Instructions:

Answer all the questions in this assignment. After you are done with a question, show your output and code to a TA. Save all your files in the server in a new folder lab04. You have 45 minutes to finish Set I and show the outputs to your TAs. Solve the questions in Set II in the remaining time and show the outputs to your TAs.

Practice Problem Set I

Q.1. WAP(Write a program) in Python which gives the solution of a quadratic equation $ax^2 + bx + c = 0$ as its output. Your programs should input the values of a, b, c and give the real roots(if any) as output.

Q.2. WAP which inputs a positive integer and returns whether it is prime or composite.

Q.3. WAP which inputs an array and sorts it in descending order.

Practice Problem Set II

Q.4. WAP to generate 100 uniform random numbers between 0 and 1, find its mean and variance without using inbuilt functions. Repeat this exercise for 1000 and 10000 numbers. What do you observe?

Q.5. WAP which takes 100 evenly spaced points between 0 and 10(use a function from numpy), calculates the following function values at these points and plots the same. Include titles, labels and legends. Also, include commands which save the image files.

1. $sin(x)$
2. $x - e^{-x}$

Q.6. WAP to input two different 3×3 matrices and return its sum and product. Use lists to enter the matrices. Repeat this exercise using the numpy package and also calculate the determinant values and the eigen values of the matrices.