B.Tech, CSE-AI (2022-2026)
First Semester 2022-23

Problem Solving C Programming

Assignment 3
Functions and Recursion

Submission Date: (on or before) 20/12/2022

Group 1 .

Q1. Write a C program to check whether a number is prime and/or Armstrong and/or perfect number. Use different user-defined functions for checking the number is prime, Armstrong, and/or perfect.

Q2. C Program to print the reverse multiplication table of the user-entered integer using a user-defined recursive function call.

Group 2 .

Q3. Write a program in C to display the sum of the series $[1+2x+3\frac{x^2}{2!}+4\frac{x^3}{3!}+\cdots]$. Use user-defined functions to find the factorial and power of the number (not library function pow()).

Q4. Write a C Program for Q3. by using user-defined recursive function call to find the factorial and power of the number.

Group 3 .

Q5. C Program to check whether the '$n^{th\prime}$ term of the Tribonacci Sequence is even prime or odd prime or not prime. Use user-defined functions to find the '$n^{th\prime}$ term of the Tribonacci sequence and to check whether the number is prime or not.

Q6. Write a C Program for Q5. by using user-defined recursive function call to find the '$n^{th\prime}$ term of the Tribonacci sequence.

Group 4 .

Q7. C Program to display first 'n' prime numbers in the Fibonacci series. Use the user-defined function to check whether the number is prime or not.

Q8. Write a C Program for Q7. by using user-defined recursive function call to find the Fibonacci sequence.

Group 5 .

Q9. Write a program in C to display the sum of the series $[1 + 4\frac{x^2}{2!} + 9\frac{x^3}{3!} + \cdots]$. Use user-defined functions to find the factorial and power of the number (not library function pow()).

Q10. Write a C Program for Q9. by using user-defined recursive function call to find the factorial and power of the number.

Group 6 .

Q11. C Program to check whether a number can be expressed as the sum of two prime numbers. Find all those combinations. (use user-defined functions to check whether prime or not.)

Q12. Write a program in C to display the sum of n terms of the series $[1+11+111+1111+\cdots]$. Use the user-defined recursive function to calculate the sum of the series.

Group 7 .

Q13. C Program to take input from the user (circle/ rectangle/ square) and then calculate the circumference of the circle/ rectangle/ square according to the user's choice. (use switch case and user-defined functions to calculate area)

Q14. Write a C program to display Pascal's triangle. Take the number of rows in the triangle as input from the user.

```
      1
    1 1
  1 2 1
  1 3 3 1
1 4 6 4 6
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Use a user-defined recursive function call to print Pascal's triangle.

Group 8 .

Q15. Write a program in C to display the sum of n terms of the series $[1 + 2\frac{\sqrt[2]{x}}{2!} + 3\frac{\sqrt[3]{x}}{3!} + 4\frac{\sqrt[4]{x}}{4!} + \cdots]$. Use user-defined functions to find the factorial and root of the number (not library function sqrt()).

Q16. Write a C Program for Q9. by using user-defined recursive function call to find the factorial and root of the number.

Group 9 .

Q17. C Program to check whether the n^{th} term of the Catalan Sequence is even prime, odd prime, or not prime. Use user-defined functions to find the n^{th} term of the Catalan Sequence and to check whether the number is prime or not.

Q18. Write a C Program for Q17. by using user-defined recursive function call to find the Catalan Sequence.

Group 10 .

Q19. Write a program in C to display the sum of the series $[1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \cdots]$. Use a user-defined function to calculate the factorial of the number.

Q20. Write a C Program for Q19. by using user-defined recursive function call to find the factorial and power of the number.

Group 11 .

Q21. C Program to check whether the '$n^{th\prime}$ term of the Fibonacci Sequence is prime or not. Use user-defined functions to find the '$n^{th\prime}$ term of the Fibonacci sequence and to check whether the number is even prime, odd prime, or not prime.

Q22. Write a C Program for Q21. by using user-defined recursive function call to find the Fibonacci Sequence.

Group 12 .

Q23. Write a program in C to display the sum of n terms of the series $[x + 3\sqrt[2]{x} + 5\frac{\sqrt[3]{x}}{2!} + 7\frac{\sqrt[4]{x}}{3!} + \cdots]$. Use user-defined functions to find the factorial and root of the number (not library function sqrt()).

Q24. Write a C program to check whether the entered number is a palindrome number or not. Use a user-defined recursive function call to find the palindrome.

Group 13 .

Q25. C Program to check whether a number can be expressed as the sum of two prime numbers. (use user-defined functions to check whether prime or not.)

Q26. C program to enter the value of 'n' and find the sum of the series $\frac{1!}{1} + \frac{2!}{2} + \frac{3!}{3} + \cdots + \frac{n!}{n}$. Use user-defined recursive functions to calculate the sum of n terms and to find the factorial of the number.

Group 14 .

Q27. Write a program in C to display the sum of n terms of the series $[1 + 4\frac{\sqrt[2]{x}}{+}9\frac{\sqrt[3]{x}}{2!} + 16\frac{\sqrt[4]{x}}{3!} + \cdots]$. Use user-defined functions to find the factorial and root of the number (not library function sqrt()).

Q28. Write a C Program for Q27. by using user-defined recursive function call to find the factorial and root of the number.