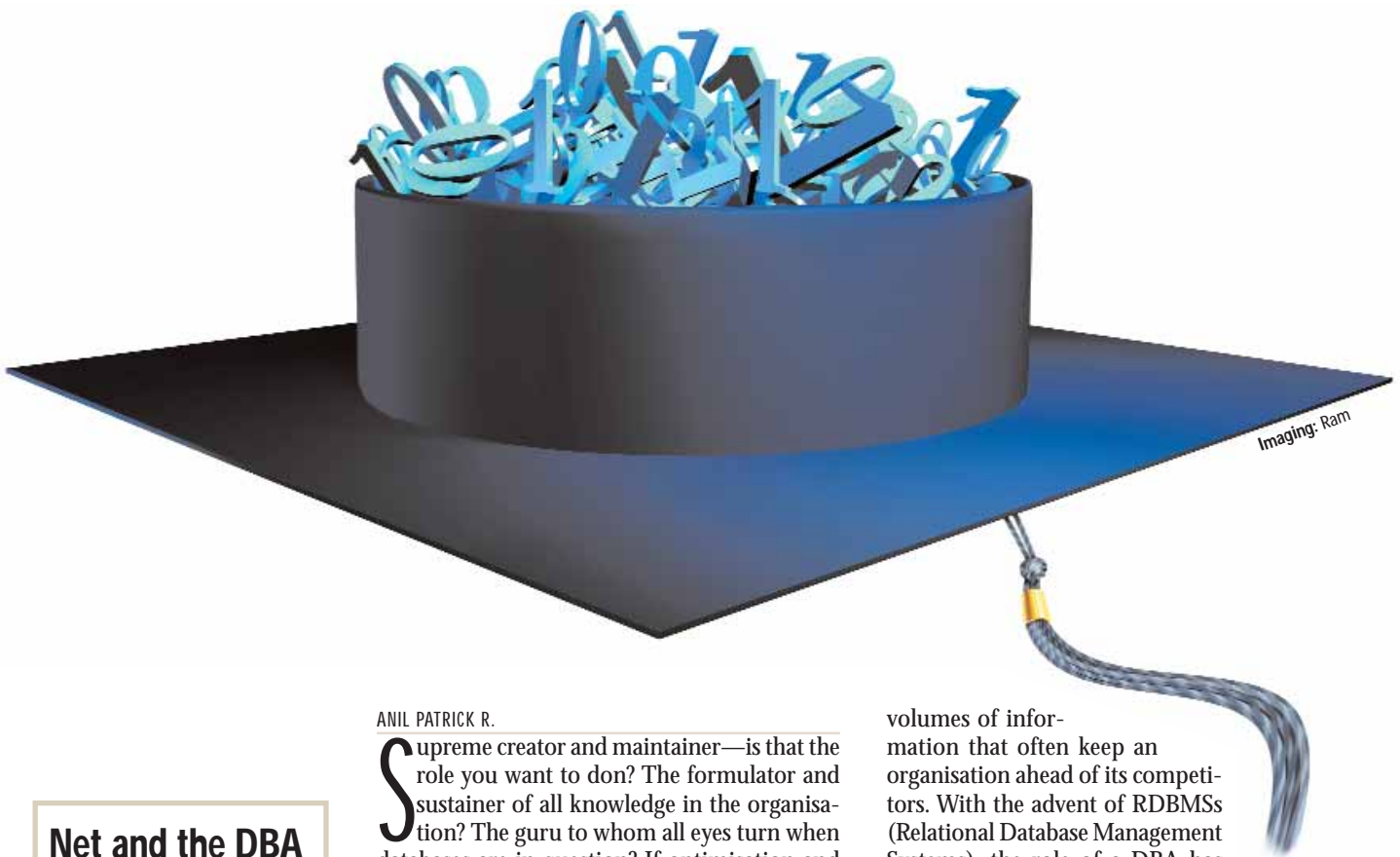
Imaging: Ram

Net and the DBA

Most Web sites require a database for content, e-commerce, etc. In many cases, the database has to be integrated to be accessed via the Net. The DBA is usually the person in charge of installing and integrating the database from scratch. Besides, he is also responsible for stability, backups and performance optimisation.

ANIL PATRICK R.

Supreme creator and maintainer—is that the role you want to don? The formulator and sustainer of all knowledge in the organisation? The guru to whom all eyes turn when databases are in question? If optimisation and perfection even at the micro level are your speciality, then a DBA (Database Administrator) is what you need to be. A DBA certification will go a long way in helping you become one of the elite DBA clan where perfection is the name of the game.

The God of big (and small) things

Let's get some basics right before we go into what DBA certification is all about. Who exactly is a database administrator? What does he or she do? Databases are the wheels on which every organisation runs, irrespective of whether it is a small or a big one. These databases contain huge volumes of information that often keep an organisation ahead of its competitors. With the advent of RDBMSs (Relational Database Management Systems), the role of a DBA has turned even more prominent. The job of a DBA is to keep these mountains of data error-free and readily accessible whenever personnel in the organisation need it.

Sounds easy? Let's ask Maya Ganesan, a DBA with more than three years of experience and presently working in the US. Ganesan says, "The role of a DBA is the most challenging since you can never say you have learnt it all. The field is vast and rapidly changing. The best way to learn is to work on a database that has a multitude of problems!"

Sometimes the job of a DBA starts right from the development of the database itself. The DBA

is in charge of taking backups of data and specific recovery strategies for retrieval of backups. He has to monitor the health of the database and perform database re-organisation at periodic intervals. He is also responsible for monitoring the performance of the database and tune it for best throughput. And if you are a DBA working in a small organisation with a small database, you may even have to do a little bit of back-end development. It is the job of a DBA to study and implement upgrades to the latest releases so that the database is the best and the latest available.

Working as a DBA can get a bit tough at times, but it can be a pretty satisfying job if you are one of the systematic kinds. We asked Chandrasekhar Madathil, a DBA with more than five years of experience in the field about it. He says, "One should be able to withstand strain, work under pressure and be very pro-active to be a successful DBA. Besides these, having sound

The best way to learn is to work on a database that has a multitude of problems
Maya Ganesan
Database Administrator

knowledge of the database you are working on is really essential."

Why a certification?

There are many DBA certifications provided by leading companies such as Oracle, Microsoft, Sybase, Informix and others. These certifications are accepted standards in the industry and it is a good idea to have a certification in the database platform you want to work on as a DBA.

Certifications increase your bargaining power in the job market while negotiating for salaries. In addition, companies usually prefer recruiting a DBA with experience and a certification rather than a DBA with simply the same experience.

However, it's always better to go in for a certification only after you have gained some experience as a DBA. Says Madathil, "You definitely need to have good exposure before going for the exams. You may clear the exams after mugging up a lot of things but still won't have a clear idea about the entire scenario."

You must have a good understanding of database fundamentals before you start thinking about getting certified. Working under a senior DBA as part of a group will give you valuable insights, which no course can give you. Also, starting out with the database of a small

company can be helpful since this can be an opportunity to learn a lot. The practical experience you gain by actually working on a database cannot be substituted by any course or exam.

Of course, if you have the aptitude, becoming a DBA ought to be easy. Says Ganesan, "I do believe anyone with good analytical and logical ability can learn and catch up pretty quick. The problem is that the IT boom and accompanying ease of getting a degree and a job has led people with no aptitude for the skill set required, into the stream. This is a line that needs a specific trait of intelligence, one that does not always come with time."

It is not necessary to have formal qualifications for getting certified. However, an engineering degree in Computer Science or an MCA or some similar certification would be beneficial when applying for a job because employers prefer candidates who are thus equipped to those who have only a certification.

Certified by Oracle!

An Oracle certification, the hottest DBA certification on the block, can offer you the largest number of job opportunities and some of the best salaries in comparison with all the other certifications. This is mainly because of the fact that Oracle is the most common and powerful RDBMS available. DBA certifications are available from Oracle for Oracle 8 and Oracle 8i. The latest entrant to the Oracle certification scheme is the Oracle 9i database beta examination, which Oracle is offering now.

Microsoft Certified DBA (MCDBA)

Microsoft offers certifications for its SQL server. To become an MCDBA, you have to pass three core exams and an elective exam about Microsoft SQL Server databases.

The certification is intended for database administrators, database developers and database analysts. It is necessary that you have at least a year of experience on the SQL Server before you can appear for the certification exams. Earlier, certification was available from Microsoft for the NT4.0 platform. However, Microsoft has retired this certification in favour of the Windows 2000 Server OS. They also plan to roll out exams for Windows XP and the Windows .Net Server soon.

Sybase certifications

Although not as much in demand as Oracle Certified Professionals and MCDBAs, getting certified in Sybase databases can be a good career option. Sybase offers associate and professional

Tools for the Road

Determine which RDBMS platform you want to specialise in. Or maybe you want to be an expert in working cross-platform across several products. Irrespective of the platform you are working on, you have to have a strong base in relational database theory and terminology. Once you have these fundamentals clear, it really isn't a major task to work on any platform. Very thorough knowledge of SQL is the next pre-requisite. This can go a long way in making you one of the best DBAs on the block. With databases being made available over the Internet, it is necessary to have at least a basic understanding of Web technologies. In fact, this area has advanced such a lot that it is a specialisation by itself.

A DBA needs to know only how to keep the database in top shape, right? No, wrong. Depending on the organisation and the database structure you are working on, you might have to know several other technologies other than databases. Many organisations have DBAs as part of their technical support team, mainly because once a database is up and running, the DBA may have to look into technical support of products other than databases as well. When it comes to deciding what other skills you need to have in addition to a DBA certification, it's always better to listen to your heart. If you are good at hardware, go in for it. If coding is your strong point, go in for programming something besides just databases. Maybe you are good at managing operating systems or networks. Just go ahead and do it. Having these extra skills will not only raise your value in the job market, but will also help you optimise the database you are working on to the maximum.

certification as an adaptive server administrator. The online exam consists of 60 to 70 multiple choice questions to be answered in 75 minutes. Check out the Sybase Certifications Web page for more details.

Are certifications forever?

Your learning experience doesn't end with having obtained the certificate. You have to keep upgrading your certification to keep up with the latest products and releases. Else the certification that you worked so hard for would go to nought. For instance, let's say you are an Oracle 8i certified DBA. Oracle 9i is the latest product from the Oracle stables. You will definitely need to upgrade your certification to Oracle 9i if you still want to be the chosen one from among the numerous other certified DBAs.

Certification as a DBA opens up new vistas to DBA aspirants. It not only improves your market value, but also provides you with opportunities to learn more. The latter is possible due to various benefits that most certifications offer such as conferences, magazines, organisations for certificate holders, etc. So what are you waiting for? Go get that certification under your belt.

http://www.

www.oracle.com/education/certification
Check out the Oracle site for more details on their certification schemes.
www.microsoft.com/trainingandservices
Microsoft's training centre has all the info you need about their DBA certifications.
www.sybase.com/education
The one-stop for everything about Sybase certifications.

Imaging: Ram

A TIME FOR GIVING

Be it a festive season, or just any occasion... the mood is right for that perfect gift

NILESH KAKADE

"A gift for someone you love"—a catchy slogan for a chocolate ad and a nice way to express your love for that someone special. But with the rapid pace at which things move in this day and age, how often do you really get a chance to express your feelings? Trapped in the daily hustle and bustle you can't even remember what you had for breakfast, so how do you remember to shop for your friend's birthdays?

While nothing beats the pleasure of shopping in person, when you're pressed for time and need to send that special someone a gift, you can avail the services of the numerous gift sites on the Net and avoid those cold stares later on.

A gift too many

The e-shopping experience definitely provides you something different, and you will find that every modern e-tailer worth his salt has a shop on the Net, aiming to make online shopping a fruitful experience for you.

So, you have everything from traditional flower bouquets, delicious cakes and pastries to high-tech appliances such as computers, television sets and refrigerators, all just waiting to be presented.

The most attractive aspect of online shopping is, of course, the fact that it's so convenient. A simple search on any search engine from a cyber cafe or the comfort of your home and you get the most elaborate information on all products available, such as product details, the price and even the mode of payment and delivery options.

While online shopping is a relatively new phenomenon in India, it does have scope for widespread acceptance, if the trend set by online shopping giants such as Amazon, Barnes and Noble and Wal-Mart is anything to go by. As more gift sites enter the race, the increasing competition will lead to better service conditions and access to genuine products. With most of these sites even doubling up as auction sites, you can definitely expect online shopping to take off as a concept.

Strolling through the malls

Among the plethora of Indian gift sites in cyber space, www.countryoven.com is a cut above the rest. ➡

Find it on
digit interactive

Indiasites
New Indian sites
Sitemap
thenewspapertoday.com, check out
Playware

SSL and the Art of Encryption

One of the major hurdles for online shopping is the issue of a secure system, which promises the users that they are in safe hands and their credit cards wouldn't be misused.

Many of the e-commerce sites provide for secure transactions, using encryption technology to protect your credit-card number. You can verify that you have entered a secured transaction when you see 'https://' at the beginning of the URL instead of 'http://' and the SSL security icon (a closed lock) at the bottom of your browser.

The higher the bit-depth of the encryption technology used, the more secure is the transaction. For instance, 128-bit encryption provides a significantly greater amount of cryptographic protection than 40-bit encryption.

According to security experts, 128-bit encryption is a very strong and secure method of encryption— even if someone tries to break into the security it would take him innumerable man-years of effort to break in.

However, even though we have industry experts shouting at the top of their voices, assuring people that credit-card numbers are safer online than they would be in any local restaurant or store, it's a natural tendency for people not to part with valuable information and it will definitely take some time to change this mindset. As a work-around many sites offer accept alternate forms of payment, such as through cheque, DD or cash on delivery.

Countryoven eases your gift giving dilemmas

Do not get taken in by the name though, as this site isn't just about oven fresh cookies or other scrumptious goodies. It is, in fact, one of the most comprehensive sites where you will find almost all products ranging from chocolate chip cookies to high-end electronic gizmos neatly categorised.

In addition, the site provides you with services such as birthday reminders via e-mail. You can also get status information regarding your gift by simply typing in your order number. And if you are a bit jumpy about what kind of gifts to send to who, then relax and let the 'gift finder' do the dirty work for you.

The site is easy to navigate and has gifts categorised according to various occasions. The site also has a WAP enabled version at http://giftagift.com/wap (however, you could have some problems accessing it).

Another site that has been around for a long time is www.homeindia.com. This site was the cynosure of all eyes when it won the coveted prize for the most useful Web site, given by *The Economic Times* back in 1998.

With a strong backend and a dedicated logistics team, the site ensures that your product is delivered as promised. Since the site is also listed with the Consumer Protection Association of America (CPAA), you can freely lodge a complaint with this apex body if you find any discrepancies in the site's performance regarding delivery.

The online counterpart of the popular chain of retail gift stores, www.archiesonline.com is a site where you can gather loyalty points while shopping, which you can later redeem. The site also has a reminder and scheduler section where you can enter important dates and receive reminders accordingly.

The customise page option, called the 'My Archies page', helps you organise all the above. While this is a good enough site for shopping, it could do with better graphics to spruce up the homepage display.

Another site worth a look is www.rediff.com, which is a portal with a difference—apart from the latest in news, it has a section for all you shopaholics. Login at http://shopping.rediff.com/shopping and choose from amongst a decent collection of national and international brands. The site is easily navigable as it has well-categorised items.

For instance, the Books section has categories such as Readers Choice, New Arrivals, Best Sellers, Rediff Recommends, etc. Any queries that you might have can be directed at the site's customer help line that can be reached by phone, e-mail, toll free line and even online chat. While at the site, glance through their Hot Sellers and Popular Picks sections, as also the Maha Offers section, where you can find some interesting bargains.

The site also offers you a flexible mode of payment through cheque, demand draft, cash on delivery or even Internet banking. Being a Verisign-certified site makes all the difference, as it ensures that your transactions are secure, with the help of SSL (Standard Sockets Layer) encryption.

While not quite in the league of a giant such as Amazon, www.fabmart.com is a neat site with good navigation features and a good range of products that are well arranged and easy to identify.

Fabmart.com: A fab product range

The book lovers amongst you will find the site's collection, ranging from *Amar Chitra Katha* to the latest releases quite good, but what's more interesting is that if the site fails to deliver certain purchases by a certain time, it will not charge for that shipment.

And even if you are not looking for gifts to buy but are interested in more mundane things like groceries, Fabmart takes care of that too. So you can choose from cheese spreads to jams and ➡

Better Shopping Guide

■ Does the portal provide contact details (phone number/e-mail)?
■ Does it specify any person's name whom you can contact if you need assistance?
■ Does it have an FAQ section?
■ Is the help desk responsive?
■ Is it a secure site (check for 'https://' in the URL)?
■ Is it registered with Verisign, CCNOW, www.truste.org, or other international bodies for security/redressal?
■ What does the fine print say about how the product is shipped? Are there any hidden costs, mode of payment, etc?

The Shopping Route

Infographic: Jaya Shetty
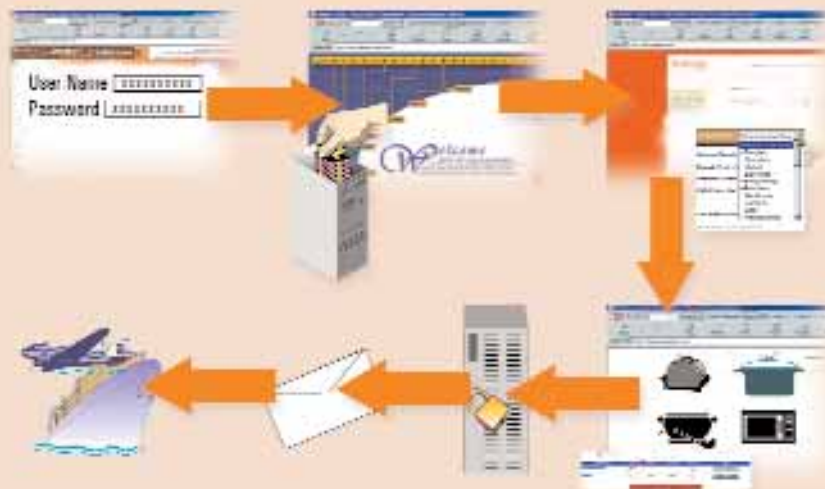
■ For any normal e-commerce transaction, you are required to register with the site wherein you provide your personal details. A small text file called a cookie is placed on your computer. This file usually keeps track of the user preferences, which helps the site to keep a record of regular visitors/users. For this you must have the 'cookie' options enabled on your browser.

■ The page where you enter your details is mostly in a normal HTML format, but may also use high-end languages such as Java and C to process your information online. The basic drop-down menus and radio boxes are a part of the online form and are designed to aid you while surfing through the various sections.

■ When you shop for a particular product and intend to purchase it, you are required to add that item to your portfolio list, i.e 'add to cart'. This specially designed 'shopping cart'

software allows you to keep track of your shopping as you browse through the site.

It even helps you keep a running total of your expenses. Therefore, the software designed has to be simple and elegant so as to entice the user to shop for the product without any major hassles.

■ When the order is placed, it usually goes through a secure server transaction. It is likely that when you place an online order you will receive a confirmation through e-mail telling you the order number. Remember your order number or better still, to be on the safe side, print (photocopy) the order confirmation document.

This can definitely help you to follow up on your purchase with the concerned site. Finally, the site ships your order to the right destination.

marmalades to frozen food products, and have these delivered to your doorstep (although they are currently shipping only in Bangalore, Hyderabad and Chennai).

The site features a reward program called 'Fab points' which you earn as you shop. You can also try your hand at the contest and quizzes section. If watches are what make you tick, then choose from a list of national and international brands. Or run through the movies and music sections for some good discounts. This site also provides for secure transactions via SSL encryption.

In the midst of this, can www.indiatimes.com be far behind? At http://shopping.indiatimes.com you will find a one-stop mega portal for practically everything under the sun. Though the site has a wide range of products in certain categories, in others

there are just a bare minimum selection of products.

However, the site takes care of this shortcoming by providing links to other shopping channels that partner the site. Aside from the regular goodies, this portal provides you with collector items such as T-shirts, mugs and souvenirs.

The site also has hot deals and pick of the week sections. What's more, you can personalise your gifts by having your photograph embossed on them, but there isn't much variety in the options for the accompanying message. This portal does have its fine points but needs some work if it has to stand out from the rest.

You could also drop in at www.sifymall.com, a portal that's loaded with some really big names offering a wide product range and a good vari-

ety of brands to choose from. You can make use of the site's search facility or compare products using the Click and Compare option. The site also marks out the best selling and hottest products as What's Hot?, Top Sellers, New Arrivals and so on.

Go to tajonline.com for that special gift you seek

You can pay for your purchases using Indian and international credit cards and also through Internet banking (ICICI Infinity, HDFC and Global Trust Bank).

If you still haven't found that special gift then try Taj Gifts at www.tajonline.com. This gift shop has a special Request-A-Gift service where members can ask for gifts to be delivered. So go right ahead and make a request. The site is quite com-prehensive and showcases a wide variety of products, from chocolates, flowers, cakes, Indian sweets, to electronic and leather goods, ceramics, jewellery, watches…you'll find almost everything here. Other attractions at this Web site are their hot deals section and the facility to track the status of your order online, as well as a variety of upmarket stores that are featured on the site.

So go get generous!
While the joy and pleasure that you receive from the act of gift giving needs no description, the question still remains—why buy online? Why not just go to the shop around the corner and buy something that you can touch and examine? Well, for one it's convenient.

Besides, you have access to products and brands from all over the world and could strike some good deals. Add to that the growing power and user friendliness of technology, which allows you to take advantage of company promos such as 'Shop more and win free gifts', not to mention the numerous online prizes and contests to be won, and you have a win-win situation. Your gift could be a prizewinner, and you never know when you might hit the jackpot!

So loosen those purse strings and shop till you drop—all from the comfort of your chair! **d**

The Pros and Cons

The upside
■ Convenience factor
■ You have a wider choice of selection
■ It saves time and you could probably get a better deal on other sites
■ You can easily and quickly zero down to exactly the product you want
The downside
■ There could be lack of trust
■ Security concerns
■ It's a relatively new concept in India
■ Face-to-face interaction is missing
■ Cannot touch-feel the product

Born to be free?

E-mail came, saw, became a part of our lives…and was then taken for granted. But with pay-for-services raising their ugly head, it's time for some re-evaluation

MOHAN KRISHNAN

With all the hullabaloo over free e-mail sites such as usa.net and 123india.com going the paid-service way, we decided to see for ourselves just what the free e-mail service providers had to offer. We looked at 14 such services and, wherever possible, tested their Indian edition. So, it's Yahoo.co.in and not Yahoo.com and Lycosasia.com, not Lycos.com. The reason for this is that sites hosted in Asia or closer home, tend to be faster than those

located in the US. Also, we clubbed Email.com, Mail.com and Iname.com, which have integrated their services.

Room for more
How much land does a man need? If you remember the old but meaningful tale, a man was told that between sunrise and sunset, the area he covered by running or walking would be his. So, he started out to cover as much as possible, but at sunset he dropped dead. So, 20 MB

space might do a lot for your avarice, but only if you were undisciplined about regularly looking after your e-mail account would you care for that much space. And knowing the adage that 'data expands to fill up space', even 20 MB might soon be insufficient.

Among the e-mail service providers that we looked at, Geek.com and Lycosasia offer 20 MB space. (You know the competition in India is heating up when you realise that Lycos, as opposed to Lycosasia, offers only 6 MB). Geek goes a step further to add to your greed by providing for POP3 access to their account, which means that you can download messages using your e-mail client. The same is true for Myreal-box.com, which offers 10 MB space and POP3 and IMAP access. Guess these sites take the notion of '*Yeh dil maange* more' to heart!

However, aside from providing you with storage space, many sites put a cap on the size of e-mail attachments that you can receive. Geek, for instance, has a cap of 5 MB as the attachment size that you send. Indiatimes.com, with its 10 MB storage space, allows you to send e-mails up to a maximum of 1.5 MB per message, though there seems to be no bar on the size of

Get greedy at Geek.com with 20 MB space

attachments that you can receive. Similarly, Email.com provides 10 MB storage space, but here you can send and receive e-mails only up to 2 MB. Yahoo.co.in pegs the limit at around 1.5 MB, Chequemail.com at 3.5 MB while Hotmail.com puts a limit of 1 MB. So, if your work involves sending a number of large attachments, then you should probably opt for Geek or Myrealbox, or maybe keep a file splitter handy!

Speeding it up
One look at the e-mail services, and you wouldn't need a data log or a timer to tell you that Indiatimes and Rediffmail.com are really fast. Whether in terms of receiving e-mail, sending e-mail with attachments, or even viewing a JPEG image in the browser itself, there's a perceptible difference between these two and the rest. The reason, as we mentioned earlier, is that these sites are hosted in India itself, which provides a major speed difference.

Chequemail, which is also hosted in India, provides for good transfer speeds but tends to get bogged down by the banner-ads on the site that consume a lot of bandwidth. Other sites that are fast in terms of sending and receiving e-mail are Yahoo.co.in and Excite.com.

Say No to spam
The anti-spamming features that Hotmail provides are truly great. You can choose to block senders and also known domain names. You can also set up an exclusive list wherein only those present in your address book can send messages to you and at the same time have an exception list, called the safe list, for this exclusive list. This safe list would comprise of those persons in your exclusive list that you would also like to block. The site lets you protect your mailing lists and also set up 11 additional filters or rule-sets. While

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Read the Fine Print

Most people click on the I Accept button on the Terms and Conditions page with the same lackadaisical attitude as when they say, "I Do" at the altar. They don't realise what they're getting into, until after disaster strikes!

Here's a sampling of some of the terms and conditions for using the e-mail services. Chequemail, for instance, has clearly spelt-out anti-spamming policies. Such is their wrath against spammers that, if caught, they charge you Rs 25 for each mail! For that matter, you are liable for $5 even with Hotmail, if damage due to spamming is proven.

If you read Hotmail's Terms and Condi-tions carefully, it clearly states that you cannot have a Hotmail account for company purposes ('You may not use your MSN Hotmail address as your primary business address'). So, if your company e-mail address is something like yourcompany-name@hotmail.com, you are clearly violating their terms of use.

Most sites provide for adequate spam protection and agree to safeguard your privacy. Most of the terms and conditions clearly specify that you cannot use the accounts for unlawful purposes such as e-mailing serial numbers and cracks. Sites such as Hotmail, Yahoo.co.in, Excite, etc, have adopted the Truste privacy statement.

This is a kind of endorsement from a third-party organisation, wherein the e-mail service provider agrees to abide by certain rules such as not providing your personal information to advertisers or not allowing users below the age of 13 to register.

Of course, in spite of all the terms of use and privacy policy statements, the bottom line is that the service is always provided on an 'as is where is' basis, with no claims possible if the site isn't up. And Indiatimes even says that it maintains the right to ask users to pay for the service at a later date ('This site reserves the right to charge subscription or membership fees'). So, what was the free stuff all about?!

Think Big

Worried about your e-mail service provider going kaput tomorrow? Then you can sign up with an e-mail for-warding service such as Big-foot.com or Pobox.com. Both of these allow you to forward all your e-mails to any e-mail account of your choice and you can keep on changing the forwarded mails option on a regular basis. Unfortunately, both of these are paid services, though Bigfoot.com does have a free, limited service wherein only 25 e-mails received every day will be forwarded.


The anti-spam features of Hotmail.com

sites such as Yahoo.co.in had spam protection as well, the only site that came anywhere close to Hotmail in terms of this feature, was Indya.com with its green list (addresses allowed) and red list (blocked addresses).

Addressing the audience

At a very basic level, an address book just needs the e-mail addresses and contact names. How-ever, many sites have started providing for more comprehensive contact lists with phone num-bers, addresses, birthdays and birthday reminders.

The most feature-rich address book is the one provided by Yahoo.co.in. You can export or import the address book in dif-ferent formats, define four cus-tom fields in addition to the various contact fields provided and even print out the address book for your reference. Chequemail was the only other site that allowed you to import and export address books, while Indya and Lycosasia only allowed importing.
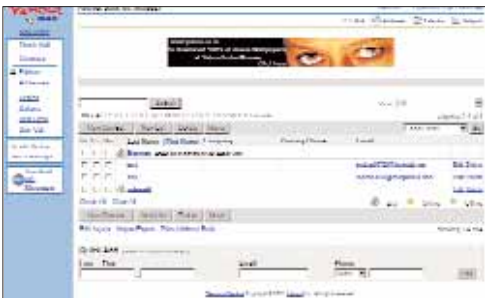
Yahoo.co.in has a feature-rich address book

Functionality and interface

If you look at the address book functionality that most e-mail service providers have designed, you realise that programmers don't really bother as much about the interface as with providing for functionality. Take for instance the case of Indya, after you've done with adding e-mail addresses to the address book, you cannot select more than one e-mail address while sending an e-mail. Worse, the Compose Message option doesn't have access to the address book at all. Most sites don't provide an option for adding addresses from received messages to your address book.

In this respect, Hotmail really scores in terms of the overall interface. You can select the Add to Address book feature when you receive a mes-sage (or even when you send a message). You can select addresses from a quick list while compos-ing messages. Though Geek and Chequemail are also totally functional in this respect, they lack in aesthetic design. While composing a message

in Yahoo.co.in and Indiatimes, the address book opens in a new window from where you can select the entries.

Address book apart, Hotmail has the best-designed interface (it underwent a design change in July 2001) with all the options made accessi-ble within a narrow rectangular frame or within eye range. This means that you don't have to scroll or move the mouse around much. The only time you would probably have to move the mouse a bit further is while signing out. Guess Hotmail feels that signing out is something very few people will do! Almost all sites have the option for changing the interface, and Sify.com and Lycosasia even offer skins that change the entire look and feel.

Signing off

Signatures are a great way to show off your cre-ativity—if this is important to you, you certain-ly wouldn't like Lycosasia, which doesn't come with a signature option. On the other hand, you might like Geek with its options for HTML sig-natures and the ability to remove the signature it normally appends to all outgoing mail. Rediff-mail also lets you remove its default signature and Myrealbox goes a step further by not even having its own signature. Most other sites allow you to have text-based or HTML-based signa-tures in addition to the site's signature.

In addition, around half the sites we looked at provided for auto-replies or on-vacation replies. Indya is the only site that provides a template for the message, while Indiatimes and Yahoo.co.in allow you to specify the scheduled dates for the auto-reply.

Strangely enough, Hotmail, which has the most features, didn't have the auto-reply func-tion and neither did Sify, Excite and a few others.

But the extra frills?

