Simulation Lab (MC503)

Assignment-1

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 $A, B, AB, (AB)^t$.
   (iv) Find the row sum and column sum of both matrices A & B without using any inbuilt function.

   Description: Here, you are not supposed to use inbuilt R packages for all problem. Better, if you defined a "**function**" program for that. You cannot use % * % to calculate matrix multiplication. Here you can use only *,+,-, /.

2. Write a program to find $n!$. Hence find $6!, 13!, 37!$. You can initialize $0! = 1$ and $1! = 1$.

3. Write a program to find the maximum and minimum from a set of numbers. Consider input as $(-4, 44.7, -2, 40, 54, 1, -3, 4)$.

4. Write a program to sort a data set in ascending order.

5. Write a program to check whether a number is prime or composite.

6. Write a program to compute the Gamma $(\Gamma(\cdot))$ function. Take input as $8, 2, 25, \frac{3}{2}$. You can initialize $\Gamma\left(\frac{1}{2}\right) = \sqrt{\pi},\ \Gamma(1) = 1$. You can use $\Gamma(x+1) = x\Gamma(x)$.

7. Write a program to find the mean and median of any data set.
   Consider input as $(5, 10, 6, 8, 12, 16, 20, 10, 16, 15)$.

8. Write a program to find the first 10 Fibonacci sequences in R.

9. Write a program to find the common element from any two vectors. For example, Suppose $X = (5, 1, 4, 3)$ and $Y = (2, 4, 6, 10)$.

10. Create a function to check whether a vector contains a particular element or not. For example, check whether the vector $X = c(4, 8, 10, 5, 6, 12)$ contains 5 or not.

. . . . . end . . . . . .