INSTITUTE OF TECHNOLOGY AND MANAGEMENT
SKILLS UNIVERSITY,
KHARGHAR, NAVI MUMBAI

C++ PROGRAMMING LAB

Prepared by:

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Batch: 2023-27

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Ex	List of Experiment

p. No	
1	Write a program to find the roots of a quadratic equation.
2	Write a program to calculate the power of a number using a loop.
3	Write a program to check if a given string, is a palindrome.
4	Write a program that simulates a simple ATM machine, allowing users to check their balance, deposit, or withdraw money using a switch statement.
5	Write a program that finds the largest among three numbers using nested if-else statements
6	Write a program that determines the grade of a student based on their marks of 5 subjects using if-else-if ladder.
7	Write a program to find the sum of digits of a number until it becomes a single digit number.
8	Write a program to print a Pascal's triangle using nested loops.
9	Write a program to calculate the sum of series 1/1! + 2/2! + 3/3! + ... + N/N! using nested loops.
10	Write a program to create an array of strings and display them in alphabetical order.
11	Write a program that checks if an array is sorted in ascending order.
12	Write a program to calculate the sum of elements in each row of a matrix.
13	Write a program to generate all possible permutations of a string.
14	Create a C++ program to print the following pattern: ***** * * * * * *

	*****

15	Write a C++ program to display the following pattern: 1 232 34543 4567654 34543 232

16	Write a program to creating an inventory management system for a small store. The system should use object-oriented principles in C++. Yourprogram should have the following features:
	• Create a **Product** class that represents a product in the inventory. Each **Product** object should have the following attributes:
	  • Product ID (an integer)
	  • Product Name (a string)
	  • Price (a floating-point number)
	  • Quantity in stock (an integer)
	• Implement a parameterized constructor for the **Product** class to initialize the attributes when a new product is added to the inventory.

17	Write a program to manage student records. Create a class Student with attributes such as name, roll number, and marks. Implement methods for displaying student details, adding new students, and calculating the average marks of all students in the record system.
18	Write a program that implements a basic calculator. Use a class Calculator with methods to perform addition, subtraction, multiplication, and division of two numbers. The program should allow the user to input two numbers and select an operation to perform.
19	Write a program to simulate a simple online shop. Create a class Product with attributes like name, price, and quantity in stock. Implement methods for adding products to the shopping cart, calculating the total cost, and displaying the contents of the cart.

20	Write a program to manage student grades for a classroom. Create a class Student with attributes for student name and an array to store grades. Implement methods for adding grades, calculating the average grade, and displaying the student's name and grades. Use constructors and destructors to initialize and release resources.

Name of Student: Shikha singh

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_____ Experiment No:1

Title:

1.Write a program to find the roots of a quadratic equation.

Theory:

Quadratic equations are the polynomial equations of degree 2 in one variable of type f(x) = ax2 + bx + c = 0 where a, b, c, ∈ R and a ≠ 0. It is the general form of a quadratic equation where 'a' is called the leading coefficient and 'c' is called the absolute term of f (x).

Code:

```
#include <iostream>
#include <cmath>
int main() {

    float a, b, c;
    std::cout << "Enter the coefficients (a, b, c): ";
    std::cin >> a >> b >> c;

    float discriminant = b * b - 4 * a * c;
    if (discriminant > 0) {

        float root1 = (-b + sqrt(discriminant)) / (2 * a);
        float root2 = (-b - sqrt(discriminant)) / (2 * a);
        std::cout << "Root 1 = " << root1 << std::endl;
        std::cout << "Root 2 = " << root2 << std::endl;
    } else if (discriminant == 0) {

        float root = -b / (2 * a);
        std::cout << "Root = " << root << std::endl;
    } else {

        float realPart = -b / (2 * a);
        float imaginaryPart = sqrt(-discriminant) / (2 * a);
        std::cout << "Root 1 = " << realPart << " + " << imaginaryPart << "i" << std::endl;
        std::cout << "Root 2 = " << realPart << " - " << imaginaryPart << "i" << std::endl;
    }
    return 0;
}
```

Output: (screenshot)

Test Case: Any two (screenshot)

Conclusion:

A quadratic function has two root values since its highest degree is 2. Any quadratic equation can be solved by three different methods to find the roots. These values give the x-intercept for plotting the graph, which results in a parabolic curve.