

**SEMESTER I/ II**  
**COMPUTER PROGRAMMING LABORATORY**

**Sub Code: 14CPL 16 / 14CPL26**  
**Hrs/ Week: 03**  
**Total Hrs.: 42**

**IA Marks : 25**  
**Exam Hours : 03**  
**Exam Marks : 50**

**PART – A : Demonstration of Personal Computer and its Accessories**

**Demonstration and Explanation on Disassembly and Assembly of a Personal Computer by the faculty-in-charge. Students have to prepare a write-up on the same and include it in the Lab record and evaluated.**

**Laboratory Session-1:** Write-up on Functional block diagram of Computer, CPU, Buses, Mother Board, Chip sets, Operating System & types of OS, Basics of Networking & Topology and NIC.

**Laboratory Session-2:** Write-up on RAM, SDRAM, FLASH memory, Hard disks, Optical media, CD-ROM/R/RW, DVDs, Flash drives, Keyboard, Mouse, Printers and Plotters.

**Note: These TWO Laboratory sessions** are used to fill the gap between theory classes and practical sessions.

**PART – B: Problem Solving in C**

**Implement the programs with WINDOWS / LINUX platform using appropriate C compiler.**

1. Design and develop a flowchart or an algorithm that takes three coefficients (*a*, *b*, and *c*) of a Quadratic equation ( $ax^2+bx+c=0$ ) as input and compute all possible roots. Implement a C program for the developed flowchart/algorithm and execute the same to output the possible roots for a given set of coefficients with appropriate messages.
2. Design and develop an algorithm to find the *reverse* of an integer number **NUM** and check whether it is **PALINDROME** or **NOT**. Implement a C program for the developed algorithm that takes an integer number as input and output the reverse of the same with suitable messages. Ex: Num: **2014**, Reverse: **4102**, Not a Palindrome
3.
  - 3a. Design and develop a flowchart to find the square root of a given number *N*. Implement a C program for the same and execute for all possible inputs with appropriate messages. Note: **Don't use library function *sqrt(n)*.**
  - 3b. Design and develop a C program to read a *year* as an input and find whether it is *leap year* or not. Also consider end of the centuries.

4. Design and develop an algorithm for evaluating the polynomial  $f(x) = a_4x^4 + a_3x^3 + a_2x^2 + a_1x + a_0$ , for a given value of  $x$  and its coefficients using Horner's method. Implement a C program for the developed algorithm and execute for different sets of values of coefficients and  $x$ .
5. Write C Program to compute **Sin(x)** using Taylor series approximation given by  $\text{Sin}(x) = x - (x^3/3!) + (x^5/5!) - (x^7/7!) + \dots$ . Compare the result with the built-in Library function and print both the results.
6. Develop, implement and execute a C program that reads  $N$  integer numbers and arrange them in ascending order using **Bubble Sort** technique. Extend the program to perform a search operation on these sorted numbers by accepting a key element from the user applying **Binary Search** method. Report the result SUCCESS or FAILURE as the case may be.
7. Develop, implement and execute a C program that reads two matrices **A** ( $m \times n$ ) and **B** ( $p \times q$ ) and Compute the product **A** and **B**. Read matrix **A** in row major order and matrix **B** in column major order. Print both the input matrices and resultant matrix with suitable headings and in matrix format. Program must check the compatibility of orders of the matrices for multiplication. Report appropriate message in case of incompatibility.
8. Write and execute a C program that
  - i. Implements string copy operation **STRCOPY**(str1,str2) that copies a string *str1* to another string *str2* without using library function.
  - ii. Reads a *sentence* and prints frequency of each of the vowels and total count of consonants.
9.
  - a. Design and develop a C function **RightShift**( $x, n$ ) that takes two integers  $x$  and  $n$  as input and returns value of the integer  $x$  rotated to the right by  $n$  positions. Assume the integers are unsigned. Write a C program that invokes this function with different values for  $x$  and  $n$  and tabulate the results with suitable headings.
  - b. Design and develop a C function **isprime**(num) that accepts an integer argument and returns 1 if the argument is prime, a 0 otherwise. Write a C program that invokes this function to generate prime numbers between the given range.
10. Develop a function in C called **MatchAny**(s1,s2) that takes two string arguments and does the following task:
  - i) if s1 is **substring** of s2, Returns **1** along with the first location in the string s2,
  - ii) if s1 is **equal** to s2, returns **0** and
  - iii) **otherwise**, returns **-1**.
 Write a C program that invokes **MatchAny**(s1,s2) for different input strings and output both the strings s1 & s2 with the return value in tabular form. **Note: Do not use the standard library functions.**

11. Draw the flowchart and write a *recursive* C function to find the factorial of a number,  $n!$ , defined by  $fact(n)=1$ , if  $n=0$ . Otherwise  $fact(n)=n*fact(n-1)$ . Using this function, write a C program to compute the binomial coefficient  ${}_nC_r$ . Tabulate the results for different values of  $n$  and  $r$  with suitable messages.
12. Given two text documentary files “Ramayana.in” and “Mahabharatha.in”. Write a C program to create a new file “Karnataka.in” that appends the content of file “Ramayana.in” to the file “Mahabharatha.in”. Display the contents of output file “Karnataka.in” on to screen. Also find number of words and newlines in the output file.
13. Write a C program to maintain a record of “ $n$ ” student details using an array of structures with four fields (Roll number, Name, Marks, and Grade). Each field is of an appropriate data type. Print the marks of the student given student name as input.
14. a. Write a C program using pointers to compute the sum of all elements stored in an array  $A[n]$ . Where  $n$  is the number of elements.  
 b. Write a C program to find sum of  $n$  elements entered by the user. Demonstrate the program using functions `malloc()` to allocate memory dynamically and `free()` to deallocate.
15. a. Write a C program using pointers to find the median of a list of members.  
 b. Write a C program to find first minimum element and its position in an unsorted array. Use pointer technology.

#### **Reference Book:**

1. Reema Thareja, Computer Fundamentals and Programming in C, Oxford Press, 2012.

#### **Practical Examination Procedure:**

1. **Part - A** experiment is a demo experiment only and shall not be included in practical exam.
2. **Part – B:** All experiments are to be included for practical examination.
3. Students are allowed to pick one experiment from the lot.
4. Strictly follow the instructions as printed on the answer script for breakup of marks
5. **Change of experiment is allowed only once and 15% Marks should be deducted from the procedure part.**