PROGRAM 01:

```
#include <iostream>

using namespace std;

int main()

{

   int choice;

   double totalBill = 0.0;


   while (true)

           {

      cout << "Cafeteria Menu:\n";

      cout << "1. Tea - $2\n";

      cout << "2. Coffee - $3\n";

      cout << "3. Sandwich - $5\n";

      cout << "4. Burger - $7\n";

      cout << "5. Exit\n";

      cout << "Enter your choice (1-5): ";

      cin >> choice;



      if (cin.fail())

                     {

         cin.clear();

         cin.ignore(numeric_limits<streamsize>::max(), '\n');

         cout << "Invalid input. Please enter a number between 1 and 5.\n";
```

```
    continue;
}

// Handle the menu choices using switch case
switch (choice) {
    case 1: // Tea
        totalBill += 2.0;
        cout << "You selected Tea. $2 added to your bill.\n";
        break;
    case 2: // Coffee
        totalBill += 3.0;
        cout << "You selected Coffee. $3 added to your bill.\n";
        break;
    case 3: // Sandwich
        totalBill += 5.0;
        cout << "You selected Sandwich. $5 added to your bill.\n";
        break;
    case 4: // Burger
        totalBill += 7.0;
        cout << "You selected Burger. $7 added to your bill.\n";
        break;
    case 5: // Exit
        cout << "Exiting the menu. Your total bill is $" << totalBill << ".\n";
        break;
    default:
```

```
            cout << "Invalid choice. Please select a number between 1 and 5.\n";
            continue;
        }

        // Exit the loop if "Exit" option (5) is selected
        if (choice == 5) {
            break;
        }
    }

    return 0;
}
```

PROGRAM 02:

```
#include <iostream>
using namespace std;

int main() {
    double balance = 1000.0;  // Initial balance
    int choice;
    double amount;

    do {
        // Display the menu
        cout << "\nATM Menu:\n";
        cout << "1. Check Balance\n";
```

```
cout << "2. Withdraw Money\n";
cout << "3. Deposit Money\n";
cout << "4. Exit\n";
cout << "Enter your choice (1-4): ";
cin >> choice;

// Input validation
if (cin.fail()) {
   cin.clear();  // Clear the error flag
   cin.ignore(numeric_limits<streamsize>::max(), '\n');  // Ignore invalid input
   cout << "Invalid input. Please enter a number between 1 and 4.\n";
   continue;
}

// Handle the user's choice using switch case
switch (choice) {
   case 1: // Check balance
      cout << "Your current balance is $" << balance << ".\n";
      break;

   case 2: // Withdraw money
      cout << "Enter the amount to withdraw: $";
      cin >> amount;

      // Check if the withdrawal amount is valid
```

```
            if (amount > 0 && amount <= balance) {
                balance -= amount;
                cout << "You have successfully withdrawn $" << amount << ". Your new balance is $" << balance << ".\n";
            } else if (amount > balance) {
                cout << "Insufficient balance. You cannot withdraw more than $" << balance << ".\n";
            } else {
                cout << "Invalid withdrawal amount.\n";
            }
            break;

        case 3: // Deposit money
            cout << "Enter the amount to deposit: $";
            cin >> amount;

            // Check if the deposit amount is valid
            if (amount > 0) {
                balance += amount;
                cout << "You have successfully deposited $" << amount << ". Your new balance is $" << balance << ".\n";
            } else {
                cout << "Invalid deposit amount.\n";
            }
            break;

        case 4: // Exit
```

```
            cout << "Exiting the ATM. Thank you for using the ATM.\n";
            break;

        default:
            cout << "Invalid choice. Please select a number between 1 and 4.\n";
            continue;  // If an invalid choice is made, continue the loop
    }

    // The loop will repeat until the user chooses to exit (option 4)
  } while (choice != 4);  // Exit condition when the user selects "4"

  return 0;
}
```

PROGRAM 03:

```
#include <iostream>
using namespace std;

int main() {
  int number;
  int evenCount = 0;
  int oddCount = 0;

  // Continuously prompt the user to enter numbers
  while (true) {
    cout << "Enter a number (0 to stop): ";
```

```
        cin >> number;

        // Check if the user entered 0, if so, break the loop
        if (number == 0) {
            break;
        }

        // Check if the number is even or odd and increment the respective counter
        if (number % 2 == 0) {
            evenCount++;  // Increment even counter if the number is even
        } else {
            oddCount++;   // Increment odd counter if the number is odd
        }
    }

    // Display the total count of odd and even numbers
    cout << "Total even numbers: " << evenCount << endl;
    cout << "Total odd numbers: " << oddCount << endl;

    return 0;
}
```

