

C++ PROGRAMMING LAB



Prepared by:

Name of Student: _Shikha singh_____

Roll No: ___25_____

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 $1/1! + 2/2! + 3/3! + \dots + N/N!$ 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	<p>Create a C++ program to print the following pattern:</p> <pre> ***** * * * * * *</pre>

--	-------

15	<p>Write a C++ program to display the following pattern:</p> <pre> 1 232 34543 4567654 34543 232 </pre>
16	<p>Write a program to creating an inventory management system for a small store. The system should use object-oriented principles in C++. Your program should have the following features:</p> <ul style="list-style-type: none"> • Create a Product class that represents a product in the inventory. Each Product object should have the following attributes: <ul style="list-style-type: none"> • 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	<p>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.</p>
18	<p>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.</p>
19	<p>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.</p>

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

_____ **Roll Number: 25**

_____ **Experiment No:3**

Title: 3. Write a program to check if a given string, is a palindrome.

Theory: A palindrome is a string that reads the same backwards as it does forwards. For example, the strings "racecar" and "madam" are palindromes.

There are a few different ways to check if a string is a palindrome. One way is to compare the string to its reverse. If the two strings are equal, then the original string is a palindrome.

Another way to check if a string is a palindrome is to use a stack. A stack is a data structure that follows the Last In First Out (LIFO) principle. To check if a string is a palindrome, we can push each character of the string onto a stack. Then, we can pop the characters off the stack one by one and compare them to the corresponding characters in the original string. If all the characters match, then the string is a palindrome.

Code:

```
#include <iostream>
#include <string>
using namespace std;
bool isPalindrome(string str) {
```

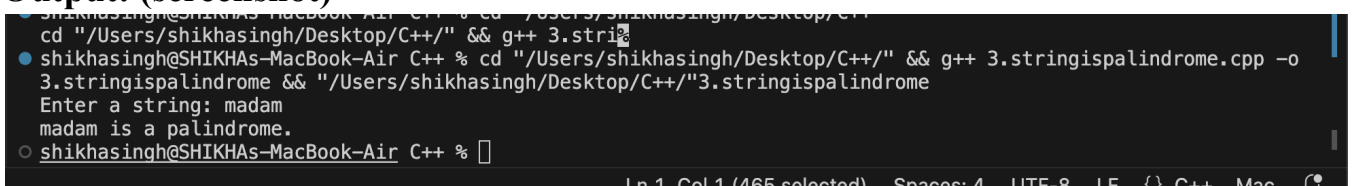
```

for (int i = 0; i < str.length() / 2; i++) {
    if (str[i] != str[str.length() - 1 - i]) {
        return false;
    }
}
return true;
}
int main() {

    string str;
    cout << "Enter a string: ";
    cin >> str;
    if (isPalindrome(str)) {
        cout << str << " is a palindrome." << endl;
    } else {
        cout << str << " is not a palindrome." << endl;
    }
    return 0;
}

```

Output: (screenshot)



```

shikhasingh@SHIKHAS-MacBook-Air C++ % cd "/Users/shikhasingh/Desktop/C++/" && g++ 3.stringis
shikhasingh@SHIKHAS-MacBook-Air C++ % cd "/Users/shikhasingh/Desktop/C++/" && g++ 3.stringispalindrome.cpp -o
3.stringispalindrome && "/Users/shikhasingh/Desktop/C++/"3.stringispalindrome
Enter a string: madam
madam is a palindrome.
shikhasingh@SHIKHAS-MacBook-Air C++ %

```

Test Case: Any two (screenshot)

```
shikhasingh@SHIKHAS-MacBook-Air C++ % cd "/Users/shikhasingh/Desktop/C++/" && g++ 3.stringispalindrome.cpp -o 3.stringispalindrome && "/Users/shikhasingh/Desktop/C++/"3.stringispalindrome
Enter a string: madam
madam is a palindrome.
shikhasingh@SHIKHAS-MacBook-Air C++ %
```

```
shikhasingh@SHIKHAS-MacBook-Air C++ % cd "/Users/shikhasingh/Desktop/C++/" && g++ 3.stringispalindrome.cpp -o 3.stringispalindrome && "/Users/shikhasingh/Desktop/C++/"3.stringispalindrome
Enter a string: shikha
shikha is not a palindrome.
shikhasingh@SHIKHAS-MacBook-Air C++ %
```

Conclusion:

The program above uses the first method to check if a string is a palindrome. It compares the string to its reverse and returns true if the two strings are equal. Otherwise, it returns false.