Apart from the basic e-mail service, these sites also come with a few extras such as calendars and reminders, spell-checkers, Web folders, etc. The frills you might especially like are the ones that come with Hotmail, Yahoo.co.in and Indiatimes. All three provide for a rich-text editor that allows you to send messages with different background colours, change font sizes, indulge in a bit of text
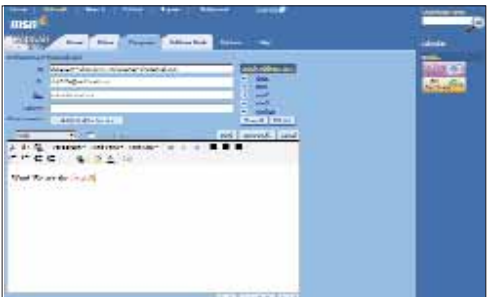
All options within your eye range at Hotmail.com ➤

Specifications

What you get for Free

Feature	Chequemail.com	Excite.com	Fetchmail.com	Geek.com	Hotmail.com	Lycosasia.com	Indiatimes.com	Indya.com	Mall.com	Mallandnews.com	Myrealbox.com	Rediffmail.com	Sify.com	Yahoo.co.In
Type of Service														
POP3/IMAP/SMTP	No	No	No	Yes	Yes (only through Outlook Express)	No	No	No	No	Yes	Yes	No	No	No
E-mail forwarding	Yes	Yes (if you sign up for receiving ads)	No	Yes	No	No	No	No	Yes	Yes	Yes	No	Yes (through filters)	No
Check other POP3/IMAP accounts (with number)	Yes	Yes (5)	Yes	Yes (5)	Yes (4)	Yes (4)	Yes	Yes (3)	Yes (5)	Yes	Yes (3)	Yes (3)	Yes	Yes
Storage Space (in MB)	3 MB	3 MB or 1000 messages	5 MB	20 MB	2 MB	20 MB	10 MB	6 MB	10 MB	10 MB	10 MB	5 MB	5 MB	6 MB
Number of file attachments in one e-mail message	Unlimited	Not specified	Unlimited	Unlimited	Unlimited	Not specified	Not specified	Not specified	Unlimited	Not specified	Not specified	Not specified	Unlimited	Not specified
Maximum size of attachments	3.5 MB	1.2 MB	1 MB	5 MB	1 MB	1 MB	Not specified	Not specified	2 MB	Not specified	Not specified	1 MB	1 MB	1.5 MB
Options for saving mail for sending later	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Address Book Import	Yes (as CSV or LDIF)	No	No	No	No	Yes	No	Yes (CSV)	No	No	No	No	No	Yes (CSV, LDIF, Palm)
Export	Yes	No	No	No	No	No	No	No	No	No	No	No	No	Yes
Automatically add to address book	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Signatures	HTML/Text	Text	Text only (multiple signatures possible)	Text	HTML/Text	No	HTML/Text	Text	Text only (three signatures)	Text	Text	Text	HTML/Text	HTML/Text
Auto responders	Yes	No	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Spam Protection Blocking addresses	No	Has its own filters	No	No	Yes	No	Yes	Yes	Yes	No	No	Yes	No	Yes
Known domain names blocking	No	Has its own filters	No	No	Yes	No	No	Has its own filters	No	No	No	No	No	No
Create message rules	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes	No
Exception rules	No	No	No	No	Yes	No	No	Yes	No	No	No	No	No	No
Automatical e-mail scanning	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No
Security Password norms	None	Minimum 6 letters	Minimum 6 letters and cannot match your login	None	Minimum 8 characters (and cannot form part of the login name)	4-15 characters	Minimum 4 characters	4-15 characters	None	None	None	4 characters minimum	Can't be same as login	None
Secure login possible	No	No	No	No	Yes	No	No	No	No	Yes	Yes	No	No	Yes
Extra features Spell-check	Yes	No	No	Yes	Yes	No	No	Yes, in different foreign languages	No	Yes	No	No	Yes	Yes
Printing	Yes	Yes, with a HP icon next to the message	No	Printer friendly	Printer friendly version	No	No	No	No	No	No	No	No	No
Others	Discussion groups, Greetings, Saving bookmarks, Reminders	Calendars, Reminders	Messaging services link with ICQ	Bookmarks, Briefcase	Rich-text editor, Dictionary, Theasaurus, Greetings, calendar	Calendar, Skins, Bookmarks, Horoscope	Briefcase, Calendar, Rich-text editor	Notification of new e-mail on ICQ, pager, Calendar with reminders	Power editor	Calendar	None	Voice mail, Indian language e-mail	Greetings, Indian language e-mail (as GIF attachment)	Calendar, Notes
Speed	Fast	Fast	Average	Average	Average	Average	Blazingly fast	Slow	Average	Average	Average	Blazingly fast	Fast	Fast

Retrieving Lost Passwords

What happens if you forget your password? If you have an account at Indiatimes or Geek, it's pretty simple to retrieve it…so simple that even others could probably do it and use your account without your knowledge. Indiatimes asks for minimal information during registration, and the only password retrieval option is the hint question, which most people tend to keep as 'the city where you were born' or 'your pet name'. All an intruder would have to do is enter some random name, hope the hint question is one of the above, and if he gets the answer right (after all some Rajesh or Vidya would hail from Mumbai) the password flashes on his screen. Indiatimes does have an option for providing a hint question of your choice, but most people we guess do not use this at all.

The difference with other sites such as Myrealbox or Geek that also use the hint question method is that instead of displaying the original password on screen they reset it. One of the strongest password retrieval securities you will find is at Email.com. In the event that you forget your password, Email asks for details such as your name, last name, date of birth and also an alternative e-mail address. Only then does it move to the hint question. Based on your responses to all of these, a message is sent to the alternative e-mail address either informing you that your password has been reset or that the details were incorrect. Also, an intruder would not be able to try out different combinations, since Email shows a message that the last attempt was just a

minute earlier. It even reports the unauthorised request to your mailbox.

Sites such as Yahoo.co.in are so paranoid that they don't even allow you to change your birth date or the hint question once you have registered. While Hotmail is somewhat similar to Yahoo!, the only difference is that it doesn't ask for your birth date, but makes do with your

Email.com: A tough nut to crack

place of residence as specified in the registration. If you have problems even with this, you can e-mail Hotmail and based on their reply, send details about your last login, birth date, region etc, and it e-mails a new password back to you. Excite was the only site that presented you with a hint question, without requiring an answer, at the time of registration. If you were to forget your password the site asks for your birth date and pincode. After delivering the right answers, you are then presented with the hint question, which should hopefully help you recollect the password. Alternatively, if you've provided another e-mail address during registration, it e-mails a new password to you at that address.

Follow these simple steps to safeguard your password:

■ Keep your password complex. Most sites do not have password limitation criteria (minimum six characters, etc), but you should have passwords that are a combination of words and numbers, in both upper and lower case.

■ Remember the information you entered during registration. Most of us hate filling forms, and therefore enter whatever we feel like. Nothing wrong with that, but just try and ensure that you enter information regarding your birth date, country, region, pin code etc correctly. This information is mostly used during password retrieval.

■ Let your hint question be as difficult as possible. Remember that most of your friends or relatives may know everything about you, so your hint question should be one that even they wouldn't have an answer to. Avoid using hint questions such as the city you were born in. It won't take much guesswork to crack that! Use something like the last four digits of your credit card instead.

■ Preferably, if you have an alternative e-mail address, fill the field for current or alternative e-mail address during the registration process

■ If the site offers secure login or asks you whether you are on a shared or public computer, select it. This ensures that the password is encrypted. Secure logins, however, do tend to be a bit slower, so be patient.

■ Don't check the 'Remember password on my computer' option, unless you are the only user at the computer.

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formatting, etc. Hotmail and Yahoo.co.in also provide for adding emoticons to the message (you can use these features even in your signature), while Indiatimes comes with an option of adding a table, but we couldn't for the life of us figure out what you'd want to use it for.

Compose rich text at Indiatimes.com

Is there a best?

The e-mail service you use also depends, to a large extent, on the popularity of the provider and the assurance that they will be around for a long time to come.

While there's no way anyone can predict whether the service will exist tomorrow or not, we at least feel safer with a Hotmail or Yahoo! address because of the trust factor, than a Geek address (where, incidentally, we even managed to register linus@geek.com!). But if you combine the various features including the speed, registration process, storage space etc, you'd find Hotmail to be the overall best, even with a 2 MB storage space. It really scores in terms of features and combines a strong anti-spam feature, not to mention its sleek new design. You got e-mail now!⬛

Just Jammin'

When it comes to setting your PC afire with music and visuals, these little guys pull no punches. So choose well while selecting your media player

NILESH KAKADE and ROSSI FERNANDES

The digital generation sure knows to rock…from music players, MP3s and DVDs to the latest interactive videos, we've come a long way. If you're in need of a second opinion about the latest movie releases, any teenybopper out there could give you an animated version with a crisper storyline on how the 'Star Wars' trilogy could have been better or how the music director could have improved the musical score in *Final Fantasy*. And it's even more likely that they would have seen the pre release ages ago. All thanks to the Net. What's more, if you need any grounding on technology, you can expect nothing less than a running commentary.

The music makers
Well, life sure does move fast here. Gone are the days of listening to songs on a cobalt tape. This is the age of DVDs and making merry on your PC.

Almost everyone today plays music on his or her PC. This could be in the form of regular music CDs or even one of the increasingly popular digital music formats such as Wav, MP3, Ogg Vorbis, WMA, or RealAudio. MP3 stands out from the rest—a universally accepted format that has been glorified by all and sundry.

Different people have different expectations from their audio playback software. You will find die-hard loyalists such as Shashank Robby, who swear by Winamp for the simple reason that "it has the largest library of plugins one can think of".

Winamp is very popular amongst users because it is light on system resources, easy to use, and has some really sleek skins. Says Rhean D'Souza, a student, "To play music I use only Winamp because it has numerous features and is very user friendly. I prefer the MP3 format because it's very neat and compact and I can almost store a DJ station on my PC. Besides, they

are crisp and clear without any hisses or background disturbance".

For most users the player offers a useful array of equalisers, playlist and skinning features. And for the advanced users there are an incredible number of plugins available that allow everything, from special sound effects to letting you play almost every audio format available.

Sanjay Bhuneja occasionally uses Sonique and says that while the default skins and display look good, "changing the skin settings in Sonique completely changes the look". Many users would find this complete change in appearance very confusing, especially when you consider that there are three different types of views. Winamp skins, on the other hand, are easier to get accustomed to because the buttons remain in the same position.

Since all Windows PCs come with Windows Media Player installed, it probably makes sense to use this software to play your favourite music. However, version 7 of this media player is pretty heavy on system resources.

Says Bhuneja, "While it does have good features and is a comprehensive media player (plays audio, video, radio), I think it uses substantially more system resources, which gave me some problems on a low configuration PC, especially when I used visualisations". For those of you who upgraded to version 7 and are not completely satisfied, you can still access the 6.x version by going to Start>Run and typing in mplayer2.

All things considered, however, Winamp scores over other audio player software available
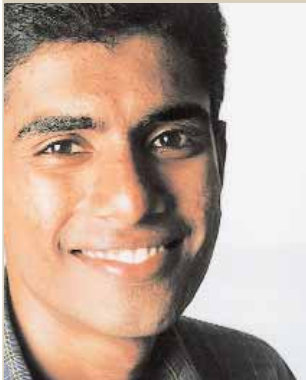
> "To play music I use only Winamp because it has numerous features and is very user friendly"
> **Rhean D'Souza**
> Student

when you consider its compactness, the large variety of skins available and the ease of use factor.

Wanna be a DJ?

If you have a collection of CDs that you have to keep popping into your CD-ROM drive every time you want to listen to some tunes, then it probably makes sense to keep the music files on

Movie Director, Anyone?

Inspired by all the cool-looking film and music videos you see? In this day and age there are plenty of software available that make movie making child's play. For instance, VCD Cutter, VCD Gear, and Virtual Dub are software that help you make your own customised movies and we're not talking about the illegal copying of movies.

These software help you cut short sequences from video files so you can build a personal collection of your favourite scenes and video clips. Using the basic video editing features offered by these software, you can even weave clips from different videos and 'make' your own film—something like a collage of video sequences.

your hard drive where they are readily available. 'Ripping' audio CDs to other more compact music formats is quite popular nowadays and this is where MP3, WMA and Ogg Vorbis come in.

There are many different software that allow you to 'rip' CDs, such as Windows Media Player, Real Jukebox, Audiograbber (Jet Audio) and Musicmatch. Says Siddharth Siva, a photographer, "I use Musicmatch to rip CDs and am quite happy with it. It's simple to use and I like the interface."

The basic (and free) version of Musicmatch, which is one of the more popular 'jukeboxes' around, allows you to rip CDs at bitrates of 128 Kbps, which is near CD quality. It also has other useful features such as an inbuilt MP3 player that automatically searches for all MP3 songs on your hard disk and sorts them by artist, songs, album, etc for easy access.

You can also list songs based on other parameters such as genre, tempos, moods, situations and so on. However, for this feature to be useful, the songs need to be tagged appropriately. If you have a large collection, assigning the right genre and mood to each and every song could be a painful task.

Advanced users who are extremely particular about the quality of the output music file, prefer using software such as Digital Audio Copy which gives you output files in the Wav format with a file size of about 40 MB for each song. This requires an additional step of converting the Wav files to MP3, which you can do using MP3 Compressor. This software compresses the files to approximately 4 MB. While

> "While Windows Media Player 7 does have good features and is a comprehensive media player, it uses substantially more systems resources"
>
> Sanjay Bhuneja
> Businessman

the process of ripping a CD may be more tedious, the clarity of music is worth the effort. "I have tried Musicmatch and a few others but have never obtained the same clarity and quality," says D'Souza.

Windows Media player is another alternative that allows you to encode files in the WMA format, which is more compact than the MP3 format. Like the other jukeboxes, it allows you to

transfer songs from your computer to your portable music player.

For the sake of video

When it comes to playing video on your PC, the choice seems considerably simpler. Most people tend to stick to Media Player, which supports around 27 different media formats including DAT, MP3, CDA, AVI, MPG, ASF and Wav. In addition to this, you can usually find a downloadable Codec that will enable you to play an unsupported file format, such as DivX, in Media Player.
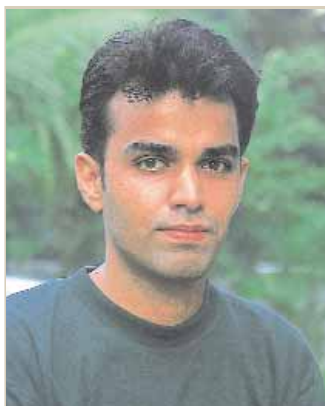
On the rare occasion where you come across a proprietary file format, you would probably need to download a player specifically for that file. One player that you are most likely to come across is Apple's QuickTime, which is quite popular for short movie clips such as trailers and ad films. These MOV files can be played on the free version of the QuickTime player that can be downloaded from www.apple.com. Another frequently used format is RealMedia (.ra or .ram), which is used mostly for streaming applications. These can be played back using the RealPlayer software, which you can download from www.real.com.

If you happen to have a DVD drive installed on your PC and enjoy feasting your senses on such movies, then players such as WinDVD and PowerDVD are ideal solutions. These software give you impeccable video quality coupled with surround sound, which can really bring a movie to life—provided you have the right set of speakers, of course. These software also let you play other common video formats.

All set to rock…

So once you have your new multimedia PC all set up, the next thing you would obviously need is a piece of software that is easy to use, supports various file formats and lets you play Metallica full blast or watch the DVD rip of *Planet of the Apes*. Well, as an audio player, Winamp seems to fulfill the needs of most users while Windows Media player is the popular choice of most people looking for both audio and video functionality. Musicmatch and Real Jukebox are also quite user friendly and a number of users have experienced Real and QuickTime players and were happy with the performance.

While all these software are widely accepted and quite popular, no software can deliver a 100 per cent. Easy availability and compatibility of features such as skin support and plugins add to the fun you can have. So depending upon your requirements, if it's the ideal music or video player that you are looking for in terms of performance and utility functions, the choice is clear enough.

Illustration: Mahesh Benkar

Bonding *for* SPEED!

Two is better than one. So, increase your download speeds by putting two modems together

ROSSI FERNANDES

Surfing the Net on the T1 lines in your office is a dream come true! Faster downloads, an always-online connection and getting your work done with the least of hassles is what you enjoy most of the time. But when you get home and try surfing the Net on your dial-up connection, 'slow' acquires a whole new mean-

ing. Many people have experienced the nightmares of dial-up connections, with their poor connection speeds and pitiful download speeds.

The most commonly called for solutions involve using high-speed connections such as DSL or cable. But, if accessibility and costs are a problem, then you can bond the bandwidth of two modems and, in effect, merge the speeds of both

September 2001

devices to get a single link to the Internet with increased bandwidth.

Before you start off…

This method of using two different modems and two phone lines to increase the overall bandwidth is called Remote Access Service (RAS). The process involves attaching two internal or external modems to a single system. One point that needs to be kept in mind is that your ISP should also provide this option with their services.

The best part is that operating systems from Windows 98 onwards come with this feature built into their Dial-up Networking. For older operating systems such as Windows 95, you would need to download the latest Dial-up networking patch in order to enable the use of Multilink PPP features. Using Multilink PPP, data packets from your PC are broken up into parts and each of these parts is sent from your two modems onto the ISP's modems where they are reassembled, thus providing twice the bandwidth.

One of the best and easiest ways to get Multilink PPP working is to use Windows 98. You can use two simple dial-up 56 Kbps modems, for example, and gain an overall speed of 112Kbps (56 Kbps x 2). Certain free software, such as MultiRAS allow you to use this feature even if you don't have the latest Windows Dial-up networking update on your system.

Lets get to it…

Installing the 2 modems: First of all, if you're installing internal modems, free up any PCI or ISA slots that you may be using. In case, you don't have any free PCI or ISA slots on your system, you will need to remove one of the cards. Internal modems can be used in conjunction with external modems. For installing an external modem, connect the modem to the external COM port or USB port. Connect each of the modems to the two phone lines and also the power supply if needed, in the case of external modems.

Drivers for modems: Boot your machine and wait for the two modems to be auto detected. In case the modems are not detected, you can go to Start > Control Panel and then to the Modem options. You can then choose to auto detect the modem by selecting it or you can manually set up each modem by choosing the correct drivers and specifying the serial ports to which they are connected. You can also go to the Control Panel > Add New Hardware and do the same. Add the necessary network protocols such as TCP/IP and IPX/SPX, if needed.

Creating a connection: Next, you need to set up a dial-up connection. To do this, go to Dial-up Networking and click on Create New Connection. Enter the name for the ISP and other information such as the phone number to be dialled to connect to the ISP.

Setting up the Multilink protocol: Once a connection has been created using Dial-up Networking, right-click on the ISP's icon and choose Properties. Now click on the Multilink tab. You can now add, remove or edit various devices.

Dialling: The final step is to dial to the Internet using your dual modem connection. Go to Dial-up Networking and double-click on your ISP icon. Enter your username and password and start dialling. After you're online, you'll have twice the bandwidth as compared to using a single Internet access method.

No support for Multilink PPP?

It could also happen that your ISP may not support the Multilink PPP protocol, thus bringing all your plans for extra bandwidth to a halt. However, certain hardware and software are available that can help you overcome this obstacle. For example, a software called SurfDoubler allows you to use two different ISPs and two different Net accounts to double your bandwidth via dual modems. This software downloads different pages through each of the ISPs that you are connected to using the dual modems. The software also includes other features such as security and firewall functionality, built into it. Midcore is a similar software.

Another very popular solution in Internet bandwidth bonding lies in the use of special hardware such as the WebRamp device. WebRamp is like a gateway to the Internet for a network and is capable of being connected to more than one modem or ISDN terminal adapter so as to bond the bandwidth of these devices.

Advantages of dual modems

While a dual modem connection does mean double bandwidth, you will also be paying double your existing phone and Internet access bills as your ISP will charge you more for the two connections. However, the resultant bandwidth improvement is very apparent and this is also a very cost-effective solution in terms of initial investment. A dual 56 Kbps modem would result in download speeds of around 10 KBps, which is double the bandwidth that you would normally get on a single modem.

An office user can start a proxy server on a particular machine that uses these two modems to provide Internet access. This is useful even for home users who don't have broadband. With the capability of even bonding ISDN and cable Internet connections, the twofold increase in bandwidth could open a range of broadband possibilities.

An especially useful application of this technology would be in cyber cafes, where you could merge the bandwidth of various devices for providing Internet connectivity to a group of users. d

Glossary

RAS: Remote Access Services is a function that allows users to connect to a network or server using a modem.

TCP: Transmission Control Protocol, one of the most widely used protocols on networks and on the Internet, to allow computers to communicate with each other.

ISDN: An acronym for Integrated Services Digital Network, which is a communication standard for computers and gives higher bandwidth as compared to normal phone lines. It also allows simultaneous use of telephony services while using the Internet.

PPP: Point to Point Protocol is used to connect computers to each other using modems or other such communication devices.

DSL: Digital Subscriber Line is a major broadband connection available for office and home users. Variants of DSL are Assymetric Digital Subscriber Lines (ADSL) and High data-rate DSL (HDSL).

The
writing
on the palm

Does trying to feed data into your palm make you run round in tight circles, tugging at your hair? Relax, we have some solutions for you

VIDYARAMANAN S.

You are a Palm newbie and are raring to stuff it with data. But seems like writing for an exam is turning out to be easier than writing on a Palm. You begin to despair of ever mastering the art of feeding your device. Yet, is it really that difficult to feed or write data onto a Palm? Well, not actually, if you are using the right software and utilities. Right out of the box, a palm does not hold any particularly rich feature for data input and the limitations concerned with data input are mainly because of its compact nature. Besides, existing input methods are nothing to trumpet about. But then again, maybe this story can stop you from despairing about data input.

Fitaly's fit for you

Data input enhancements can be made via software or hardware. Hardware enhancements can be quite expensive whereas software enhancements are simpler and cheaper. In fact, most of them are available for free. Let's get going with Fitaly. Fitaly is a good keyboard alternative that you can use with your Palm instead of the latter's built-in keyboard. It is not a qwerty keyboard; its ergonomic design minimises pen travel by as much as 84 per cent (so the makers of the software claim)—most of the keystrokes are placed close together and every keystroke is located close to another that is most likely to follow it. Unlike the standard Palm keyboard, which requires you to press the Done button to close it, Fitaly can be launched or hidden just by tapping the 'abc' in the Graffiti area. Or you can use the Close button to close the Fitaly keyboard.

Since the layout of the keyboard minimises pen movement, it increases your speed of input to the Palm. Besides, Fitaly can be dragged across the screen to any position. Another tidy aspect of this keyboard is that you don't have to bother ➜

It's Your Choice

The Palm Portable Keyboard and the GoType! Pro keyboard have a lot in common. Neither of them require extra cables and the organiser can be docked into the integrated connector available on the keyboard. They don't need a separate adapter for power; they consume a bit of the device's power. But they do have some distinct features.

The GoType! Pro keyboard has an integrated power charger, using which you can charge your Palm using the Palm V AC adapter.

This keyboard has a built-in serial port, which enables you to directly sync your PDA with your desktop without the need for an additional HotSync cradle. This device doesn't work with Palm m500 and m505. GoType! Pro has six programmable keys which can access or launch applications or programs at one touch.

The Palm Portable Keyboard, slightly bigger than your organiser, is foldable and actually fits into your pocket. It has nine programmable keys to launch or access applications you frequently use. This keyboard expands to the size of a desktop keyboard and the keys are depressed when it's folded, which makes for its miniature size. The key spacing is 19 mm horizontally and vertically—the same as in desktop keyboards.

As for the prices of the two keyboards, the GoType! Pro keyboard is priced at $70 (approx Rs 3,220) whereas the Palm Portable Keyboard is priced at $99 (approx Rs 4,554). Take your pick!

What about a Hardware Keyboard?

Although software keyboards are useful, if you are accustomed to the more tangible variety, you will obviously prefer something similar. Though Graffiti is good enough for entering brief notes and entries, it does not match the speed and comfort of a hardware keyboard.

The problem with software input methods is that you would be more often concentrating on how you are writing, rather than on what you are writing.

So if you feel better with a keyboard you can actually get your hands on, then here's some welcome news for you—the Palm can use a hardware keyboard. These neat little foldable keyboards can actually fit into your pocket. They can be plugged into the synching socket and used to input data into the device. What's more, you can concentrate on what you are writing rather than how you are writing. Keyboards also come to your rescue when you want to type in something quickly.
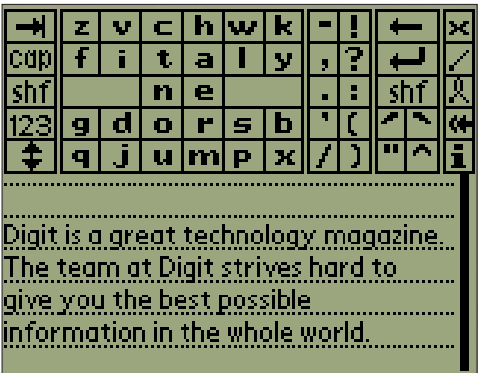
The Fitaly keyboard can be moved anywhere on the screen

with it while typing as it adjusts and repositions itself upon encountering a text entry on a line very close to it, thus letting you review what you have typed. It also has four accent modifiers that enable you to switch to the non-ASCII set of characters defined by ANSI (American National Standards Institute)—acute, grave, circumflex and umlaut. A tap on an accent changes the keyboard appearance and switches to that particular set.

TealScript your life
Those of you who claim to be die-hard Graffiti fans might now find your loyalty being severely tested. Although Graffiti can be fun to learn in the beginning, it can turn out to be slow going when you realise your Palm has an attitude to match yours—it refuses to recognise some of your strokes. You have to be perfect the way you draw a 'u' or a 'v', and especially the way you draw characters such as 'g' or 'k' that involve more strokes.

Life is not smooth sailing with Graffiti. So would it not be convenient if you could make your Palm learn your style of writing, instead of you learning what the computer understands? If your answer is yes, then you can look towards TealScript as the solution you were in search of. TealScript lets you train your Palm to understand the way you write different characters. You can make separate entries for every letter and symbol. Once you have trained the Palm to recognise your style of writing you can use the trained script in the Graffiti area to enter your information. You can make additional entries and even retrain the Palm for a particular letter or symbol.

If you find typing a chore and yearn for an easy solution, then maybe LookDA can be of assistance. Here, according to your convenience, you could choose to install a small or even a large dictionary and then make entries into or delete them from the dictionary.

The next time you start typing, the word list automatically pops up and you simply have to tap on the word in the list and the prompter completes the word for you. If the word displayed in the list is not the one you want, you could set the pop-up list to show all the possible words that start with the letters you've entered. The software shows a preview of the possible word on the top left corner of the screen.
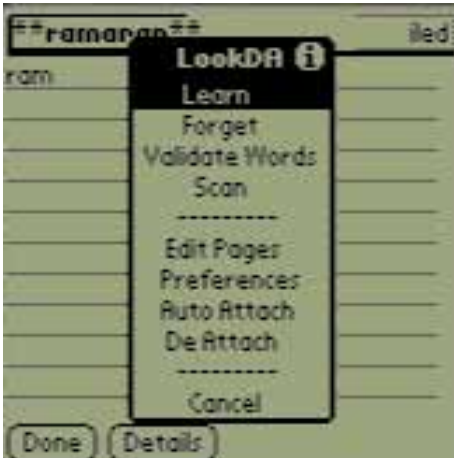
Special case
If your data input involves the use of many special characters such as fractions, the copyright
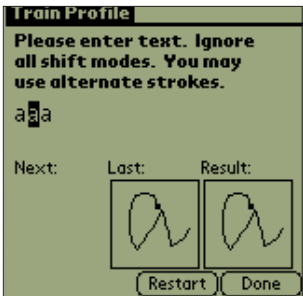
You can train your Palm to your style of writing using TealScript

LookDA can be taught to learn new words

LookDA pops up suggestions as you type

symbol and others, then the Palm by itself will not be too helpful, as not many such characters have been integrated into this device. So you are driven to hunt up some application that will allow you to use these characters—and LChars can be the solution you are in search of. It has its own special character set that helps you enter special characters that are not part of the standard Palm. All you have to do is launch the LChars application and choose the character you require. This character can then be copied onto the clipboard and pasted onto the document you are working on.
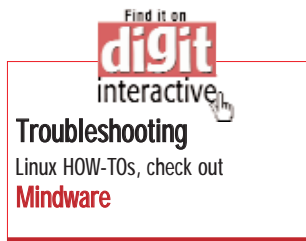
It's all up to you

The applications discussed here are some of the best input methods available for the Palm today. None of these methods bear any fundamental or radical difference in the way they work and, in fact, may just be an enhanced keyboard or an enhanced version of Graffiti. But there are unique applications waiting in the wings such as the one that Microsoft plans to release. This one will allow you to dictate information to a voice recognition software on a PC and the information can then be transferred wirelessly to your Palm. But while we wait for voice recognition on handhelds to arrive, these software—most of which are either free or trial versions—can make life a lot simpler.

Troubleshooting

Problems with display cards and monitors, wondering how to convert FAT16 to FAT32 in Windows Me, having battery troubles? We have solutions to these and other problems

Windows
➕ The right driver

I have a P-III 600 MHz-based PC with i740 8 MB graphics card, Mercury 443ZX motherboard, Yamaha Xwave soundcard, 128 MB RAM and 8.4 GB HDD running under Windows 98 SE. During boot up, many times the computer hangs after which I have to restart either in Safe or Normal mode. If I choose to start in the Normal mode, I get an error saying, 'There is a problem with your display settings. The adapter type is incorrect, or the current settings do no work with your hardware,' following which Windows starts with 640x480, 16-colour depth mode. On restarting the machine, Windows gets back to the original 800x600, 16-bit resolution without any error messages.
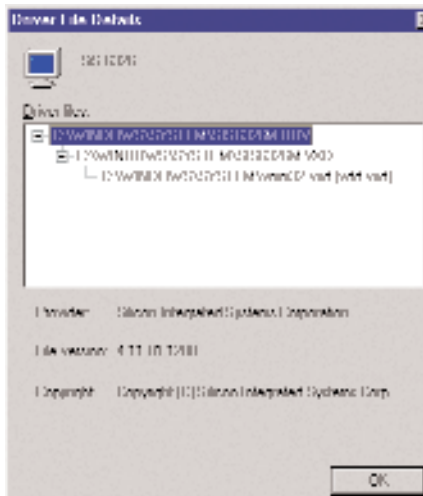
I am using the latest version of the driver (PV4.0) for the graphics card available. The same problem occurs with the previous drivers and also under Windows 95.
Please help!
Saugat
Via e-mail

℞ This is a common problem with some installations of Windows. Changing the display driver normally helps. You have to be careful when installing a different set of

drivers and ensure that only files associated with the new driver are used. The safest way to do this is to open Control Panel > System > Device Manager > Display adapters > Properties > Driver > Driver File Details.

Note down the names of the files associated with the driver. Change the driver to Standard Display Adapter (VGA)—the one that is installed by default when Windows is first installed. Restart the machine and find and delete the files you have noted down. Once again, restart the machine and install the correct drivers for the card.

Applications
➕ Scanning for viruses

Recently, the SirCam virus affected our office systems so I installed AVG anti-virus program at home. The installation went off without a hitch, but, when I restarted the PC, I got a message informing me that a virus had been found in a file called INET.exe.

I was prompted to remove the file, which I did, but then I got the message that the file could not be deleted. After repeating this exercise for a while, I got a message that the virus had been removed. On restarting the PC, the program checked for viruses and informed that there were no viruses and then proceeded to load Win98.

But when Win98 was loaded, a box popped up saying "Cannot find the file 'Inetd.exe' (or one of its components). Make sure the path and filename are correct and that all required libraries are available."

When I click on OK, another box popped up saying 'Could not load or run Inetd.exe specified in the Win.ini file. Make sure the file exists on your computer or remove the reference to it in the Win.ini file.'

On clicking OK, Win98 finishes loading and I can work without any problem. I actually checked out the Win.ini file and located the line mentioned. It occurs near the beginning. Can I remove this line so that the problem does not occur?
Sunil
Via e-mail

℞ The file has been deleted by the anti-virus program, since it did not have a cure for the virus it found. Ideally, you should update any anti-virus package after installation, before allowing it to scan your drives or take action on infected files. You can replace the file from the Windows installation CD to prevent the errors from appearing.

Windows
➕ Platter full of woes

On my Windows 98 system with 64 MB RAM, when I boot the computer I get the message that command.com file is missing. I tried to start the computer with the Win98 startup disk and reinstall Windows 98. When I am doing this, it shows the volume label of the hard disk as C C C C C C and the setup process itself is very slow.

If I try and use fdisk to delete my partition and type in my name as the Volume label, I get a volume label mismatch error. How do I fix this problem?
Rahul
Via e-mail
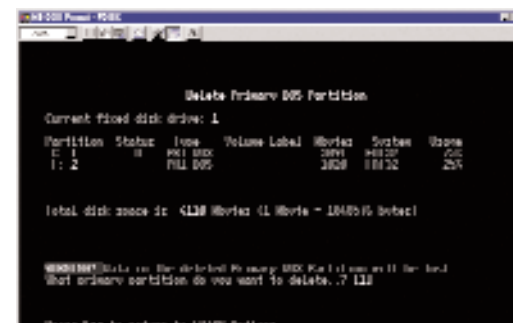
Fdisk can be used to remove partitions

℞ The hard disk definitely seems to be corrupted. This could have happened either by a virus or even by moving the disk or computer while it was on.

If you cannot access any data on it, you can try using some recovery tools such as Easy Recovery to try and retrieve some of the data. ➡

Check out your display driver files

If you don't need any of the data on the disk, you can use fdisk to remove the partitions that you have.

As you have already mentioned that the disk has been labelled as C C C C C C, provide this label when fdisk asks you for it instead of your name. Remove and recreate the partition(s), format them and then reinstall Windows.

Windows
✚ Slow shuttle

I have a Pentium-III PC with 20 GB HDD and 64 MB RAM running Windows 98. Of late, whenever I click on any of the desktop icons, it takes almost 15-20 seconds to open up and that's really annoying. What could be the problem? Is it due to bad memory?

Rohit Kale

Via e-mail

℞ It is quite unlikely that 'bad memory' is causing the problem. If there is a faulty RAM module installed, the PC will not boot at all. The delay could occur due to a number of reasons.

For example, a CD-ROM or floppy diskette already present in the drives can cause My Computer to open very slowly as it tries to access the removable drives.

It is quite possible that some anti-virus program or other such program is carrying out some validation process before allowing you to access the folders.

If you have a lot of programs installed or running, this could be especially slow.

Hardware
✚ Display terror

I have a Samsung 14-inch monitor on a Celeron 300A machine with 32 MB RAM running Windows Me on a S3 Virge AGP card. Recently, I found that while starting the computer, the monitor doesn't start at all. There is also no activity of the hard disk or CPU.

After I try fiddling around with the cables connecting the monitor to the display card for about 15 minutes, it starts, and then even if I shift the cables or tug at it, there is no problem. However, the next day again the same problem occurs, though it doesn't happen if I am working on my computer for some time.

What could be the problem? Is it a loose connection or some problem with my display card?

Rupali

Via e-mail

℞ Often a blank screen at startup is mistaken for a display card problem. It can happen for a number of reasons that cause the computer to not boot at all, such as loose RAM, processor, IDE cables, display adapter, etc.

