Utility: nagdmc_rints

Purpose

nagdmc_rints generates a set of random integers either with or without repeats.

Declaration

```
#include <nagdmc.h>
void nagdmc_rints(long wrps, long n, long l, long u, long ints[], long seed[],
                  int *info);
```

Parameters

1: **wrps** – `long` *Input*

On entry: if **wrps** $= 1$, a random sample of integers is generated that may include repeated values (i.e., sampling with replacement). If **wrps** $= 0$, the sample will not contain repeated values.

Constraint: **wrps** $\in \{0, 1\}$.

2: **n** – `long` *Input*

On entry: the number of integers required.

Constraint: **n** > 0.

3: **l** – `long` *Input*

On entry: the lower bound of the range of integers to be generated.

Constraint: **l** ≥ 0.

4: **u** – `long` *Input*

On entry: the upper bound of the range of integers to be generated.

Constraint: **u** $>$ **l**.

5: **ints**[**n**] – `long` *Output*

On exit: the random sample of integers between **l** and **u** inclusive.

6: **seed**[**5**] – `long` *Input/Output*

On entry: the seed for the random number generator. For the first call this should be set using **nagdmc_srs**; if it is not set a default value will be used. For subsequent calls the value returned by the previous call must be used.

On exit: the updated random seed.

7: **info** – `int *` *Output*

On exit: **info** gives information on the success of the function call:

0: the function successfully completed its task.

i; $i = 1, 2, 3, 4$: the specification of the ith formal parameter was incorrect.

80: sampling without replacement has been requested and **n** is greater than the number of possible values.

Notation

n the number of random integer values to generate, n.
l the lower bound, a.
u the upper bound, b.
ints the random integer values, x_i, for $i = 1, 2, \ldots, n$.

Description

nagdmc_rints generates the next n values y_i from a uniform $(0, 1)$ pseudo-random number generator and applies the transformation:

$$x_i = a + \lfloor (b - a + 1) y_i \rfloor, \quad i = 1, 2, \ldots, n,$$

where $\lfloor z \rfloor$ is the integer part of the real value z. The function ensures that the values x_i lie in the (closed) interval $[a, b]$.

References and Further Reading

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

See Also

nagdmc_srs sets the initial state of the random number generator.
