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Domain Camp CSE-3rd Year

(19-12-24 to 29-12-24)

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Section- FL_IOT_603-B

Day1

Very Easy

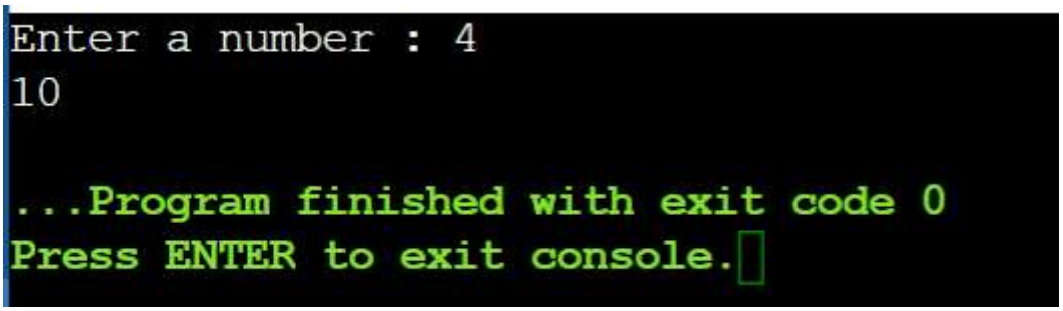
1) Sum of Natural Numbers up to N

Calculate the sum of all natural numbers from 1 to n, where n is a positive integer. Use the formula:
Sum=n×(n+1)/2 .
Take n as input and output the sum of natural numbers from 1 to n .

CODE:

```
#include <iostream>
int sum_of_natural_numbers(int n) {
   return n * (n + 1) / 2;
   }
int main() {
   int n;
   cout << "Enter a positive integer: ";
   cin >> n;
   int result = sum_of_natural_numbers(n);
   cout << "The sum of all natural numbers from 1 to " << n << " is " << result << "." << endl;
   return 0;
}
```

OUTPUT:



Easy:

1) Count Digits in a Number

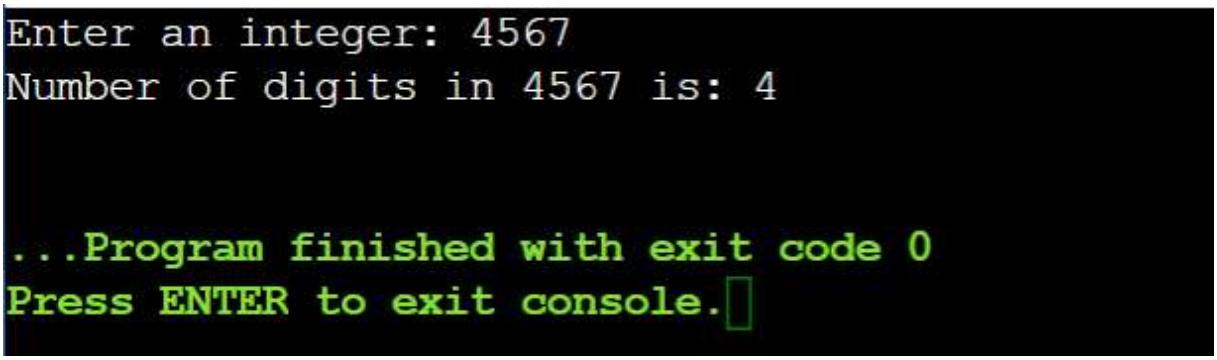
Objective

Count the total number of digits in a given number n. The number can be a positive integer. For example, for the number 12345, the count of digits is 5. For a number like 900000, the count of digits is 6.
Given an integer n, your task is to determine how many digits are present in n. This task will help you practice working with loops, number manipulation, and conditional logic.