Usually such a problem can be diagnosed by the number of times the BIOS beeps at startup. For instance, more than one beep means some device is not connected correctly.

One by one, remove all connections from the motherboard and fit them back firmly. Also, check the BIOS settings. There should be a parameter for Init Display First

with the options PCI and AGP. Ensure that this is set to AGP.

A blank screen can also be a result of the power cable attached to the monitor. Simply removing and plugging it back to the monitor should solve that. Make sure that it doesn't stretch too much to reach the power outlet.

Especially during the monsoons, you can also have problems with the soldering inside the monitor due to moisture formation. Get a technician to have a look at it.

Windows
✚ Shut on time

Even if I shutdown the system properly, using the Shutdown option, when I switch it back, it displays the message that Windows was not shutdown properly, and Scandisk starts again. How do I get rid of this?

M. Umesh

Via e-mail

℞ During the shutdown process, the contents of the virtual cache are written to the hard disk. You haven't mentioned which operating system is installed on your PC. Particularly with Windows 98 SE and Windows Me, if the disk is an IDE hard disk, data may be written to the hard disk's onboard cache, but not to the disk itself.

When this occurs, the data is lost from the cache when the computer is turned off. Hence, scandisk assumes that Windows did not shutdown correctly.

Applications
✚ Virus scanner runs amok

I recently formatted and reinstalled all the software on my machine after I upgraded my hard disk. Since the McAfee virus scan signature files were quite old, I downloaded the latest patch and installed it. But after that, the problems started.

Whenever I was working, the 'Blue screen of death' popped up saying that there was a vxd error and the application has to be terminated.

The error message pointed to mcscan32 which is a McAfee file. So, I uninstalled and reinstalled the virus scanner, but the moment I updated the files, I started getting the errors again. Now, I have permanently disabled Viruscan and Vshield, but what could be the problem?
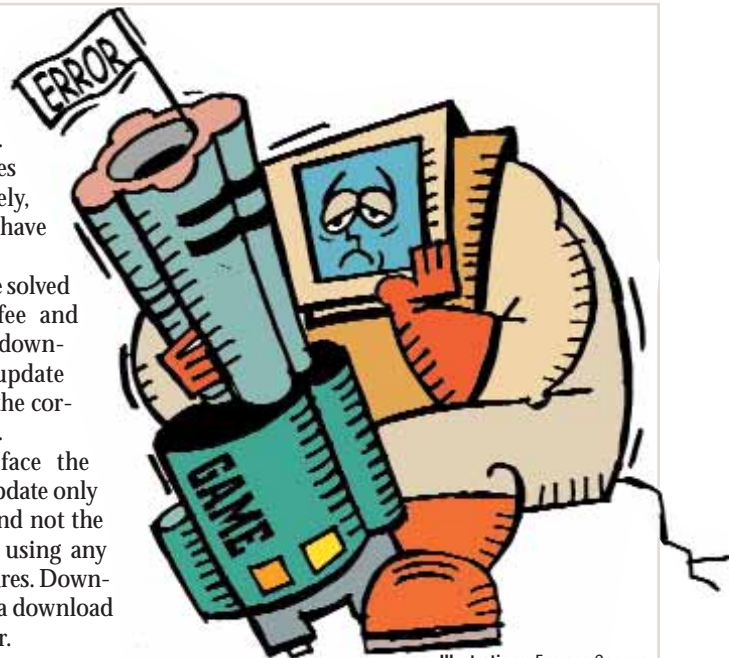
S Viswanathan

Via e-mail

℞ This is a very common error with McAfee software. Often, the update does not install completely, though it appears to have installed.

The problem can be solved by uninstalling McAfee and reinstalling it. You can download and install the update again (ensure it is for the correct operating system).

However, if you face the problem once more, update only the virus definitions and not the program itself. Avoid using any automatic update features. Download the updates from a download site; this is usually safer.

Illustrations: Farzana Cooper

Disable fast shudown using msconfig

To solve the problem, you can download the Window IDE Hard Drive Cache package from the Windows Update Web site (http://windowsupdate.microsoft.com). Another way to solve this problem is to disable the Fast Shutdown feature.

To do this, run regedit and navigate to HKEY_LOCAL_MACHINE\System\CurrentControlSet\Control\Shutdown. Change the value of FastReboot to 0.

With Windows 98, you can change this from the Microsoft System Configuration Utility (msconfig.exe), instead of modify-ing the registry. Click on the Advanced button under the General tab and check the box labelled Disable Fast Shutdown. Alternatively, you may also check the box next to Disable Scandisk after bad shut-down.

Another reason for Scandisk to run at every reboot can be because of the Autoscan entry in msdos.sys. This file is located in the root of the boot partition and controls Windows settings before Windows loads.

If the value of Autoscan is 1, it will run every time. If it is 0, it will never run auto-matically on startup and if it is 2, it will run only on improper shutdowns.

Hence, if none of the solutions can prevent it from running, you can simply set its value to 0. To edit the file, you will first need to strip its attributes by using attrib -h -r -s c:\msdos.sys at the command prompt and then open the file in notepad and change the values.

Remember to change the attributes back to the original after you are done with the change.

Internet & Communication
✚ The Hotmail XPerience
I have a Hotmail account for quite some years, and recently I installed Microsoft XP 2000 for supporting Hotmail in Outlook. Now, with Outlook XP, when I click on Send/Receive, it starts the Sending Outbox and Inbox synchronisation process, but after some time I get an error, 'Reported error (ox800ccc19): A timeout occurred while connecting with the server.' Also, on some occasions, a new message does appear in the Outlook Inbox, but when I try to open it, I get an error message saying that I cannot open this item, and that I need to con-nect to the server to complete the action. Help solve this problem.

Dilip Awari
Via e-mail

℞ This is not a problem with Outlook. Since you have mentioned that the Hot-mail account used to work well under Out-look earlier, it is doubtful that any of the settings would be wrong.

The problem is usually just due to a bad Internet connection—Hotmail takes quite long to validate users and synchronise folders. There's not much you can do about this until your connection speeds improve.

Linux
✚ The partition divide
On my 60 GB HDD, with Windows 98, I installed RedHat Linux 7.1 on a dedicated partition, while installing LiLo as mentioned in one of your arti-cles on multiple operating systems. But instead of choosing not to install LiLo in the MBR, I installed it in the MBR.

Hardware
Filled to the brim
I had a Cyrix 233 MMX processor system on a Zida/Tomato TX-98 motherboard. Since the old hard disk developed bad sectors, I replaced it with a 20 GB hard disk (Sea-gate) last year. When it was formatted and partitioned I could only use 8 GB of this disk.

Last month I upgraded the CPU to AMD Duron 750 MHz, on a DFI AK 74 SC motherboard, but I am using the same hard disk. Since I have not reformatted the disk, only 8 GB capacity is usable, but I want to use the full 20 GB capacity. How can I do this without losing any data or system files?

Francisco
Via e-mail

You haven't mentioned which operat-ing system is installed on the PC. If you are using one older than Windows 95 SR2, you will not be able to use more than 8 GB of the disk.

First, ensure that the hard disk is cor-rectly configured in the BIOS. To do this, press the [DEL] key when you start the machine (in some BIOS the key is dif-ferent and is indicated on screen). Check Standard CMOS Setup and ensure that the hard disk is recognised as a 20 GB one or as Auto. If it is and you have Windows 95 SR2 or higher, boot to DOS. If you don't already have a compatible OS installed, you can boot to DOS using a startup disk made from one. Run FDISK (type fdisk at the command prompt).

You will be asked whether you want to enable large disk support. Enter Y and create an extended partition, followed by a logical drive.

This way, you will not lose any data. If you already have an extended partition, you will not be able to create another.

You will have to delete and recreate the partition or use other third-party utilities such as Partition Magic (www.powerquest.com).

Note: For Windows 2000, you may need to install additional drivers, depend-ing on your disk make and type.

Now I could not unmount Lilo from MBR. When trying to update to Windows Me failed to solve the problem. Norton Antivirus 2001 detected a change in the MBR and prompted for cleaning it. I chose Yes, but now on restarting I get only a prompt for 'Li' and my system hangs. I can boot using the Linux boot floppy, but how do I recover the Windows partition?

G.Kalyana Sundaram

Via e-mail

℞ This is quite a simple process. Boot from the Windows Startup disk and run fdisk /mbr at the command prompt. This will replace the Master Boot Record with the Windows boot loader instead of the Linux Loader.

None of the data on the hard disk will be affected. In rare cases, this does not help. In such a case, you will have to remove and recreate the partition using fdisk. However, you must first copy all the data to another disk. You can do this by installing the hard disk on another PC that boots from a different disk.

Internet & Communication
➕ A gift for GIF
My Internet Explorer behaves peculiarly in that it displays JPG images but is not able to display GIF images. I even check the Internet Options > Advanced > Multimedia, but to no avail. Please suggest a remedy.

Samuel Praveen gathala

Via e-mail

℞ This usually happens when the file type gets associated with another program. Open Start > Settings > Folder Options and
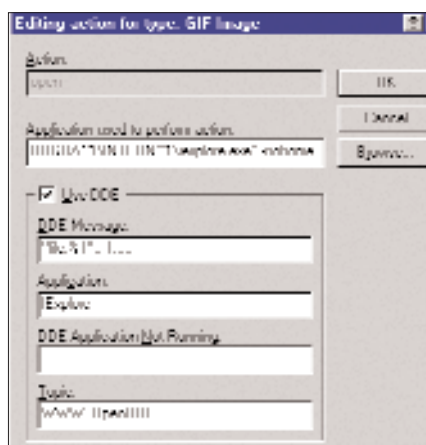
Edit the file extensions

edit the GIF File Type. Ensure that Content Type (MIME) is image/gif. Delete all actions except for open and edit this action. Under the Application used to perform action, enter "C:\PROGRA~1\ INTERN~1\iexplore.exe" -nohome (assuming that Internet Explorer is installed in C:\Program Files\Internet Explorer. Enable Use DDE and under DDE message, enter "file:%1",,-1,,,,,. Under Application, enter IExplore, leave DDE Application Not Running blank and enter WWW_OpenURL under Topic.

Applications
➕ Missing the movies
On my P-II machine with 128 MB RAM and running Win98, I was able to watch movies comfortably in all formats. But recently, I have a problem watching VCDs (dat files) on my machine using Windows Media Player or Xing

Install the right video codecs

Player. I have no problem opening AVI files. I tried installing and uninstalling both Media Player and Xing and also tried replacing the Msvideo.dll, Mciavi.drv and Dciman.dll files through the sfc utility for checking and replacing damaged Windows system files. But even after this, I am not able to run VCDs. Even copying these files from the Windows setup directory didn't help. Is there any alternative other than formatting?

Umesh

Via e-mail

℞ Most probably, the video Codecs (the software that understands the file format) are corrupted or missing. Uninstalling either of the applications would normally not remove the codecs and hence reinstalling does not replace them. Uninstall Media Player and Xing, then delete the folders where they were installed. Next, open Control Panel > Add/Remove Programs > Windows Setup and remove Video Compression from the details of the Multimedia item. Also remove Media Player from here. Restart your machine and check Control Panel > Multimedia > Devices > Video Compression Codecs.

If any of the old codecs are still listed here, remove them manually by clicking on Properties.

Now follow the above process in reverse, installing Video Compression and Media Player from Add/Remove Programs, followed by Media Player 7 and Xing. The VCDs should play now 🅳

Writing in to SOS

If you are writing in about a problem you are facing with your computer please make sure you send us the following information:

■ Which operating system do you use?
■ Which processor do you have?
■ How much RAM do you have installed?

In addition to this, provide us with information that is specific to the problem that you are facing. For example, list the error messages if a program is crashing, or graphics card specifications when games don't run properly on your system. If possible, send a screenshot of the error message that you get.

DO YOU NEED HELP?

Send an SOS to sos@jasubhai.com
Or write in to DIGIT, D-222/2, Om Sagar Bldg, MIDC, Nerul-400 706

tips &tricks

LINUX LOOMS LARGE

You can reach for the stars with Linux and currently available applications. Here's how to get the best out of it
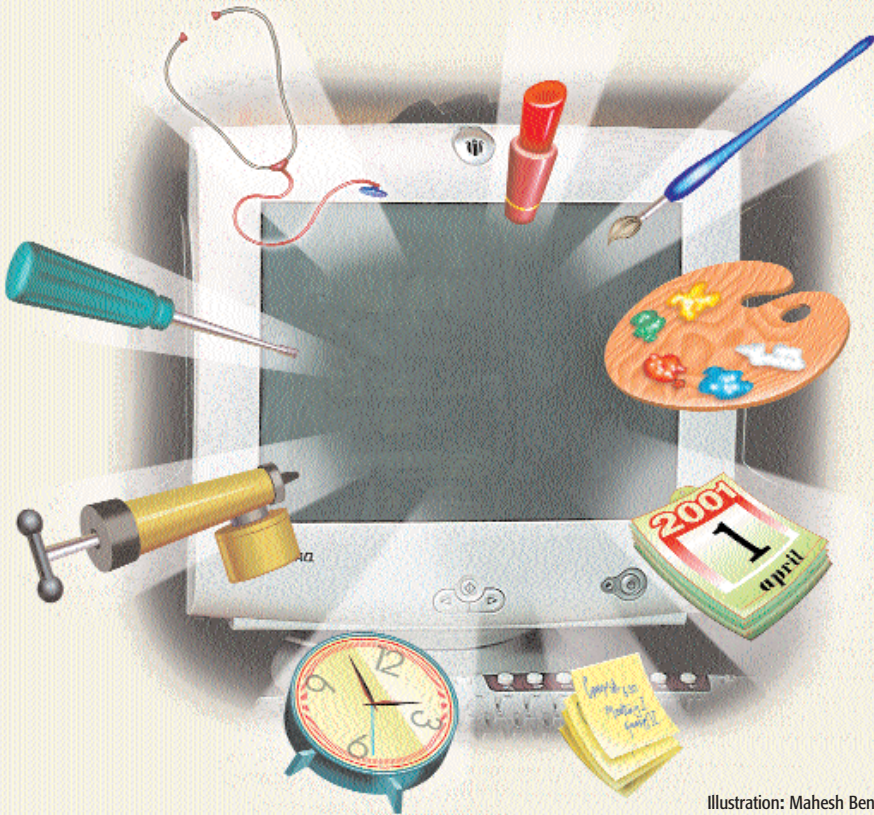
Illustration: Mahesh Benkar

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Mindware

LINUX ON YOUR DESKTOP

Want to change everything about your Linux desktop? Experiment with the desktop environment and the window manager to get the best look and feel for your Linux distribution

◗ Changing the default desktop environment

If you have both KDE and Gnome desktops then switching desktops is something you might feel like doing on and off. The simplest method is to run the command switchdesk from the terminal window. It not only allows you to switch desktops but also lets you specify different desktops with different displays.

Change the desktop to the one of your liking

◗ Changing your window manager from the terminal

If you want to change your window manager from the terminal, all you have to do is open the Xclients file in your terminal window and add a single line there in order to change the window manager that will open by default. Once you have opened the Xclients file in your text editor, just add a single line that says usr/X11R6/bin/RunWM.'yourwindowmanager'. Replace 'yourwindowmanager' with one of your choice, either WindowMaker or AfterStep or Enlightenment.

Note that you need to have these window managers installed to have it up and running. Also remember to change the
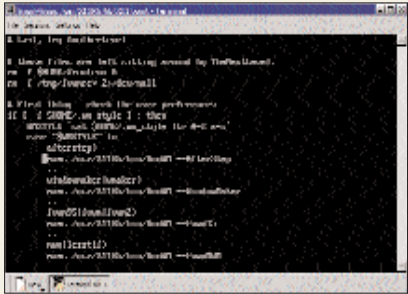
Use the terminal to change your window manager

Xclients file present in your home directory and not the one at /usr/X11R6/lib/X11/Xinit/Xclients. Changing the configuration in this file changes the default for all users and that's something you might not want.

◗ Changing your window manager in Gnome or KDE

Changing the window manager in Gnome is quite simple. Go to the Settings options and select Gnome Control Center. In the Control Center, go to the Window Manager option. Select the window manager you want and click on Try to make it the default.
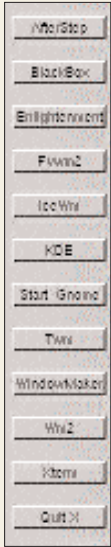
If you want, you can add window managers to the list through the Add button and by specifying the path. In KDE, you can use the terminal window, and use the command kwmcom go:window manager to specify the window manager that you want to use. However, you must first ensure that you have kwmcom installed.

Alternatively, you can

Use guichooser to change window managers

KDE Keyboard Shortcuts

[Alt] + [Esc] or [Control] + [Esc]: You get the KDE session manager using which you can either switch to a specific application or log out of KDE
[Alt] + [Tab] or [Alt] + [Shift] + [Tab]: This switches between all the open windows
[Ctrl] + [Tab] or [Ctrl] + [Shift] + [Tab]: Switches between your desktops
[Alt] + [F2]: Opens the run terminal to execute programs
[Alt] + [F3]: Gives you the window menu for the application
[Alt] + [F4]: Closes the window you are currently working on
[Ctrl] + [F1] to [F8]: Switches to the desktop number
[Ctrl] + [Alt] + [Esc]: Closes all the open windows
[Ctrl] + [Alt] + [Numpad +]: Moves to the next available screen resolution
[Ctrl] + [Alt] + [Numpad -]: Moves to the previous screen resolution

KDE Mouse Shortcuts
Clicking on border or the title bar: Left-click activates and raises the window, centre-click activates and lowers the window, while right-click shows window menu if it is active and if not, activates it.
Double-clicking on the window title: Maximises the window
Dragging on edges: Resizes the window
[Alt] + Left-click: Moves the window around
[Alt] + centre-click: Raises the window
[Alt] + right-click: Resizes the window
Clicking on the top-left icon: Pops the window menu
Clicking on Maximize: Left-click maximises the window, centre-click maximises only vertically while right-click maximises horizontally.

26

Ad will come

Choosing the Window Manager

Windows may give you screensavers and themes. But Linux goes a step ahead and bundles entire window managers with the different configurations possible in each window manager. Different window managers are normally bundled with different distributions and if your distribution doesn't come with it, you can always download them. The window manager you use also depends on the desktop environment you have—KDE or Gnome.

For instance, Sawfish works only with Gnome, rather window managers built with GTK will work only in Gnome. Here are some of the popular window managers for Linux. You can get more information on window managers from www.plig.org/xwinman .

Fvwm: Want to experiment with a basic window manager first? Then you can start with Fvwm. Fvwm lets you launch programs from a menu that pops up when you click on any blank area on the desktop.

You even have a customisable button known as GoodStuff in which you can add the programs that you want to launch. Fvwm can be quite a useful window manager, especially if you are low on system resources and want more speed than features.

Fvwm95: Want the Microsoft Windows feel with Fvwm? Then you had better shift to Fvwm95, which is configured to look like Windows 95. So you get back

Linux gives you many window managers

the look and feel of the Start menu. You can add or remove the contents of the Start menu by editing the fvwm95 configuration file, but unlike Windows, you do not have the option of dragging and dropping files on the desktop.

AfterStep: Afterstep's look and feel is largely based on the Nextstep desktop (from the erstwhile NeXT OS). Afterstep adds a certain glamour to the desktop environment with beep sounds and animations when you click on a functional icon such as minimise or maximise. You can configure most of the properties of Afterstep, such as its look and feel, through the pop-up menu. However, if you want to add files to the menu, you cannot get away without editing the configuration file. There are other features too such as controlling mouse speed. So, if you like heavy graphics and animation, AfterStep is the window manager to go in for.

Enlightenment: Configuration, customisation, flexibility. If these are the key factors you are looking for, then you'll like Enlightenment. With this window manager, not only can you apply different colour combinations and styles, but also design your own template if you wish. Here too there are a number of graphical utilities such as borders and beeps to enhance your desktop. A graphical interface allows you to configure the various themes or switch between them. Enlightment combined with the Gnome desktop environment makes for a good choice.

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use a tool known as guichooser that lists all the window managers, and lets you select the one you want.

Handling your documents

If you want to change the way certain
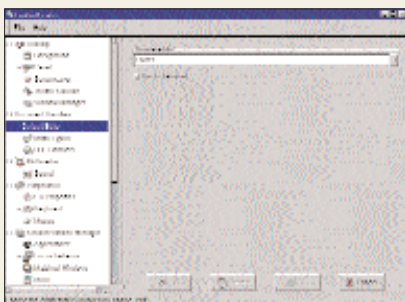
Changing your default editor in Gnome

file types are viewed, edited or manipulated, you can do so from the Document Handlers section in the Gnome Control Center. The Default Editor option, for instance, will allow you to specify your default editor while working with text of any sort. When you click on files associated with editing or text, the selected editor will open up automatically.

Working with different browsers

Given the different type of application-URLs or file-associations, you can specify which browser will handle the URL through the URL Handlers option in Gnome Control Center. You can specify the default browser for a Web page, or for

ghelp that is used for all Gnome documentation and by default opens in Nautilus (Gnome File Manager and help browser).

The ghelp URL is usually used for documentation, and there are also URLs associated with man pages that also get opened in Nautilus. You can change the browser for any of these types of URLs by changing the browser in the handler textbox and clicking on the Set button.
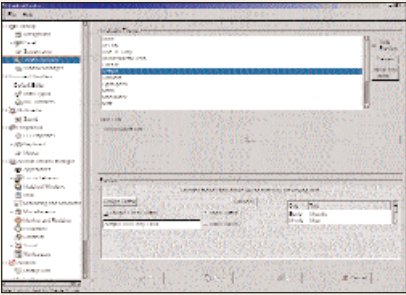
Selecting themes in Gnome

You can work with different themes for your window manager using the Theme Selector capplet. The GTK themes that you get are settings that allow you to

Ad will come

change the look and feel of the interface, including the buttons, menus, scrollbars, etc for all the Gnome applications.

Changing the themes in Gnome

From the Theme Selector capplet, select a theme from the Available Themes. Enable auto-preview and you can see the changes live. Click on the Try button to apply the theme.

While you get a basic set of themes loaded with Gnome, there are others that you can get from http://gtk.themes.org. Download the theme, and then click on the Install new theme option in the capplet. Browse to the location where you downloaded the theme.

Click OK and Gnome will automatically install the theme and you can preview it from the Available Themes option.

You can also customise your fonts if you want from the themes. Just select the custom font checkbox and click on the font button. Now, you will be presented with a font selection option wherein you can specify the font, the style and size.

Using the KDE taskbar
The taskbar is quite useful in order to keep track of all the applications that are running. The taskbar can be placed in a separate location from the KDE panel or it can be placed right there on the desktop. By default, the taskbar is located at the top of the desktop, while the panel is at the bottom.

If you want to change this, right-click on the panel, and select Settings to open the Kpanel Control Module. Choose the placement from the Panel Location
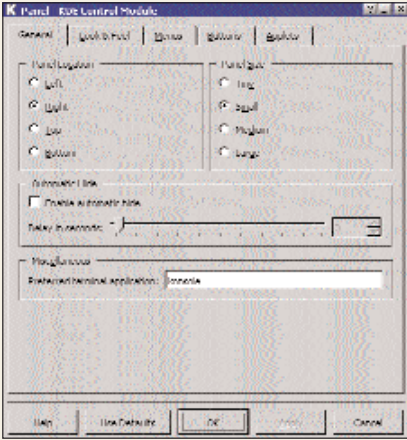
Change settings from KDE Control module

option in the General tab. You can also maximise the application currently running or bring it to the front by clicking on it in the taskbar.

Reading the manual pages in KDE
Use [Alt] + [F2] to open the run window and type man command name (where command name is the actual command). This will open the manual pages and even unzip them on the fly if they happen to be in a compressed state. You can also use the Help Center for the same purpose. Click the Help Center icon on the toolbar, and you will see an entry called Unix manual pages in the left pane. Click on it to view all the installed manual pages in the system.

Disabling KDE defaults for non-KDE applications
If you are running KDE as your default
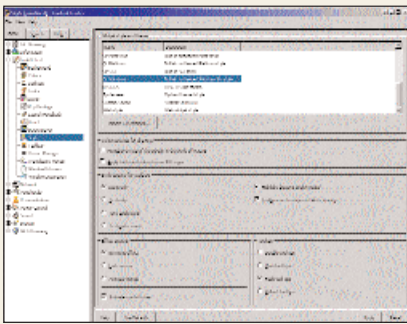
Modify defaults for non-KDE applications

desktop environment, you will find that some non-KDE applications behave strangely with fonts not displaying properly at all.

You can prevent this from happening using the Look and Feel option. Click on the K icon, go to Preferences > Look and Feel > Style and from here disable the option to apply fonts and colours to your non-KDE applications.

If this does not seem to work, ensure that you click on OK directly without clicking on Apply in the same Preferences menu. If there's still a problem, then another method is to delete app-defaults directory located at /KDEDIR/share/apps/kdisplay.

What this does is prevent KDE from locating the X resource files that it needs to apply the default settings. When you exit your KDE session and everything should be back to normal.

Using the Windows shortcuts of your keyboard
Of what use would the Windows keys on your keyboard be in Linux, you might wonder?

Well, you can configure your KDE such that even these keys come in use. For this you will have to configure your X server using xmodmap to link the keycodes for those extra keys to useful X functions.

The first step involves creating a file.Xmodmap in the home directory. Use your favourite text editor, and add the following entries:
keycode 115=F13
keycode 117=F15
(Here, we are assuming a standard keyboard mapping. To check the actual codes for your keyboard layout, use the command xev). Then type the command, xmodmap ~/.Xmodmap.

What this will do is assign [F13] to the Start key in the keyboard and [F15] to the Windows key. Now open the KDE Control Center and go to Shortcut Keys > Global Shortcut. Set the shortcut of [F13] to Pop-up system menu and that of [F15] to Windows operation menu.

Ad will come

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COMMAND LINE CONFIGURATION

You can enhance you Linux experience quite a bit if you don't harbour any hang-ups about entering commands in the terminal window or editing configuration files

Installing True Type fonts

If you like the Windows feel, you must sorely miss the True Type fonts and especially so if you are browsing using Netscape. The sites just don't feel the same. The option? Install your True Type fonts in Linux itself. You can use a utility called Xfree 4.0 that has been around for some time and comes with True Type support. First, create a directory called truetype in /usr/X11R6/lib/X11/fonts/ for the True Type fonts and copy all your .ttf (True Type fonts) files into this directory. Now, from within this directory, run the command mkttfdir. After this, add the following line to your XF86Config file: FontPath /usr/X11R6/lib/X11/fonts /truetype (where truetype is the directory you created). Restart X. Now, your Netscape or for that matter even your word processing software will give you the familiar Windows feel.

Adding or removing font paths from X

You can edit the XF86Config file to add or remove your font paths. And you can do the same even while working in X using the xset command. Use the command xset +fp,fp+,fp- fontpath. Here the plus sign before fp adds the new font path before the current path. The plus sign after fp appends the font path. Similarly, the minus sign removes the specified font path. For instance,
xset +fp /usr/X11R6/lib/fonts/truetype will add the truetype directory fonts before the existing selection.

Shutting down from a desktop environment

Even within the desktop environment, whether KDE or Gnome or anything else, you can use the terminal window or console for shutting down or restarting. Open a terminal emulation window and type shutdown -r or shutdown -h to reboot or shutdown your system, respectively. You will have to enter your password in the dialog box that comes first. Remember that this will close all running applications and you will not have the option of saving your work or the session.

Killing an X session

Well, it's quite possible that a KDE or Gnome session might crash, so in such cases you can kill the X session and get the login prompt by using the [Ctrl] + [Alt] + [Backspace] keys. Again, make sure you save your work before trying this out.

Copy-paste in terminal window

To copy-paste text with the mouse, you need to have gpm installed. You can then highlight the text with the mouse, move the cursor to the desired location and use the centre-button to paste the text. And if you don't feel like using the mouse, you can always use the shortcut keys [Shift] + [Insert] to paste the text.

Optimising terminal emulators

Most of us don't really bother about the terminal emulator that we have in our desktop environment. We generally end up using the default xterm that is standard with most distributions.

But in case of a slow video card, rxvt is a better option since xterm contains legacy codes and seems unduly bloated for a simple terminal emulator. xterm tends to be bloated because it not only functions as a plain text terminal emulator but also has the capability to emulate graphical modes which are rarely used.

With a graphics card that isn't exactly fast, xterm may end up consuming quite some time. So you should switch to rxvt. rxvt also has some features such
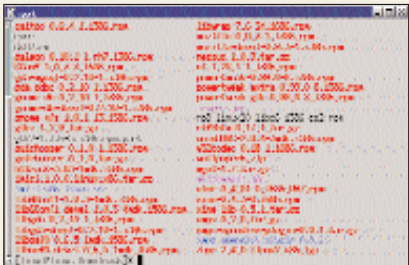

Use the rxvt terminal emulator

as pixmap backgrounds and a better scrollbar. You can use the pixmap option on the command line to any .xpm-format picture in the background and without hogging up the system resources at that.

Sound and mouse configuration

You can disable the terminal bell in X by running the command xset -b. You can also specify settings for the bell with this command line. For instance, xset b 50 500 5 would change the setting of the bell to 50 per cent of the original volume at 500 Hz for 5 milliseconds. A similar tool known as gxset is available with a GUI interface and this too allows you to modify mouse acceleration features.
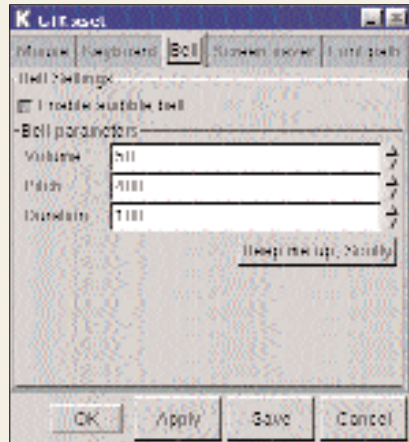
Change bell parameters with gxset

Some command line tools

There are some nifty command line tools that let you better your X experience. Xfig is a vector drawing program that can be quite useful for charts and documentation. xfontsel is a font selection utility for X.

You can use the command xterm -fn xfontsel -print & to choose a font in which to open the xterm window. xmag acts like a magnifying glass in X and sports some other cool features too. xmodmap allows you to edit and display the keyboard modifier map and keymap table.

With xsetroot you can change the colour of your desktop and it can work in conjunction with a colour selector tool like xcolorsel. So a command such as xsetroot -solid xcolorsel will allow you to select the colour and set your desktop to that colour.

Run xwininfo and then click on any window and see the additional information that you get.

NET ACCESS WITH LINUX

You may be using Netscape or Mozilla, or even trying out Konqueror, the default browser that comes with KDE. Plus there are different e-mail clients for Linux. Tweaking them will make your Web experience more enjoyable

Changing font selection in Netscape

Most Web pages tend to have True Type Fonts defined and therefore a Web page
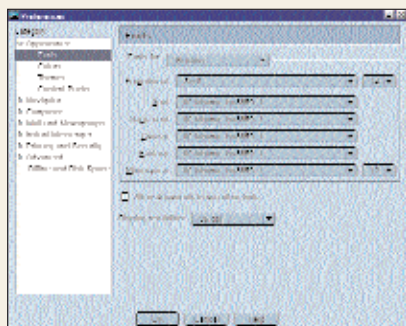
Configure fonts in Netscape

may not look quite as smart in Netscape when you open it up in Linux as it tends to use a substitute font for your Verdana or Arial as you may have chosen..

You can install True Type fonts as described earlier, or you may choose to go to the Preferences menu and under the Appearances option, enable Use my fonts overriding document-specific fonts.

This will then use the fonts that you specify in Netscape, thereby sprucing up the page and making it look better.

Customising Netscape's Toolbar

You can remove a lot of the clutter in the Netscape toolbar by modifying the Xdefaults file.

Add the following lines to the file:

Netscape*toolBar.myshopping.isEnabled: false
Netscape*toolBar.destinations.isEnabled: false
Netscape*toolBar.search.isEnabled: false
Netscape*toolBar.viewSecurity.isEnabled: false
Netscape*toolBar.home.isEnabled: false
Netscape*toolBar.print.isEnabled: false

Conversely, you can also add three lines to bring up a 'search in page' option in Netscape.

Netscape*toolBar.userCommand1.commandName: findInObject
Netscape*toolBar.userCommand1.labelString: Find
Netscape*toolBar.userCommand1.commandIcon: Search

After adding these lines, run the command xrdb -merge ~/.Xdefaults and restart Netscape.

Opening Netscape Mail without the browser

If you check mail more often than you do Web sites, you have the choice to start only the Netscape mail client. For this, type netscape -mail &.

