



**CL-1002**  
**Programming Fundamentals**  
**Lab # 9**

Objectives:

- Practice and understanding on basic c++ programs

**Note: Carefully read the following instructions (*Each instruction contains a weightage*)**

1. There must be a block of comments at start of every question's code by students; the block should contain brief description about functionality of code.
2. Comment on every function about its functionality.
3. Use understandable name of variables.
4. Proper indentation of code is essential.
5. Write a C++ statement(s) for each of the following task one after the other, in the same order.
6. Make a Microsoft Word file and paste all of your C++ code with all possible screenshots of **every task output in MS word and submit .cpp file with word file.**
7. Make separate .cpp files for all tasks and use this format **23F-1234\_Task1.cpp.**
8. First think about statement problems and then write/draw your logic on copy.
9. After copy pencil work, code the problem statement on MS Studio C++ compiler.
10. At the end when you done your tasks, attached C++ created files in MS word file and make your submission on Google classroom. (Make sure your submission is completed).
11. Please submit your word file in this format **23F-1234\_L1.docx**
12. Do not submit your assignment **after the deadline.**
- 13. Do not copy code from any source otherwise you will be penalized with negative marks.**



## Problem No 1 | Switch

Write a program to take the value from the user as an input week number and print weekday by using the switch statement.

## Problem No 2 | Switch

You are tasked with creating a program for a movie theater that calculates the ticket price based on the age of the customer. The theater has different pricing categories:

- Children (age 0-12): \$5
- Teenagers (age 13-17): \$8
- Adults (age 18-59): \$12
- Seniors (age 60 and above): \$6

Write a program that takes the age of the customer as input and uses a switch statement to calculate and output the corresponding ticket price.

## Problem No 3 | Nested Switch

You are developing a program for a pizza ordering system. The program should take two inputs: pizza size (1 for Small, 2 for Medium, 3 for Large) and pizza type (1 for Margherita, 2 for Pepperoni, 3 for Veggie). Based on these inputs, calculate and display the total cost of the pizza.

### Pricing details:

1. Small pizza: \$8
2. Medium pizza: \$12
3. Large pizza: \$15

### Additional charges for specific types:

1. Margherita: No additional charge
2. Pepperoni: \$2 extra
3. Veggie: \$3 extra

For example:

### Input:

Pizza Size: 2 (Medium)

Pizza Type: 3 (Veggie)

### Output:

Total Cost: \$15 (Medium pizza base cost) + \$3 (Veggie extra charge) = \$18

Implement the solution using nested switch statements.



## Problem No 4 | Ternary Operator

Create a program that takes a temperature value in Celsius as input and classifies it into different categories using a ternary operator. The categories are as follows:

- Freezing: Below 0°C
- Cold: 0-10°C
- Moderate: 11-20°C
- Warm: 21-30°C
- Hot: Above 30°C

For example:

Input: 15

Output: Moderate

Implement the solution using the ternary operator.

## Problem No 5 | University Admission Criteria | Nested If

A university has the following admission criteria for engineering programs:

1. Minimum Qualifications:
  - Physics, Chemistry, and Mathematics are mandatory subjects.
  - Minimum 60% aggregate in Physics, Chemistry, and Mathematics.
2. Additional Criteria for Specialization:
  - Computer Science Specialization:
    - Additional requirement: Minimum 70% aggregate in Physics, Chemistry, and Mathematics.
    - Additional subject: Computer Science (compulsory).
  - Mechanical Engineering Specialization:
    - Additional requirement: Minimum 65% aggregate in Physics, Chemistry, and Mathematics.
    - Additional subject: Mechanical Engineering (compulsory).
  - Electrical Engineering Specialization:
    - Additional requirement: Minimum 68% aggregate in Physics, Chemistry, and Mathematics.
    - Additional subject: Electrical Engineering (compulsory).

Write a program that takes the subject marks and the chosen specialization as input and determines whether a student is eligible for admission and, if so, for which specialization.

## Problem: 6 (for loop)

Write a C++ program that generates and prints the Fibonacci series up to a specified number of



terms. The program should take an integer  $n$  as input, representing the number of terms in the series. Use a for loop to calculate and display the Fibonacci series.

The Fibonacci series is defined as follows:

The first two terms are 0 and 1.

Each subsequent term is the sum of the two preceding terms.

For example:

Input: 8

Output: 0, 1, 1, 2, 3, 5, 8, 13

### Problem: 7 (for loop)

Write a program that uses a for loop to find a series number.

Consider the following sequence of numbers:  $n(a)$ ,

$n(a+1)$ ,  $n(a+2)$ ,  $n(a+3)$ , ...,  $n(a+b)$

**Note:** Do not put “,” after last digit as mentioned is output

### Problem: 8 (For loop)

Write a program that will calculate the average of  $n$  numbers. Input all number(s) from user and display there average.

For example

Enter limit of numbers= 2

Enter number 1= 10

Enter number 2= 10 Average of numbers = 10

### Problem: 9 (For loop)

Write a C++ program that takes an integer as input and determines whether it is a prime number. The program should use a for loop to check for factors of the given number.

A prime number is a natural number greater than 1 that is not a product of two smaller natural numbers.

For example:

Input: 17

Output: Prime

### Problem: 10 (For loop)

White a program that find the Lest Common Multiple by getting input of two numbers from user.



Hint: LCM of two integers a and b is the smallest positive integer that is divisible by both a and b.

## Problem: 11 (For loop)

The population of a town A is less than the population of town B. However, the population of town A is growing faster than the population of town B. Write a program that prompts the user to enter the population and growth rate of each town. The program outputs after how many years the population of town A will be greater than or equal to the population of town B and the populations of both the towns at that time. (A sample input is: Population of town A = 5000, growth rate of town A = 4%, population of town B = 8000, and growth rate of town B = 2%.).

## Problem: 12 | (for loop)

Armstrong number is a number that is equal to the sum of cubes of its digits. For example 0, 1, 153, 370, 371 and 407 are the Armstrong numbers.

Example:

$$371 = (3*3*3) + (7*7*7) + (1*1*1)$$

where:

$$(3*3*3)=27$$

$$(7*7*7)=343$$

$$(1*1*1)=1$$

So:

$$27+343+1=371$$

Write a code to check if a number is Armstrong or not. Number must be in the range of selected datatype.

Proper text alignment and screenshots will hold extra marks!

Best of luck 😊

**You are done with your exercise, submit to the classroom at given time.**