CODE:

```
#include <iostream>
#include <cmath>
int countDigits(int n) {
   if (n == 0) {
      return 1; // Special case: 0 has 1 digit
   }
   int count = 0;
   while (n != 0) {
      n /= 10; // Remove the last digit
      count++;
   }

   return count;
}
int main() {
   int n;
   cout << "Enter an integer: ";
   cin >> n;

   int digitCount = countDigits(n);
   cout << "Number of digits in " << n << " is: " << digitCount << endl;
   return 0;
}
```

OUTPUT:



Medium:

3) Function Overloading for Calculating Area.

Objective:

Write a program to calculate the area of different shapes using function overloading.
Implement overloaded functions to compute the area of a circle, a rectangle, and a triangle.

Input Format
The program should accept:
1. Radius of the circle for the first function.
2. Length and breadth of the rectangle for the second function.
3. Base and height of the triangle for the third function.

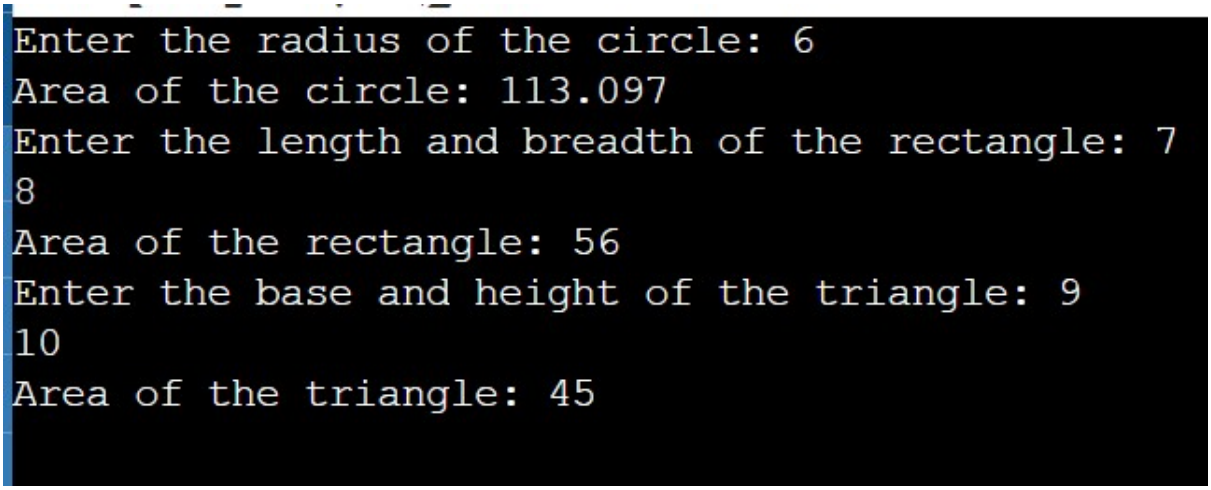
Constraints
$1 \leq radius, length, breadth, base, height \leq 10^3$
Use 3.14159 for the value of π.

CODE:

```
#include <iostream>
#include <cmath>
const double PI = 3.14159;

// Function overloading for area calculations

double area(double radius) {
   return PI * radius * radius;
}

double area(double length, double breadth) {
   return length * breadth;
}

double area(double base, double height) {
   return 0.5 * base * height;
}

int main() {
   double radius, length, breadth, base, height;

   // Get input for circle
   cout << "Enter radius of the circle: ";
   cin >> radius;
   cout << "Area of the circle: " << area(radius) << endl;

   // Get input for rectangle
   cout << "Enter length and breadth of the rectangle: ";
   cin >> length >> breadth;
   cout << "Area of the rectangle: " << area(length, breadth) << endl;

   // Get input for triangle
   cout << "Enter base and height of the triangle: ";
   cin >> base >> height;
```

```
    cout << "Area of the triangle: " << area(base, height) << endl;

    return 0;
}
```

OUTPUT:



Hard:

4) Implement Polymorphism for Banking Transactions
Objective

Design a C++ program to simulate a banking system using polymorphism. Create a base class Account with a virtual method calculateInterest(). Use the derived classes SavingsAccount and CurrentAccount to implement specific interest calculation logic:

- **SavingsAccount**: Interest = Balance × Rate × Time.
- **CurrentAccount**: No interest, but includes a maintenance fee deduction.