Alternatively, you can also configure Netscape such that it opens the mailbox
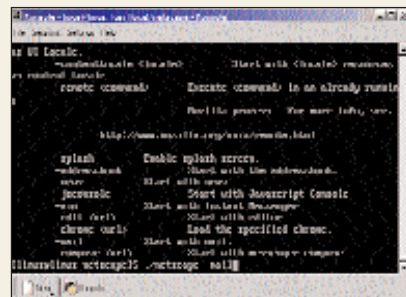
Opening Netscape Mail from the terminal

by default instead of the browser window. To enable this, start Netscape and go to Edit > Preferences > Appearances. In the On Startup option, select to launch the mail client

Konqueror with a terminal

If you are used to working continuously on the Linux terminal, Konqueror has a feature by means of which you can use the terminal even while you are browsing. In the Konqueror menu, go to Window > Show Terminal Emulator and you get the terminal at the bottom of the screen.

Configuring multiple accounts in KMail

If you are using KMail for checking your e-mail and have multiple POP3 or IMAP accounts, then you can easily configure it to check all the accounts at regular intervals of time and even automatically
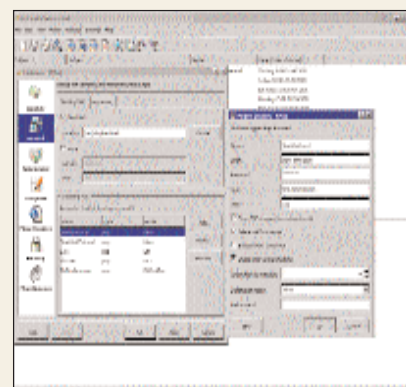
Configure Kmail for multiple POP3/ IMAP accounts

Ad will come

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redirect these mail to specific folders that you may have set up.

For this, click on Settings > Configuration in KMail. If you have already added accounts, you need to modify very little to get the above things working.

Combating spam with KMail Bounce feature

Most e-mail clients tend to have filter rules for combating spam, but you know that many times these filters are of no use
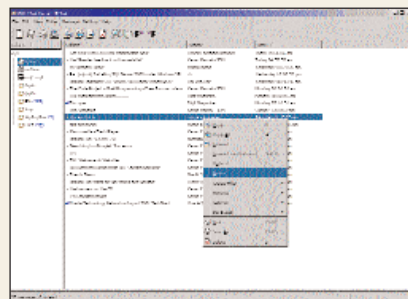
Remove spam using Kmail Bounce

and you are bombarded with spam from all over.

KMail uses quite a different feature to combat spam mail. It uses a feature known as Bounce, wherein when you receive a spam mail, you can opt to send a reply to the spammer with the subject 'mail not delivered' because of different reasons. The reasoning is that the spam list will automatically remove you from the list if it gets a 'mail not delivered' message. To access this feature, go to the Message options in the KMail toolbar.

Automatically checking e-mail

Instead of opening Netscape Mail or KMail and keeping it on all the time, you can use the mailcheck applet to notify you of new mail. Right-click on the Gnome panel, and choose to Add applet > Network > Mailcheck. Click the middle mouse button to access the mailcheck properties.

You have six sections here: the Execute option runs a program before checking for new mail. When new mail arrives, using the Execute option, you

can specify that the program you want opened should be the mail client that you are using.

You can specify the time lapse before checking for new mail, and also tell it to play pre-defined sounds or animations when new mail arrives. The mailbox option is where you give in details of your POP3/IMAP account such as your username, password and the servers.
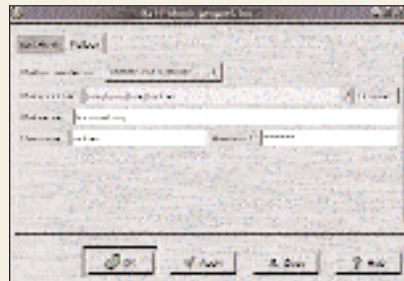
Use mailcheck for new mail notification

Making Konqueror assume Netscape's role

Many sites check the browser you are using and render pages according to the browser. You can set Konqueror to appear like Netscape to such sites. For this, open the KDE Control Center and select Web Browsing > User Agent and add the desired user agent.

Running Java applets in Konqueror

To run Java applets even within Konqueror, browse a Web page and then in the Konqueror menu bar, go to Settings > Configure Konqueror > Konqueror Browser and select to run Java applets.
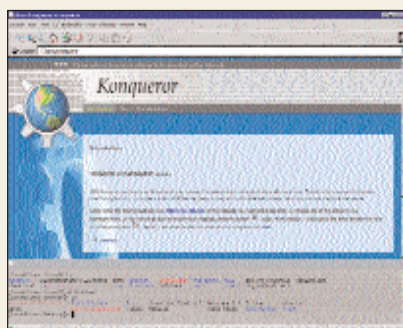
Konqueror: An alternative browser
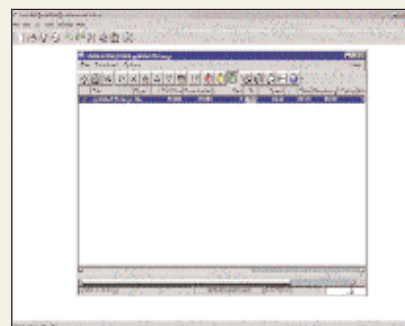
Working with WebDownloader

Download managers for X

You can use download managers such as WebDownloader with your browser. This particular program can download almost everything automatically and is faster and more stable.

Just paste the link in WebDownloader and watch the download happen. Even if you get disconnected, it has the ability to resume from the point it stopped.

Faster Web browsing

You know that you can always browse faster using IP addresses than domain names. Linux has several methods of converting IP numbers and domain names, and the most common is the /etc/hosts file that contains the IP address and the corresponding domain name.

Also, if you install a DNS server locally, you will be able to process requests faster. But even without the DNS server, the /etc/hosts file helps since your system will check this file first for the known domain name to IP address resolution. Editing this file is quite simple, and all you have to do is add the IP number, name and any aliases to this file. You can also use a script that will automate the adding of addresses to the /etc/hosts file. Use the following command: !/bin/bash HOST="$1" IP=$(host "$1" | cut -f3 | head -1) ALIAS="$2" echo "$IP" "$HOST" "$ALIAS" > > /etc/hosts.

You can just invoke this by using the domain name and an alias if you want. For example, ./hostit thinkdigit.com d, will add the site thinkdigit.com with the alias d

Ad will come

IN TEST: 24 MONITORS

They say image is everything. So
if you are looking for a monitor
that displays sharp images and
comes at a price that suits your
wallet, then read on

ALIASGAR PARDAWALLA and ASHU MEHROTRA

Are you a design professional hunting for a
monitor that can offer you clean and sharp
images? One that can show up all the
details? Or maybe you are someone looking
for a 'no high jinks' monitor, one that you can
work with for prolonged periods of time without
getting the cross-eyed look. Something that suits
your work, your eyes and your pocket.

The monitors that we reviewed were divided
into three categories: 15-inch, 19-inch and 21-
inch. We also tested LCD monitors of all sizes,
but we performed only a feature test (usability,
ease of use, image quality, features) on these and
not a comparison test. All the monitors we test-
ed were priced below Rs 50,000 (all-inclusive)
for the end user.

Performance test
Does the monitor give you eye strain while you
are viewing it? The performance tests conduct-
ed on the monitor explain what you should be
looking for to avoid such problems.
Geometry test: When you connect a new mon-
itor to your PC the first thing that you might do
is adjust the screen so that it perfectly fits the
raster. That is, you want that the rectangular area
on the screen for display purposes (the viewing
area) should be as close to the physical dimen-
sion of the screen as possible. This is obvious
since you might as well make the best use of the
viewing area that you have.

While this is an important adjustment that
you make, it is equally necessary to correct the
geometric irregularities that may appear—

Contents

Glossary

Pincushion and Barrel distortion: This is the geometric distortion in monitors where a geometric shape doesn't appear as it should. Pincushion distortion is when the screen bends inwards from the edges, whereas barrel distortion is when the screen bends outwards. This can be corrected by the special circuitry in the monitor.

Screen regulation: The screen expands in size when it suddenly turns bright from dark. This could be either in some part of the screen or the complete screen size might change.

Focus matrix: This is the pattern that tells how good the sharpness of the monitor is. It produces a coarse and fine test pattern on the screen. Many monitors show the pattern sharp in the middle and blurred around the corners.

Streaking and ghosting: When there is substantial difference in the intensity in adjacent areas of the screen, the streaking and ghosting effect occurs. The faint but visible trail (like a comet) visible in low intensity areas at the edge of the bright area is known as streaking. Ghosting on the other hand is the shadow formed at the edge of the image.

Black- and white-level shift: The shifting of the white or black colour on to the adjacent colour is known as level shift. The edge here will appear blurred.

RGB colour purity: This test produces pure RGB colour one by one on the screen and any irregularities are looked out for. Monitors mainly show more than one shade of a colour on the screen, whereas in the ideal case it should produce the colour precisely and uniformly across the screen.

Defocusing, blooming and halos: The bright image will always look thicker than the image less bright. This is a function of both the CRT and the human visual system.

CRT Shadow Mask Distortion: When the screen is kept bright for a long period of time, the ghost image of that screen will stay as a faint image on the screen even after the screen is changed. This is Shadow Mask Distortion.

TEST PROCESS

The monitors we tested were evaluated on the basis of two main parameters: performance and features.

While testing for performance, we used DisplayMate as the benchmarking tool. This software generates test images using which we examined the features of the monitors. We checked for the clarity of patterns displayed on the screen, the accuracy of the screen's internal geometry (whether the lines were parallel or not), the effect of screen brightness on the size of an image, the monitor's ability to accurately display an image at high resolution, and whether there was a streaking effect when there was a change in intensity in one part of the screen.

We also looked for white and black level shift, colour purity, screen uniformity and flickering.

Among the features that we looked for were, data memory for video modes, number of storable modes, clarity of the OSD text and energy saving features. Apart from these, we also checked out factors such as ease of use, help and troubleshooting features, build quality and price.

distortions such as lines not being parallel, circles appearing oval and squares looking like rectangles. 15-inch monitors using the Shadow Mask technology witness such geometric distortions due to the fact that if the dots or pixels on the shadow mask are very bright, they tend to bleed together making lines look thicker or jagged. The distortion could be due to the inaccuracy of the electron beam deflection or faults in the support electronics. The distortions are usually prominent at the corners of the screen.

The DisplayMate test for geometric distortion and screen regulation revealed that almost all the monitors in the 15-inch category had visible distortion except for Sony CPD-E100 and ViewSonic E53. But even these monitors were not able to give a distortion-free reading when we checked on the left and right edges using a digital Vernier calliper.

However, the 19-inch monitors performed quite well with hardly any increase in screen size except in the case of Samsung SyncMaster 900NF which gave a low score in the geometry test since the lines were not perfectly parallel and there was a slight expansion in the screen when the brightness was increased. Acer's P911 monitor did well in this test, though the 15-inch monitor from Acer returned unsatisfactory results.

In the 21-inch category, the LG StudioWorks 221U was almost perfect in producing parallel lines and gave above average result in the screen regulation test, especially in the symmetric and asymmetric regulation test.

The geometry of the monitor is important for those who are using CAD software, especially on a 19-inch or a 21-inch monitor, since these are the people who have to deal with lines, circles and polygons all the time. So, if the monitor is not capable of generating these perfectly, the design that appears on screen may not be up to the mark.

There are many free utilities such as vgatest available on the Net, which you can use to minimise the geometric distortion. This software, for instance, produces a test pattern on the screen, using which you can adjust the pincushion and barrel distortion.

Sharpness and resolution test: These tests are important for those in design-related professions. Sharpness and resolution is what you pay for and if, after creating what you think is a perfect image it doesn't show up that well, then most likely the monitor would be the culprit.

For testing the image sharpness and clarity of resolution, we ran seven different patterns in DisplayMate. The first pattern was the horizontal bar resolution test where there were a total of five bands with the vertical bar at the

The 19-inch Acer P911 has a good build quality and reproduces sharp images

The Display of Your Choice

Given the wide range of monitors available in different sizes, what exactly should you go in for? 15-inch monitors are still considered the primary choice for all new systems for both the home and the office because of the price factor. These monitors cost around Rs 4,000 less than a 17-inch monitor, so unless you really need a bigger viewing area, it doesn't make much sense going in for a 17-inch monitor. However, just like the 15-inch eased out the 14-inch, in the coming years, the 17-inch might replace the 15-inch as the standard. For people who need to do basic image-editing work or those who can afford the price, a 17-inch monitor will offer a better viewing experience as also better resolution and quality.

The 19-inch category as of now, is way too expensive. However, given its viewable area, it's the perfect choice for the professional and medium to large DTP setups. The 18-inch viewable area that you get is almost perfect for the professional designer or those working on CAD/CAM workstations.

The 21-inch monitor provides for unmatched screen size and resolution and is more suited for people like interior designers or architects who have to deal with big designs and drawings. The screen size eliminates the need for scrolling in most of the cases. But remember that 21-inch screens are quite expensive, starting off at around Rs 45,000 (roughly the cost of a new, assembled system).

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one-fourth, one-third, half and full resolution with a solid reference band. Here, we observed the full resolution band and saw whether there were any gaps visible between the two bars. The vertical bar resolution test does the same with the bars being placed vertically.

Among the 15-inch monitors the one that did quite well in these two tests was the Compaq MV540. It clearly showed gaps between the bar, but a slight moiré pattern was visible. The moiré pattern occurs when two identical dots overlap each other and the alignment is not perfect. The line (dark and light) pattern that appears is called the moiré pattern. If the electron beam doesn't perfectly match the dot on the shadow mask then the moiré pattern will appear, especially in the fine resolution images with tiny details. In fact, the moiré pattern was visible in all the monitors. The Sony CPD E100 showed more moiré pattern than the rest, but you could easily reduce this by 80-90 per cent using the moiré cancellation feature present in the OSD.

To evaluate the monitor's capability of displaying fine detail properly, the focus matrix test was run. A total of five tests were run and we observed the coarse, fine

The 15-inch Compaq MV540 comes with good-quality detachable speakers

and diagonal resolution matrix pattern.

HP 55, ViewSonic E50 and Microtek Flatvision38FI, performed well in this test. The coarse pattern was displayed perfectly, the diagonal lines also did not show much jaggedness and the fine pattern emerged clearly too. However, all the monitors showed slight haziness in the corners, making the pattern lose its sharpness in the corners.

In the 19-inch category, the monitor that did well in these tests was the Acer P911, which displayed the pattern clearly, with no moiré pattern. But even this monitor showed a coloured tinge in the pattern, which made the lines appear off-white.

In the 21-inch category, the LG StudioWorks 221U was a shade better than the Viewsonic G810 but again both the monitors showed a slightly hazy image in the corner.

Screen pixel resolution: Your video card renders the image that you see on the monitor in conjunction with the display driver. The pixels that make up the image are arranged horizontally and vertically. This arrangement makes it almost impossible to generate the perfect curve or inclined line because the neighbouring pixel has to be lighted up. If this neigh-

bouring pixel is not a point on the curve or inclined line, then there will be jaggedness.

To observe how well each monitor showed up the inclined lines, we used a scaled diamond pattern. This test gives us a fair idea of how the image will look at different resolutions and the amount of jaggedness that will occur in the image and in which area. Design professionals may find the results useful because they can then decide whether they need to use the anti-aliasing utility to make the inclined lines and curves smoother, though this may take up some amount of memory.

We found that all the monitors, irrespective of size, gave almost the same result with slight differences in the jaggedness of the inclined lines.

**Colour and gray scale:** This test looked at the streaking and ghosting effect, white and black level shift and red, green and blue colour purity. Streaking is the trail of colour that sometimes follows a moving image. This happens when there is substantial change in the intensity of light in the adjacent area. The bar graph is a very good example of streaking (look at the trail that follows the image). Ghosting, on the other hand, is the shadow formed by the image on the screen, which follows it as it moves on the screen.

The streaking and ghosting effect might become a problem, especially for those who make presentations that use different types of graphs. The graphs and images will look blurry due to this effect.

The streaking effect was seen in almost all the monitors but the ghosting effect
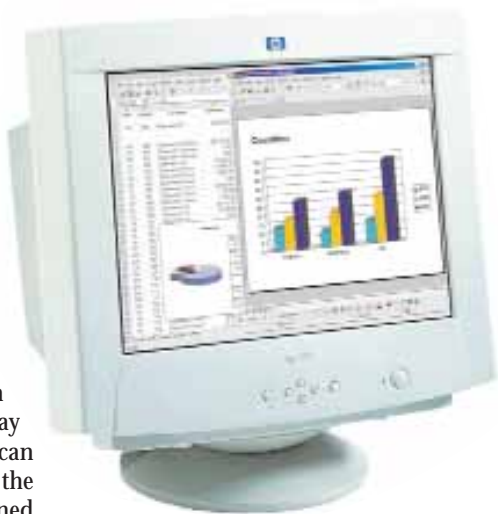
The HP P920: it can take a resolution of 1920x1440 at 70 Hz

was seen only in the LG StudioWorks 995E 19-inch monitor and the Sony CPD E100 15-inch monitor. In the 21-inch monitors, there was slight streaking in the white band for Viewsonic G810 and in the black band for LG Studioworks 221U.

The white- and black-level shift were also observed as a part of this test. You can easily understand the white and black shift if you think of your word processor with a white background and the menu options on a grey background. If the monitor shows a white-level shift, then you will notice that the edges where the grey area meets the white area in the word processor will not be sharp and the white can be seen overlapping on the grey band. This is just an example and you might not notice it much unless you have a 19-inch or a 21-inch monitor. The same is true for black-level shift.

There were a few monitors that showed white-and black-level shift. In the

Identifying Monitors with DDC

DDC, short for Display Data Channel, is the chip that is nowadays incorporated in most new monitors. The sole function of this chip is to communicate with the video adapter and get its properties such as resolution, refresh rate, etc. The newer monitors with the DDC chip not only display the brand name of the company but also the model number of the monitor. Older monitors failed to properly identify themselves to the system and that is why the DDC technology was developed.

The Video Electronics Standard Association developed the serial communication protocol called Display Data Channel.

This chip stored the EDID (extended Display ID) table of the respective monitor, which would communicate with the video card. This made the monitor plug-and-play compatible in Windows 95 and onwards.

DDC chip is nothing but the EEPROM (Electrically Erasable Programmable ROM). The reason why this memory is used is because the DDC chip works in two modes, that is, DDC1 mode where the data is only transmitted to the video card and DDC2 mode which is a little more advanced wherein the video card writes specific information such as addresses to the DDC chip.

Microtek Flatvision 38FI a slight shift was visible at the edge of the bands. The same was the case with the HP 55 and Sony CPD E100.

In the 19-inch category, white-and black-level shift was visible in the Samsung 900NF whereas the white level shift was visible in the HP P920 and LG 995E. In the 21-inch category, ViewSonic G810 showed a slight white-level shift at the edge of the bands, but nothing of the sort was visible in LG StudioWorks 221U.

The monitors were even tested for colour purity in terms of the red, green and blue primaries. In this test, we found that red was difficult to produce—it tended to be brighter in the middle and darker at the corners. Blue and green were produced on the screen with near perfection in most of the monitors. Among the 19-inch monitors, the Compaq MV940 gave good results with no irregularities anywhere on the screen.

The Sony CPD-E100 was the only 15-inch monitor with an Aperture Grille CRT

In the 15-inch category, Acer V551, Philips 105E and Sony CPD E100 all returned good results with the screen perfect throughout in all the three colour purity tests.

In the 21-inch category, ViewSonic G810 gave unsatisfactory results in the red colour purity test with a pink tinge visible at the lower left corner of the monitor and this appeared more prominent on this monitor because of the large viewable area.

Miscellaneous effects: Screen uniformity is an important consideration, especially if you are transferring images from a scanner or a digital camera. Slight changes in colour and you end up thinking of it as a scanning or transfer problem, while the real culprit could be the monitor.

In the 19-inch category, only two monitors, Compaq MV940 and HP P920, passed this test successfully. The remaining either had a colour tinge in the corner or were bright in the middle or in the corners. The 15-inch monitors were not very different in this respect, and only the Compaq MV540 had a uniform screen followed by the Philips 105E that had a uniform screen but for the green line visible at the right edge of the monitor. However, in the 21-inch range, both the monitors fared above average, though the ViewSonic G810 was a little brighter in the middle than in the corners and LG StudioWorks 221U had a prominent blue tinge in the lower right corner.

For 21-inch monitors, it is essential to have perfect screen uniformity because of the large viewable area—any colour tinge or variation is more prominent in these monitors.

The monitors were also tested for flicker and most monitors passed this test at the standard 75 Hz refresh rate. However, the Acer 99SL 19-inch monitor had a lot of flicker even at 75 Hz, which can strain your eyes.

In the 15-inch category, the Comptech CT535 OSD had lots of flicker, which was especially prominent in the white colour. The Krypton V500 was also not flicker-free at 75 Hz, flicker being more visible in light colours than in the dark colours.

One problem that we came across in the dark screen test was that in monitors such as the Compaq MV940 and MV540, Krypton V500 and LG StudioWorks 563N, background objects were clearly visible, which means if you are using an application such as 3D imaging software where the background is mostly black, you will have to adjust the seating arrangement time and again to get rid of the background object which otherwise will give rise to a lot of problems while viewing the drawing on the screen and the small font.

Features

What is the maximum resolution you get, or the actual viewing area? Questions such as these may very well mark your buying decision.

Horizontal and vertical scan rate: Horizontal scan rate is always mentioned in terms of a range, say between 30-98 KHz. This is the number of times the horizontal

lines are scanned on the screen in one second. The horizontal scan rate is controlled by the video card. Video cards are generally capable of generating higher scan rates but it depends on the speed at which the monitor is capable of scanning the electron beam across the screen and then returning it to the beginning of the next line. The monitors that had a higher horizontal scan rate were Sony CPD-E100 and ViewSonic E53 (30-70 KHz), whereas the others had a scan rate between 30-61 KHz.

The vertical scan rate on the other hand is the number of times the screen is displayed in one second and is popularly known as the refresh rate. Like the horizontal scan rate, it is always denoted as a range, but in Hertz, for example, 50-160 Hz. It is controlled by the vertical sync rate by the video card. Vertical scan rate is limited by the horizontal scan rate and the maximum resolution of the monitor.

Almost all the monitors had a refresh rate in the range of 50-120 Hz. Refresh rate is very subjective because at 60 Hz you might find the screen flickering whereas others might not find it so. So when buying a monitor, check out the range of horizontal and vertical refresh rate.

Video bandwidth: Normally, most of us tend not to notice this feature while buying a monitor as this is not mentioned anywhere on the box and may not be mentioned in the manual either. But it is an important feature as greater the video bandwidth of the monitor, higher the refresh rate it can take at a higher resolutions, thus affecting image quality. Video bandwidth is the product of refresh rate and maximum resolution (horizontal resolution x vertical resolution x refresh rate= video bandwidth) and is measured in mega hertz (MHz).

In the15-inch category only ViewSonic E53 and Sony CPD-E100 had a video bandwidth of 110 MHz and 108 MHz, respectively, whereas the Samsung 55E had a bandwidth of 80 MHz, which is still on the higher side and gives the monitor the ability to work at 1024x768 at a refresh rate of 72 Hz .

Video bandwidth is higher in 19-inch monitors than in 15-inch monitors because of the screen size. The monitor that offered the best bandwidth was Samsung SyncMaster 955DF (240 MHz), while the Samsung 900NF had the lowest video bandwidth (135 MHz) in this category.

Among the 21-inch monitors, the LG Studioworks 221U had 30 MHz

TFT Display Tech

Flat Panel displays, also called Liquid Crystal displays (LCDs), have shown improvement in terms of features, technology and price by quantum leaps over the past year. In the past, they were accessible only to that select group of people who had the money and wanted to have the most appealing display systems available.

Two of the main technologies available in Flat Panel display systems are Active Matrix displays, more popularly known as TFTs (Thin Film Transistors), and Passive Matrix displays or DSTN (Dual Scan Twisted Nematic).

LCD screens use liquid crystals. Invented by James Fergason in 1970, liquid crystals are organic compounds that exhibit characteristics of both solids and liquids.

When light is passed through this nearly transparent substance, it gets aligned with the molecules of the liquid crystals as it passes through. Additionally, if an electric field is applied to these crystals, their alignment can be changed and consequently, so can the behavior of the light passing through it. This works in much the same way as do blinds on a window—depending on the orientation of the slats, light is passed or blocked. In the case of the slats, we change their orientation by hand while in the case of TFTs, the microscopic orientation of the LCD elements are changed by passing a voltage between them.

In the construction of LCD panels, the liquid crystals are sandwiched between two very finely grooved layers that serve to arrange the crystals in accordance with the layers. Since the molecules follow the grooves, if the grooves are parallel, then so are the molecules. There are two grooved surfaces used where one set is aligned 90-degrees compared to the other, hence disallowing the passage of light. However, if an electric field is applied to one set of these grooves, these liquid crystals become aligned, allowing the passage of light. This principle is used in the creation of all types of Flat Panel screens used today, including DSTN and TFT screens.

TFT vs CRT Screens

Display Type	Viewing Angle	Contrast Ratio	Response Time	Brightness	Power Consumption	Life
Passive Matrix LCD	40-100 degrees	40:1	300 ms	70-90	45 Watts	600,000 hours
Active Matrix LCD	> 140 degrees	140:1	25 ms	70-90	50 Watts	600,000 hours
CRT	> 190 degrees	300:1	NA	220-270	180 Watts	Years

Due to the technologies used, various types of display systems exhibit different performance and display characteristics. This is a brief comparison of the most common parameters between the CRT (Cathode Ray Tube), the Active Matrix LCD (TFT) and the Passive Matrix TFT (DSTN).

nology: The Inside Story

One inherent shortcoming with DSTN displays is the fact that the response of the elements is very slow. This results in a smearing caused in the image due to the inability of the screen to update fast enough to display new signals. The older DSTN displays use a material that typically has a response time of about 300 ms—almost a third of a second—making these displays highly inappropriate for fast moving graphics and multimedia-intensive applications.

One of the most prevalent technologies in the LCD arena that has proved to be very effective in both speed and image contrast is TFT. With response times of 25 ms, these displays are quite suitable for multimedia and video applications that need the screen to have fast switchover times.

TFT screens are constructed using an additional transistor to drive each of the RGB lines for every pixel. Since the switching capability of these transistors is very fast, the problems of ghosting and blurring of the images are significantly reduced. One of the disadvantages with TFT screens is that if any of the transistors fail, that pixel on the screen will remain permanently off. In its infancy, LCD screens used to have the crystalline material placed such that it ran vertically from the top to the bottom of the screen with the voltages changing the direction of these crystals and permitting light to pass through. Therefore, the viewing angle of these screens was rather restricted.

TFT screens today use a crystalline material that is naturally aligned in a horizontal plane, allowing for viewing angles of up to 140 degrees—a very significant

increase over that of passive matrix' 40 to 100 degrees.

The only present disadvantage with TFTs is the pixel size. Until now, manufactures have not been able to get below the 0.3 mm limit, which is way too large by monitor standards. Therefore, when this technology is adapted to 15- and 17-inch computer displays the pixellation, when compared to a high-end monitor is significantly more apparent.

The newest range of third-generation TFT screens designed specifically for the desktop also feature the capability of being driven through digital outputs from the newer graphics cards. This connector, known as DFP (Digital Flat Panel) connec-

tor, eliminates the need to convert an analog video signal to digital format for LCD displays. Staying in the digital realm, there is greater noise immunity and therefore greater image clarity with this method.

Find it on
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More Info on
Test process and reviews
Acer FP563
Convergent CT170
Convergent XTAL6220
Philips 150X
Philips Brilliance 150P
Samsung SyncMaster 151MP
Samsung SyncMaster 570S
Sharp LL – T1501A
check out
Mindware

Specifications

An Eye on the Monitors

Manufacturer	Model	Dealer	Phone	Price	Warranty	E-mail	Viewable area (inches)	Video bandwidth (MHz)	Hor. scan rate (KHz)	Ver. scan rate (Hz)	Maximum resolution	Dot Pitch (mm)	HeightxWidthxDepth (mm)	Weight (kg)	Rating
15-inch Monitors															
ACER	V551	Acer Communications	022-5705230	Rs 7,500	1 year	joe@acercm.com.tw	13.8	65	30-54	50-120	1024x768 at 67Hz	0.28	389x361x384	11.88	B+
COMPAQ	MV540	Avi Electronics	022-6465522	Rs 10,868	1 year	aviteam@vsnl.com	13.8	65	31.5-54	50-120	1024x768 at 60Hz	0.28	396x371x414	13	B+
COMPTECH	CT535-OSD	Comptech Electronics	044-626 6113	Rs 6,800	1 year	comptech@vsnl.net.in	13.8	65	30-54	50-120	1024x768 at 60Hz	0.28	NA	12.5	B
HP	HP 55	HP-India	011-6826000	Rs 9,500	1 year	sunish_raghavan@hp.com	13.8	65	30-54	60-67	1024x768 at 60Hz	0.28	352x354x385	12.5	B
KRYPTON	V500	Priya	022-2663611	Rs 6,500	2 years	jain@priyagroup.com	13.9	65	30-54	50-120	1024x768 at 60Hz	0.28	367x360x382	12.5	B
KRYPTON	M554	Priya	022-2663611	Rs 6,500	2 years	jain@priyagroup.com	13.9	65	30-54	50-120	1024x768 at 60Hz	0.28	367x360x382	12.5	B
LG	Studioworks 563N	LG Electronics India	011-6910123	Rs 7,500	3 years	sanjaym@lgindia.com	13.8	78	30-61	50-120	1280x1024 at 60Hz	0.28	356x371x395	11.7	B
MICROTEK	1569MD	Microtek International	022-8362406-07	Rs 6,875	3 years	sunilkrkaushik@yahoo.com	NA	65	30-69	50-120	1024x768 at 75Hz	0.28	450x460x450	13	B
MICROTEK	FLATVISION 38 FI	Microtek International	022-8362406-07	Rs 6,500	3 years	sunilkrkaushik@yahoo.com	NA	65	30-55	50-120	1024x768 at 60Hz	0.28	460x470x460	12.5	B-
PHILIPS	105E	Philips India	022-6912000	Rs 8,500	2 years	c.d.khatu@philips.com	14	NA	30-54	50-120	1024x768 at 60Hz	0.28	358x380x379	11.5	B
SAMSUNG	SAMTRON 55E	Samsung Electronics India	011-6322517	Rs 8,000	1 year	marketing@samsungindia.com	13.8	80	30-61	50-120	1024x768 at 75Hz	0.24	386x362x386	13.5	B
SONY	CPD-E100	Sony India	022-8313333	Rs 15,215	1 year	salesmb@sid.in.sony.com.sg	14		30-70	48-120	1280x1024	0.24	356x378x389	15.1	B+
VIEWSONIC	E50	Roop Technologies	022-6631921	Rs 7,350	2 years	roop@vsnl.com	13.8	75	30-56	50-120	1024x768	0.28	368x365x394	12.5	B+
VIEWSONIC	E53	Roop Technologies	022-6631921	Rs 7,750	2 years	roop@vsnl.com	14	110	70	50-120	1280x1024	0.27	374x360x390	12	B+
19-inch Monitors															
ACER	99SL	Acer Communications	022-5705230	Rs 28,000	1 year	joe@acercm.com.tw	18	203	30-96	50-160	1600x1200 at 75Hz	0.26	465x448x476	21.5	B
ACER	P911	Acer Communications	022-5705230	Rs 39,000	1 year	joe@acercm.com.tw	18	230	94-11	75.12	1600x1200	0.25	470x502x468	28.2	B+
COMPAQ	MV940	Avi Eletronics	022-6465522	Rs 26,000	1 year	aviteam@vsnl.com	18	162	31-85	50-120	1600X1200	0.26	482.6x457.2x46	24.75	B+
HP	P920	HP-India	011-6826000	Rs 30,500	3 years	Sunish_raghavan@hp.com	18	NA	29-107	NA	1920x1440 at 70Hz	0.24	6	25	B+
LG	Studioworks 995E	LG Electronics India	011-6910123	Rs 27,000	3 years	sanjaym@lgindia.com	18	203	30-96	50-160	1600x1200 at 75Hz	0.26	487x486x472	21.5	B+
SAMSUNG	SyncMaster 900IFT	Samsung Electronics India	011-6322517	Rs 36,000	1 year	marketing@samsungindia.com	18	205	30-96	50-160	1600x1200 at 76Hz	0.2	465x448x476	24.2	B
SAMSUNG	900NF	Samsung Electronics India	011-6322517	Rs 39,000	1 year	sanjaym@lgindia.com	18	135	30-85	50-160	1600x1200 at 65Hz	0.2	483x468x492	25.65	B+
SAMSUNG	SyncMasteR 955DF	Samsung Electronics India	011-6322517	Rs 32,000	1 year	sanjaym@lgindia.com	18	240	30-110	50-160	1600x1200 at 87Hz	0.25	477x462x460	23.31	B+
21-inch Monitors															
LG	Studioworks 221U	LG Electronics India	011-6910123	Rs 52,000	3 years	sanjaym@lgindia.com	20	250	30-115	50-200	1600x1200	0.28	510x498x512	30	A-
VIEWSONIC	G810	Roop Technologies	022-6631921	Rs 50,000	2 years	roop@vsnl.com	20	220	30-97	50-180	1600x1200 90Hz	0.22	475x498x485	27	B+

higher bandwidth than the ViewSonic (250 MHz).

