

## COMPUTER PROGRAMMING LAB

(Common to all Branches)

**Course Code: 15CT1103**

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### Course Outcomes:

At the end of the course, a student will be able to

- CO 1** Use RAPTOR tool in program development.
- CO 2** Program mathematical operations using control statements.
- CO 3** Develop Programs for Arrays and String manipulations.
- CO 4** Implement Programs using functions, pointers, structures, and unions.
- CO 5** Implement Programs for File I/O operations

### LIST OF PROGRAMS:

- 1 Demonstration of RAPTOR Tool to generate flowcharts by considering simple algorithms. Generation of flow charts to solve problems such as Temperature Conversion, Swapping of two numbers etc. using RAPTOR Tool.
- 2 Write C Programs to solve problems such as Student Grading, Income Tax Calculation, and Largest of three Numbers etc., which expose students to various categories of IF Statements. Generate flowcharts using RAPTOR Tool.
3.
  - a) Write a C program to find the roots of a quadratic equation.
  - b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, \*, /, % and use Switch Statement.

4.
  - a) The total distance travelled by vehicle in 't' seconds is given by distance =  $ut + \frac{1}{2}at^2$  where 'u' and 'a' are the initial velocity (m/sec.) and acceleration ( $m/sec^2$ ). Write a C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.
  - b) Write a C program to determine whether a given number is an Armstrong or not. (If the sum of the cubes of digits in the number is equal to the original number, then the number is called Armstrong number. Eg: 371 is Armstrong number ( $3^3 + 7^3 + 1^3 = 371$ ))
5.
  - a) Write a C program to find the sum of individual digits of a positive integer.
  - b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
6.
  - a) Write a C program to calculate the following:  $Sum = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \frac{x^8}{8!} - \frac{x^{10}}{10!}$
  - b) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
7.
  - a) Write a C program to generate Pascal's Triangle.
  - b) Write a C program to construct a Pyramid of Numbers.
8. Write C programs that use both recursive and non-recursive functions for the following
  - a) To find the factorial of a given integer.
  - b) To find the GCD (greatest common divisor) of two given integers.
9.
  - a) Write a C function to read in two numbers, x and n, and then compute the sum of this geometric progression:  $1 + x + x^2 + x^3 + \dots + x^n$  also perform error checking by

- considering negative values for  $n$  and also check for illegal values of  $x$ .
- b) Write a C function to read in two numbers,  $x$  and  $n$  (no. of terms), and then compute  $\sin(x)$  and  $\cos(x)$ .
10.
    - a) Write a C program to find the largest and smallest number in a list of integers.
    - b) Write a C program to perform Matrix Addition & Matrix Multiplication.
    - c) Write a C program to compute Transpose of a Matrix.
  11.
    - a) Write a C program to exchange value of two integers using call by value and call by reference.
    - b) Write C programs to demonstrate the use of Pointers.
  12. Write user defined string handling functions to implement the following standard library functions: `strlen()`, `strcpy()`, `strcat()`, `strrev()`, `strcmp()`.
  13.
    - a) Write a C program that displays the position/ index in the string  $S$  where the string  $T$  begins, or -1 if  $S$  doesn't contain  $T$ .
    - b) Write a C program to determine whether a given string is Palindrome or not.
  14. Write a C program that uses functions to perform the following operations:
    - a) To insert a sub-string in to given main string from a given position.
    - b) To delete  $n$  Characters from a given position in a given string.
    - c) To replace a character of string either from beginning or ending or at a specified location.
  15.
    - a) Write a C program to find the two's complement of a binary number.
    - b) Write a C program to convert a Roman numeral to its decimal equivalent.

16. Write a C program that uses functions to perform the following operations using Structures:
  - a) Reading a complex number.
  - b) Writing a complex number.
  - c) Addition of two complex numbers.
  - d) Multiplication of two complex numbers.
17.
  - a) Write a C program which copies one file to another.
  - b) Write a C program to count the number of characters, lines, words, tabs and spaces in a given file.