Input Format

1. Account Type (1 for Savings, 2 for Current).
2. Account Balance (integer).
3. For Savings Account: Interest Rate (as a percentage) and Time (in years).
4. For Current Account: Monthly Maintenance Fee.

Constraints

- Account type: $1 \leq type \leq 2$.
- Balance: $1000 \leq balance \leq 1{,}000{,}000$.
- Interest Rate: $1 \leq rate \leq 15$.
- Time: $1 \leq time \leq 10$.
- Maintenance Fee: $50 \leq fee \leq 500$.

CODE:

```
#include <iostream>
#include <cmath>
const double PI = 3.14159;

// Function overloading for area calculations

double area(double radius) {
   return PI * radius * radius;
}

double area(double length, double breadth) {
   return length * breadth;
}

double area(double base, double height) {
   return 0.5 * base * height;
}

int main() {
   double radius, length, breadth, base, height;

   // Get input for circle
   cout << "Enter radius of the circle: ";
   cin >> radius;
   cout << "Area of the circle: " << area(radius) << endl;

   // Get input for rectangle
   cout << "Enter length and breadth of the rectangle: ";
   cin >> length >> breadth;
   cout << "Area of the rectangle: " << area(length, breadth) << endl;

   // Get input for triangle
   cout << "Enter base and height of the triangle: ";
   cin >> base >> height;
   cout << "Area of the triangle: " << area(base, height) << endl;

   return 0;
}
```

OUTPUT:

```
Balance: $10000
Interest calculated for Savings Account: $1000
Balance: $11000

Balance: $5000
Maintenance fee deducted for Current Account: $50
Balance: $4950
```

Very Hard

5) Hierarchical Inheritance for Employee Management System
Objective

Create a C++ program to simulate an employee management system using hierarchical inheritance. Design a base class Employee that stores basic details (name, ID, and salary). Create two derived classes:

Manager: Add and calculate bonuses based on performance ratings.

Developer: Add and calculate overtime compensation based on extra hours worked.

The program should allow input for both types of employees and display their total earnings.

Input Format

1. Employee Type (1 for Manager, 2 for Developer).
2. Name (string), ID (integer), and salary (integer).
3. For Manager: Performance Rating (1–5).
4. For Developer: Extra hours worked (integer).

Constraints

- Employee type: $1 \leq type \leq 2$.
- Salary: $10{,}000 \leq salary \leq 1{,}000{,}000$.
- Rating: $1 \leq rating \leq 5$.
- Extra hours: $0 \leq hours \leq 100$.
- Bonus per rating point: 10% of salary.
- Overtime rate: $500 per hour.

