

B.SC(H) Computer Science (CBCS)
 C-I: Programming Fundamentals using C++
 Total Marks: 150
 Theory: 75
 Practical: 50
 Internal Assessment: 25

Guidelines

Ref Book: A. B. Forouzan, Richard F. Gilberg *Computer Science: A structured Approach using C++*, 2nd edition, Cengage Learning, 2010.

S.No	Content	Chapters
1.	Programming constructs, Basic data types, Constants and variables	Ch 2 (2.1 – 2.8) Pg 26 - 59
2.	Control structures in conditionals, Arithmetic and logical expressions, Assignment	Ch 3 (3.1 to 3.6) Pg 75-101, 3.7 ,5.5 for Lab only Ch 5 (5.1 to 5.3) Pg 175-205
3.	Looping	Ch 6 (6.1 to 6.7) 6.8 for Lab only Pg 227-260
4.	Functions	Ch 4 (4.1 – 4.4) (Pg 118- 147)
5.	Strings and arrays, Command line arguments,	Ch 8 (8.1 to 8.3,8.7) Pg 345- 359 , 382 – 391 Ch 9 (9.1 to 9.9) Pg 412 – 434 Ch 14 (14.1 to 14.5, 14.7) Pg 678 – 707, 715 - 721 Appendix L(Pg 955-958)
6.	File handling.	Ch 7 (7.1, 7.2) Pg 299-303 (7.3 – 7.7 For Lab only)
7.	Abstraction and Encapsulation, Procedural abstractions, Objects and classes	Ch 10 (10.1 – 10.5) Pg 489-513 Ch 11 (11.1 – 11.5) Pg 542 - 561
8.	Inheritance, polymorphism	Ch 12 (12.1 – 12.6)Pg 597 -625
9.	Exception Handling	Ch 15 (15.1 – 15.3)Pg 738-751

COMPUTER SCIENCE LAB (C-I): Programming Fundamentals using C++ Lab

Practical: 60 Lectures

1. WAP to print the sum and product of digits of an integer.
2. WAP to reverse a number.
3. WAP to compute the sum of the first n terms of the following series
 $S = 1 + 1/2 + 1/3 + 1/4 + \dots$
4. WAP to compute the sum of the first n terms of the following series
 $S = 1 - 2 + 3 - 4 + 5 - \dots$
5. Write a function that checks whether a given string is Palindrome or not. Use this function to find whether the string entered by user is Palindrome or not.
6. Write a function to find whether a given no. is prime or not. Use the same to generate

the prime numbers less than 100.

7. WAP to compute the factors of a given number.

8. Write a macro that swaps two numbers. WAP to use it.

9. WAP to print a triangle of stars as follows (take number of lines from user):

*

10. WAP to perform following actions on an array entered by the user:

i) Print the even-valued elements

ii) Print the odd-valued elements

iii) Calculate and print the sum and average of the elements of array

iv) Print the maximum and minimum element of array

v) Remove the duplicates from the array

vi) Print the array in reverse order

The program should present a menu to the user and ask for one of the options. The menu should also include options to re-enter array and to quit the program.

11. WAP that prints a table indicating the number of occurrences of each alphabet in the text entered as command line arguments.

12. Write a program that swaps two numbers using pointers.

13. Write a program in which a function is passed address of two variables and then alter its contents.

14. Write a program which takes the radius of a circle as input from the user, passes it to another function that computes the area and the circumference of the circle and displays the value of area and circumference from the main() function.

15. Write a program to find sum of n elements entered by the user. To write this program, allocate memory dynamically using malloc() / calloc() functions or new operator.

16. Write a menu driven program to perform following operations on strings:

a) Show address of each character in string

b) Concatenate two strings without using strcat function.

c) Concatenate two strings using strcat function.

d) Compare two strings

e) Calculate length of the string (use pointers)

f) Convert all lowercase characters to uppercase

g) Convert all uppercase characters to lowercase

h) Calculate number of vowels

i) Reverse the string

17. Given two ordered arrays of integers, write a program to merge the two-arrays to get an ordered array.

18. WAP to display Fibonacci series (i) using recursion, (ii) using iteration

19. WAP to calculate Factorial of a number (i) using recursion, (ii) using iteration

20. WAP to calculate GCD of two numbers (i) with recursion (ii) without recursion.

21. Create Matrix class using templates. Write a menu-driven program to perform following Matrix operations (2-D array implementation): a) Sum b) Difference c) Product d) Transpose

22. Create the Person class. Create some objects of this class (by taking information from the user). Inherit the class Person to create two classes Teacher and Student class. Maintain the respective information in the classes and create, display and delete objects of these two classes (Use Runtime Polymorphism).

23. Create a class Triangle. Include overloaded functions for calculating area. Overload assignment operator and equality operator.

24. Create a class Box containing length, breath and height. Include following methods in it:

- a) Calculate surface Area
- b) Calculate Volume
- c) Increment, Overload ++ operator (both prefix & postfix)
- d) Decrement, Overload -- operator (both prefix & postfix)
- e) Overload operator == (to check equality of two boxes), as a friend function
- f) Overload Assignment operator
- g) Check if it is a Cube or cuboid

Write a program which takes input from the user for length, breath and height to test the above class.

25. Create a structure Student containing fields for Roll No., Name, Class, Year and Total Marks. Create 10 students and store them in a file.

26. Write a program to retrieve the student information from file created in previous question and print it in following format:

Roll No. Name Marks

27. Copy the contents of one text file to another file, after removing all whitespaces.

28. Write a function that reverses the elements of an array in place. The function must accept only one pointer value and return void.

29. Write a program that will read 10 integers from user and store them in an array. Implement array using pointers. The program will print the array elements in ascending and descending order.