## Simulation Lab

## Assignment- 2

Solve all the questions

**Problem 1.** 
$$A = \begin{pmatrix} 3 & -2 & 1 \\ -1 & 4 & -2 \end{pmatrix}$$
 and  $B = \begin{pmatrix} -7 & 4 \\ 9 & 5 \\ 2 & -1 \end{pmatrix}$ 

- (i) Find matrix-matrix multiplication (AB)
- (ii) Find  $(AB)^t$  and  $(AB)^{-1}$
- (iii) Find the mean, standard deviation for each column and row for the matrices  $A, B, AB, (AB)^t, (AB)^{-1}$ .

**Description:** Here you are not supposed to use R packages. It means that for the calculation of matrix-matrix multiplication you cannot use % \* %. Here you can use only \*,+,-,/. So, write your own code for these computations and verify these with the solution of assignment 1 (question number 4). Better if you provide a "function" program for that.

**Problem 2.** Write a "function" program in R to find n!. Hence find 13!, 32!. Do not name the function by "factorial". You can initialize that 0! = 1 and 1! = 1.

**Problem 3.** Write a "function" program in R to find maximum and minimum from a set of numbers. Do not name the function by "max" or "min". As an input you take (-4, 44.7, -2, 40, 54, 1, -3, 4)

**Problem 4.** Write a "function" program in R to sort for the above set in an increasing order. Do not name the function by "sort".

**Problem 5.** Write a "function" program in R to check whether a number prime or composite. Do not use any default function.

**Problem 6.** Write a "function" program in R to compute  $\Gamma$  function. Do not name the function by "gamma". As an input you take  $8, 2, 25, \frac{3}{2}$ . You can initialize  $\Gamma(\frac{1}{2}) = \sqrt{\pi}$ ,  $\Gamma(1) = 1$ . You can use  $\Gamma(x+1) = x\Gamma(x)$ 

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