

# NAG C Library Function Document

## nag\_enum\_name\_to\_value (x04nac)

### 1 Purpose

nag\_enum\_name\_to\_value (x04nac) returns a value corresponding to the name of a NAG enumeration member, via the function name.

### 2 Specification

```
#include <nag.h>
#include <nagx04.h>

int nag_enum_name_to_value (const char *enum_string)
```

### 3 Description

nag\_enum\_name\_to\_value (x04nac) takes a string argument, which must be the name of a NAG enumeration member (e.g., **Nag\_ColMajor**, **Nag\_LogNormal**, etc.), and returns, as an `int`, the corresponding NAG enumeration member value. If the input string is not the name of a valid NAG enumeration member then the value `-1` is returned.

The reverse process of converting from enumeration member value to enumeration member name is also available using nag\_enum\_value\_to\_name (x04nbc).

Converting enumeration members to and from name and value may be of use when saving a set of problem arguments to file or reading problem arguments from a file for use in an application. In the case of saving problem arguments, any enumeration members to be saved should be saved using their names to be subsequently read as strings. When these strings are read back by an application, nag\_enum\_name\_to\_value (x04nac) can be used to convert the strings to values suitable for inclusion in NAG Library function calls.

nag\_enum\_name\_to\_value (x04nac) is also useful when calling NAG Library functions from external application interfaces that do not facilitate enumeration types. In such cases, NAG function calls that expect an enumeration member name as one of its input arguments can pass instead its corresponding integer value following a call to nag\_enum\_name\_to\_value (x04nac).

### 4 References

None.

### 5 Arguments

- 1: **enum\_string** – const char \* *Input*  
*On entry:* the name of a NAG enumeration member, e.g., **Nag\_GeneralMatrix**.

### 6 Error Indicators and Warnings

If the value `-1` is returned then the input string is not recognized as a valid NAG enumeration member name.

### 7 Accuracy

Not applicable.

## 8 Further Comments

None.

## 9 Example

The example program reads problem arguments from input, converts enumeration member names to their corresponding value using `nag_enum_name_to_value` (x04nac), and passes these values to a function for solving a system of equations.

### 9.1 Program Text

```
/* nag_enum_name_to_value (x04nac) Example Program.
 *
 * Copyright 2005 Numerical Algorithms Group.
 *
 * Mark 8, 2005.
 */

#include <stdio.h>
#include <nag.h>
#include <nag_stdlib.h>
#include <nagf07.h>
#include <nagx04.h>

int main(void)
{
    /* Scalars */
    Integer i, j, n, nrhs, pda, pdb;
    Integer exit_status=0;
    NagError fail;
    Nag_OrderType order;
    Nag_TransType trans;
    Nag_MatrixType matrix;
    Nag_DiagType unitdiag;

    /* Arrays */
    double *a=0, *b=0;
    Integer *ipiv=0;
    char nag_enum_arg[20];

    INIT_FAIL(fail);
    Vprintf("nag_enum_name_to_value (x04nac) Example Program Results\n\n");

    /* Skip heading in data file */
    Vscanf("%s[^\n] ");

    /* Read the problem dimensions. */
    Vscanf("%ld%ld%s[^\n] ", &n, &nrhs);

    /* Read the storage order of the matrices and convert to value. */
    Vscanf("%s%s[^\n] ", nag_enum_arg);

    /* nag_enum_name_to_value (x04nac).
     * Converts NAG enum member name to value
     */
    order = (Nag_OrderType)nag_enum_name_to_value(nag_enum_arg);

    /* Read whether matrix A is to be transposed and convert. */
    Vscanf("%s%s[^\n] ", nag_enum_arg);
    trans = (Nag_TransType)nag_enum_name_to_value(nag_enum_arg);

    /* Read and convert parameters for writing solution using
     * nag_gen_real_mat_print (x04cac). */
    Vscanf("%s%s[^\n] ", nag_enum_arg);
    matrix = (Nag_MatrixType)nag_enum_name_to_value(nag_enum_arg);

    Vscanf("%s%s[^\n] ", nag_enum_arg);
```

```

unitdiag = (Nag_DiagType)nag_enum_name_to_value(nag_enum_arg);

/* Set up defines for reading matrices using given order. */
#define A(I,J) a[(J-1)*pda + I - 1]
#define B(I,J) b[(J-1)*pdb + I - 1]
if (order == (int) Nag_ColMajor) {
    pda = n;
    pdb = n;
} else {
    pda = n;
    pdb = nrhs;
}

/* Allocate memory */
if ( !(a = NAG_ALLOC(n * n, double)) ||
      !(b = NAG_ALLOC(n * nrhs, double)) ||
      !(ipiv = NAG_ALLOC(n, Integer)) )
{
    Vprintf("Allocation failure\n");
    exit_status = -1;
    goto END;
}

/* Read A and B from data file */
if (order == Nag_ColMajor) {
    for (i = 1; i <= n; ++i)
    {
        for (j = 1; j <= n; ++j)
            Vscanf("%lf", &A(i,j));
    }
    Vscanf("%*[\n] ");
    for (i = 1; i <= n; ++i)
    {
        for (j = 1; j <= nrhs; ++j)
            Vscanf("%lf", &B(i,j));
    }
    Vscanf("%*[\n] ");
} else {
    for (i = 1; i <= n; ++i)
    {
        for (j = 1; j <= n; ++j)
            Vscanf("%lf", &A(j,i));
    }
    Vscanf("%*[\n] ");
    for (i = 1; i <= n; ++i)
    {
        for (j = 1; j <= nrhs; ++j)
            Vscanf("%lf", &B(j,i));
    }
    Vscanf("%*[\n] ");
}

/* Factorize A */
/* nag_dgetrf (f07adc).
 * LU factorization of real m by n matrix
 */
nag_dgetrf(order, n, n, a, pda, ipiv, &fail);
if (fail.code != NE_NOERROR)
{
    Vprintf("Error from nag_dgetrf (f07adc).\n%s\n", fail.message);
    exit_status = 1;
    goto END;
}

/* Compute solution */
/* nag_dgetrs (f07aec).
 * Solution of real system of linear equations, multiple
 * right-hand sides, matrix already factorized by nag_dgetrf
 * (f07adc)
 */
nag_dgetrs(order, trans, n, nrhs, a, pda, ipiv, b, pdb, &fail);

