

Assignment 3

1. Read descriptions of array functions. Create examples for: maxval, maxloc, pack, reshape, size and unpack.

2. Let A and b be:

$$A = \begin{bmatrix} 12 \\ 35 \end{bmatrix}, \quad b = \begin{bmatrix} 5 \\ 11 \end{bmatrix}$$

Write a function that calculates the quadratic form: $b'Ab$. Make this function:

- a) external,
- b) internal,
- c) module

3. Write a function that calculates a sample from a pseudo-normal distribution using a formula:

$$\sum_{i=1}^{12} u_i - 6, \quad u_i \sim \text{UN}(0,1)$$

Samples from the UN(0,1) distribution are generated by subroutine random_number().

Write a subroutine that, given a vector with samples, calculates mean and SD

Write a program that asks for a number of samples to be generated, generates those samples from a) UN(0,1) and b) N(0,1), and then calculates their mean and SD.

4. Modify function that generates normal samples to accept parameters for mean and variance. Make these parameters optional with default mean=0 and variance=1.

Optional

5. Create a vector x of 100,000 reals and initialize $x(i)=i+1.0/3.0$. Store it in files in two formats:

- a) formatted
- b) unformatted

Then read the files and accumulate the sums. Compare timings of either reading using the CPU_TIME subroutine.

Close files with options to delete them.

6. Write a subroutine printnice_r(x,n), that will print a real matrix x(n,n) with nicely aligned columns.

7. Modify function printnice

- a) putting it in a module as an internal procedure
- b) eliminating the n argument
- a) adding an optional argument, which is format for one line