CODE:

```
#include <iostream>
#include <string>

using namespace std;

class Employee {
public:
   string name;
   int ID;
   int salary;
   Employee(string n, int i, int s) : name(n), ID(i), salary(s) {
      if (salary < 10000 || salary > 1000000) {
         cout << "Invalid salary. Salary must be between 10000 and 1000000." << endl;
         exit(1);
      }
   }

   virtual int getTotalEarnings() {
      return salary;
   }
};

class Manager : public Employee {
public:
   int performanceRating;
```

```
    Manager(string n, int i, int s, int pr) : Employee(n, i, s), performanceRating(pr) {
        if (performanceRating < 1 || performanceRating > 5) {
            cout << "Invalid performance rating. Rating must be between 1 and 5." << endl;
            exit(1);
        }
    }

    int getTotalEarnings() override {
        int bonus = 0;
        switch (performanceRating) {
            case 1:
                bonus = 0;
                break;
            case 2:
                bonus = salary * 0.05;
                break;
            case 3:
                bonus = salary * 0.10;
                break;
            case 4:
                bonus = salary * 0.15;
                break;
            case 5:
                bonus = salary * 0.20;
                break;
        }
        return salary + bonus;
    }
};

class Developer : public Employee {
public:
    int extraHours;

    Developer(string n, int i, int s, int eh) : Employee(n, i, s), extraHours(eh) {}

    int getTotalEarnings() override {
        int overtimePay = extraHours * (salary / 200); // Assuming 200 working hours per month
        return salary + overtimePay;
    }
};

int main() {
    int employeeType, ID, salary, performanceRating, extraHours;
    string name;

    cout << "Enter Employee Type (1 for Manager, 2 for Developer): ";
    cin >> employeeType;

    cout << "Enter Name: ";
    cin >> name;
    cout << "Enter ID: ";
    cin >> ID;
    cout << "Enter Salary: ";
    cin >> salary;
```

```
    if (employeeType == 1) {
        cout << "Enter Performance Rating (1-5): ";
        cin >> performanceRating;
        Manager manager(name, ID, salary, performanceRating);
        cout << "Total Earnings for Manager " << manager.name << ": " << manager.getTotalEarnings()
<< endl;
    } else if (employeeType == 2) {
        cout << "Enter Extra Hours Worked: ";
        cin >> extraHours;
        Developer developer(name, ID, salary, extraHours);
        cout << "Total Earnings for Developer " << developer.name << ": " <<
developer.getTotalEarnings() << endl;
    } else {
        cout << "Invalid Employee Type." << endl;
    }

    return 0;
}
```

OUTPUT:

```
Enter Employee Type (1 for Manager, 2 for Developer): 1
Enter Name: ABHI
Enter ID: 234
Enter Salary: 200000
Enter Performance Rating (1-5): 4
Total Earnings for Manager ABHI: 230000
```

QUES 6: Check if a Number is Prime

Objective Check if a given number n is a prime number. A prime number is a natural number greater than 1 that has no positive divisors other than 1 and itself. To determine if a number is prime, iterate from 2 to √n and check if n is divisible by any number in this range. If it is divisible, it is not a prime number; otherwise, it is a prime.

Solution:

```
#include <iostream>
#include <cmath>
using namespace std;
bool isPrime(int n) {
    if (n <= 1) return false;
    for (int i = 2; i <= sqrt(n); i++) {
        if (n % i == 0) {
            return false;
        }
    }
    return true;
}
int main() {
    int n;
    cout << "Enter a number: ";
    cin >> n;
    if (n >= 2 && n <= 100000) {
        if (isPrime(n)) {
            cout << "Prime" << endl;
        } else {
            cout << "Not Prime" << endl;
        }
    } else {
        cout << "Number out of range. Please enter a number between 2 and 100000." << endl;
    }
    return 0;
}
```

```
Enter a number: 7
Prime
```

QUES 7: Print Multiplication Table of a Number

Objective: Print the multiplication table of a given number n. A multiplication table for a number n is a list of products of n with integers from 1 to 10. For example, the multiplication table for 3 is:

3×1=3,3×2=6,…,3×10=30.

Solution:

```
#include <iostream>
using namespace std;
int main() {
    int n;
    cout << "Enter a number: ";
    cin >> n;
    for (int i = 1; i <= 10; i++) {
        cout << n << " x " << i << " = " << n * i << endl;
    }
    return 0;}
```

```
Enter a number: 7
7 x 1 = 7
7 x 2 = 14
7 x 3 = 21
7 x 4 = 28
7 x 5 = 35
7 x 6 = 42
7 x 7 = 49
7 x 8 = 56
7 x 9 = 63
7 x 10 = 70
```

QUES 8: Print Odd Numbers up to N

Objective: Print all odd numbers between 1 and n, inclusive. Odd numbers are integers that are not divisible by 2. These numbers should be printed in ascending order, separated by spaces. This problem is a simple introduction to loops and conditional checks. The goal is to use a loop to iterate over the numbers and check if they are odd using the condition i%2≠0.

