

## NAG Toolbox

### nag\_file\_print\_matrix\_integer (x04ea)

#### 1 Purpose

nag\_file\_print\_matrix\_integer (x04ea) is an easy-to-use function to print an integer matrix stored in a two-dimensional array.

#### 2 Syntax

```
[ifail] = nag_file_print_matrix_integer(matrix, diag, a, title, 'm', m, 'n', n)
[ifail] = x04ea(matrix, diag, a, title, 'm', m, 'n', n)
```

#### 3 Description

nag\_file\_print\_matrix\_integer (x04ea) prints an integer matrix. It is an easy-to-use driver for nag\_file\_print\_matrix\_integer\_comp (x04eb). The function uses default values for the format in which numbers are printed, for labelling the rows and columns, and for output record length.

nag\_file\_print\_matrix\_integer (x04ea) will choose a format code such that numbers will be printed with the smallest I edit descriptor that is large enough to hold all the numbers to be printed.

The matrix is printed with integer row and column labels, and with a maximum record length of 80.

The matrix is output to the unit defined by nag\_file\_set\_unit\_advisory (x04ab).

#### 4 References

None.

#### 5 Parameters

##### 5.1 Compulsory Input Parameters

1: **matrix** – CHARACTER(1)

Indicates the part of the matrix to be printed.

**matrix** = 'G'

The whole of the rectangular matrix.

**matrix** = 'L'

The lower triangle of the matrix, or the lower trapezium if the matrix has more rows than columns.

**matrix** = 'U'

The upper triangle of the matrix, or the upper trapezium if the matrix has more columns than rows.

*Constraint:* **matrix** = 'G', 'L' or 'U'.

2: **diag** – CHARACTER(1)

Unless **matrix** = 'G', **diag** must specify whether the diagonal elements of the matrix are to be printed.

**diag** = 'B'

The diagonal elements of the matrix are not referenced and not printed.

**diag** = 'U'

The diagonal elements of the matrix are not referenced, but are assumed all to be unity, and are printed as such.

**diag** = 'N'

The diagonal elements of the matrix are referenced and printed.

If **matrix** = 'G', then **diag** need not be set.

*Constraint:* if **matrix**  $\neq$  'G', **diag** = 'B', 'U' or 'N'.

3: **a**(*lda*,:) – INTEGER array

The first dimension of the array **a** must be at least  $\max(1, \mathbf{m})$ .

The second dimension of the array **a** must be at least  $\max(1, \mathbf{n})$ .

The matrix to be printed. Only the elements that will be referred to, as specified by arguments **matrix** and **diag**, need be set.

4: **title** – CHARACTER(\*)

A title to be printed above the matrix.

If **title** = ' ', no title (and no blank line) will be printed.

If **title** contains more than 80 characters, the contents of **title** will be wrapped onto more than one line, with the break after 80 characters.

Any trailing blank characters in **title** are ignored.

## 5.2 Optional Input Parameters

1: **m** – INTEGER

2: **n** – INTEGER

*Default:* the first dimension of the array **a** and the second dimension of the array **a**.

The number of rows and columns of the matrix, respectively, to be printed.

If either **m** or **n** is less than 1, nag\_file\_print\_matrix\_integer (x04ea) will exit immediately after printing **title**; no row or column labels are printed.

## 5.3 Output Parameters

1: **ifail** – INTEGER

**ifail** = 0 unless the function detects an error (see Section 5).

## 6 Error Indicators and Warnings

Errors or warnings detected by the function:

**ifail** = 1

On entry, **matrix**  $\neq$  'G', 'L' or 'U'.

**ifail** = 2

On entry, **matrix** = 'L' or 'U', but **diag**  $\neq$  'N', 'U' or 'B'.

**ifail** = 3

On entry, *lda* < **m**.

**ifail** = -99

An unexpected error has been triggered by this routine. Please contact NAG.

**ifail** = -399

Your licence key may have expired or may not have been installed correctly.

**ifail** = -999

Dynamic memory allocation failed.

## 7 Accuracy

Not applicable.

## 8 Further Comments

A call to `nag_file_print_matrix_integer` (x04ea) is equivalent to a call to `nag_file_print_matrix_integer_comp` (x04eb) with the following argument values:

```
ncols = 80
indent = 0
labrow = 'I'
labcol = 'I'
form = ' '
```

## 9 Example

This example calls `nag_file_print_matrix_integer` (x04ea) twice, first to print a 3 by 5 rectangular matrix, and then to print a 5 by 5 triangular matrix.

### 9.1 Program Text

```
function x04ea_example

fprintf('x04ea example results\n\n');

nmax = nag_int(5);
a = zeros(nmax,nmax,nag_int_name);

for i = 1:nmax
    a(i,:) = [1:nmax] + 10*i;
end

% First matrix : 3x5 general matrix
mtitle = 'Example 1: ';
matrix = 'General';
diag    = ' ';

[ifail] = x04ea( ...
            matrix, diag, a(1:3,:), mtitle);

fprintf('\n');
% Second matrix : 5x5 non-unit lower triangular
mtitle = 'Example 2: ';
matrix = 'Lower';
diag    = 'Non-unit';

[ifail] = x04ea( ...
            matrix, diag, a, mtitle);
```

## 9.2 Program Results

x04ea example results

Example 1:

```
  1  2  3  4  5
1 11 12 13 14 15
2 21 22 23 24 25
3 31 32 33 34 35
```

Example 2:

```
  1  2  3  4  5
1 11
2 21 22
3 31 32 33
4 41 42 43 44
5 51 52 53 54 55
```

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