Maximum resolution: The maximum resolution of the monitor is the product of video bandwidth and refresh rate. The higher the video bandwidth of the monitor, the more the resolution at a higher refresh rate.

In the 15-inch category, almost all the monitors had the standard 65 MHz video bandwidth but the ViewSonic E53 had an excellent video bandwidth of 110 MHz and therefore the monitor could easily take the maximum resolution of 1280x1024 pixel at 60 Hz refresh rate and 1024x768 pixels at 75Hz, which is a very good resolution for a 15-inch monitor. The other monitor that could work at resolution as high as 1280x1024 pixels at 60 Hz was Sony CPD–E100.

All the other monitors managed 1024x768 pixels but because of the lower refresh rate it became very uncomfortable to work at that resolution due to the high amount of flicker.

Dot pitch: Dot pitch is the distance measured between two like-coloured phosphor dots—that is, if the distance between two red coloured dots is, say 0.25 mm, then the dot pitch of the monitor is 0.25 mm. A low dot pitch means that the display will be sharp and crisp.

Most good quality monitors have a dot pitch as low as 0.20 mm and you can see this in the Samsung SyncMaster 955DF. Even 15-inch monitors such as the Sony CPD-E100 and Samsung 55E have the diagonal dot pitch as low as 0.24 mm whereas it is 0.28 mm generally.

In the 19-inch category, HP P920 and Samsung SyncMaster 900IFT had a dot pitch of 0.24 mm. In the 21-inch category, ViewSonic G810 had a dot pitch as low as 0.22 mm and this is particularly good for a 21-inch monitor because at higher resolution and a dot pitch as small as 0.22 mm, the image will appear extremely crisp and sharp on the screen, making it a joy to work with image-editing software or watch movies, especially on DVD.

Dimensions: An important consideration, especially if you are tight on space, is the dimension of the monitor. If the monitor ends up taking up all the space on the table, then you better start practising typing with the keyboard on your lap. The depth and width are more of a concern than the height and therefore monitors with less depth and width are considered space savers.

The one monitor that comes to mind while talking about the dimension, especially the depth, is the Philips 105E which had a depth of 379 mm.

In the 19-inch category, the monitor that had the smallest depth was the Samsung SyncMaster 900NF (only 460 mm).

If you are very finicky about dirt and like to experiment with the position of your monitor, then you better consider the weight factor also, as you might have to move the monitor around when cleaning. Preferably, keep your 21-inch or 19-inch in a place where you don't have to move it too much and there's enough space at the back too if you have to adjust the monitor cables—especially if you happen to have the Acer P911, which is the heaviest at 28.2 Kg (even heavier than the 27-kg, 21-inch ViewSonic). The Philips 105E forms the other end of the spectrum, being the lightest at 11.5 kg.
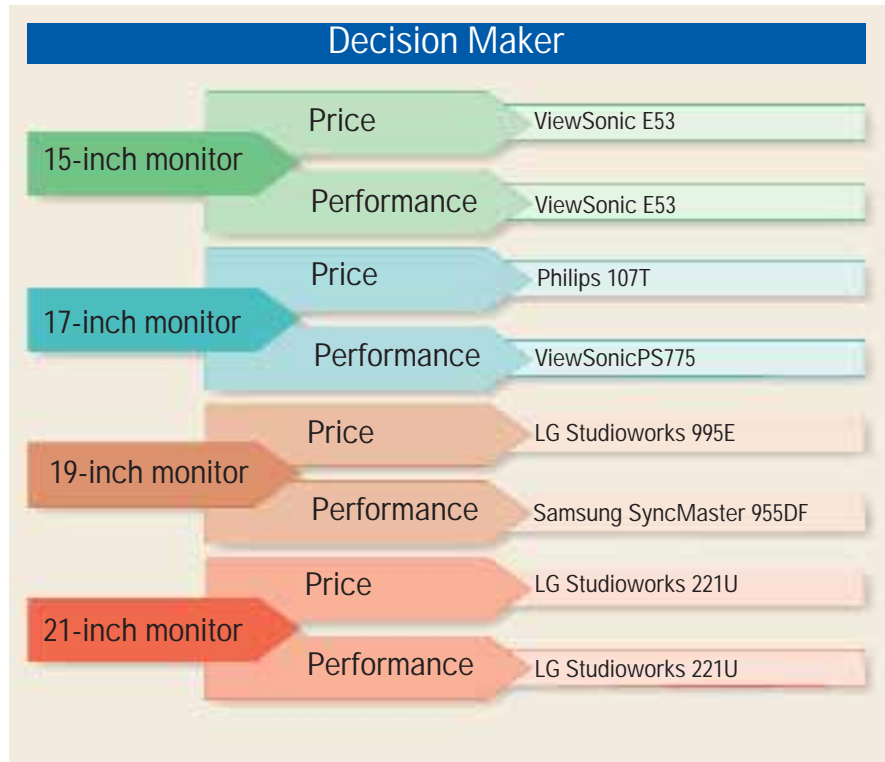
1/2 page H AD

Warranty

We expect our monitors to last a lifetime and most of us ignore the warranty clause. But it doesn't hurt to have a monitor that has more warranty period. The Microtek 1569MD and Microtek Flavision 38FI came with an impressive three-year onsite warranty. This was the shining spot for these monitors, which otherwise showed an unsatisfactory performance.

On the other hand, major players such as Acer, Compaq, HP and Samsung came with only a one-year warranty. Ideally, the monitor should have a two-year warranty. HP-P920, LG Studioworks 995E (both 19-inch) and the 21-inch LG Studioworks 221U sported a three year warranty. This spells as peace of mind given the price that you might shell out for these monitors.

CONCLUSION

The competition was really fierce in the 15-inch category with not much in terms of features or performance to distinguish between the winner, first runner-up and

Decision Maker

15-inch monitor	Price	ViewSonic E53
	Performance	ViewSonic E53
17-inch monitor	Price	Philips 107T
	Performance	ViewSonicPS775
19-inch monitor	Price	LG Studioworks 995E
	Performance	Samsung SyncMaster 955DF
21-inch monitor	Price	LG Studioworks 221U
	Performance	LG Studioworks 221U

ViewSonic E53 (15-inch): an all rounder

Samsung Syncmaster 955DF (19-inch): where performance is the key

LG Studioworks 995E (19-inch): great value

LG Studioworks 221U (21-inch): a clear winner

second runner-up. The **ViewSonic E53** emerged as the winner over the Sony CPD-E100 by a mere 0.22 per cent. Although, Sony performed better, its high price due to the Aperture Grille CRT and lesser warranty of just one year made it lose out to the ViewSonic. The ViewSonic E53 also emerges the best buy for the value conscious.

In the 19-inch category, the **Samsung SyncMaster 955DF** came out tops for many reasons. The monitor was lighter, had a USB hub and even though the price was not the lowest at Rs 32,000, given its performance, the price seems justified. The second in this category was the Acer P911, which again scored higher in the performance test than the Samsung SyncMaster 955DF but lost due to its lower bandwidth, higher price and heavyweight nature. If you are value-conscious, then you might want to try out the **LG Studioworks 995E**.

In the 21-inch category, there was no problem identifying **LG Studioworks** as the clear winner. While both the monitors scored equally well in the feature tests, the LG monitor took the lead by upping its performance, especially in the geometry distortion, colour and gray scale tests. The LG also had one upstream and four downstream USB ports that added to the use of the monitor for different purposes. ◀

IN TEST: 20 GRAPHICS CARDS
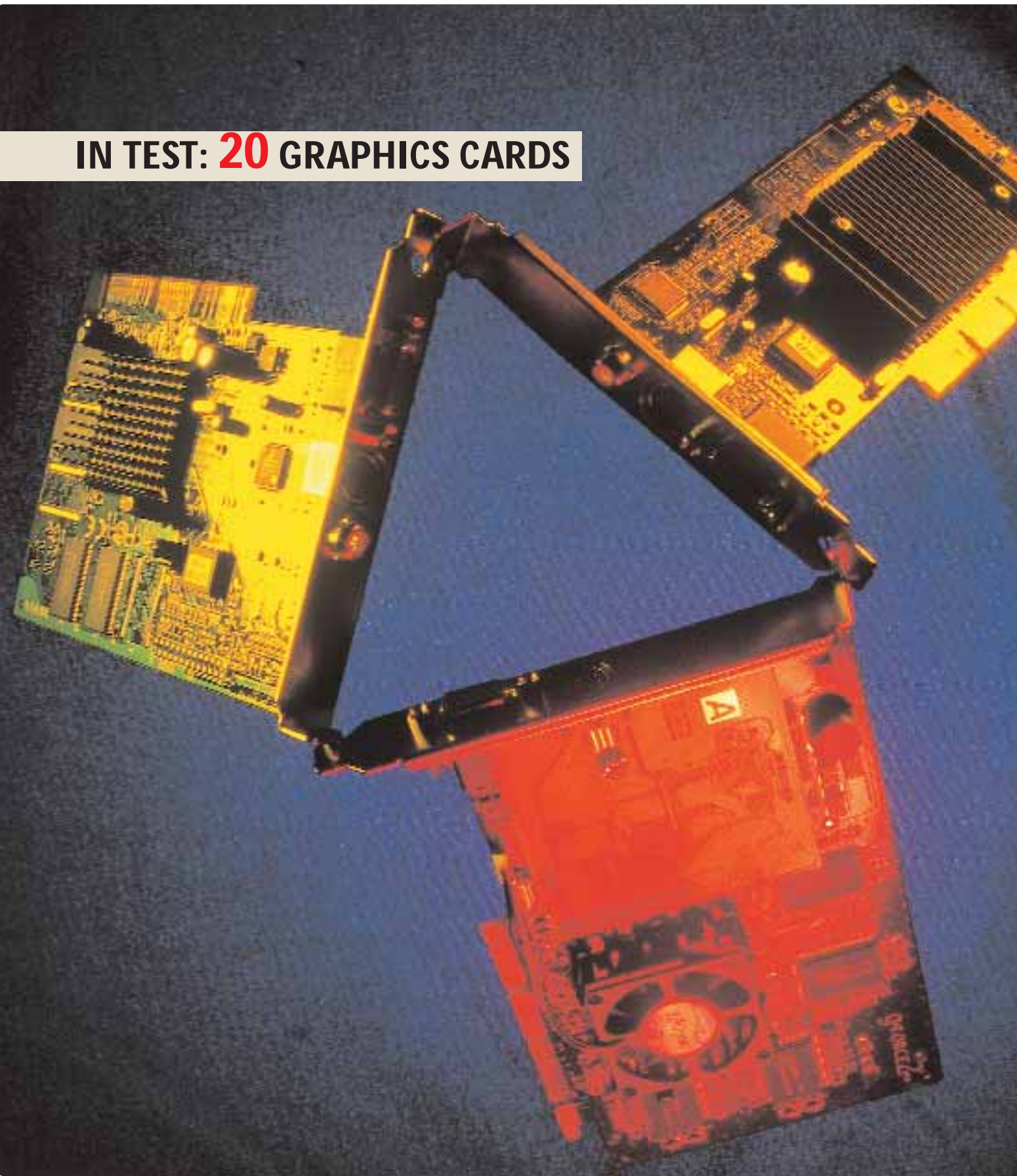
loaded for the kill

Fast action, a racy pace and superlative visual effects…the right graphics card can give you all of this to enhance your gaming experience

YATISH SUVARNA

The 3D accelerator card is one component of the PC that just doesn't stop getting better. Leading 3D card manufacturers keep the rubber burning by churning out new technologies almost every six months, be it Per Pixel Shading, Environment Mapped Bump Mapping, Full Screen Anti-aliasing, or Truform—there's a new technology that promises to bring you closer to real-life effects and visual quality while gaming.

End users affect this change to some extent because people are no longer interested in mere high frame rates. They also expect to see superlative visual effects along with hyper

Contents

TEST PROCESS

We broadly categorised the cards into two groups: high-performance and general use. We tested the graphics cards on a high-end machine and then on a low-end machine in order to get a clear idea of how a high-end graphics card would perform on a low-end system as well as on a very powerful machine. Will it deliver a real performance boost by taking the load off the processor? We also took price and features into account and rated the cards accordingly.

To test the performance of the cards,

we ran the 3DMark 2000 and the 3DMark 2001 tests, and the Vulpine GL Mark test, which is a very graphics-intensive test and specifically tests the OpenGL capabilities of the card. We also ran a timedemo in *Quake III* in normal, high and max settings, and *Serious Sam*, a game which is highly configurable for graphics and visual effects. Another test run on the graphics cards was *Evolva*. This benchmark runs a demo game with bump mapped textures and displays the average frame rate.

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speed gameplay. And this is what the newest range of 3D cards promise to offer.

Only a high-end gamer would appreciate these qualities. Those who are into 2D or low-end 3D gaming would do just fine without these high-end cards. And who would need Full Screen Anti Aliasing to run office suites anyway?

Such is the power of today's graphics processors, that a new name has been coined for them—the Graphics Processing Unit (GPU). Looking at where GPU technology is heading, who knows, in the future the drops of blood flying around from your freshly fragged bot might have trillions of polygons each, thus giving you a feel of playing the game with movie-quality special effects.

Name your game

To judge which kind of user a particular card would be suitable for, we categorised gamers according to the kind of games they play and the kind of features/gameplay they would be happy with. Accordingly, a hardcore gamer would be someone who likes to play games at high resolutions (at least 1024x768x32) with the extra effects turned on. The machine used by such a gamer would also be a high-end system—a P-III 1 GHz with at least 128 MB of RAM.

An average gamer would be someone who plays games at a fairly high resolution (800x600x32) but with some of the extra frills off and a casual gamer would be someone who is okay with the idea of playing games at the least possible resolution (640x480x16) and with all the effects turned off.

High-end test
Hardcore is the word

Are you the kind who think that blood should look like blood as your opponent takes a hit when you rail him and get as much satisfaction from the realistic effects as from the gameplay itself? Then you should settle for nothing less than the **Asus V8200 GeForce3 Deluxe** with 64 DDR memory to swap textures ranging from a rail gun to a race track crammed
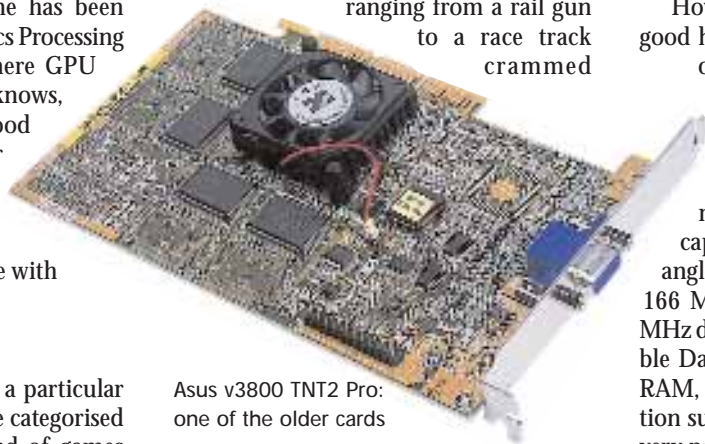
Asus v3800 TNT2 Pro: one of the older cards

with sports cars. The card features the GeForce3 chipset, which as a GPU is loaded with almost every technologically advanced feature to keep the hardcore gamer happy until the next advanced chipset is released. What's more, the card, with its nFiniteFx Engine, leaves space for game programmers to include new features in the upcoming games.

The scores logged by this card in each of our tests will simply amaze you. The 3D Mark 2000 and 2001 scores prove the fact that this card is simply the best as far as Direct 3D performance is concerned. In 3DMark 2001 it notched up a never-before-recorded score of 5751. The card excelled in the OpenGL benchmarks

as well. In the Vulpine GL Mark test we recorded a score of 47.7 fps with max settings. As far as performance is concerned, this card is a true winner and the best choice to compliment your high-end machine.

Not very close behind is the **Asus V7700 GeForce2 Ultra**. Hardcore gamers would appreciate the card's capability of pumping out 31 million triangles per second and its huge memory bandwidth of 7.36 GBps—this means that you can crank up all those texture settings in your games without having to worry about your gameplay slowing down. The card's memory clock runs at a supercharged 460 MHz DDR, and to keep the heat under control you will find two strips of heat sink on the RAM chips on each side of the card.

On our high-end machine, the card was simply outstanding. In *Quake III* it outperformed the GeForce3 in the normal mode by giving an average frame rate of 220.5 fps. One of the reasons for this is the higher core frequency of the card (250 MHz). If you are stuck for a good card with all the GeForce3-based cards sold out, then this card is what you should buy.

However, if you want to buy a really good high-end card and are falling short of cash, then you could go in for the **Asus V7700 GeForce2 Pro Deluxe**, featuring the commendable GeForce2 GTS chipset but clocked at a higher core, which means the same core but with the capability to churn out 25 million triangles per second. Its memory speed is 166 MHz but it effectively runs at 333 MHz due to the fact that it has DDR (Double Data Rate) memory. With 64 MB of RAM, playing *Quake III* at a high resolution such as 1280x1024 at 32-bit depth is very possible without worrying about the smooth gameplay and the eye candy. The lower price (Rs 29,000 vs Rs 38,000 for the Asus V7700 GeForce2 Ultra) is the icing on the cake.

The **AOpen GeForce2 GTS DDR** is also worth a mention here. This card too is based on a GeForce2 GTS graphics processor, which ensures very good high-end gaming because of the fast processor and also because it features 32 MB of DDR SGRAM. The scores of this card were expectedly impressive, especially considering its low price. If you want a value solution in the high-end category then this card is your best bet.

The **Elsa Synergy3 Quadro2 MXr** performed well in 3DMark 2000 with a

And the Race goes on...

The wait for GeForce3 was definitely worth it and the card lived up to everybody's expectations. For the past few months we would say the name GeForce3 is on everybody's lips and everyone in the 3D gaming world is treating it like nothing less than god. So the GeForce3 is rocking and all set to rule the 3D accelerator scene…. Well, ATi thinks otherwise and is all ready to give the GeForce3 the stick.

Welcome the ATi Radeon 8500, based on the much-awaited R200 chipset. Looking at the feature list of this card, it seems that we will be coming one step closer to movie-quality special effects. The card will incorporate a new technology called Truform from ATi. Other additions include Smartshader, Smoothvision, HyperzII, Hydravision, Charisma EngineII and Pixel TapestryII, just to name a few. The chip

will be built on the 0.15-micron process and will be crammed with 60 million transistors.

Finally, the GeForce3 will be feeling the heat and the hard-core gamers will have a choice. The card will cost $399 (Indian launch prices may be much higher) and should be available by September this year.

However, nVidia is in no mood to hit the brakes. Here are the rumoured specifications for the, hold your breath… GeForce4. The core frequency will probably run between 250-300 MHz and the memory will also run somewhere in the same range (DDR of course). Texture swapping will be a cakewalk with 128 MB RAM, which will now be the default specification. The chip will feature two vertex shaders as in the Xbox—the GeForce3 only

has one. With a fill rate of 2.4 gigatexels per second, which is almost double that of the GeForce3, and a memory bandwidth of 9.6 GBps, this chip will leave only one place for the chips of today…the history books.

In the more immediate future, going by the nVidia way of coming out with products every six months, we could expect a GeForce3 Ultra very soon. The specifications could be on the 0.15-micron process with 128 MB DDR RAM. The GeForce3 Ultra could offer a memory bandwidth of a cool 8 GBps, running at a memory frequency of 250 MHz DDR.

The competition in the 3D card scene is hotting up like never before and the two biggest chip manufacturers, nVidia and ATi, are all set to fight it out. Which spells good news for the gaming enthusiasts.

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score of 5529. The scores in *Quake III* were also impressive: with the normal settings, it gave an average of 192.8 fps. The card features the Quadro2 MXr chipset, which is the nVidia version of a workstation solution. However, the card is highly recommended if you are less into gaming and if you work more with professional 3D applications. Through this card you can attach two monitors, be it analog, digital, VGA or DVI. This could be extremely useful if you work with 3D packages such as 3D Studio Max, Maya, Light Wave, etc. Its price at Rs 30,000 will definitely burn a hole in your pocket but if you don't mind the price and need a good card for your workstation needs, this card is worth a try.

The **Matrox G450 32MB** is based upon the G450 processor. This card features 32 MB of onboard memory. In the 3DMark 2000 test, it logged a score of 2380, which was just a shade higher than its 16 MB counterpart. In *Quake III Arena,* with normal settings we logged a very playable 73 fps with this card. But in the max mode (1280x1024 at 32-bit depth) it could pump out only an average of 10 fps, which means that if you don't mind playing games at a lower resolution of 800x600 at 16-bit depth with some of the effects turned off then you could consider this card.

The scores in the *Serious Sam* test were also very low: with low-quality visual settings, the average frame rate was a mere 26.5 and with the max settings, we logged just 7.3 fps. This again proves that this card

is not suitable for playing games at high resolution with 32-bit textures on.

The **Asus GeForce2 MX200 Magic** features 32 MB of video memory with a 350 MHz RAMDAC, allowing for very decent gameplay. In the 3DMark 2000 test, it gave a score of 3243 on our high-end machine, which is a good score for cards in its class. The performance of this card makes it suitable for the average gamer. The *Quake III* tests show that the card is not suitable for playing high-end games with all the frills on such as FSAA, Trilinear Filtering and the likes, because with all these effects on the card was very slow when run at higher resolutions—in
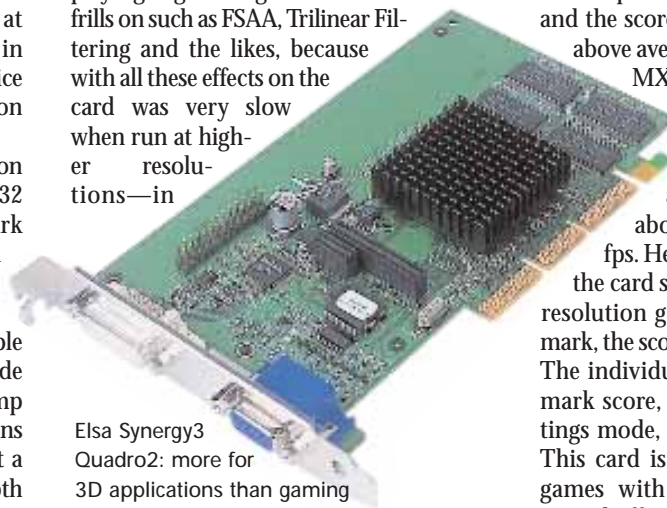
Elsa Synergy3 Quadro2: more for 3D applications than gaming

the max settings test, it returned a score of just 13.7 fps. Even in the *Serious Sam* test, the card returned a playable score of 74.5 fps in the low settings mode, but died out in the max settings mode (average frame rate of 7.5 fps).

The **AOpen PA256 GeForce2 MX** features the GeForce2 MX processor, which is a scaled-down version of the GeForce2 GTS chip. It has a memory bandwidth of 2.8 GBps, which would easily get you gaming in low to medium resolutions with texture and colour depth settings set to 16 bit. If you plan to play at high resolutions with textures and colour settings at 32 bit, then you should avoid an MX-based solution.

The performance of this card was good and the scores in the *Quake III* tests were above average when compared to other MX-based solutions. At settings, it gave an average frame rate of 180 fps and with max settings (1280x1024 at 32-bit depth) it gave a just about playable frame rate of 29.5 fps. Here you can easily observe that the card suffers when it comes to high-resolution gaming. In the *Evolva* benchmark, the score was 52.5 fps, which is good. The individual Vulpine GL Mark benchmark score, when tested in the max settings mode, was quite low (a mere 13.9). This card is an ideal choice if you play games with some of the extra effects turned off and at a medium resolution of 800x600 at 16-bit depth.

Asus V3800 Riva TNT2 Pro, with 140/166 MHz core and memory, which is higher than 125/150 MHz core and memory offered by the TNT2, is one of the older cards that are still on the scene and is

1 Col AD

CPU or GPU?

A marriage between equals is the one that's likely to thrive and the same holds true for the graphics card. A high-end card without a CPU to match is like a one-horse carriage—it will run, but wont give you the best that it's capable of. At home you can check this for yourself. Here we assume that you have *Quake III* installed and also possess a 3D card in the GeForce range and have a P-III 500 with 64 MB RAM. Start any map in *Quake III* in the multiplayer mode without adding any bots. Bring the console down and type cg_drawfps1. Typing this command will show you the average fps on the top

right-hand corner of the screen. Then move around the map, fire rockets and check the frame rate on the top right-hand corner of your screen. After this, press [Esc], add at least five bots and resume the game. You will see that the average fps will be drastically lower, and you will also notice frame drops while playing the game. This means that if you are not into multiplayer gaming and like to play games in single player mode, then you would do fine with a low-end machine but if you want to experience the true power of a high-end 3D card, you should opt for a high-end machine.

aimed at the average gamer who is not looking for steroidal performance and for whom price is a constraint. This card failed in the 3DMark 2001 test but in 3DMark 2000 it gave a score of 3192. The GL Mark score was very low even in the lowest resolution; it returned an average frame rate of a mere 6.1 fps. The card died out in *Quake III* when we ran it at the max settings, logging an average score of 7.5 fps with severe artifacting. We noted the same thing happening again in the *Serious Sam* test and it managed to survive in the low settings mode with an average of 54.9 fps. We could actually physically count the frames in the max settings mode—2.7 fps, to be precise.

Now we move lower on to cards based on the M64 chipset. Looking at the scores of these cards we conclude that they are suitable only for the casual gamer who is not interested in playing games with any frills or at a high

Gigabyte TNT2 M64

resolution. Here, in the 3DMark 2000 test, **Galaxy Riva TNT2 M64** logged a score of 1830, which was the highest amongst the TNT2 M64 chipset based cards in the shootout. Performance was wanting in the GL Mark test where the frame rate logged in the lowest setting was just 7.1 fps.
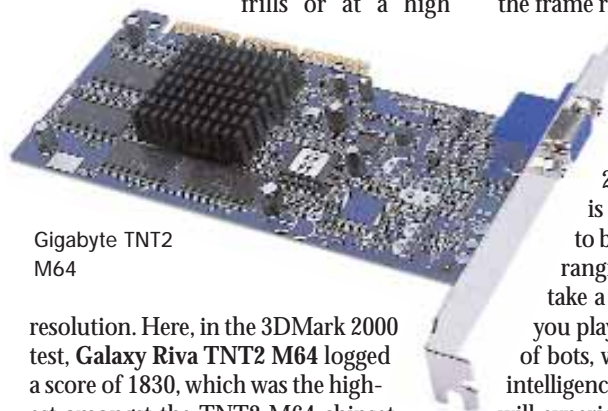
Low-end tests
Plain Jane?

The one thing that stood out clearly when we tested the cards on the low-end test bed was that even if you have a powerful card falling in the range of the GeForce2 and higher class, it would not be able to deliver the promised performance on a low-end machine. What this means is that to realise the full potential of a high-end card, you need to have a CPU that complements it. But this doesn't mean that it's impossible to play games on a low-end machine, with acceptable frame rates. Our test logs will prove this point to you.

Take for example the scores logged by the **Asus V8200 GeForce3 Deluxe**. On our high-end system, it gave phenomenally high scores, but on the low-end system even a card of its calibre couldn't do much to boost the frame rate above a certain point. Here the frame rates in *Quake III* would just not move above the 60 fps mark in any of the settings—which in itself is quite playable—whereas in the high-end system we reached 209 fps in the normal mode. This is mainly because the CPU proves to be a bottleneck. Though all cards ranging from GeForce and above take a significant load off the CPU, if you play the game with a large number of bots, which means more AI (artificial intelligence) will have to be calculated, you will experience a severe performance loss. This is because the number crunching, that is making the calculations for each and every bot in the game, is done by the CPU and not by the graphics card.

September 2001

Specifications

Graphics Cards: The Features

Name of card	Graphics Processor	Onboard Video RAM (MB)	RAM Type	Core Frequency (MHz)	Memory Frequency (MHz)	Video Memory Interface (bits)	Video Memory Bandwidth (GBps)	Number of Pipelines	Chip Manufacturing Process	Hardware T&L	AGP Texturing	AGP 4x Support	Full Screen Anti-aliasing	Price (Rs)	Contact	Phone	E-mail	Ratings
Aopen PA256 GeForce2MX	nVidia GeForce2 MX	32 MB	SDRAM	175	166	128	2.7	2	0.18 microns	Yes	Yes	Yes	Yes	5750	Yogi Comp	022-8806582	info@yogicomp.com	B
Aopen GeForce2 GTS	GeForce2 GTS	32 MB	SGRAM	200	333 (DDR)	128	5.3	4	0.18 microns	Yes	Yes	Yes	Yes	11500	Yogi Comp	022-8806582	info@yogicomp.com	B+
Aopen PA3000-Plus	TNT2 M64	32 MB	SDRAM	125	150	64	1.2	2	0.25 microns	No	No	Yes	No	3750	Yogi Comp	022-8806582	info@yogicomp.com	B-
Asus v8200 GeForce3 Deluxe	nVidia GeForce3	64 MB	SGRAM	200	460 (DDR)	128	7.36	4	0.15 microns	Yes	Yes	Yes	Yes	35000	Mnemonic	022-8010871	mnemonic@vsnl.com	A-
Asus v7700 GeForce2 ultra	nVidia GeForce2 Ultra	64 MB	SGRAM	250	460 (DDR)	128	7.4	4	0.18 microns	Yes	Yes	Yes	Yes	38000	Rashi Peripherals	022-8260258	ho@rptechindia.com	B+
Asus v7700 Geforce2pro Deluxe	nVidia GeForce2 pro	64 MB	SGRAM	200	333 (DDR)	128	5.3	4	0.18 microns	Yes	Yes	Yes	Yes	29000	Rashi Peripherals	022-8260258	ho@rptechindia.com	B+
Asus GeForce 2MX-200 Magic	GeForce2 MX200	32 MB	SDRAM	175	166	64	2.7	2	0.18 microns	Yes	Yes	Yes	No	9500	Rashi Peripherals	022-8260258	ho@rptechindia.com	B-
Asus v6600MX-GeForce256	nVidia GeForce 256	32 MB	SDRAM	120	166	128	2.7	4	0.22 microns	Yes	Yes	Yes	No	5450	Zeta Technologies	022-4102288	tejas@zetaindia.com	B-
Asus v3800 Riva TNT2 Pro	Riva TNT2 Pro	32 MB	SDRAM	143	166	128	2.65	2	0.22 microns	Yes	Yes	Yes	No	4450	Zeta Technologies	022-4102288	tejas@zetaindia.com	B-
Elsa Synergy2	nVidia Riva TNT2	16 MB	SGRAM	125	150	128	2.4	2	0.18 microns	Yes	Yes	Yes	No	12480	Welwin Industries	022-8550161	Mumbai@welwinind.com	C
Elsa Synergy3, Quadro2 MXR	nVidia Quadro2 MXR	32 MB	SGRAM	175	166	128	2.93	2	0.18 microns	Yes	Yes	Yes	Yes	30160	Welwin Industries	022-8550161	Mumbai@welwinind.com	C+
Galaxy GeForce2MX (32)	GeForce2MX	32 MB	SDRAM	175	166	128	2.7	2	0.18 microns	Yes	Yes	Yes	Yes	5500	Fortune Marketing	011-6427627	fortune@del2.vsnl.net.in	C+
Galaxy Riva TNT2-m64	TNT2 M64	32 MB	SDRAM	125	150	64	1.2	2	0.25 microns	No	Yes	Yes	No	2000	Fortune Marketing	011-6427627	fortune@del2.vsnl.net.in	B-
Gigabyte GA-622c	TNT2 M64	32 MB	SDRAM	125	150	64	1.2	2	0.25 microns	No	Yes	Yes	No	3500	Mnemonic	022-8010871	mnemonic@vsnl.com	B-
Matrox G450 (dual head) Matrox	Matrox G450	32 MB	SDRAM	125	333 (DDR)	64	2.7	2	0.18 microns	Yes	Yes	Yes	Yes	8600	Neoteric Infomatique	022-4172600	sales@neoteric-info.com	B-
Marvel G450 (32), ETV	Matrox G450	32 MB	SDRAM	125	333 (DDR)	64	2.7	2	0.18 microns	Yes	Yes	Yes	Yes	18500	Neoteric Infomatique	022-4172600	sales@neoteric-info.com	B
Matrox Millennium G450 DDR	Matrox G450	16 MB	SDRAM	125	333 (DDR)	64	2.7	2	0.18 microns	Yes	Yes	Yes	Yes	5450	Neoteric Infomatique	022-4172600	sales@neoteric-info.com	B
MaxForce TNT2 M64	TNT2 M64	32 MB	SDRAM	125	150	64	1.2	2	0.25 microns	No	Yes	Yes	No	2200	Micro Masters	3880597	micromasters@vsnl.com	B-
Mercury TNT2 M64	TNT2 M64	32 MB	SDRAM	125	150	64	1.2	2	0.25 microns	No	Yes	Yes	No	—	Visualan Technologies	820 2688	geeta@visualanindia.com	C+
Pixelview GeForce2MX	nVidia GeForce2 MX	32 MB	SDRAM	175	166	128	2.7	2	0.18 microns	Yes	Yes	Yes	Yes	6500	Rashi Peripherals	022-8260258	ho@rptechindia.com	B