Solution:

```
#include <iostream>
using namespace std;
int main() {
    int n;
    cout << "Enter a number: ";
    cin >> n;
    for (int i = 1; i <= n; i++) {
        if (i % 2 != 0) {
            cout << i << " ";
        }
    }
    return 0;
}
```

```
Enter a number: 5
1 3 5
```

QUES 9: Sum of Odd Numbers up to N

Objective: Calculate the sum of all odd numbers from 1 to n. An odd number is an integer that is not divisible by 2.The sum of odd numbers, iterate through all the numbers from 1 to n, check if each number is odd, and accumulate the sum.

Solution:

```
#include <iostream>
using namespace std;
int main() {
    int n, sum = 0;
    cout << "Enter a number: ";
    cin >> n;
    for (int i = 1; i <= n; i++) {
        if (i % 2 != 0) {
            sum += i;
        }
    }
```

```
    cout << "Sum of odd numbers up to " << n << " is: " << sum << endl;
    return 0;
}
```

```
Enter a number: 5
Sum of odd numbers up to 5 is: 9
```

EASY

QUES 10: Reverse a Number

Objective: Reverse the digits of a given number n. For example, if the input number is 12345, the output should be 54321. The task involves using loops and modulus operators to extract the digits and construct the reversed number.

Solution:

```
#include <iostream>
using namespace std;
int main() {
    int n, reversedNumber = 0;
    cout << "Enter a number: ";
    cin >> n;
    while (n > 0) {
        int digit = n % 10;
        reversedNumber = reversedNumber * 10 + digit; number
        n /= 10;
    }
    cout << "Reversed Number: " << reversedNumber << endl;
    return 0;
}
```

```
Enter a number: 12345
Reversed Number: 54321
```

QUES 11: Find the Largest Digit in a Number

Objective: Find the largest digit in a given number n. For example, for the number 2734, the largest digit is 7. You need to extract each digit from the number and determine the largest one. The task will involve using loops and modulus operations to isolate the digits.

Solution:

```
#include <iostream>
using namespace std;
int main() {
    int n, largestDigit = 0;
    cout << "Enter a number: ";
    cin >> n;
    while (n > 0) {
        int digit = n % 10;
        if (digit > largestDigit) {
            largestDigit = digit;
        }
        n /= 10;
    }
    cout << "Largest Digit: " << largestDigit << endl;
```

```
    return 0;
}
```

```
Enter a number: 37937670
Largest Digit: 9
```

QUES 12: Check if a Number is a Palindrome

Objective: Check whether a given number is a palindrome or not. A number is called a palindrome if it reads the same backward as forward. For example, 121 is a palindrome because reading it from left to right is the same as reading it from right to left. Similarly, 12321 is also a palindrome, but 12345 is not.

Solution:

```
#include <iostream>
using namespace std;
int main() {
    int n, originalNumber, reversedNumber = 0;
    cout << "Enter a number: ";
    cin >> n;
    originalNumber = n;
    while (n > 0) {
        int digit = n % 10;
        reversedNumber = reversedNumber * 10 + digit;
        n /= 10;
    }
    if (originalNumber == reversedNumber) {
        cout << "Palindrome" << endl;
    } else {
        cout << "Not a Palindrome" << endl;    }
    return 0;
}
```

```
Enter a number: 12321
Palindrome
```

QUES 13: Find the Sum of Digits of a Number

Objective: Calculate the sum of the digits of a given number n. For example, for the number 12345, the sum of the digits is 1+2+3+4+5=15. To solve this, you will need to extract each digit from the number and calculate the total sum.

Solution:

```
#include <iostream>
using namespace std;
int main() {
    int n, sum = 0;
    cout << "Enter a number: ";
    cin >> n;
    while (n > 0) {
        int digit = n % 10;
        sum += digit;
        n /= 10;
    }
    cout << "Sum of digits: " << sum << endl;
    return 0;
```

}

```
Enter a number: 478758
Sum of digits: 39
```

MEDIUM

QUES 14: Encapsulation with Employee Details

Objective: Write a program that demonstrates encapsulation by creating a class Employee. The class should have private attributes to store:
Employee ID.
Employee Name.
Employee Salary.
Provide public methods to set and get these attributes, and a method to display all details of the employee.

