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Reg. No. :

Question Paper Code : 10294

M.C.A. DEGREE EXAMINATIONS, APRIL/MAY 2023.

Elective

(Bridge Course)

BX 4002 — PROBLEM SOLVING AND PROGRAMMING IN C

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is top down design?
2. How to measure the efficiency of algorithms?
3. Draw the flowchart for computing the sum of first 'n' nature numbers.
4. Specify the role of Linker and Loader.
5. What are the rules for defining an identifier?
6. State the significance of break statement in switch case.
7. List the storage classes and its scope and lifetime.
8. Write the syntax of malloc and calloc functions.
9. Differentiate structure and union.
10. What are the arguments of fopen function?

PART B — (5 × 13 = 65 marks)

11. (a) Discuss the process in finding the computational complexity of the algorithm with an example.

Or

- (b) What is an algorithm? What is the purpose of analysing an algorithm? With an example explain about best, worst and average case analysis of algorithm?

12. (a) Write the algorithm and pseudocode for generating all prime numbers between 1 to 'n'.

Or

- (b) Discuss in detail the flow of execution of a 'C' program along with the intermediate files generated during execution.
13. (a) Write a program to check whether the given 'n' number is a lucky number or not. A number is said to be a lucky number if the following conditions are met.
- The number should be a Harshad number. A number is said to be Harshad number if it is divisible by the sum of its digits (SoD).
 - The SoD of the quotient obtained by dividing the number with its SoD is equal to 10.

Example:

Given number: 1729

SoD: $1 + 7 + 2 + 9 = 19$

Quotient: $1729/19 = 91$

SoD of Quotient: $9 + 1 = 10$

Output: Lucky Number

Or

- (b) Digital Clock is used to display the time in the following format HH:MM:SS (hours:minutes:seconds). Write a program to simulate a digital clock to display the time continuously. Use 24-hour format for the same. Every 10th day, the clock instead of displaying the time, it should display it as \$\$##: @@ and resume to normal functioning thereafter. [Hint: The iteration should be infinite.]
14. (a) Write a program to receive a two dimensional matrix from the user and find the maximum element in each row.

Or

- (b) Write a program to find pairs of numbers that give the desired sum.

Example:

5	6	2	4	3
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Desired sum: 7

Pairs in the array that produce desired sum is:

5,2

4,3

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15. (a) Write a program to read the file and copy the contents of one file to the other file except for vowels.

Or

- (b) Create a structure "Book" consisting of members Title, number of pages, author, price and publisher. display all books that are published by "Wiley".

PART C — (1 × 15 = 15 marks)

16. (a) The Artcraft organization, decided to give 10% discount in their total bill cost to the customer if their name is a Palindrome. Define a function "Palindrome" to check whether the string is a palindrome or not. Define a function "Get_Details" to get the details of the customer: name, contact number and address, totalcost. Write a program to display the details of customers and the bill amount.

Or

- (b) If a number passed recursively to a function is 0, then return 0, and if it's 1, then return one. Otherwise, return 2 multiplied by the current Pell number - 1 + the current Pell number - 2 or: $pellNumber_{current} = (2 \times pellNumber_{n-1}) + pellNumber_{n-2}$. Write a program to simulate the given scenario. Formula for pell number: $P_n = 2 + P_{n-1} + P_{n-2}$ with seeds $P_0 = 0$ & $P_1 = 1$.

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