Specifications

Graphics Cards: How they Performed

Product	LOW-END MACHINE								HIGH-END MACHINE							
	3DMark2000	3DMark2001	GL Mark (1024x768x32)	Quake III Arena (Normal)	Quake III Arena (High)	Serious Sam:[800x600 x16] (original recorder)	Serious Sam:[1280x10 24x32] (original recorded)	Evolva Bumpmapped Demo	3DMark2000	3DMark2001	GL Mark (1024x768x32)	Quake III Arena (Normal)	Quake III Arena (High)	Serious Sam:[800x600 x16] (original recorder)	Serious Sam:[1280x10 24x32] (original recorded)	Evolva Bumpmapped Demo
Aopen PA256 GeForce2MX	2634	1128	19	60.1	58.8	32.4	19.7	53.8	5008	2250	21.8	180	82.9	106.1	39.9	52.5
Aopen GeForce2 GTS DDR	2934	1196	27.8	62	61.4	33.5	32.6	67	7294	3270	35.2	219.5	134.4	121.8	28	93
Aopen PA3000-Plus	1262	382	5	45.6	19	25.9	6.4	15.1	1830	537	4.3	55.4	14.9	34.4	3.8	11.5
Asus v8200 GeForce3 Deluxe	2753	2820	32.1	58.3	58	34.7	27.3	67.1	9145	5751	62.5	209.2	197.5	113.3	61.5	165.9
Asus v7700 GeForce2 ultra	2890	1216	33.7	60.5	60.9	31.1	35.3	67.3	9107	4216	46.7	220.5	185.2	123.5	43.5	136
Asus v7700 Geforce2pro Deluxe	2642	1209	17.5	62.3	62.1	37.9	33	65.2	8130	3748	40.6	225.2	162.8	114.5	34.9	112
Asus GeForce2MX-200 Magic	2379	846	13.2	60.5	42.2	38	12.7	28.4	3243	1231	12.4	78.5	44.2	74.5	7.5	25.6
Asus v6600MX- GeForce256	2141	686	0	60.5	36.9	35.4	7.3	21.7	2450	818	0	96.5	33	59.5	5.3	19.6
Asus v3800 Riva TNT2 Pro	1351	0	6	47.3	38.2	27.2	2.6	32.5	3192	0	4.7	92.6	35.7	54.9	2.7	34
Elsa Synergy2	1355	498	6.6	47.1	38	27.9	18.5	33.5	3118	1334	12.4	88.8	36.7	51	13.9	35.1
Elsa Synergy3, Quadro2 MXR	2790	1150	16.6	61.2	59.3	37.3	31.3	58.7	5529	2490	20.6	192.8	80.4	107.4	25.8	57.5
Galaxy GeForce2MX (32)	2218	733	9.6	61.2	40	35	12.2	22.6	2400	847	8.8	97.2	33.9	29	8.6	18.4
Galaxy Riva TNT2-m64	1870	0	4.7	45.2	18.9	28.4	1.9	16.6	1802	380	1.4	53.3	14.6	29.6	1.6	13
Gigabyte GA-622c	1290	349	4.4	45.3	23.1	29.4	7.1	17.6	2002	769	7.2	63.6	18.4	30.7	3.5	14.7
Matrox G450 (32)	1276	470	0	46.7	33.7	21.8	5.8	24.2	2380	1183	0	73	33.8	26.5	7.3	24.1
Matrox Marvel G450 (32), ETV	1259	472	0	46.5	34.5	24.6	5.4	24.6	2387	1191	0	75.2	34.7	37.9	7	24.5
Matrox Millennium G450 (16)	0	0	0	0	0	0	0	0	2085	911	0	66.2	29.7	25.9	6.3	20.5
MaxForce TNT2 M64	1274	381	4.1	45.1	19	28	7.1	15.1	1828	530	4.7	55.4	14.9	30.3	1.6	11.5
Mercury TNT2 M64	1298	422	5.1	46	22.5	27.4	7.5	18.4	2122	687	5	63.6	18.4	41.9	5.1	14.7
Pixelview GeForce2MX	2757	1132	16	62	60.2	37.1	29.3	54.3	4964	2278	22.1	181.3	83.9	73.6	17.3	53.4

Decision Maker

Hardcore Gamer	Performance	Asus V8200 GeForce3 Deluxe
	Value	Asus V7700 GeForce2 Pro
Average Gamer	Performance	Aopen GeForce2 GTS
	Value	Pixelview GeForce2 MX
Casual Gamer	Performance	Asus v3800 Riva TNT2 Pro
	Value	Mercury TNT m64
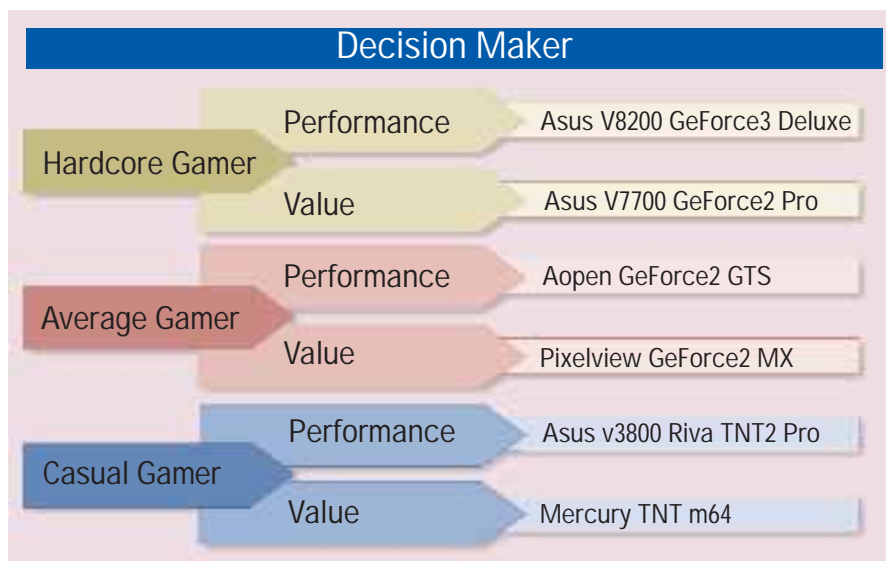
What all this means is that if you have a high-end 3D card but lack a good processor (you need at least an 800 MHz P-III with 128 MB of RAM), then you will experience a huge performance loss, and you wont be able to experience more than half of what the card is capable of—you can play a high-end game with 32 bit textures and at a fairly high resolution of 1024x768 even on a low-end machine, but minus the effects.

As we move on to the Matrox range of cards, we found that the performance of these cards varied in the Direct 3D tests but the performance in the OpenGL tests was more or less the same. The **Matrox G450 32MB** logged a score of 1276 points in 3DMark2000 which was a lot lower than what we recorded on the high-end machine. The same was the case in the 3DMark2001 test where we recorded a score of only 470 points: a lot lower than the score of 1183 recorded on our high-end machine. In the *Quake III* test the card logged an average of 46.7 fps in the normal mode, which was much lower than the score of 73 fps recorded on the high-end machine. But there wasn't any noticeable difference in the scores logged with high-quality and max-quality settings. What this indicates is that with all the effects enabled, this card would not give you a performance boost even if you have a high-end machine but if you don't mind playing games with the extra visual goodies turned off and at a lower resolution, then you will get a better performance.

The **Elsa Synergy3 Quadro2 MXR** is based on the nVidia Quadro 2MXR chipset. This card scored 2790 points in 3DMark 2000, which is almost half the score recorded on the high-end machine. This card is mainly useful for working with high-end 3D packages such as 3D Max and Maya where you also have to possess a high-end machine. Therefore this card is not recommended for anybody possessing a P-III 1.2GHz or lower. If you want the best performing M64-based card then you should go in for the **Mercury TNT M64**. This card was the best in the shootout with acceptable performance. In the 3DMark 2000 test it returned a score of 1298, which again was lower than its score on the high-end machine. In the *Quake III* test it gave a playable frame rate of 46 fps in the low-quality mode, but with the max settings on, the card died out with an average 7.1 fps. The comparative scores of this card on both the machines show that it will not give you a huge performance boost if you use it with a high-end machine. This card is recommended for the casual gamer who does not posses a high-end machine.

What about the extra goodies?
These days most of the 3D cards come with a lot of extra goodies, besides the inherent features of the card itself. Take for example the **Asus V8200 GeForce3 Deluxe** which sits right on the top of the list with a total package that comes loaded with VR glasses, game CDs, utilities and the manual and driver CD. The packaging of this product is excellent. In fact, all the products that we received from Asus were good as far as packaging is concerned and some were exceptionally good such as the GeForce3. The **Matrox Marvel G450 ETV** also came with good packaging and included the cables for connecting dual monitors to the card. **Elsa Synergy3 Quadro2 MXR** contained the DVI/VGA adapter along with detailed manuals.

CONCLUSION
This graphics card test is more or less a clear representation of what is available in the market today. It wouldn't be unfair to say that nVidia rules the market. From the extremely high-end solution to the low-end 'will get your game running' cards—all have nVidia written all over them. The consumer is more or less swamped with solutions in the mid-range price bracket (Rs 2000-8000). Here, one should bear in mind that apart from the extra goodies (free games, software and other accessories) there isn't much to separate the cards.

As far as pure performance is concerned there is absolutely no

Asus V8200 GeForce3 Deluxe

AOpen PA256 GeForce2 MX

doubt as to who the winner is. The **Asus V8200 GeForce3 Deluxe** beats everyone hollow. It is simply hard not to be awestruck with its amazing processing power. Sadly, this card costs more than most PCs and needs a souped up CPU to get the best out of it. Hence, it can be recommended only to the extreme gamer/enthusiast.

For lesser mortals there is a wide range to choose from. The **AOpen PA256 GeForce2 MX** is the clear winner as far as the value segment is concerned. It also packs in a decent punch and will run most games at low to medium resolutions.

IN TEST: 10 WEB AUTHORING SOFTWARE
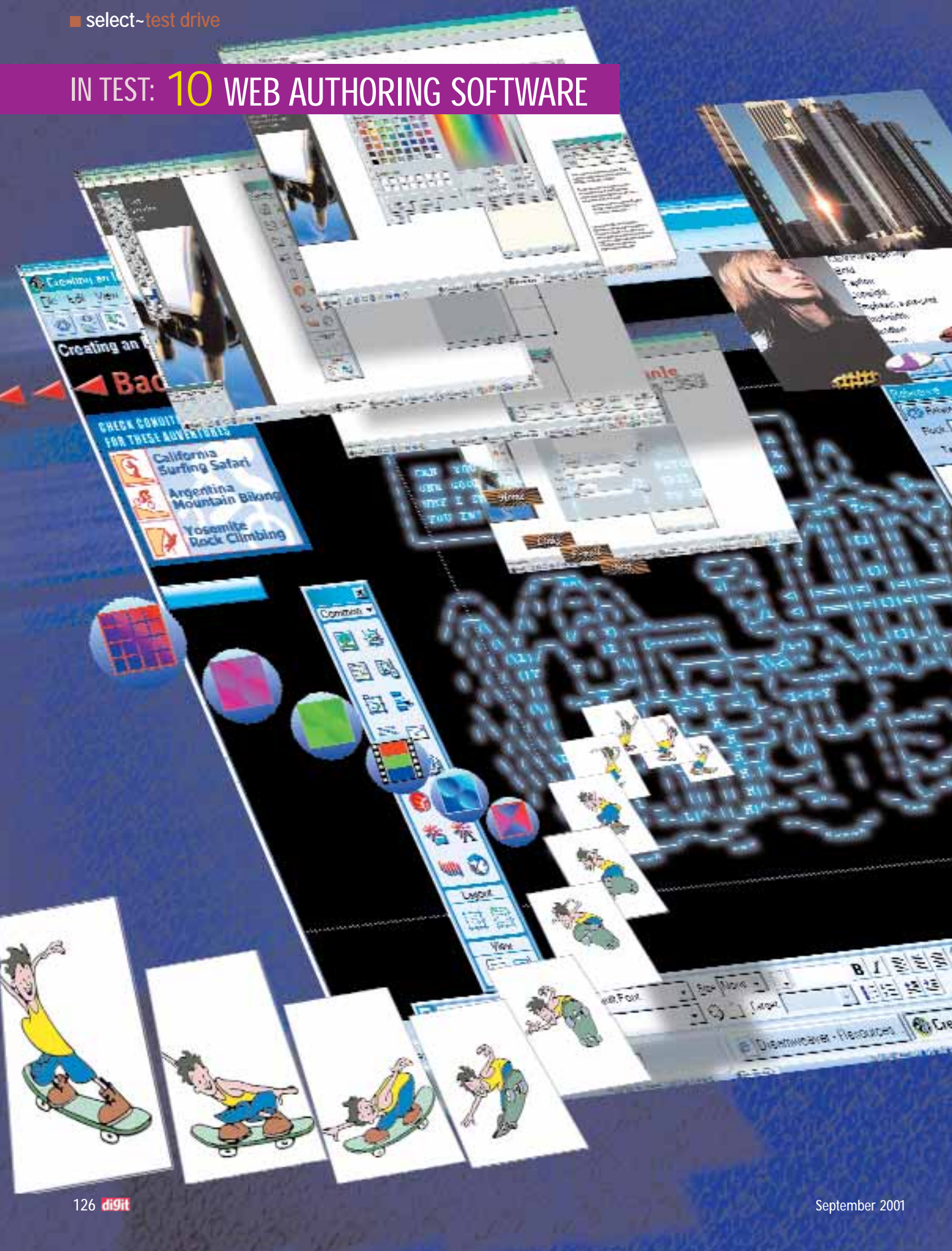
W E A V I N G
D R E A M S

DIPTI RANADE and ROSSI FERNANDES

When was the last time you visited a truly outstanding Web site—the kind that seemed to simply spring out of your monitor, grab you by the neck and see to it that you'd remember it for a long time to come? With tools that let you create dynamic content, animations, embed sounds and graphics into your Web pages, the creativity that can be incorporated into your Web site is limited only by your imagination.

If you want to build your own Web site, but the thought of all the coding you would have to do (and learn first) sets you squirming, then let us have you know that there are methods by which you could sideline all the back-breaking coding and have your own Web site at the same time. So if you're among those who like to have their cake and eat it as well, then read on!

There are tools aplenty that help you to design your own Web site. You can choose from tools that you would have to purchase or simple but efficient tools that you could download from the Net. So lets take a look at some WYSIWYG (what you see is what you get) tools that let you create your own Web site—without any HTML coding!

The creator speaks

Most programmers initially disliked WYSIWYG HTML editors primarily because the code that these editors generated were not compliant with W3C standards, and therefore the Web page often tended to appear differently on different browsers. Also, initially most of these packages

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didn't support scripting or creation of dynamic Web pages.

However, now, most Web authoring software allow you to add JavaScript functionality without having to actually write code and you can just add, say, a mouse rollover function, with the click of a mouse! While you cannot create a complete dynamic Web page without having to do even one bit of coding, Web authoring tools have certainly eased the task by automating most of the tedious and repetitive aspects of coding.

In all, we tested 10 Web authoring tools that have been around for quite some time, but have improved functionality now. Software such as Adobe GoLive 5, Namoeditor and FrontPage 2002 even employ database operands to make your task even more simpler.

Other software such as HotMetal Pro, Dreamweaver, etc, have been favourites with Web developers and are becoming easier to use with each new version.

Text matters

Text formatting is the most basic of tasks that you would expect from a Web authoring package, and none disappoint with respect to these basics. You have the facility of importing text in most of them, and then working on formatting the text in terms of alignment, fonts, colours, etc.

With packages such as Macromedia Dreamweaver or Namo WebEditor, you almost feel as if you are working in Microsoft Word, such is the ease of use and functionality that you get. These packages had a very minimal learning curve in terms of trying to understand the icons, menu locations for common tasks or toolbars for one-stop formatting options.

Though text insertion on a Web page is such an elementary feature, we couldn't help but wonder why software like NetObjects Fusion and Tarantula had unnecessarily complicated it by forcing the user to insert a text box on the Web page first and only then allowing you to work on the text.

Linking spree: What's an HTML page without hyperlinks? Obviously, all the packages had made it quite simple to create links to text. All you had to normally do was select the text, click on the link icon on the toolbar, and in the window specify the target URL or range.

Only with Dreamweaver, though, we found options to specify whether the target URL should be opened in the same

Creating links is easy with Dreamweaver

window or a new window, right there within the toolbar options itself. In addition, you could even specify the placement of the new windows, like, say, the centre of left of your screen—this is an amazing amount of control.

Cascading effect: Text handling is really made simple through the use of Cascading Style Sheets (CSS). CSS allows you to specify formatting attributes (font, text size, colour, etc) to a text and create a style that can be universally applied across the Web page. So, for instance, you can create a style for headings, another style for captions, a third for numbered lists, etc.

Unfortunately, it wasn't that easy to locate the CSS options in most of the software. You had to either check the help files or navigate around the menu items. However, with Dreamweaver and GoLive
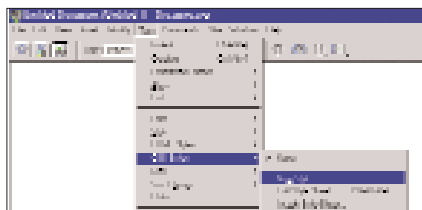
Dreamweaver allows you to format text using Cascading Style Sheets

we faced no such problem. CoolPage and NetUp were two software that didn't have options for CSS at all.

Image mapping

You've heard the phrase before, 'a picture speaks a thousand words'. Well, we repeat it, because there is nothing like an image to create an impression though of course, bandwidth-hungry Internet users may complain at the time a page with images takes to load up.

There was no actual problem in inserting images in any of the packages, and most of the popular formats such as BMP, JPG, GIF, etc, were supported. You could also resize images using the resize tool that appears when you position your mouse at the edges of the images.

NetObjects Fusion offered quite a bit of flexibility and accuracy in terms of positioning images on the Web page with the use of the easily identifiable grid lines. These served as guide marks and you could move the image accordingly or even snap to grid if you chose to. NetObjects has an entire toolbar that allows you to manipulate the images as per you liking.

Viewers and shakers: While, Microsoft FrontPage 2002 or Dreamweaver did not
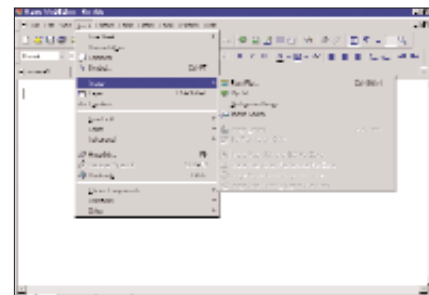
Inserting and resizing images is easy in Namo Editor

Code Editors

HTML pages are not any kind of compiled programs and pages. They are basically text files with tags that are converted into a page by the browser after referring to the HTML standard. So basically, one can create an HTML page using a simple notepad program and then view the page using a browser. The most easy to use HTML page editors and creators available are the WYSIWYG type of Web authoring tools. These software are usually very expensive and therefore not the best bet for new users.

There is, however, another category of Web authoring tools, called code editors, which work the same way as WYSIWYG editors and many of these can be down-loaded for free from the Internet. The only difference is that they don't show you a live preview of the page that you're currently working on.

Code editors allow you to manually add your own piece of code. They usually have the buttons for creating the elements that you would create on a WYSIWYG editor, but the program adds the particular code to the same page without the preview. However, one can always preview the page using the Preview button that may exist in the software. Quite a few of these code editors have wizards for various themes and sometimes code editors can be as advanced as the WYSIWYG tools.

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have any inbuilt image editor, you could use a default external image viewer/editor for editing the images. Adobe GoLive, however, integrated the feature into the software itself, while other software such as Tarantula and Allaire Homesite did not provide an integrated image editor or viewer.

Mapping progress: Creating links for images is something that the more advanced packages provide for mapping images. This means that within the same image, you can create different hotspots or demarcate areas that have different target links.

Allaire Homesite allows image mapping through the Web authoring tool itself, where specific portions of an image can be linked to different parts of the Web page or other external resources. It opens up sub-applications and then you can mark up the areas on the image that you want to create links to. Even in NetObjects, creation of hotspots was quite simple.

Images alternatives: Alternative text for images is a feature that is quite useful if you are browsing using a text-browser such as Lynx, or have disabled images in your browser. This text can be specified in the properties of the image itself. This feature was available in all the software except NetUp.

Most software also come with options of rendering a low-resolution image first; clicking on the low-res photo will take you to the original one. This feature is known as Lower source and was available with all the packages except NetUP and CoolPage.

Dreamweaver offered one of the simplest interfaces to create such lower resolution images.

Tabling it right

Tables are at the heart of most Web pages, especially nested tables (tables within tables). Most design errors in Web pages tend to occur in this area, especially in cell padding or cell borders.

NetUp and Cool Page were two software that did not have the table feature at all. Inserting tables in Macromedia Dreamweaver, Namo Editor, Net Object Fusion and HotMetal Pro was really easy and this function was very easy to locate. You could specify the table rows and columns and their width either in pixels or percentages. All of these also supported the creation of nested tables.

We could change the background colours of all the tables that we created, but only Dreamweaver provided for creation of headers for tables and a whole lot of parameters for cells.

Creating tables was the easiest in
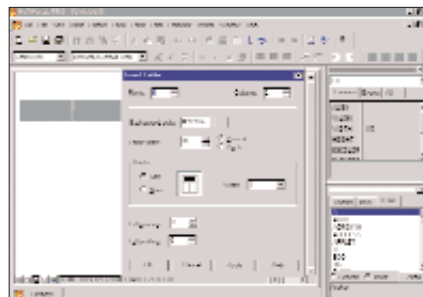
Creating tables and nested tables in HotMetal Pro is a simple task

Microsoft FrontPage as you could just click on the Tables' icon and drag the mouse to create how many ever number of columns and rows that you wanted on the page.

Moving in formation

Most Web sites will require some dynamic form elements on the page, such as Push buttons (for Submit and Reset options generally), drop-down boxes (while selecting items such as date of birth), text boxes (comments field or name field), radio buttons (to specify whether male or female), check boxes (to tick off items that are of interest), etc.
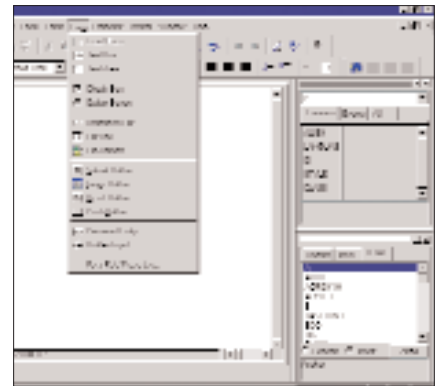
Creating Form elements in HotMetal Pro

Well, in NetUP and CoolPage we didn't have to bother at all, since these packages didn't have the Forms option. This was a major drawback. In such cases, you would have no option but to manually code if you wanted to use forms. The other software had form templates and they were easily accessible at the click of a button.

The form creation option in HotMetal Pro is a special option on the menu bar that allows you to create a form element. The other software that allows you to insert forms with ease is Macromedia Dreamweaver, where the Insert option on the menu bar has the options for inserting the form elements.

More on the feature side

Ah! If you start really working on your Web site, there's no stopping on the number of items that you would require. But, basics first! You need to upload your files to a Web server first, so if your software allows you to upload the Web pages, then you can give a miss to the FTP client.

One of the main additional features that we found in GoLive was the synchronizing feature, wherein you could match

SCOREBOARD The Web Authoring Tools at a Glance

	Adobe GoLive	Cool Page 2.65	HotMetal Pro 6.0	Macromedia Dreamweaver	Macromedia HomeSite 4.5	Microsoft Frontpage 2002	Namo Editor	NetObjects Fusion	NetUp	Tarantula
Image handling										
Sizing	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Alternate Text	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Image Maps	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes
Linking	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Hotspots	Yes	Yes	No	Yes	No	Yes	No	Yes	No	No
Low Source	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Text Handling										
CSS	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Hyperlink	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Target page for hyperlink	Yes	No	No	Yes	Yes	Yes	No	Yes	No	Yes
Adding form elements	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Tables										
Sizing	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Pixels in size or %	Yes	NA	Yes	Yes	No	Yes	Yes	Yes	NA	No
Adding background	Yes	NA	Yes	Yes	No	Yes	Yes	Yes	NA	No
Colours to individual cells	Yes	NA	Yes	Yes	No	No	Yes	Yes	NA	No
Colour of the border	Yes	NA	Yes	Yes	No	Yes	Yes	Yes	NA	No
Table headers	Yes	NA	Yes	Yes	No	Yes	Yes	Yes	NA	No
Borders	Yes	NA	Yes	Yes	No	Yes	Yes	Yes	NA	No
Nested tables	Yes	NA	Yes	Yes	Yes	Yes	No	Yes	NA	No
Price	Rs 17,872	Rs 2,300	Rs 4,653	Rs 14,250	Rs 4,653	Rs 8,400	Rs 4,653 (by courier)	Rs 4,698	Rs 2,068	Rs 4,230
Contact	Adobe Systems India, 0118-4532026	www.cool-page.com	www.soft-quad.com	Wipro Infotech Enterprise, 080-8440011, surajs@wipro.co.in	Wipro Infotech Enterprise, 080-8440011, surajs@wipro.co.in	Microsoft Corporation, 011-6294600	www.netup-shop.com	www.netob-jects.com	www.netup-shop.com	www.nostru-mindia.com/nostrumindia/
Rating	B+	C	B	A	B+	A-	C+	B-	C	B

the Web pages on your local disk with those on the Web server. You could then upload the pages such that only the modified or edited files are uploaded.

CONCLUSION

If you have a clear picture in mind about what kind of a Web page you want, it really will not be very difficult to implement it with any of the tools that we have tested. With the ability to handle the entire process of creating and finally building your Web site, today's software offer enormous amounts of functionality for both the beginner and the advanced user.

If you are a first timer to the Web development world, then we suggest that you start off with something like Tarantula, NetObjects Fusion or Namo WebEditor

Macromedia Dreamweaver: a comprehensive Web authoring tool

since the number of features that the others offer might make it difficult for you to use them.

However, if you have a bit of experience with HTML editors or coding, then you can opt for Macromedia Dreamweaver. This Web authoring tool has just about everything that you would want—forms, tables, pre-set scripts. The interface is quite simple to use, and you can get precision Web pages that render the same in any browser.

Web Hosting

Along with free Web authoring tools, you also have free Web hosting sites that allow you to upload your Web page to the Internet. There are sites such as Geocities, which is a partner of Yahoo, and provides free Web space over the Internet.

Such sites sometimes have a Web authoring tool in the form of Java applets and wizards that allow you to create an attractive page. They also have huge image and animation libraries.

Some of the free Web space providers also provide free guest books and counters. There are some very huge communities like Yahoo that provide a wide range of services including mail, newsgroups, news, Web space and messaging services to registered users.

Most of these sites give around 10 MB of Web space over the Internet and allow users to upload files using FT. You can use the Web hosting site's Web authoring tool to synchronise the site you've created with the online FTP server.

However, when selecting an online Web space provider, do consider whether it supports scripts such as CGI on your Web page.

Imaging: Ram

On a Creative Note

Add the zing to your multimedia project with the right authoring tool

MITUL MEHTA

When it comes to communicating an idea effectively, nothing beats a well-made multimedia presentation. There are a variety of authoring software available to help you put together an attractive project using animations, applying transitions and other effects to various objects and all this on the fly. Some of them even offer the facility of scripting for those of you who would like a greater degree of control.

Multi-Multimedia

If you were to hunt for multimedia authoring packages on the Internet you would bump into loads of freeware, shareware and commercial tools and applications. However, a number of these tools are basically presentation utilities and cannot handle all the elements that 'multimedia' requires. Multimedia authoring packages are useful for creating CD titles and multimedia projects that include aspects such as animation, transition effects, editing capabilities, timelines and scripting capabilities.

We tested six such software, which let you create projects and play them from a CD or from your hard drive. So take a look at the review and get ready to spread your word more effectively.

Among the packages themselves, Macromedia has been coming up with new versions of its main package, Director, for quite some time and also has Authorware, which is more focussed on the creation of educational packages. At the same time, multimedia is not restricted to a single medium. For instance, Macromedia is trying to integrate Flash, used largely for Web-based animation into Authorware for creating timelines. Hence, we also tested Web-based multimedia creation tools such as Flash and Adobe LiveMotion.

Features

A good feature-set is essential in a multimedia authoring tool if you are looking to create dazzling CD-titles or multimedia projects.

File formats supported: The wider the variety of file formats that can be imported into a software, the wider is the scope of working with different types of objects, say images, sounds or video files. Here, we saw that Formula Graphic 97 did not support importing images saved in the TIFF format and, like Adobe LiveMotion and Illuminatus Opus, it could not import MP3 audio files either. Having to import Wav sound files implies increased file sizes and it also consumes unnecessarily more memory. With MP3 having become such a universally accepted standard, the inability to support these files is a rather glaring absence.

Except Director 8.5 and Formula Graphic 97, none had the facility of importing 3D objects. With this feature, 3D files created in 3D Studio can be read and worked on directly within the software.

Macromedia's Flash supports importing MOV and AVI files. However, when one imports AVI, it takes it in as a sequence of bitmaps and not as a single file. On the other hand, Adobe's LiveMotion does not support importing of video files at all, which is not a big deal if you consider the bandwidth restrictions on the Web.

Animation and transition effects: Multimedia titles rely a lot on animation and transition effects. Authorware does not have any facility for creating animations but it can import Flash animations. Formula Graphic 97 only features five predefined ways of animating objects and hence, custom animation can't be done. Whereas Illuminatus Opus does allow you to have custom animation, it does not support masking, a feature available in Adobe LiveMotion and Macromedia's Flash.

Authorware, Flash and LiveMotion have absolutely no predefined set of transitions. However, with the help of scripting you can create transitions but it is quite a tough task. Instead, you would prefer to use a software such as Director or Illuminatus Opus that provides an extensive list of predefined transitions that can easily be added.

Buttons: The facility to add buttons helps in adding dynamic elements to the page and also helps in enhancing navigation. Here, all the software were able to create buttons, but Flash and LiveMotion provided an excellent library o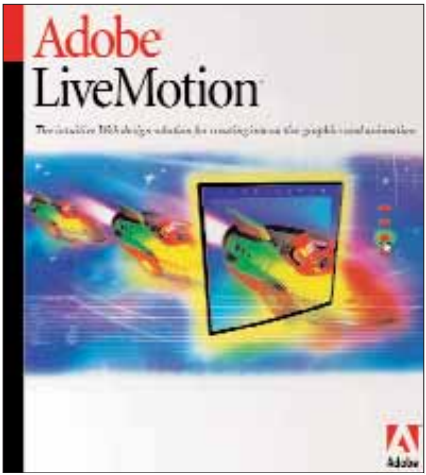f colourful buttons where all you had to do was drag and drop them on to the stage. Assigning actions to these buttons was also easy—with just a click you could choose from a predefined set of actions.

Drawing tools: Last-minute alterations to or addition of drawing elements to the project becoms easier if the software integrates drawing capabilities into its functionality. All the software provided this feature but there were variations in the degree to which this functionality was implemented. Flash and Adobe LiveMotion provide the pen tool for more accuracy in drawing objects, thus eliminating the need to work with a separate drawing application.

Projector creation: A multimedia project should be able to run in all the machines without requiring the software to be installed, and should have no problems in rendering fonts either. For this, the software should allow you to create a project.

Authorware, LiveMotion and Formula Graphic 97 did not possess this feature. You could only view projects created through these applications if the application itself was installed

Adobe LiveMotion has a good set of filters

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on the remote computer. With the rest, you didn't have any such problems.

Miscellaneous features: Adobe LiveMotion was the only software that possessed a good set of useable filters, which have been

Authorware has good scripting capabilities

borrowed from Adobe Photoshop's vast repository. Director's latest release lets you do 3D animation. Illuminatus Opus has a feature called Hotspot with which you can easily draw an object with a fill. However, in the editor window it will always be semi-transparent so that you can see what's underneath; in the final presentation you will be able to see the actual effects of the hotspot. The newer version of Flash extends its functionality by providing support for XML as well.

Ease of Use

Multimedia authoring packages can be complicated to work with. Hence, the interface and ease of use are important aspects—you want to be able to operate and access advanced features without juggling through many options.