Solution:

```
#include <iostream>
#include <string>
using namespace std;
class Employee {
private:
    int employeeID;
    string employeeName;
    double employeeSalary;
public:
    void setEmployeeID(int id) {
        employeeID = id;
    }
    void setEmployeeName(string name) {
        employeeName = name;
    }
    void setEmployeeSalary(double salary) {
        employeeSalary = salary;
    }
    int getEmployeeID() const {
        return employeeID;
    }
    string getEmployeeName() const {
        return employeeName;
    }
    double getEmployeeSalary() const {
        return employeeSalary;
    }
    void displayDetails() const {
        cout << "Employee ID: " << employeeID << endl;
        cout << "Employee Name: " << employeeName << endl;
        cout << "Employee Salary: $" << employeeSalary << endl;
    }
};
int main() {
    Employee emp;
    emp.setEmployeeID(101);
    emp.setEmployeeName("John Doe");
    emp.setEmployeeSalary(55000.50);
    cout << "Employee Details:" << endl;
```

```
    emp.displayDetails();
    return 0;
}
```

```
Employee Details:
Employee ID: 101
Employee Name: John Doe
Employee Salary: $55000.5
```

QUES 15: Inheritance with Student and Result Classes.

Objective: Create a program that demonstrates inheritance by defining:

- A base class Student to store details like Roll Number and Name.
- A derived class Result to store marks for three subjects and calculate the total and percentage.

Solution:

```
#include <iostream>
#include <string>
using namespace std;
class Student {
protected:
    int rollNumber;
    string name;
public:
    void setDetails(int r, string n) {
        rollNumber = r;
        name = n;
    }
    void displayDetails() const {
        cout << "Roll Number: " << rollNumber << endl;
        cout << "Name: " << name << endl;
    }
};
class Result : public Student {
private:
    float marks[3];
public:
    void setMarks(float m1, float m2, float m3) {
        marks[0] = m1;
        marks[1] = m2;
        marks[2] = m3;
    }
    float calculateTotal() const {
        return marks[0] + marks[1] + marks[2];
    }
    float calculatePercentage() const {
        return (calculateTotal() / 300) * 100; // Assuming each subject is out of 100
    }
    void displayResult() const {
        displayDetails(); // Call base class method
        cout << "Marks: " << marks[0] << ", " << marks[1] << ", " << marks[2] << endl;
        cout << "Total Marks: " << calculateTotal() << endl;
        cout << "Percentage: " << calculatePercentage() << "%" << endl;
    }
```

```
};
int main() {
    Result student;
    student.setDetails(101, "Alice");
    student.setMarks(85, 90, 88);
    cout << "Student Result Details:" << endl;
    student.displayResult();
    return 0;
}
```

```
Student Result Details:
Roll Number: 101
Name: Alice
Marks: 85, 90, 88
Total Marks: 263
Percentage: 87.6667%
```

QUES 16: Polymorphism with Shape Area Calculation.

Objective: Create a program that demonstrates polymorphism by calculating the area of different shapes using a base class Shape and derived classes for Circle, Rectangle, and Triangle. Each derived class should override a virtual function to compute the area of the respective shape.

