BT640 Neural Imaging & Signal Processing

Tutorial-1

Course Instructor: Dr. Cota Navin Gupta (cngupta@iitg.ac.in)
Teaching Assistants: Ms. Tanmayee Samantaray (tanma176106113@iitg.ac.in)
Ms Doli Hazarika (dhazarika@iitg.ac.in)

Perform all the below questions using MATLAB programming only

1. Basic Mathematical operation
   For x = 25 and y = 5, perform:
   a. Addition: x+y b. Subtraction: x-y
   c. Multiplication: x*y d. Division: x/y

2. a. Find the area of a circle with diameter 30 cm.
   b. Area of a parallelogram is 500 sq cm. Its height is twice its base. Find its height and base.

3. Take any two numbers. Write a program to find and print whether the first number is less than or greater than the second number or both the numbers are equal.

4. Let the marks obtained by a class of 50 students range between 35 to 92. Create an array with 50 random marks.
   a. Plot the histogram of these marks considering 5 bins. Label the axes. Print your understanding on histogram.
   b. Calculate the mean, median and mode.

5. Start with any numerical value. Use 'for' loop to execute the line 4 times and each time the value to be displayed should increase by 1.
   eg. Output 20
   21
   22
   23

6. Create an array with number of new positive cases of Coronavirus (month-wise from January to December 2020) in India.
   a. Show the curve of increase/ decrease in the number of positive cases with red colour.
   b. To the above plot, add another curve depicting the number of recovered cases with green.
   c. Now add a third curve depicting the number of deceased cases with blue colour.
   d. Save the plot as Q6d_yourRoll.jpg eg. Q6d_176106123.jpg.

7. Create an array with any 6 countries. Now plot a bar graph to show the number of people affected by Coronavirus in three different age groups (0-10 yrs, 11-60 yrs, 61-100 yrs) for each of the countries from March to December 2020. Show the bars of different age groups

IISS

in different colours. Label the x and y axes. Save the plot as Q7_yourRoll.jpg eg. Q7_176106123.jpg.

8. Generate 2000 equally spaced numbers between -10 and 10. Store these numbers in an array x. Save the array x generated in workspace as 'Q8_xval_yourRoll' eg. Q8_xval_176106123.mat.

9. Matrix operation:
   a. Create two matrices M1 and M2, each with 5 rows and 3 columns. Now add M1 and M2
   b. Create two matrices M3 with 3 rows & 4 columns and M4 with 4 rows and 3 columns. Perform matrix multiplication (M3*M4)
   c. Create two matrices with same dimension. Perform element-wise multiplication (dot product).

10. a. Create a 3D matrix of dimension 8*6*4 with uniformly distributed random integers in the range 1 to 10. Find the largest element in the entire matrix.
    b. Trace the element in the position (x=7, y=5, z=3) and replace it with 100.
    c. Convert the above 3D matrix into a 2D matrix of dimension 24*8. Find the position of 100 in this 2D matrix.

11. Save the entire work as 'YourRoll_NISS_Tut1.m' eg. 176106113_NISS_Tut1.m

****

NISS