Formula Graphic 97 sported a very dull interface. In order to add any sort of element to the screen, say a picture or text, you first have to select a specific area and only then can you get the picture on the screen. Even Illuminatus Opus had an absolutely cramped and intrusive default interface, though you could customise and remove those extra windows that occupied the screen at startup.

Adobe LiveMotion's interface is reminiscent of that of Adobe Photoshop. With the exception of specific toolbars that allow access to the multimedia authoring effects and features, there are the familiar toolbars and buttons to allow access to photo and image editing tools.

Macromedia's Flash 5 has an interface similar to its earlier version. However, it will definitely be difficult for a novice to operate this software. Even those who have used the previous version may find it difficult as certain common features such as Motion Tweening and Shape Tweening suddenly seem to be missing from their familiar locations. However, this version of Flash incorporates a lot of new features and many features have been revamped and grouped according to function. And to make things easier, the software does offer an option to revert to the older Flash 4 type display.

Macromedia's Authorware is quite simple to use as there are Knowledge Objects (wizards and templates to create forms) that guide you so you do not find it that difficult to work in this software even if you are using it for the first time. Macromedia Director 8.5's interface does not seem any different from its previous versions and hence, if you are used to the previous versions you would find it very familiar to work with this one too.

Help at hand

Since multimedia authoring packages tend to have a steep learning curve, the help file is indispensable for most users. The Macromedia products, Director, Authorware and Flash, really score in this respect. Flash has an excellent set of help files that take you right from how to animate, mask, draw objects, and even how to apply actions to buttons, to the basics of scripting. Most of the advanced features of Director are normally worked out using the Lingo scripting language. But to make this task easier, Director has a library of predefined scripts and all you have to do is drag and drop them on the objects you want.

SCORE BOARD The Multimedia Packages

	Adobe LiveMotion 1.0.2	Formula Graphic 97 Multimedia System	Illuminatus Opus	Macromedia Authorware 5.2	Macromedia Director 8.5 Shockwave Studio	Macromedia Flash 5
Company	Adobe Systems India, 0118-4532026, sandeep@adobe.com	www.formulagraphics.com

Free for download | www.digitalwork-shop.com | Wipro Infotech, 080-8440011, sura-js@wipro.co.in | Wipro Infotech, 080-8440011, surajs@wipro.co.in | Wipro Infotech, 080-8440011, sura-js@wipro.co.in |
Price	Rs 17,765	2.9	Rs 5,870(approx)	Rs 1,16,000	Rs 47,950	Rs 19,000
Space required	100		50	60	100	40
File Format Supported		JPEG, GIF, Animated GIF, BMP, PSD, PNG, VEC, 3DS, etc.			JPEG, bitmap, GIF, PSD, TIFF, Animated GIF, PNG,	JPEG, GIF, BMP, PNG,
(a) Images	JPEG, GIF, Animated GIF, TIFF, BMP,EPS, PSD, targa, pixar etc.		JPEG, GIF,BMP, PNG, TIFF, WMF Etc.	JPEG, bitmap, GIF, PSD, TIFF, Animated GIF, PNG, etc	Shockwave 3D, etc	TIFF, WMF, EPS, AI, FH, etc
(b) Sound	WAV	Wav	MP3, Wav, Midi etc.	Wav	AVI, MOV, Real Media, etc	MP3, Wav,AIF. MOV, AVI
(c) Video	Can't import	AVI, MOV	MPEG. AVI, MOV, etc	MPEG, AVI, MOV		
Transition Effects	No predefined effects	Yes	Yes	No	Yes	Yes but no pre-defined
Animation	Path based animation not posible	Custom animation not pos-sible	Custom animation possible	No, only importing of animation possible	Path based anima-tion not possible	Path based animation pos-sible
Masking Capabilties	Yes	No	No	No	Yes, through Lingo	Yes
Creation of Buttons	Yes	Yes	Yes	Yes	Yes	Yes
Drawing Tools	Yes	No	Yes	No	Yes	Yes
Projector Creation	No	No	Yes	No	Yes	Yes
Rating	B+	B-	B	B	A-	B+

Formula Graphic 97 disappoints when it comes to integrated help—it just provides extremely elementary help, making it difficult for new users to learn and use advanced features of the software. Adobe's LiveMotion, on the other hand, provides satisfactory help to users by explaining how to work around with the software.

CONCLUSION

Professional-level multimedia authoring software costs quite a bit, so if you are only interested in creating basic, uncomplicated projects, it doesn't make sense purchas-

ing a high-end utility. Also, you need some basic skills to work efficiently with some of these packages. For instance, going in for Director without learning Lingo wouldn't make much sense.

Furthermore, some of these packages are better suited for certain kinds of projects. For instance, trainers, developers, instructional designers and tutors who need to create visually rich media for online learning applications can primarily use Authorware, while software such as Illuminatus Opus and Formula Graphic 97 Multimedia System weren't that much up to the mark. However, if you are just starting off on multimedia authoring, Illuminatus Opus is a good enough tool to start off with.

As far as Web animation is concerned, Flash and LiveMotion are basically targeted at a similar set of users who do a lot of animation. Their prices are almost the same, but Flash

Flash 5 provides support for XML

scores higher due to the features that it presents, as also the layer-based animation in Flash that is much easier to use than the object-based animation of LiveMotion. Flash also has more pre-defined scripts.
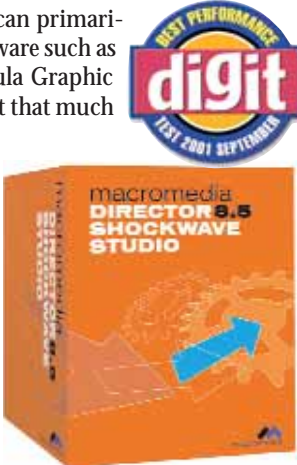
For professionals who make projects not for internal purposes but also for corporate clients, the advanced features provided by Director would be quite valuable.

With Director, you can import almost all known file formats generally used in the industry. Plus it adds support for sound channels and has robust scripting capabilities.

With **Director 8.5**, you also have support for 3D objects. Overall, the feature-set, online help, animation and file import capabilities, along with a very easy-to-navigate interface make it the best multimedia authoring applications to work with.
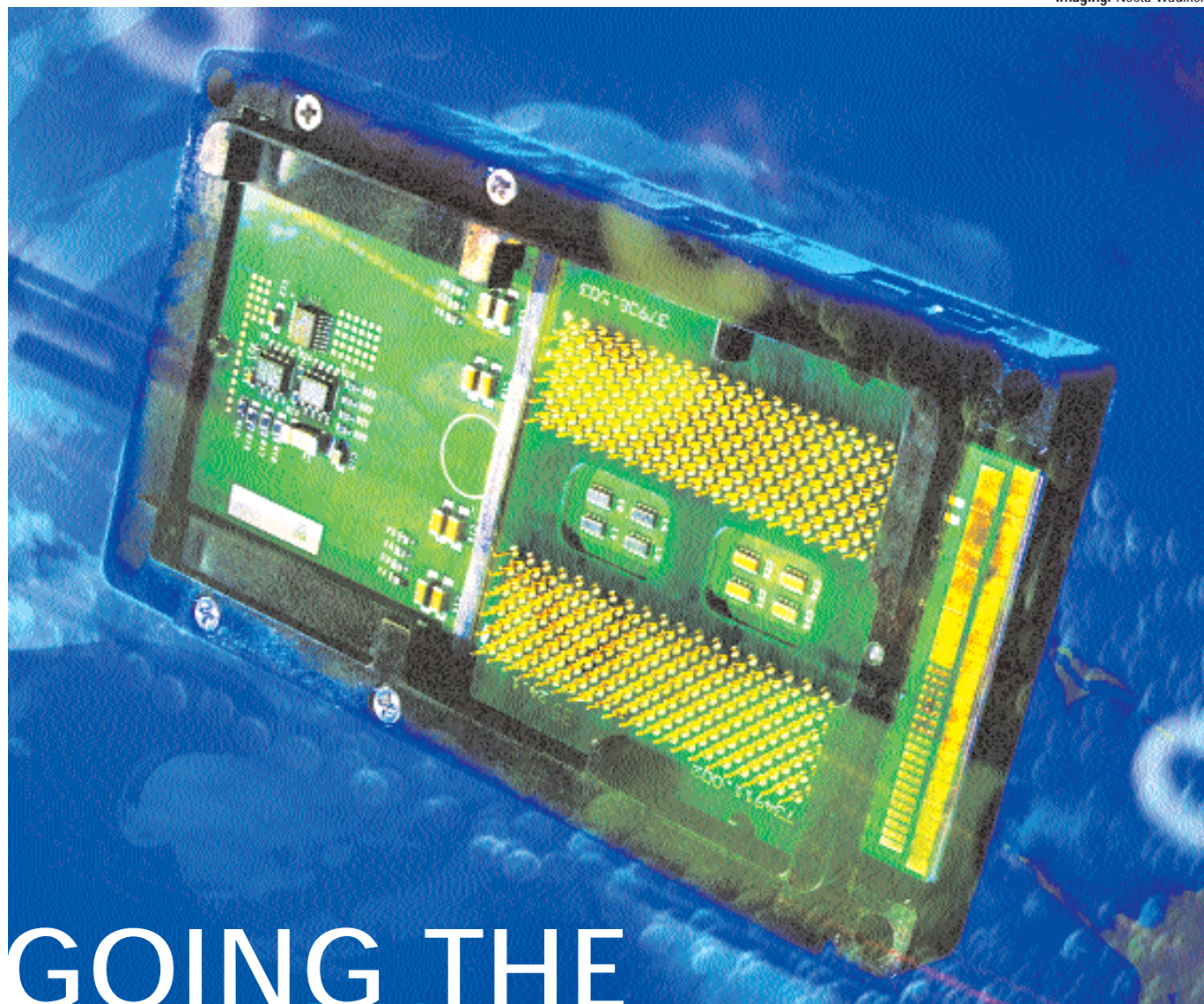
Director: the winning choice

GOING THE
64-bit way

MITUL MEHTA

Products that boast of the 'bigger, better, faster' syndrome keep coming to the fore regularly, each promising to outdo its predecessor. The most recent technological development is Intel and Hewlett-Packard teaming up to offer a new processor named 'Itanium'. This processor has been co-invented by HP, produced by Intel and is targeted at the most demanding server applications, especially useful in today's age where such Web-servers and enterprise computing needs are on an exponential rise.

The Itanium is successor to the Xeon, which was quite a popular choice for server applications. While the Xeon was built around a 32-bit RISC (Reduced Instruction Set Computing) architec-

ture, the Itanium ushers in a new age of processing as it is built around a 64-bit architecture. These new technologies are collectively referred to as IA-64 (Intel Architecture-64) and EPIC (Explicitly Parallel Instruction Computing). Itanium consists of about 25.4 million transistors and will be fabricated on the 0.18-micron process while later releases will be created on the 0.13-micron process.

The new technology

Intel is known for its wide range of processors for desktops, servers and laptops. Up till now all processors were built on an IA-32 architecture including the Celerons, the Pentium 4 and the Xeon. These processors were made to run 32-bit applications on operating systems such as Win-

Announcing the arrival of the path breaker for all future processors—the Itanium

dows 98, Me, 2000 and NT. In the next logical iteration, Itanium's 64-bit architecture is built to tap the potential that is going to be offered by 64-bit applications and operating systems, such as the Windows XP 64-Bit scheduled to be launched in October this year.

Until now, processors have been fabricated with two levels of cache (L1 and L2) onboard, but the Itanium has three levels of cache (L1, L2 and L3). It comes with 128 KB of L1 cache, while the L2 cache ranges from 256 KB to 1 MB. The L1 and L2 cache are on-die. OEMs will be able to add L4 cache too. On-die cache, which refers to the high-speed memory that's fabricated onto the processor core itself, is a common feature available in today's processors, be it for desktops or servers. Since it is on-die, cache is run at full speed, thereby processing data at a faster rate than processors that do not have on-die cache.

The L3 cache is mounted separately on the card that houses the actual Itanium core and ranges from 2 MB to 4 MB. The cartridge houses this daughter card—much like what was seen with Intel's slot-based processors. The L3 and L4 cache will not be on-die but will be unified with the package. The additional cache is handy if you are using high-end applications such as data warehousing or running a Web server.

As of now, the Itanium is available in speeds of 733 MHz and 800 MHz and just like the Pentium 4, this processor will also be based upon Intel's Quad Pumped bus technology to deliver an effective bus frequency of 400 MHz, while the actual bus runs at 100 MHz.

On an EPIC path…

Another aspect of the Itanium is the use of enhanced parallel processing techniques, which basically means its ability to process more than one instruction at a time. EPIC, the name given to this technology, executes and processes information in parallel and on an instruction level. In this system, the IA-64 compiler splits the source code into sets of machine code that are fed to the processor in parallel. This increased co-operation between the hardware and compiler sub-systems of the processor greatly increases its efficiency as compared to its predecessors, allowing it to execute more instructions in the same amount of time.

So far the Pentium III and the Athlon could issue three instructions per clock cycle but the Itanium, with a parallel execution core, will have a six issue scheduler, 11 execution units, four integer, two floating point, three branch and two load/store units. This implies that the Itanium can handle an enormous number of instructions simultaneously.

In order to implement EPIC, two technologies are used: 'Predication' and 'Speculation'.

Predication: Today's processors use branch prediction (the path the processor needs to decide on while processing data) but a considerable amount of time is spent on calculations for branches that end up being unused and finally discarded. Predication is a compiler-based technique of looking ahead to make more accurate predictions of what code will be actually used, thereby considerably reducing chances of making wrong predictions and wasting precious clock cycles.
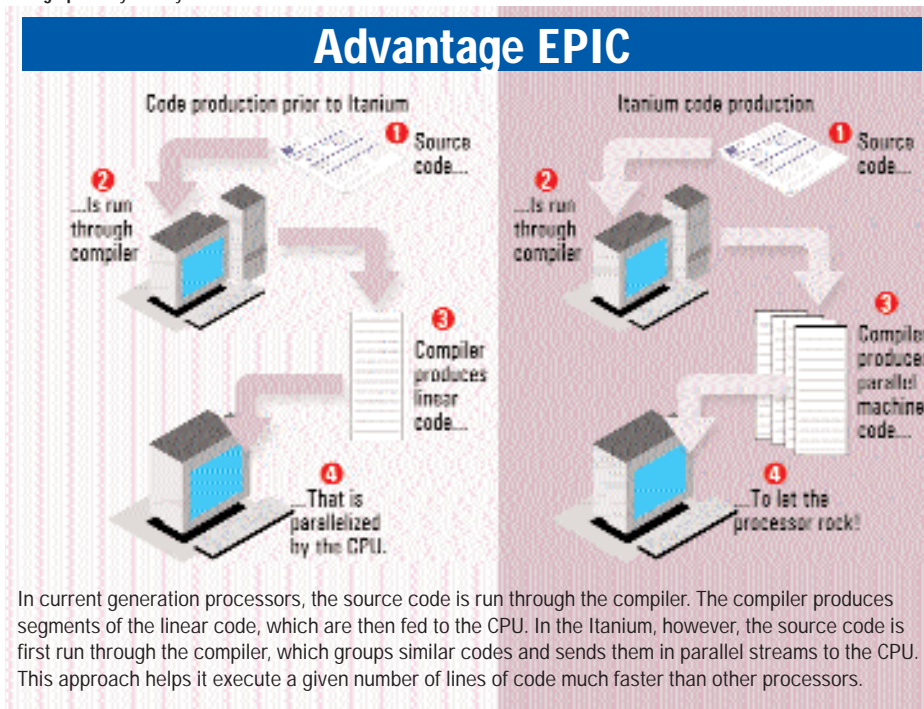
Speculation: This is a process whereby a processor loads instruction sets and data even before you ask for it. The Itanium processor performs this task while it is idle, which means that the relevant data and instructions are already present and available when the processor needs them, thereby increasing its efficiency.

Similar to other processors, the Itanium preloads instruction sets and data purely through a set of algorithms based on probability and there are chances that the instructions loaded might be of no use at all. In this case, the unused instructions and data are simply flushed from the processor and alternate courses of action are taken. The advantage of speculation is evident only when the predictions made by the processor are correct and when the pre-fetched data is actually needed.

Where does it lead?

So what does a 64-bit processor mean in real life? It simply means that the processor is able to access 64 bits of memory

Infographic: Jaya Shetty

Advantage EPIC

In current generation processors, the source code is run through the compiler. The compiler produces segments of the linear code, which are then fed to the CPU. In the Itanium, however, the source code is first run through the compiler, which groups similar codes and sends them in parallel streams to the CPU. This approach helps it execute a given number of lines of code much faster than other processors.

The Xeon vs the Itanium		
	Xeon	**Itanium**
Available Speeds	1.40 GHz, 1.50 GHz 1.70 GHz	733 MHz and 800 MHz
Features	Intel® Net Burst™ Micro architecture	IA-64
	400 MHz Front Side Bus	400 MHz Front Side Bus
	Hyper-Pipelined Technology	64-bit addressing and high-memory band-
	Execution Trace Cache	width for superior memory scaling
	Rapid Execution Engine	Transaction processing and large memory for
	Streaming SIMD Extensions 2 (SSE2)	enterprise solutions
	Advanced Dynamic Execution	Data integrity via machine check architec-
	Double Precision Floating Point	ture, ECC and parity
	RISC based processor	RISC based processor with EPIC functionality.
Chipset	Intel 860 Chipset	Intel 460GX Chipset
Cache	L1 Execution Trace Cache (8 Kb + 12 KB)	L1 (128 KB)
	L2 Advanced Transfer Cache - 256 KB	L2 (256 to 1 MB)
		L3 (2 MB to 4 MB)
RAM	Dual Channel RDRAM	SDRAM and DDR SDRAM
Fabrication Process	0.18 micron process	0.18 micron process
Transistor Count	42 million	25.4 million

information and can also process data, 64 bits at a time. This is precisely where the Itanium scores over other processors that are built around a 32-bit architecture. A 32-bit processor can theoretically access approximately 4.3 billion bits of data per second, whereas the Itanium can access around 2.1 billion GB (18.4 quintillion bits), that is, effectively 4 billion times more than the current 32-bit processors!

Enhanced floating point: Another advantage with this processor is that it has a huge number of registers. Registers are the areas within the processor where instructions act on data. The Itanium has 128 82-bit floating-point registers, 64 1-bit and 64 8-bit Predicate and Branch registers. Due to the 128 registers of the Floating Point Unit, it is ideally suited for executing complex tasks and computations that specifically make use of this unit, such as weather predictions, industrial level 3D modelling, etc.

Multimedia architecture: Multimedia applications require more CPU power and RAM. The Itanium is ideal for running multimedia applications due to its capability of executing arithmetic and data arrangement functions in parallel.

A new chipset: As is the case with all new processors, even this processor will have a new motherboard with a Slot M or C4 (flip chip assembly) based on the all-new AL 460 GX chipset which can support from one to four Itanium processors and up to 64 GB of RAM. Another chipset, BS 460 GX, will support one or two Itanium processors. This chipset supports PC100 SDRAM (Synchronous Dynamic RAM) and PC1600 DDR SDRAM only. The reason for using SDRAM is that it is extremely cost-effective and since high-end servers and workstations use large amounts of memory, RDRAM (Rambus Dynamic RAM) would greatly increase the overall system cost.

Compatibility: According to Intel, Itanium provides full compatibility with 32-bit applications, implying that all current 32-bit based applications will run on it without any modifications. However, 32-bit applications will not run faster on an Itanium. In fact, there are chances that there would be no noticeable speed difference between, say, a Coppermine 800 MHz and an Itanium 800 MHz. While a Coppermine is tuned to run 32-bit applications, the Itanium is built to run 64-bit applications and hence would not be able to run 32-bit applications as fast as a 32-bit processor. An ideal condition would be an Itanium processor running on a 64-bit operating system with a target application that is also 64-bit based.

Soon, but not yet

Time and experience have shown that whenever a new processor is launched, its true power can only be experienced a year or two after its launch, when applications that actually tap its potential are made available. Hence, you may not find a distinct difference while using newer processors with older applications. The same would be the case with the Itanium—the power of this processor will come to the fore only when 64-bit operating systems and applications are made available.

The Itanium would be suitable for large corporates and enterprises that require a high level of computing power and need to 'future-proof' their investments in new servers. As it stands, 64-bit is the way processors are headed and for an enterprise that uses high performance applications, the Itanium would prove to be a good investment.

Picture PERFECT

Say bye bye to
wishy-washy prints of
pictures taken on
your digi cam...Print
Image Matching in
here!

MENLYN NORONHA

Plan to buy a new printer? Then you might want to check out the latest news from Epson, especially so if you have or use a digital camera and frequently take prints of your photographic endeavours. The Print Image Matching (PIM) technology developed by Epson is a new print optimisation technology that guarantees the pictures being printed on paper are exactly as the camera recorded them.

What exactly is PIM?

Seiko Epson Corporation has developed PIM technology in conjunction with major digital camera manufactures such as Casio, Konica, Kyocera, Minolta, Olympus, Ricoh, Sony and Toshiba. It ensures that digital cameras and PIM-enabled printers work in perfect harmony to create the best possible prints. With PIM, digital camera manufacturers can set critical image-specific parameters for printing such as gamma level (a feature of a display device that relates brightness to contrast and maintains a realistic image), colour space (the total range of colours that can be displayed or reproduced by a device), contrast, sharpness, brightness, saturation, shadow point (darkest level in an image), highlight point (brightest level in an image—a bright shine on a chrome surface) and colour balance to ensure the best results from each digital camera model.

Using a PIM-enabled digital camera you can simply point and click photographs in automatic mode or select an image type such as portrait, landscape, or macro, in the camera and take a picture. If you are wondering about the difference between the portrait and macro modes it's this—the print commands for photos taken in macro mode may stress on particular settings such as sharpness and clarity, while those taken in portrait mode could highlight soft focussing and subtle flesh tones. The gamma setting data will reflect the original brightness of the image, while

the wider colour space setting of the digital camera will provide access to formerly unavailable colour data, resulting in better colours. The camera saves this 'camera-specific' information (like shutter speed, aperture, etc) in each image data file. A PIM compatible printer uses this information automatically while printing to ensure that it accurately reproduces the image captured by the camera and it does so by varying brightness, gamma and contrast settings accordingly.

The how of it

A conventional CCD sensor used in a digital camera consists of a multitude of tiny light-sensitive elements that convert light into an electrical signal. This in turn is converted to a dual or digital signal by an analog/digital converter module. These sensor elements do not recognise colour. So colour palettes of red, green and blue filters are attached on the CCD in such a manner that each individual light-sensitive element sees red, green or blue.

From the colour spectrum, the camera's electronics then calculate the 'correct' colours, a procedure referred to as colour interpolation. There are different colour spaces for different image processing hardware such as digital cameras. Therefore, 'correct' colours refer to that range of colours that can be used by the camera while other colours that cannot be reproduced by the camera are left out. The number of colours a camera can actually record is expressed by its colour depth value. Most digital cameras work with 24-bit colour, which means you can get 16 million colours. Some digital cameras can even process 30 bits,

which equals 1 billion colours.

To 'write' these colours, a specification called the YCbCr (Yellow, chrominance blue, chrominance red) colour space is used in digital cameras. This is a colour model by which colours are defined in terms of their brightness (referred to as luminance) and two of their shades (chrominance blue, chrominance red). Although the YCbCr colour space is usually used for storage in JPEG format, there are a few cameras that support TIFF YCbCr colour format.

Since the YCbCr colour space only permits 8 bits per component (Y, Cb and Cr), only 24 bits are stored with these file formats (i.e. 16 million colours). However, even 16 million colours is a large number—it's greater than the number of colours the human eye can recognise. Besides, you have special print colours such as light cyan and light magenta in addition to standard print colours such as cyan, magenta, yellow and black. Modern inkjet photo printers can apply most of these colours onto paper. But you can't always guarantee that the print perfectly replicates the real scene—what the digital camera 'sees' cannot be interpreted by the printer and you end up getting an image that might be close to the real thing but not exactly it.

So why is there a mismatch in the colours of the image captured by a digital camera and the colour print? The reason for this is that the colour management and colour optimisation technology available with conventional printers helps in optimising the colours only in the final image and cannot optimise the colours during the process of acquiring the image.

Infographic: Jaya Shetty

It's a Match!

A digital camera records information about the settings used to capture an image. The digital image can then be transferred to your hard disk or a CD along with this information. When printing the image, the PIM-enabled printer reads the information to output a near-perfect match of the original image

Most computer systems use the sRGB colour model for defining colours. This is a standardised coloration model jointly developed by Microsoft and Hewlett-Packard. The sRGB colour model guarantees that individual devices working on the RGB code (red, green, blue) reproduce colours logically and realistically, but the range of colours with this model is very restricted. When defining sRGB, the lowest common denominator is taken as the basis because the aim is to permit the rendition of colours on the medium that is most limited with respect to colour reproduction. So with conversion from YCbCr to sRGB, a multitude of colour shades are lost and this is why the printed image is not up to the mark. But with PIM technology, inkjet printers that are PIM enabled can now reproduce the colours in the YCbCr colour space.

Priming it with PIM

In PIM, the entire colour space that the camera is capable of writing is put in an EXIF header, which is a JPEG header that can contain camera-related information such as the definition of print gamma (gamma settings used by the printer) and the definition of the colour space actually captured by the camera. Further, camera information relevant to the printing process is also written into this header—the gamma value, the reference colour and the values for light and shade, colour saturation and colour balance, brightness, contrast and definition. As these values differ from camera to camera and from printer to printer, the original image (from the camera) often does not agree with the finished photo produced by the printer using conventional technology. This is where PIM technology comes handy—it recognises such discrepancies and the printer driver itself is able to interpret the supplementary image information contained in the EXIF header and it adjusts the print accordingly.

The print can also be adjusted for the subject. If a camera has the subject programming facility and is set for portrait photography, prints are produced with some amount of soft focus with optimised skin tones, while in the case of macro shots the priority is given to absolute definition and maximum contrast. Thus, the image capture process is optimised for the type of format selected.

With PIM technology, digital camera manufacturers can incorporate additional print-relevant data and commands in the EXIF header. Initially, only the Epson PhotoQuicker software will enable analysis of all the print-relevant data contained in the EXIF header and the conditioning of this data for printing. This software will be supplied with future PIM-compatible printers from Epson such as the Epson Stylus Photo 785EPX and allow camera images to be displayed, selected and printed.

Future developments in PIM technology will also support the DPOF (Digital print Order Form) specification—a kind of digital 'envelope'. This format of recording information allows images captured by digital cameras to be automatically printed through photo-finishing print services or home printers and allows pictures to be printed with pre-made frame patterns.

Epson has also included PIM into its digital-camera range such as in the Epson CP-920Z. It is presently working on a plan to license PIM technology to software manufacturers and printer manufacturers for a suitable fee so that image manipulation programs and printers can support this technology in the near future.

PIM technology brings a genuine quality advantage for users in practical use since it will allow home and amateur users to create prints that match those that were until now only seen in professional applications. ▪

1/2 page Ver. AD

HARDWARE

Radar

A motherboard, a colour printer from Epson, a Palmtop from Psion, hard drives and other latest hardware tested

On the board

This motherboard has a hardware monitoring system that monitors the working voltage, fan status and CPU temperature. There are no other components around the CPU socket, which makes it easy to install and troubleshoot the CPU and the heatsink. Impressive test scores and an affordable price make it a good platform for the Pentium 4.

AOpen AX4T

SPECIFICATIONS:
Intel 850 chipset, 4 RIMM sockets supporting 2 GB of memory, 5 PCI sockets, 100 MHz FSB, 300/400 MHz RDRAM RIMM support, jumperless design, onboard 10/100 LAN controller, AGP 2.0 and CNR compliance, four-channel USB ports
Benchmarks: 4172 in 3D Mark 2001 and 24011 in SiSoft Drive index. 96.1 fps in *Quake III Arena* at 1280x1024 resolution and 95.3 fps at a resolution of 1280x1024

verdict	B +
AOpen AX4T	
Performance	🔥🔥🔥🔥◢
Build Quality	🔥🔥🔥◢◣
Value for Money	🔥🔥🔥◢◣
Features	🔥🔥🔥🔥◣
OVERALL	🔥🔥🔥◢◣

+ Good test results
+ Excellent package and contents
Price: Rs 10,500
Contact: Yogi Comp
Phone: 022-8806582
Fax: 022-8806582
E-mail: yogicomp@netkracker.com
Web site: www.yogicomp.com

No nonsense

A completely bare system without a CPU, RAM or hard drive; it can be fully configured according to your requirements. Its small but stocky cabinet is suitable for cramped desktops. But it has only two PCI slots and no AGP slot. Therefore, it's a 'no-no' for those who want faster graphics and upgrading it will also be a problem.

The ASUS Terminator Barebones Machine

SPECIFICATIONS:
Specifications: SiS chipset-based ASUS CUSC motherboard, integrated graphics-cum-audio chip, 52x ASUS CD-ROM drive, floppy drive, two PCI slots, no AGP slot, four USB ports, headphone and microphone socket
Benchmarks: 20.2 in Ziff-Davis Content Creation, 28.8 fps in *Quake III Arena* in normal configuration (640x480) and 5 fps in high configuration (1024x768), 1 minute 8 second to encode audio, 2 minute 5 second to encode video

verdict	A -
The ASUS Terminator Barebones Machine	
Performance	🔥🔥🔥🔥◣
Build Quality	🔥🔥🔥◢◣
Value for Money	🔥🔥🔥🔥◣
Ease of use	🔥🔥🔥🔥◣
OVERALL	🔥🔥🔥🔥◣

+ Very small footprint; affordable
- Limited scope for future upgrades
Price: Rs 15,000
Contact: Rashi Pheripherals
Phone: 022-8260258/59
Fax: 022-8221012
E-mail: ho@rptechindia.com
Web site: www.rptechindia.com

Quality that's affordable

This colour printer is not suited for heavy printing applications but would be apt for the home user who needs quality prints and is ready to comprise on speed. It has a user-friendly interface that shows the online status of the print in queue and even the amount of ink left in each cartridge.

The Epson Stylus C20SX

SPECIFICATIONS:
Interface: USB
Printing technology: Piezo-electric Inkjet

verdict	B +
The Epson Stylus C20SX	
Performance	🔥🔥🔥🔥◣
Build Quality	🔥🔥🔥◣◣
Value for Money	🔥🔥🔥🔥◣
Features	🔥🔥🔥◣◣
OVERALL	🔥🔥🔥◢◣

+ Good graphic interface and print quality
- Light output in high-speed printing mode; slow print speed; no USB port
Price: Rs 5,995
Contact: Epson India Ltd.
Phone: 080-5321266; **Fax:** 080-5581799
E-mail: gsuresh@eid.epson.co.in
Web site: www.epsonindia.com

Computer on the move

It's as small as most conventional PDAs, but is actually marketed as a Palmtop. As a Palmtop Computer, it's fantastic. It integrates a keyboard that is recessed into the device—as the case opens, the keyboard slides out from underneath, making it effectively larger than it is when closed.

PSion 5mx

SPECIFICATIONS: Integrated keyboard, serial cable, buit-in microphone, PsiWin software, Compact Flash slot, no support for PC and Ethernet cards, runs on two AA batteries

verdict — B

PSion 5mx

Performance	♦ ♦ ♦ ♦ △
Build Quality	♦ ♦ ♦ △ △
Value for Money	♦ ♦ ♦ △ △
Featues	♦ ♦ ♦ ♦ △
OVERALL	♦ ♦ ♦ △ △

+ Excellent voice recording capability
- Very expensive
- No support for LAN cards
Price: Rs 32,000
Contact: Ingram Micro
Phone: 6833726, 6834688
Web site: www.imindia.com

Affordable 5.1 system

An affordable alternative to the expensive 5.1 systems, it didn't compromise in quality in any of the tests. It has wall-mounting hinges that can be attached to the satellites, so you can mount the speakers comfortably. The speakers generated good high frequencies, but at low frequencies the bass sounded weak.

Mercury SR-301F

SPECIFICATIONS: 2000-watt PMPO 5.1 surround sound speaker system, supports 4.1 channel and enhanced two-channel stereo, 2.5-inch 3-watt RMS satellites, 2.75-inch 5-watt RMS centre speaker, powerful 4-inch 22-watt RMS subwoofer, wireless remote, no Dolby Digital decoder

verdict — B

Mercury SR-301F

Performance	♦ ♦ ♦ ♦ △
Build Quality	♦ ♦ ♦ ♦ △
Value for Money	♦ ♦ ♦ ♦ △
Features	♦ ♦ ♦ △ △
OVERALL	♦ ♦ ♦ △ △

+ Wireless remote plus console
+ Good low-frequency response
- Overall power not too impressive
Price: Rs 4,600
Contact: Neoteric Infomatique
Phone: 022-4172600; **Fax:** 022-4163679
E-mail: sales@neoteric-info.com
Web site: www.neoteric-info.com

Portable storage capacity

A portable storage product for users who need larger capacity on the move. The drive tested by us had a capacity of 10 GB but 20 GB variants are also available. It does not require any other third-party application for running and backing up data. It has an LCD interface that displays the data transfer speed.