Solution:

```
#include <iostream>
#include <cmath>
using namespace std;
class Shape {
public:
    virtual double getArea() = 0;
    virtual ~Shape() {}
};
class Circle : public Shape {
private:
    double radius;
public:
    Circle(double r) : radius(r) {}
    double getArea() override {
        return M_PI * radius * radius;  // Area = π * radius²
    }
};
class Rectangle : public Shape {
private:
    double length, breadth;
public:
    Rectangle(double l, double b) : length(l), breadth(b) {}
    double getArea() override {
        return length * breadth;  // Area = length × breadth
    }
};
class Triangle : public Shape {
private:
    double base, height;
public:
```

```
    Triangle(double b, double h) : base(b), height(h) {}
    double getArea() override {
        return 0.5 * base * height;  // Area = ½ × base × height
    }
};
int main() {
    Shape* shapes[3];
    shapes[0] = new Circle(5);
    shapes[1] = new Rectangle(4, 6);
    shapes[2] = new Triangle(3, 7);
    for (int i = 0; i < 3; i++) {
        cout << "Area of shape " << i + 1 << ": " << shapes[i]->getArea() << endl;
    }
    for (int i = 0; i < 3; i++) {
        delete shapes[i];
    }
    return 0;
}
```

```
Area of shape 1: 78.5398
Area of shape 2: 24
Area of shape 3: 10.5
```

HARD

QUES 17: Matrix Multiplication Using Function Overloading

Objective: Implement matrix operations in C++ using function overloading. Write a function operate() that can perform:

- Matrix Addition for matrices of the same dimensions.
- Matrix Multiplication where the number of columns of the first matrix equals the number of rows of the second matrix.

Solution:

```
#include <iostream>
#include <vector>
using namespace std;
void printMatrix(const vector<vector<int>>& matrix) {
    for (const auto& row : matrix) {
        for (int elem : row) {
            cout << elem << " ";
        }
        cout << endl;
    }
    cout << endl;
}
vector<vector<int>> operate(const vector<vector<int>>& mat1, const vector<vector<int>>&
mat2) {
    int rows = mat1.size();
    int cols = mat1[0].size();
    vector<vector<int>> result(rows, vector<int>(cols, 0));
    for (int i = 0; i < rows; i++) {
        for (int j = 0; j < cols; j++) {
            result[i][j] = mat1[i][j] + mat2[i][j];
        }
    }
```

```
    return result;
}
vector<vector<int>> operate(const vector<vector<int>>& mat1, const vector<vector<int>>&
mat2, bool multiply) {
    int rows = mat1.size();
    int cols = mat2[0].size();
    int common = mat1[0].size();
    vector<vector<int>> result(rows, vector<int>(cols, 0));
    for (int i = 0; i < rows; i++) {
        for (int j = 0; j < cols; j++) {
            for (int k = 0; k < common; k++) {
                result[i][j] += mat1[i][k] * mat2[k][j];
            }
        }
    }
    return result;
}
int main() {
    vector<vector<int>> mat1 = {{1, 2}, {3, 4}};
    vector<vector<int>> mat2 = {{5, 6}, {7, 8}};
    vector<vector<int>> mat3 = {{1, 2, 3}, {4, 5, 6}};
    cout << "Matrix 1:" << endl;
    printMatrix(mat1);
    cout << "Matrix 2:" << endl;
    printMatrix(mat2);
    cout << "Matrix 3:" << endl;
    printMatrix(mat3);
    cout << "Matrix Addition (mat1 + mat2):" << endl;
    vector<vector<int>> additionResult = operate(mat1, mat2);
    printMatrix(additionResult);
    cout << "Matrix Multiplication (mat1 x mat3):" << endl;
    vector<vector<int>> multiplicationResult = operate(mat1, mat3, true);
    printMatrix(multiplicationResult);
    return 0;
}
```

```
Matrix Addition (mat1 + mat2):
6 8
10 12

Matrix Multiplication (mat1 x mat3):
9 12 15
19 26 33
```

QUES 18: Polymorphism in Shape Classes

Objective: Design a C++ program using polymorphism to calculate the area of different shapes:

A Rectangle (Area = Length × Breadth).

A Circle (Area = π × Radius²).

A Triangle (Area = ½ × Base × Height).

Create a base class Shape with a pure virtual function getArea(). Use derived classes Rectangle, Circle, and Triangle to override this function.

