U.G. 4th Semester Examination - 2021

COMPUTER SCIENCE

[HONOURS]

Skill Enhancement Course (SEC)

Course Code : COM.SC-H-SEC-P-402

[PRACTICAL]

Full Marks : 50 Time : 4 Hours

Marks Allotment :

Class Attendance and Internal : 10 marks

Semester End Practical : 40 Marks

(Experiment : 30 Marks, Viva : 10 Marks)

Answer any one question and that to be alloted on lottery basis.

1. Create an array of N numbers. Write a MATLAB program that picks out from that array the 1 , 4 , 9 , 16 · · · $\sqrt{N}$ th entries, i.e., those numbers having indices that are perfect square.

2. Write a program to input two strings from the user and to print out

   a) The concatenation of the two strings with a space between them.

   b) A line of asterisks the same length as the concatenated strings.

   c) The reversed concatenation.

3. Write a program to assign the following expressions to a variable A and then to print out the value of A.

   a) (2+4)/(7+8)

   b) $\sqrt{10}$

   c) (0.0000123 + 5.6710 – 3)0.456710 – 4

4. A supermarket conveyor belt holds an array of groceries. The price of each product (in pounds) is [0.6, 1.2, 0.5, 1.3]; while the numbers of each product are [3, 2, 1, 5]. Write a MATLAB program to calculate the total bill.

5. Draw a square joining the points (2,2), (4,2), (4,4) and (2,4).

6. Write a program to input 2 strings from the user and to print out

   a) Concatenation of the two strings with a space between them,

   b) A line of asterisks the same length as the concatenated strings.

   c) Reverse the concatenated string.

7. Draw a circle using plot function of Matlab of radius 5.

8. The sort rows(X) function will sort a vector or matrix X into increasing row order. Use this function to sort a list of names into alphabetical order.

9. Write a Matlab code to plot the histogram of the sum of five six-sided dice thrown together 100 times. For this problem randomly generate five numbers between 1 and 6 (both inclusive), add them and repeat this step 100 times. Store the results in a vector that would count the number of appearance of each sum value (5 to 30).

10. Draw a graph that joins the points (5,8), (8,8), (5,3) and (8,3).

11. X is a vector with values starting from 0 and ranging upto 3600 with an interval of 0.1. In a single graph plot the equations of sin(X) and cos(X).

12. Consider these two polynomials a^3+2a^2+3a+5 and $3a^2+5a+6$. How can you represent them in Matlab? Now add, subtract and multiply them and show the results.

13. Write two Matlab functions to

    a) convert Fahrenheit to Celsius

    b) convert Celsius to Fahrenheit

Now ask the user to input some values. If the temperature is in Celsius the inputed value has to say 50 C, and similarly for Fahrenheit. Then convert the value and show the result.

14. Generate the following pattern using Matlab

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    *
  * * *
* * * * *
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15. Using Matlab randomly generate two 100 digit decimal numbers. Store them and add them.

16. The Identity Matrix is a square matrix that has ones on the major diagonal and zeros elsewhere. You can generate one with the eye() function in MATLAB. Use MATLAB to find a matrix Y, such that when multiplied by matrix $X=\begin{bmatrix}1 & 2\\ 3 & 4\end{bmatrix}$ the identity matrix $I=\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}$ is generated. That is $X \times Y = I$.

17. Implement any sorting method in Matlab and store that code in **sort.m** file. Write another Matlab code that randomly generates 10 numbers and uses the sort.m file to sort that random list of numbers.

18. Consider these two matrices $A=\begin{bmatrix}1 & 2\\ 2 & 1\end{bmatrix}$ and $B=\begin{bmatrix}1 & 3\\ 5 & 2\end{bmatrix}$. Find and print A^{T}, B^{T}, A^{-1}, B^{-1}, $A + B$, $A - B$, $A \times B$ and $A.B$.

19. Create a text file whose content will be your name. Write a Matlab code to read the text file. Create a $N \times N$ matrix (N is the number of characters of your name). Put your name in the major diagonal.

20. Store some numbers in a spreadsheet in single column. Save the file as ‘file.csv’. Read the file through Matlab. Plot the values in any chart you like using Matlab. Find the largest value.

21. Design a program in Matlab that will ask input from user. If user provides any string the program will calculate the number of ‘a’ in the function. The program will only end if user enters ‘quit’.

22. Using Matlab plot sin(X) for any variable X. Save the plotted file as an image file.

23. Create a Matlab function that will calculate sum of the numbers provided by the user repeatedly. The user must input only positive values. Program will end if the inputed value is negetive.

24. Calculate and replay 2 second of a cosine wave at 500Hz with a sampling rate of 2050Hz. Save the sound to a file called "result.wav". Plot the first 1000 samples.

25. Build a square wave by adding together 10 odd harmonics: 1f, 3f, 5f, etc. The amplitude of the nth harmonic should be 1/n. Display a graph of one cycle of the result superimposed on the individual harmonics.

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