M.Phil/2nd Sem/125/19

2019

M.Phil.

2nd Semester Examination

COMPUTER SCIENCE

Paper - 125

Full Marks : 50   Time : 3 Hours

The figures in the margin indicate full marks.
Candidates are required to give their answers
in their own words as far as practicable.
Illustrate the answers wherever necessary.

Unit - I

(MATLAB)

Answer any *one* on the Lottery basis.   15×1=15

1. A file called 'avehighs.dat' stores for 3 locations the average high temperatures for each month for a year (rounded to integers) .There are three lines in the file; each stores the location number followed by the 12 temperatures (this may be assumed). For example, the file might store :

432 33 37 42 45 53 72 82 79 66 55 46 41

777 29 33 41 46 52 66 77 88 68 55 48 39

567 55 62 68 72 75 79 83 89 85 80 77 65

Write a script that will read this data and plot the temperatures for the three locations separately in one Figure Window. A for loop must be used to accomplish this.

2. The coefficient of variation is useful when comparing data sets tht have quite different means. The formula is CV = (standard deviation/mean) * 100%. A history course has two different sections; their final exam scores are stored in two separate rows in a file. For example.

99 100 95 92 98 89 72 95 100 100

83 85 77 62 68 84 91 59 100

Create this data file, read the data into vectors, and then use the CV to compare the two sections of this course.

3. Read a color image and convert the image into Gray Scale. Plot the histogram of the gray Image.

4. Create a GUI in Matlab for length conversion.

5. Create the following complex variables :

   c1 = complex (0,2);

   c2 = 3 + 2i;

   c3 = sqrt (–4);

   Then, do the following :

   (a) Get the real and imaginary parts of c2.

   (b) Print the value of c1 using disp.

   (c) Print the value of c2 in the form a+bi

   (d) Subtract c2 from c1.

   (e) Plot the real part versus the imaginary part for c2.

6. Create a Matlab program to implement a binary crossover of Genetic Algorithm.

7. Write a simple script that will calculate the volume of a hollow spere that is, $\frac{4\pi}{3}(r_0^3 - r_1^3)$

where r_i is the inner radius and ro is the outer radius. Assign a value to a variable for the inner radius, and also assign a value to another variable for the outer radius. Then, using these variables, assign the volume to a third variable. Include comments in the script.

8. Clouds are generally classified as high, middle, or low level. The height of the cloud is the determining factor, but the ranges vary depending on the temperature. For example, in tropical regions the classifications may be based on the following height ranges (given in feet) :

low   0 − 6500

middle   6500 − 2000

high   > 20000

Write a script that will prompt the user for the height of the cloud in feet, and print the classification.

(6)

Unit - II

1. Write a program in Python to print all permutations of a string in lexicographic order.

2. Write a program in Python to read a string from the user and append it into a file.

3. Write a program in Python that takes a sorted list and key as inputs and search the key in the list using binary search technique.

4. Write a program in Pythom to create a class which performs basic calculator operations.

5. Write a program in Python that takes a list as input and sort the items using quick sort technique.

6. Create a "Person" class with the two attributes "firstname" and "lastname" and one method which displays the full name concatenating the "firstname" and the "lastname". Create another class named "Employee" which is inherited from Person. This new class should have a method which prints the full name of the employee along with his/her salary.

7. Write a program in Python to create a class and get all possible subsets from a set of distinct integers.

(8)

Unit - III

$$1 \times 15 = 15$$

1. Write a CUDA-C/CUDA-MATLAB program to add two vectors of length N and show the reseults in the following format. 15

N	Time taken on CPU (parallel mode)	Time taken on CPU (sequential mode)
10		
100		
1000		
5000		
10000		

2. Write a matrix multiplication (n×n) program on CUDA-C and shows the result in following manner.

15

N	Time taken in parallel mode	Time taken in sequential mode
10×10		
5×5		
20×20		
15×15		
30×30		

3. Write a CUDA-C program to find the maximum and minimum of N elements of an array. Show the results in following format.   15

N	Time taken for parallel mode	Time taken for sequential mode
10		
100		
500		
1000		
10,000		