Solution:

```
#include <iostream>
#include <cmath>
using namespace std;
class Shape {
public:
    virtual double getArea() const = 0;
    virtual ~Shape() {}
};
class Rectangle : public Shape {
private:
    double length, breadth;

public:
    Rectangle(double l, double b) : length(l), breadth(b) {}
    double getArea() const override {
        return length * breadth;
    }
};
class Circle : public Shape {
private:
    double radius;
public:
    Circle(double r) : radius(r) {}
    double getArea() const override {
        return M_PI * radius * radius;
    }
};
class Triangle : public Shape {
private:
    double base, height;
public:
    Triangle(double b, double h) : base(b), height(h) {}
    double getArea() const override {
        return 0.5 * base * height;
    }
};
int main() {
    Shape* shapes[3];
    shapes[0] = new Rectangle(5, 3);
    shapes[1] = new Circle(7);

    shapes[2] = new Triangle(4, 6);
    cout << "Area of Rectangle: " << shapes[0]->getArea() << endl;
    cout << "Area of Circle: " << shapes[1]->getArea() << endl;
    cout << "Area of Triangle: " << shapes[2]->getArea() << endl;
    for (int i = 0; i < 3; ++i) {
        delete shapes[i];
    }
    return 0;
}
```

```
Area of Rectangle: 15
Area of Circle: 153.938
Area of Triangle: 12
```

VERY HARD

QUES 19: Implement Polymorphism for Banking Transactions

Objective: Design a C++ program to simulate a banking system using polymorphism. Create a base class Account with a virtual method calculateInterest(). Use the derived classes SavingsAccount and CurrentAccount to implement specific interest calculation logic:
SavingsAccount: Interest = Balance × Rate × Time.
CurrentAccount: No interest, but includes a maintenance fee deduction.

Solution:

```
#include <iostream>
using namespace std;
class Account {
protected:
    double balance;
public:
    Account(double bal) : balance(bal) {}
    virtual void calculateInterest() = 0;
    virtual ~Account() {} // Virtual destructor
};
class SavingsAccount : public Account {
private:
    double rate;
    int time;
public:
    SavingsAccount(double bal, double r, int t) : Account(bal), rate(r), time(t) {}
    void calculateInterest() override {
        double interest = balance * (rate / 100) * time;
        cout << "Savings Account Interest: " << interest << endl;
    }
};
class CurrentAccount : public Account {
private:
    double maintenanceFee;
public:
    CurrentAccount(double bal, double fee) : Account(bal), maintenanceFee(fee) {}
    void calculateInterest() override {
        balance -= maintenanceFee;
        cout << "Current Account Balance after maintenance fee: " << balance << endl;
    }
};
int main() {
    int accountType;
    cout << "Enter Account Type (1 for Savings, 2 for Current): ";
    cin >> accountType;
    if (accountType == 1) {
        double balance, rate;
        int time;
        cout << "Enter Balance: ";
        cin >> balance;
```

```
            cout << "Enter Interest Rate (%): ";
            cin >> rate;
            cout << "Enter Time (in years): ";
            cin >> time;
            if (balance >= 1000 && rate >= 1 && rate <= 15 && time >= 1 && time <= 10) {
                SavingsAccount sa(balance, rate, time);
                sa.calculateInterest();
            } else {
                cout << "Invalid input for Savings Account." << endl;
            }
        } else if (accountType == 2) {
            double balance, fee;
            cout << "Enter Balance: ";
            cin >> balance;
            cout << "Enter Monthly Maintenance Fee: ";
            cin >> fee;
            if (balance >= 1000 && fee >= 50 && fee <= 500) {
                CurrentAccount ca(balance, fee);
                ca.calculateInterest();
            } else {
                cout << "Invalid input for Current Account." << endl;
            }
        } else {
            cout << "Invalid Account Type. Please enter 1 or 2." << endl;
        }
        return 0;
}
```

```
Enter Account Type (1 for Savings, 2 for Current): 1
Enter Balance: 45000
Enter Interest Rate (%): 5
Enter Time (in years): 6
Savings Account Interest: 13500
```