Computational Thinking through Programming
(CTP1301C)

HANDWRITTEN END - SEM EXAMINATION, BTECH 1ST YEAR, TOTAL: 6 QUESTIONS

Time: 3 hrs (10am - 1pm); 5th Dec'24 (Thu); Mr Bibek Singh

Question-1: **(10 marks)**

Manorama is leading a software development project. She is worried about the quality of the software. Help Manorama in using **V-Model** to ensure a quality software product.

Question-2: **(3+2+10 = 15 marks)**

Government has asked your IT company to develop a website, similar to IRCTC (railway ticket booking system). For this project, answer the following:

A. What should be the three key **Non-Functional Requirements** for this project?
B. Draw a **flowchart** to depict booking of a seat (Confirmed, RAC, Waiting List).
C. What should be the **five environments** for this project? Elaborate their usage.

Question-3: **(10+10 = 20 marks)**

Your family is planning to buy a new refrigerator.

A. While searching for it on a website, you get an error - "*The Page cannot be displayed*". Using the **5-Whys concept**, elaborate the possible reasons & determine the ROOT CAUSE of this problem.
B. Once the error has been taken care of, you get 12 search results. You wish to sort the results based on the customer ratings or the price. Elaborate as to how the '**Merge Sort**' algorithm works for such a website to produce results in either ascending or descending order.

Question-4: **(5+5 = 10 marks)**

A. What do you mean by '**Software Configuration Management**'?
B. What is the difference between **Corrective** Maintenance & **Preventive** Maintenance?

Question-5: **(5+5+5 = 15 marks)**

A. What do you mean by '*Continuous Maintenance & Support*'?
B. Explain the steps involved in 'Root Cause Analysis'.
C. Define "***Computational Thinking***" in your own words.

Question-6:

(30 marks)

Briefly answer the following questions ->

01. Write a program to find the largest and smallest elements in an array of integers.
02. Explain the concept of contiguous memory allocation.
03. What is a union in C? How does it differ from a structure?
04. Write a program to calculate and display the total marks and grade of a student using a structure.
05. Explain the use of fopen, fclose, fscanf, and fprintf.
06. How can you pass a structure to a function?
07. What are user-defined data types?
08. Explain the difference between text files and binary files.
09. Define a string in C. How is it different from a character array?
10. What are the advantages and limitations of using arrays over other data structures?
11. How does the break statement work in loops?
12. Compare and contrast the while and do-while loops.
13. Explain the difference between "call by value" and "call by reference".
14. Write a program to check whether a character is a vowel or a consonant.
15. Explain the difference between the if-else and switch statements.

********** End of End Sem Examination Paper **********