```

```

if (fail.code != NE_NOERROR)
{
    Vprintf("Error from nag_dgetrs (f07aec).\n%s\n", fail.message);
    exit_status = 1;
    goto END;
}

/* nag_enum_value_to_name (x04nbc).
 * Converts NAG enum member value to its name
 */
Vprintf("Array storage scheme used in nag_dgetrs (f07aec) is %s\n",
        nag_enum_value_to_name(order));

/* nag_error_name_to_code (x04ncc).
 * Converts NAG error name to its code value
 */
Vprintf("nag_dgetrs (f07aec) returns with the error code (fail.code) set "
        "to %d\n\n", nag_error_name_to_code("NE_NOERROR"));

/* Print solution */
/* nag_gen_real_mat_print (x04cac).
 * Print real general matrix (easy-to-use)
 */
nag_gen_real_mat_print(order, matrix, unitdiag, n, nrhs, b, pdb,
                        "Solution(s)", 0, &fail);
if (fail.code != NE_NOERROR)
{
    Vprintf("Error from nag_gen_real_mat_print (x04cac).\n%s\n",
            fail.message);
    exit_status = 1;
    goto END;
}
END:
if (a) NAG_FREE(a);
if (b) NAG_FREE(b);
if (ipiv) NAG_FREE(ipiv);
return exit_status;
}

```

## 9.2 Program Data

```

nag_enum_name_to_value (x04nac) Example Program Data
  4  2                               :Values of N and NRHS
Nag_ColMajor
Nag_NoTrans
Nag_GeneralMatrix
Nag_NonUnitDiag
  1.80   2.88   2.05  -0.89
  5.25  -2.95  -0.95  -3.80
  1.58  -2.69  -2.90  -1.04
 -1.11  -0.66  -0.59   0.80   :End of matrix A
  9.52  18.47
 24.35   2.25
  0.77 -13.28
 -6.22  -6.21               :End of matrix B

```

## 9.3 Program Results

nag\_enum\_name\_to\_value (x04nac) Example Program Results

Array storage scheme used in nag\_dgetrs (f07aec) is Nag\_ColMajor  
nag\_dgetrs (f07aec) returns with the error code (fail.code) set to 0

Solution(s)

|   | 1       | 2      |
|---|---------|--------|
| 1 | 1.0000  | 3.0000 |
| 2 | -1.0000 | 2.0000 |
| 3 | 3.0000  | 4.0000 |
| 4 | -5.0000 | 1.0000 |