Iomega Peerless 10 GB Drive

SPECIFICATIONS:
System requirements: USB Port in IBM, IBM-compatible and Macintosh computers; Win98/98SE/Me/2000, Mac8.6 and higher OS
Features: One USB Interface cable, one power cable, three CDs including drivers,
Bundled software: Iomega Quick Sync, MGI PhotoSuite and MGI Videowave
Benchmarks: Random access time of 19.7 ms in HDTach, 837 Kbps random read and 911 Kbps write in SiSoft Sandra, Drive Index score of 914

verdict — B +

Iomega Peerless 10 GB Drive

Performance	♦ ♦ ♦ ♦ △
Build Quality	♦ ♦ ♦ △ △
Value for Money	♦ ♦ ♦ △ △
Features	♦ ♦ ♦ ♦ △
OVERALL	♦ ♦ ♦ ♦ △

+ Huge storage capacity
+ Bundled applications
- Needs power for ejecting media
Price: Rs 26,990
Contact: Iomega Pacific Pvt Ltd, India
Phone: 9820267791
Fax: 022-6527023
E-mail: menon@iomega.com

Good performer

This hard drive from Samsung has a capacity of 60 GB with a 5400-rpm spindle speed. The drive was not at all noisy and caused no heating problems while running the tests. However, the drive was shipped only with an anti-static cover, making it prone to physical damage due to possible mishandling during transportation.

Samsung SV 6004 H

SPECIFICATIONS: 60 GB capacity, 5400 rpm spindle speed, ATA/100, 20 GB per platter, IDE interface
Benchmarks: 29 MBps sequential read and 7 MBps random read in SiSoft Sandra 2001, 28 MBps in sequential write and 6 MBps in random write tests, average access time of 7 ms, burst speed of above 80 MBps and random access time of 9.7 ms in HDTach test

verdict — B +

Samsung SV 6004 H

Performance	♦ ♦ ♦ ♦ △
Build Quality	♦ ♦ ♦ △ △
Value for Money	♦ ♦ ♦ △ △
Features	♦ ♦ ♦ △ △
OVERALL	♦ ♦ ♦ △ △

+ No heating problems
- No proper packaging
Price: Rs 8,000
Contact: Samsung Electronics India Information and Telecommunication Ltd
Phone: 011-6322517; **Fax:** 011-6322607
E-mail: marketing@samsungindia.com
Web site: www.samsungindia.com

Radar

Software to remotely access your machine, a utility that integrates your scanner and fax modem, an IRC client, a PC monitoring software and other tools tested

Ideal client for IRCs

An IRC client written in Borland Delphi, BersIRC has a very long customising option menu, allowing you to choose from various options such as firewall's nicks, colour schemes, etc. Plenty of plugins have been included for added functionality. Good scripting facilities are also available.

BersIRC v1.35

SPECIFICATIONS:
Download size of 2 MB

verdict	A -
BersIRC v1.35	
Ease of use	♠ ♠ ♠ ♠ △
Features	♠ ♠ ♠ ♠ △
Performance	♠ ♠ ♠ ♠ ◗
Value for money	♠ ♠ ♠ ♠ ◗
OVERALL	♠ ♠ ♠ ♠ △

+ Easy to use, cool interface
- A bit unstable and crashes unexpectedly
Price: Freeware
Web site: www.bersirc.com

For the fun of faxing

This small software utility integrates your scanner and fax-modem to work together. You can use it to send faxes via your modem, you can scan your documents and you can preview them before you send them. If your scanner has the automatic document feeder option, you can scan and fax multiple documents.

Fax Machine 1.12

SPECIFICATIONS
Features: One-click exporting of scans directly to Fax, 1.09 MB download size

verdict	B +
Fax Machine 1.12	
Ease of use	♠ ♠ ♠ ◗ △
Features	♠ ♠ ♠ △ △
Performance	♠ ♠ ♠ ◗ △
Value for money	♠ ♠ ♠ ♠ △
OVERALL	♠ ♠ ♠ ◗ △

+ Simple to use
+ Intuitive interface
- Can send/receive the fax only when connected to the Net
Price: Freeware
E-mail: nico.cuppen@icu.nl
Web page: www.nico2000.com

Rock DJ

Live Act lets you compose music and combine it with visual effects of your choice. Three different levels make it the ideal music maker for enthusiasts who have a basic understanding of music sequencing applications. You can simultaneously control audio, MIDI and video files and connect a synthesiser to fully explore all features.

Magix Live Act V2000

SPECIFICATIONS
Features: Three levels of usage: DJ Screen, Rock Screen and Master Screen, allows for simultaneous control of audio, MIDI and video files

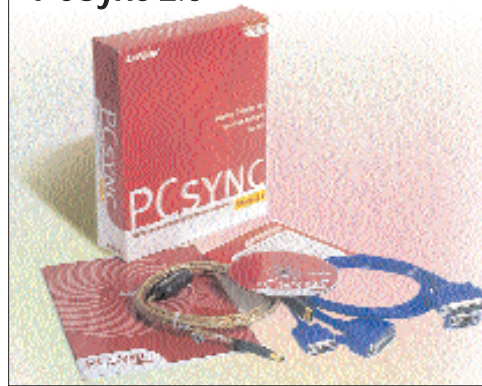| verdict	B +
Magix Live Act V2000	
Ease of use	♠ ♠ ♠ △ △
Features	♠ ♠ ♠ ◗ △
Performance	♠ ♠ ♠ △ △
Value for money	♠ ♠ ♠ ♠ △
OVERALL	♠ ♠ ♠ ◗ △

+ Good features
- Could prove arcane for beginners
- Requires a fast processor
Price: Rs 725
Contact: Microware Computer Services
Phone: 022-8729725; Fax: 022-8727446
E-mail: vinod@mwcdrom.com
Web site: www.mwcdrom.com

PC cupid

Using PCSync, you can connect two computers that are not networked, through either the serial or the USB port. Computers can also be controlled remotely over the Internet. You can copy or move files between the host and the remote computer using the transfer option in the menu bar or by simply dragging and dropping them.

PCSync 2.0

SPECIFICATIONS
Features: Comes with cables for USB or serial port, lets you manage MP3s

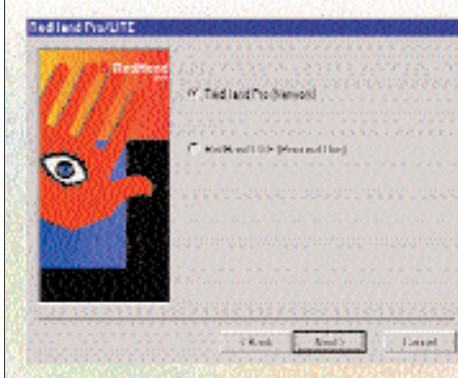| verdict	B
PCSync 2.0	
Ease of use	
Features	
Performance	
Value for Money	
OVERALL	

+ Easy-to-use graphic interface
- Different cables (i.e., USB and Serial) call for different software packs
Price: Rs 5,500
Contact: B.M.Technologies.
Phone: 022-6907577; Fax: 022-6907577
E-mail: bmtech@vsnl.com
Web site: www.bmtonline.com

Caught red handed

An extremely useful software with an advanced set of tools if you want to know what applications and programs others may have used on your PC while you were away. It comes in two versions: RedHand Lite for standalone machines and RedHand Pro for networked machines.

RedHand 7

SPECIFICATIONS
Features: Comes in two versions: RedHand Lite for standalone machines and RedHand Pro for networked machines

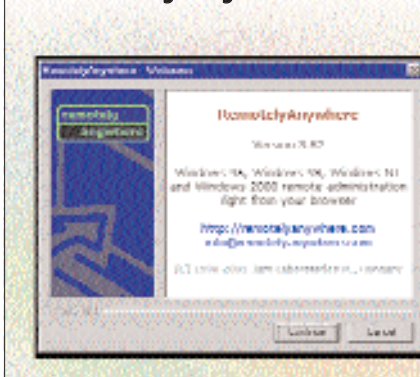| verdict	B
RedHand 7	
Ease of use	
Features	
Performance	
Value for Money	
OVERALL	

+ Operates in invisible mode
+ One installable for both standalone and networked machines
Price: Rs 3,750
Contact: Alladin Multimedia Pvt Ltd
Phone: 022-8818558; Fax: 022-8832695
E-mail: aladdin@vsnl.com
Web site: www.aladdinindia.com

Remote accessing

This is a remote administration utility that allows you to access your machine from remote locations. It uses an HTML or JavaScript or Java-based client, therefore requiring only an Internet browser capable of running JavaScript and Java. Along with this, RemotelyAnywhere can even be configured to work through a proxy server.

RemotelyAnywhere

SPECIFICATIONS
Features: Uses an HTML or JavaScript or Java-based client. Can even be configured to work through a proxy server, uses NT logins, has an easy-to-use interface

verdict	B
RemotelyAnywhere	
Ease of use	
Features	
Performance	
Value for Money	
OVERALL	

+ Has performance monitoring utility
- Complicated configuration procedure
Price: Rs 5,500
Contact: Alladin Multimedia Pvt Ltd
Phone: 022-8818558
Fax: 022-8832695
E-mail: aladdin@vsnl.com
Web site: www.aladdinindia.com

3D fun

Win3D converts your desktop into a virtual 3D office where applications run on the 'walls' of the office, recent documents are stored in a 3D 'drawer' on your bureau and so on. You can use your keyboard to move from one place to another just like you would in a 3D game.

Win3D

SPECIFICATIONS:
Minimum requirements: Microsoft Windows 95/98/2000/Me/XP, P-II 250 MHz or better, 32 MB RAM, 16-bit high colour display with 640x480 resolution, a display adapter with at least 8 MB RAM, hardware 3D support for DirectX 6

verdict	B -
Win 3D	
Ease of use	
Features	
Performance	
Value for Money	
OVERALL	

+ Fun using Internet news and updates
- Very dependent on games, Explorer, etc and switches to normal windows
- Using it on a regular basis slows down your PC
Price: Shareware
E-mail: sales@clockwise3d.com
Web site: www.clockwise3d.com

Reviews

Find it on
digit
interactive

Arena
For game reviews
check out,
Playware

Office XP Inside Out

In and out of office

This book is a one-stop guide for almost all applications bundled in the new *avatar* of Office. Conventions and features used to mark important points make your reading a pleasurable experience. The book covers a wide spectrum of topics and comes with a CD-ROM that includes add-ins, office tools on the Web, author's sample files and macros that are used in the book, and step-by-step interactive tutorials.

Contact: Prentice Hall of India
Phone: 011-3321779
Fax: 011-3717179
E-mail: iphi@phindia.com
Price: Rs 895 (with CD)
Rating: ♠ ♠ ♠ ☆ ☆

Foundation Flash 5

Off in a flash

If Web animations are what grab you, but you don't know where to start, then this is the book for you. You'll find here beginner-level information on working with the latest version of Macromedia's motion Web graphics package. The book covers aspects such as interface essentials, shortcuts while working with Flash 5 and also ActionScript for those designers who enjoy scripting and even those who don't.
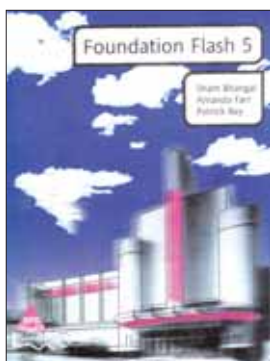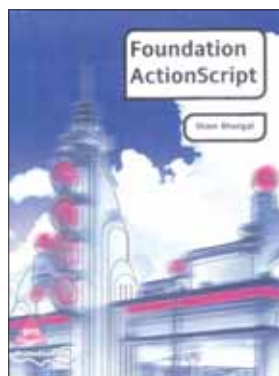
Publisher: Shroff Publishers & Distributors
Contact: Computer Bookshop
Phone: 022-2070989
Fax: 022-2623551
E-mail: cbsbom@giasbm01.vsnl.net.in
Price: Rs 350
Rating: ♠ ♠ ♠ ☆ ☆

Foundation ActionScript

Scripting new actions

If you've mastered the basics of working with Flash 5 then this book will help you take your creativity to a new level—with ActionScript. This book is aimed at those of you who are comfortable with the basics of Flash 5 but are new to programming. It introduces beginners to a little programming theory and looks at topics such as planning an ActionScript project, animation for interactive games and more.

Publisher: Shroff Publishers & Distributors
Contact: Computer Bookshop
Phone: 022-2070989
Fax: 022-2623551
E-mail: cbsbom@giasbm01.vsnl.net.in
Price: Rs 300
Rating: ♠ ♠ ♠ ☆ ☆
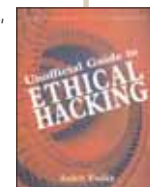
On the Stands

Unofficial guide to Ethical Hacking

This book is aimed at providing you all the information you ever wanted about hacking and how hackers work, but didn't know where to look. The book looks at topics such as Hacking Windows, Cracking Passwords, Hacking Concepts and a whole lot more.
Publisher: Macmillan India
Contact: Computer Bookshop
Price: Rs 345

Internet from A-Z

Who better to introduce your kids to the fun world of the Internet than Disney? This book teaches you the basics of the Internet such as using search engines and guides, chatting on the Net and more. A fun way for your child to get acquainted with the Net, accompanied by his favourite Disney characters.
**Contact:** Egmont Imagination
Phone: 022-6924700
Price: Rs 150

Access 2002 for Dummies

Characteristic of the Dummies range, this book features simple and easy-to-understand language and step-by-step instructions on different aspects of Access 2002 such as understanding database fundamentals, setting up fields, records and tables, importing and exporting data and more.
Contact: IDG Books
Phone: 011-3260877
E-mail: idgbooks@vsnl.com
Price: Rs 199
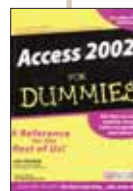
UNDERCOVER

Sizzle and burn

Agent 001 is on the blazing trail, tracking that invaluable asset for PC users—the blank CD-R

You should generally stick to gold pigments. CD-Rs that have green or blue pigments usually use low quality dyes, don't have a long life and generate errors while writing

Work hard, play even harder, that's my motto in life. As much as I enjoy each mission that comes my way, nothing beats the pleasure of sitting in my easy chair back home and enjoying the DivX version of *The Planet of the Apes*, or for that matter burning rubber with *Need for Speed*. And to think that these pleasures do come cheap…the price of a blank CD-R to be precise! That's right, blank CDs are a PC enthusiast's best friend. The Indian market, in recent times, has been flooded with CDs of every type and capacity. The choices, I was told, were wide, ranging from manufacturers, dye types to various sizes and formats. So I decided to go see for myself and get the cheapest and best possible CD-R in town.

My first stop—the mecca of hardware and the 'find-it-all-in-one-place-*galli*', Lamington road! The first shop I walked into stocked only branded media, namely, HP, Sony, etc. Expensive too! Starting from Rs 60 and above. When I asked for something cheaper, the dealer expressed an obvious distaste. He went into a lengthy sermon on how, with cheaper CD-Rs infiltrating the market, the general non-discerning consumers were ending up with inferior quality CD-Rs. He went on to say that these CD-Rs could even spoil your hardware (the CD writer). What he said had some truth in it though, as cheaper CD-Rs use low quality dyes (dye is the organic layer on which the actual recording takes place). You should generally stick with gold pigments. CD-Rs that have green or blue pigments or their variants usually use low

quality dyes, don't have a long life and generate errors while writing.

I also dug up some dirt on 80-minute CD-Rs. Rumour has it that while these CDs have problems with certain CD writers, the market is flooded with them. The second shop I visited in Andheri (W) in Mumbai had an entire spindle (containing 100 CDs) for Rs 1,750. Wow! A blank 700-MB CD-R (80 minutes) for less than Rs 18! I was also told that I could avail of cheaper but unbranded variants. Cheap CD-Rs come without jewel cases and inlay cards, so storage could be a problem unless you plan on buying a CD pouch. Funnily, the vendors would insist on the good value of the CDs they stocked and would at times go to the extent of saying that other CDs were fakes and hence cheaper. Pester them further and out would come long spindles full of cheap CDs.

Onto shop number three, also in Andheri, and I was offered an entire spindle containing 100 CDs for less than Rs 12 a CD, though all were unbranded and didn't offer any guarantee. Another disadvantage with these spindles is that they come in large numbers and don't sell in smaller quantities, forcing you to buy the entire lot. And the dealer couldn't say whether these CDs would run on all CD writers.

Well, at the end of the hunt, here's what my investigations told me: 80-minute CD-Rs can be written to by almost any CD writer, but certain manufacturers such as HP and Sony do not officially support the 80-minute format. Add to this the issues with certain CD-writing software—some even fail to correctly detect the 80-minute format. This is because these CD-Rs do not comply with the CD Red-Book standard, jointly developed by Philips and Sony. (Audio tracks on Red-Book discs are stored at 44,100 Hz, 16 bits, stereo and have a defined track spiral.) Nevertheless, these CDs have become the rage and are slowly replacing the 74-minute (650 MB) format. You can easily avail of these CDs from most vendors and choose from among brands such as TDK, BASF, SUPER, Frontech, Dysan, Traxdata, Maxell, Imation, Kodak, Samsung…the list is endless!

So go make burning a habit. Emperor Nero would be proud!

CD-ROM File Systems

To access any file, a computer's operating system needs to be able to locate the file. A file system facilitates the storage and retrieval of hundreds or even thousands of distinct files. Every operating system uses a different file system and therefore there are a number of CD-ROM file systems in use on Windows, Macintosh, Unix and others. The most common file systems for CD-ROMs are the ISO 9660 and Joliet extensions. ISO 9660 is the international standard and is

designed for the PC and MSDOS. The Joliet specification was designed to resolve certain deficiencies of the original ISO 9660 file system such as a limited character set and file name and path lengths. CD-ROMs that are to be used on Macintosh computers are usually created in the Hierarchical Filing System (HFS) format. This format features support for subdirectories, up to 31 characters per file name and up to 27 characters for volume names.

Want to share your experiences with buying and burning CD-Rs?
Write in to readersletters@jasubhai.com

A-List

A listing of the best products in different hardware and software categories

Who's in, who's out? The competition's hot, but only the winners get to this page—a listing of the best performing hardware and software that have been tested till date in different categories.

Every month, at the Digital Media Test & Research Centre, we carry out a series of comparison tests as well as individual product reviews. Based on these tests, the best products have been listed here.

As different products get reviewed over the months, the top products might find themselves slipping out of the charts and replaced by the latest entrants in the market. So, keep your ears sharp and eyes open and keep yourself abreast of the latest cool products.

HARDWARE

Monitors (19-inch)
Samsung 955DF
+ Good build quality
+ Good colour results
– Screen clarity test fades out on corners

Contact: Samsung Electronics India Information & Telecommunication Limited
Phone: 011-6322517
Fax: 011-6932607
Price: Rs 32,000

Monitors (14-15 inch)
Viewsonic E53
+ OSD Support
+ 110 MHz video bandwidth

+ Good build quality
– No message signal if power cut off
Contact: Roop Technologies
Phone: 022-6631921
Fax: 022-6103919
Price: Rs 7,750

Monitors(17-inch)
ViewSonic PS775
+ Very good image quality
+ Support for high resolutions
Contact: Roop Electronics
Phone: 022-6175213
Fax: 022-6103919
Price: Rs 24,000

Graphics card
ASUS V8200 GeForce3 Deluxe
+ Unsurpassed video quality and speed
– Needs a fast CPU to get maximum result

Contact: Mnemonic Systems
Phone: 022-8010871
Fax: 022-8051761
Price: Rs. 35,000

Speakers
Creative SoundWorks DTT2500
+ True Dolby Digital-compliant sound
– Too clumsy stand for speakers

Contact: Compuage Infocom
Phone: 022-4913986
Fax: 022-4919069
Price: Rs 25,000

Soundcards
SoundBlaster Live! Platinum 5.1
+ Dolby Digital AC-3 compliant
+ High quality sound processing
Contact: Compuage Infocom
Phone: 022-4913986
Fax: 022-4919069
Price: Rs 12,500

Motherboards
ASUS P4T
+ Fits into any ATX cabinet
+ Good feature list
Contact: Rashi Peripherals
Phone: 022-8260258
Fax: 022-8190766
Price: Rs 16,500

Processors
Pentium 4 - 1.4 GHz
+ Fastest processor tested by us
+ Good build quality
Contact: Ockam Systems
Phone: 022-6234798
Fax: 022-6704503
Price: Rs 30,000 (kit including motherboard, 128 MB RDRAM and cabinet)

Hard disks (SCSI)
Seagate Cheetah 18XL - ST318404LW - 18GB
+ Blazingly fast
– Heats up quite a lot
Contact: ACI

Phone: 022-8595830
Fax: 022-8595831
Price: Rs 16,500

Hard disks (IDE)
IBM Deskstar 75GXP DTLA-307075 - 75GB
+ 10,000 RPM; good data transfer
+ 1 MB buffer
Contact: Wales Technologies
Phone: 022-3828100
Fax: 022-3828200
Price: Rs 18,000

DVD drives
Aopen 1640 Pro DVD
+ 16x DVD speeds; 512 KB cache
+ Good build quality
– Does not support DMA

Contact: Yogi Comp
Phone: 022-8806582
Fax: 022-8806582
Price: Rs 5,950

CD drives
ASUS CD-S500
+ Good performance
– Slightly inferior build quality
Contact: Rashi Peripherals
Phone: 022-8260258
Fax: 022-8190766
Price: Rs 2,700

CD-RW drives
Plextor W1610TA
+ High write and rewrite speed
Contact: Zeta Technologies
Phone: 022-4102277
Fax: 022-4102277
Price: Rs 13,450

Laser Printers
Lexmark Optra M412
+ Good print speeds
– Image quality isn't that good
Contact: T.V.S. Electronics
Phone: 044-2325506
Fax: 044-2327577
Price: Rs 42,995 + taxes

Inkjet Printers
Epson Stylus Color 880
+ Very quiet; good results
+ Print resolution of 2880 dpi
Contact: Epson India
Phone: 022-8257286
Fax: 022-8267287
Price: Rs 18,500

PCs
Dell Dimension 4100
+ Customisation possible
– Too compact for expansion
Contact: Dell Computers
Phone: 1600338044 Toll free
Fax: 1600338046 Toll free
Price: Rs 81,999

Scanners
Epson Perfection 1640SU
+ Transparency unit included as standard accessory
+ Fast image scanning
– Too bulky (4.5 kgs)
Contact: Epson India
Phone: 080-5321266
Fax: 080-5581799
Price: Rs 22,500

Laptops
Nishubuki 1 GHz
+ Attractively priced
- Low end graphics card

Contact: Nishubuki Computer Systems
Phone: 022-5825965
Fax: 022-5379719
Price: Rs 1,19,000

External Storage Devices
IOMEGA 2GB Jaz
+ Very good price per MB; hard-disk-class performance
Contact: Neoteric Infomatique
Phone: 022-4172600
Fax: 022-4163679
Price: Rs 17,500

Handhelds
HP Jornada 680E
+ Power 133 MHz processor
+ Colour screen
Contact: Hewlett-Packard
Phone: 011-6826000
Fax: 011-6826030
Price: Rs 39,000

MP3 players
Creative NOMAD 2MG
+ Excellent build quality
+ Supports WMA format and upgradeable firmware
- Controls not easily accessible

Contact: Compuage Infocom
Phone: 022-4913986
Fax: 022-4919069
Price: Rs 21,500

Keyboards
Logitech Cordless Freedom Navigator
+ Very comfortable
+ Extensive configuration options
Contact: Rashi Peripherals
Phone: 022-8260258
Fax: 022-8190766
Price: Rs 7,750

Digital cameras
Sony Cybershot DSC-P1
+ Good features offered
- Limited memory
Contact: Best International
Phone: 022-2611050

Fax: 022-2624795
Email: bestint@vsnl.com
Price: Rs 49,990

Pointing devices
Logitech Cordless Mouse-man Wheel
+ Good accuracy with features; resilient to dirt
+ Many extra function keys
Contact: Rashi Peripherals
Phone: 022-8260258
Fax: 022-8190766
Price: Rs. 4,500

SOFTWARE
Operating systems (Windows)
Windows 2000 Professional
+ Very stable
– Heavy on system requirements
Contact: Integrated Business Solutions
Phone: 022-8214701
Fax: 022-8328240
Price: Rs 8,400

Operating systems (Linux)
SuSE Linux 7.2
+ Simple to install
+ Many bundled applications
+ Customisable interface
Contact: G. T. Enterprises
Phone: 080-6606093
Fax: 080-6671407
Price: Rs 3,000

Office suites
Microsoft Office XP
+ Rich features
– Expensive
Contact: Microsoft (India)
Phone: 011-6294600
Price: Rs 19,250

OCR Packages
FineReader Pro 5.0
+ Quite accurate
Contact: Vikmans Multimedia
Phone: 011-6472325
Price: Rs 5,000

Web authoring
Macromedia Dreamweaver4 ver.4.0
+ Extensive feature support
+ Integrates with other packages
- Intimidating for first time user

Contact: Wipro Infotech Enterprise
Phone: 080-8440011
Fax: 080-8440187
Price: Rs 14,250

Firewalls
ZoneAlarm Pro 2.6
+ Good performance
– No protection against ActiveX controls
Contact: www.zonelabs.com
Price: Rs 2,000 (approx)

CD-burning software
Easy CD Creator 5 Platinum
+ Very fast writing speed
Contact: www.roxio.com
Price: Rs 3,600 (approx)

Voice recognition
Dragon NaturallySpeaking v5.0 (Preferred Edition)
+ Impressive speech recognition
– High on system requirements
Contact: HCL Infosystems
Phone: 011-4526518
Fax: 011-4526579
Price: Rs 17,995

Accounting software
FACT 1.90
+ Exhaustive feature list
– No security for database
Contact: Vedika Software
Phone: 022-5006490
Fax: 033-2400824
Price: Rs 14,500

Digital English

Techno talk is gradually supplanting British English as the standard, and gaming rules in Digit

Writing and working for a magazine that brings you the very latest in the digital world has a very interesting side effect. It changes the way you think and talk.

Here are some samples of typical 'Digit' talk:

Sample 1: The elevator is under repair. On realising that the lift would be unavailable, a Digster very helpfully informs her colleagues that the lift is 'offline'.

Sample 2: Another Digster has a tough time explaining what she wants to the dressmaker. Because all that she can think of saying is, "*Mujhe yeh* dress *isi* format *mein chahiye*".

Sample 3: Hunger pangs strike and people are in a mood for a pizza party. But there's a snag. The guy taking the order has no clue what you mean when you ask, "Do I have to configure my own pizza? Don't you guys have any default options?"

The more initiated among us tend to go a step further. The things that get them excited would puzzle most others. Don't believe us? Here's an exchange we overheard:

"Hey! Look at this!"

"What?"

"This event added itself to my Alerts list. I got an e-mail about it but I didn't add it."

"How does it do that?"

"I dunno, but it seems to work like an Outlook worm."

"What!!?? Gimme, Gimme, I want to have a look at the source code."

Surrounded as we are by technology and techno talk, we sometimes tend to forget how things work in a lesser world. The other day someone was looking desperately for Varun in the Test Centre. Now most of the communication happens over MSN, and this is what we recorded:

"Damn, I need to find Varun!"

"Must be at his desk."

"Nope he's not online on MSN."

"Have you tried the phone?"

"Oops."

Not to mention this other incidence when a PR guy wanted to send some product information to one of our writers. "Ok," says the writer, "just e-mail it over to me."

"Can't I send it to you by fax?" asks the PR person. "Er...I'm not sure that I have a viewer for that." (Go figure!)

So where does this rapid takeover of British English by digital English leave us? One thing is definite, we are very likely candidates for alternate careers. We heard there are courses in US universities that examine how 'talking' is gradually turning into 'techtalking'. Maybe we can apply to these schools for posts as visiting faculty. Any takers?∎

Go Slow, People Hard at Play

From 6 pm, the countdown begins. Everybody at Digit keeps sneaking a look at the clock, waiting for the magic hour of 6.30 pm for that's game time! That's the appointed hour when avid gamers in the Digit team each day, without fail, come hell or high water, slip out of work mode and slide into play mode. Sagging energy levels mysteriously soar. The *Quake* server is switched on, decibel levels rise and the keyboards clack a different tone; we now begin to hear bangs, booms, staccato gun fire and spine chilling cries of "Aaaaaargh, you fragged me", and others to that effect.

Call it an addiction, call it an affliction, call it a passion, call it what you will. *Quake* is serious business out here as newcomers soon realise. Like Krishnan, our new

COO - Content Services, found out when he walked into the Test Center looking for its head honcho, Marco.

Not familiar with the 'tradition', he was a little taken aback to see *Quake* running on all the machines and war cries rending the air. Unable to locate Marco, he came up behind Hatim and gently tapping him on the shoulder, ventured to ask where Marco was. Now absolutely nothing can come between the gamer and the game. With full attention on the game, Hatim dismissed him with a brusque, "He's not here", without taking his eyes off the monitor even for a moment. A little taken aback, Krishnan asked again. Completely exasperated, Hatim looked up, paused, and then reluctantly trooped off in search of Marco.

PS: A big hue and cry was made for the whereabouts of Marco, so that The Game could be resumed as soon as possible.
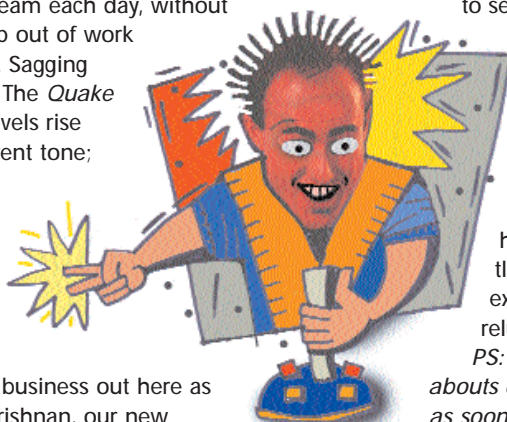
Illustrations: Farzana Cooper

Now you know!

You know why work never gets done at government offices? Well, they never have the right resources. For instance, how could you get any work done on a laptop that's 101 bugs compatible!!!

Contributed by: Akhilesh Jain, via e-mail

What lies beneath

Now for some breaking news. While the generation gap still exists, the gap between Microsoft and Linux has finally been bridged!

As is evident from the accompanying picture, all you have to do is turn Microsoft XP inside out…and you have Red Hat Linux 7.x!

Contributed by: Saket Saurav, Patna

Boing-boing-bong

Long hours of sitting at your desk at work can be torture for your back. (For those of you who haven't experienced it yet, trust us. We know!).

Here's an interesting solution for such contingencies— an inflatable gymnastics ball that costs $40 and takes 15 minutes to inflate! No, you don't take time out to play with it. You use it instead of regular office and home working chairs. But the question is, how do you get your employer to not throw a fit?

Source:: http://slashdot.org

Don't go together

While 'opposite poles attract' may be true for the laws of physics, it just doesn't work with browsers! That's what **Bhavit Naik** realised when he tried viewing the Microsoft Web site with Netscape Navigator. Talk about serious incompatibility!

Readers Rants

Mouse, joystick and...coffee?

Cyber cafes are a fun place to hang out at…play games, send mail and surf. But they still don't really live up to their name—unless of course they had one of these.
Contributed by: Vasuki B.K., via e-mail

RETRO

The first bite

Apple computers came into being with the Apple I, which was the first contribution of Steve Wozniak to the personal computer field. The designing process went on for a number of years and the computer was only built in printed circuit board form when Wozniak's long time friend, Steven Jobs, insisted that the machine could well be sold.

The Apple I made its debut in April 1976 at the Homebrew Computer Club in Palo Alto, but wasn't taken very seriously by a lot of people. The computer was based on the MOStek 6502 chip as compared to other computers at the time that were built on Intel 8080.

It included only the circuit board and a tape interface that was sold separately, but its case had to be built. The Apple I was sold through several small retailers at an initial price of $666.66.

Windows or virus?

Hey, we all have our gripes with Windows, but it's really not all that bad. In fact, one of our readers has drawn up a few points of difference (or similarities, if you please) between good ol' Windows and those nasty viruses, and… well, Windows does come out looking pretty good (we think)!

Windows is not a virus. Here's what viruses do:

1. They replicate quickly…okay, Windows does that.

2. Viruses use up valuable system resources, slowing down the system as they do so…okay, Windows does that.

3. Viruses will, from time to time, crash your hard disk… okay, Windows does that, too.

4. Viruses are usually carried, unknown to the user, along with valuable programs and systems. Sigh…Windows does that, too.

5. Viruses will occasionally make the user suspect their system is too slow (see 2) and the user will buy new hardware. Yup, that's with Windows, too.

Until now it seems Windows is a virus but there are fundamental differences: viruses are well supported by their authors, are running on most systems, their program code is fast, compact and efficient and they tend to become more sophisticated as they mature.

So, Windows is 'not' a virus!
Contributed by: Ashwin, via e-mail