

## Utility: nagdmc\_rank\_long

### Purpose

**nagdmc\_rank\_long** computes the ranks for an array of integer values.

### Declaration

```
#include <nagdmc.h>
void nagdmc_rank_long(long n, long start, long step, long data[], long rank[],
                      int *info);
```

### Parameters

- |    |                                                                                                                               |               |
|----|-------------------------------------------------------------------------------------------------------------------------------|---------------|
| 1: | <b>n</b> – long                                                                                                               | <i>Input</i>  |
|    | <i>On entry:</i> the number of data values to arrange in rank order.                                                          |               |
|    | <i>Constraint:</i> <b>n</b> > 0.                                                                                              |               |
| 2: | <b>start</b> – long                                                                                                           | <i>Input</i>  |
|    | <i>On entry:</i> <b>data[start]</b> is the first data value considered.                                                       |               |
|    | <i>Constraint:</i> <b>start</b> ≥ 0.                                                                                          |               |
| 3: | <b>step</b> – long                                                                                                            | <i>Input</i>  |
|    | <i>On entry:</i> the step length between pairs of data values.                                                                |               |
|    | <i>Constraint:</i> <b>step</b> ≥ 1.                                                                                           |               |
| 4: | <b>data[d]</b> – long                                                                                                         | <i>Input</i>  |
|    | <i>On entry:</i> an array of length $d \geq (\mathbf{n} - 1) * \mathbf{step} + \mathbf{start} + 1$ containing integer values. |               |
| 5: | <b>rank[n]</b> – long                                                                                                         | <i>Output</i> |
|    | <i>On exit:</i> the ranks for the <b>n</b> considered data values in <b>data</b> .                                            |               |
| 6: | <b>info</b> – int *                                                                                                           | <i>Output</i> |
|    | <i>On exit:</i> <b>info</b> gives information on the success of the function call:                                            |               |
|    | 0: the function successfully completed its task.                                                                              |               |
|    | <i>i</i> ; <i>i</i> = 1, 2, 3: the specification of the <i>i</i> th formal parameter was incorrect.                           |               |

### Notation

**n**            the number of data values,  $n$ .  
**data**       data values  $x_i$  (separated by **step** values) to rank, for  $i = 1, 2, \dots, n$ .  
**rank**       rank values  $r_i$ , for  $i = 1, 2, \dots, n$ .

### Description

Given the  $n$  data values  $x_i$ , for  $i = 1, 2, \dots, n$ , we seek a permutation,

$$p(1), p(2), \dots, p(n)$$

that arranges the data values in ascending order, i.e.,

$$x_{p(1)} \leq x_{p(2)} \leq \dots \leq x_{p(n)}.$$

The position of the  $i$ th data value  $x_i$  in the permuted order is its rank value,  $r_i$ , for  $i = 1, 2, \dots, n$ .

### References and Further Reading

Knuth D E (1973) *The Art of Computer Programming (Volume 3)* (2nd Edition) Addison-Wesley.

### See Also

[nagdmc\\_index](#)            converts a ranks into indexes in sorted order.  
[nagdmc\\_order\\_long](#)    re-arranges an array of data values according to rank values.