PROGRAM 04:

```
#include <iostream>
using namespace std;
```

```
int main() {
    int choice;
    double num1, num2, result;

    do {
        // Display the menu
        cout << "\nSimple Calculator Menu:\n";
        cout << "1. Addition\n";
        cout << "2. Subtraction\n";
        cout << "3. Multiplication\n";
        cout << "4. Division\n";
        cout << "5. Exit\n";
        cout << "Enter your choice (1-5): ";
        cin >> choice;

        // Input validation for menu choice
        if (cin.fail()) {
            cin.clear();  // Clear the error flag
            cin.ignore(numeric_limits<streamsize>::max(), '\n');  // Ignore invalid input
            cout << "Invalid input. Please enter a number between 1 and 5.\n";
            continue;
        }

        // Switch statement for selected operation
        switch (choice) {
```

```
case 1: // Addition
    cout << "Enter two numbers: ";
    cin >> num1 >> num2;
    result = num1 + num2;
    cout << "Result: " << num1 << " + " << num2 << " = " << result << endl;
    break;

case 2: // Subtraction
    cout << "Enter two numbers: ";
    cin >> num1 >> num2;
    result = num1 - num2;
    cout << "Result: " << num1 << " - " << num2 << " = " << result << endl;
    break;

case 3: // Multiplication
    cout << "Enter two numbers: ";
    cin >> num1 >> num2;
    result = num1 * num2;
    cout << "Result: " << num1 << " * " << num2 << " = " << result << endl;
    break;

case 4: // Division
    cout << "Enter two numbers: ";
    cin >> num1 >> num2;
    // Validate division by zero
```

```
            if (num2 == 0) {
                cout << "Error: Division by zero is not allowed.\n";
            } else {
                result = num1 / num2;
                cout << "Result: " << num1 << " / " << num2 << " = " << result << endl;
            }
            break;

        case 5: // Exit
            cout << "Exiting the calculator. Thank you!\n";
            break;

        default:
            cout << "Invalid choice. Please select a number between 1 and 5.\n";
            continue; // Loop back to the menu if an invalid choice is entered
    }

    // Loop continues until the user chooses "Exit"
  } while (choice != 5);  // Exit when "5" is selected

  return 0;
}
```

PROGRAM 05:

```
#include <iostream>
using namespace std;
```

```
int main() {
    string correctPassword = "1234";  // Predefined correct password
    string enteredPassword;
    int attempts = 3;

    // Use a for loop to allow up to three attempts
    for (int i = 0; i < attempts; ++i) {
        cout << "Enter password (Attempt " << (i + 1) << " of " << attempts << "): ";
        cin >> enteredPassword;

        // Check if the entered password is correct
        if (enteredPassword == correctPassword) {
            cout << "Access granted\n";
            break;  // Exit the loop if the password is correct
        } else {
            cout << "Incorrect password\n";
        }

        // If all attempts are used and password is not correct
        if (i == attempts - 1) {
            cout << "Access denied\n";
        }
    }
```

```
    return 0;
}
```

PROGRAM 06:

```
#include <iostream>
using namespace std;

int main() {
    int marks;
    char choice;

    do {
        // Prompt the user to enter marks
        cout << "Enter the student's marks (0-100): ";
        cin >> marks;

        // Validate input to ensure marks are between 0 and 100
        if (marks < 0 || marks > 100) {
            cout << "Invalid input! Marks must be between 0 and 100. Please try again.\n";
            continue;  // Skip the grade calculation and prompt for marks again
        }

        // Determine the grade using if-else conditions
        char grade;
        if (marks >= 90 && marks <= 100) {
            grade = 'A';
```

```
        } else if (marks >= 80 && marks < 90) {
            grade = 'B';
        } else if (marks >= 70 && marks < 80) {
            grade = 'C';
        } else if (marks >= 60 && marks < 70) {
            grade = 'D';
        } else {
            grade = 'F';
        }

        // Display the grade
        cout << "The student's grade is: " << grade << endl;

        // Ask the user if they want to calculate another grade
        cout << "Do you want to calculate another grade? (Y/N): ";
        cin >> choice;

    } while (choice == 'Y' || choice == 'y');  // Repeat if the user enters 'Y' or 'y'

    cout << "Exiting the grade calculator. Goodbye!" << endl;
    return 0;
}
```

PROGRAM 07:

```
#include <iostream>
using namespace std;
```

```
int main() {
    int number;

    // Prompt the user to enter a positive integer
    cout << "Enter a positive integer: ";
    cin >> number;

    // Validate the input to ensure the number is positive
    if (number <= 0) {
        cout << "Please enter a positive integer greater than 0.\n";
        return 1;  // Exit the program if the input is invalid
    }

    cout << "The divisors of " << number << " are: ";

    // Use a for loop to find and display all divisors of the number
    for (int i = 1; i <= number; i++) {
        // If the number is divisible by i, print i as a divisor
        if (number % i == 0) {
            cout << i << " ";
        }
    }

    cout << endl;
```

```
    return 0;
}
```

PROGRAM 08:

```
#include <iostream>
using namespace std;

int main() {
    int n;

    // Prompt the user to enter a positive integer
    cout << "Enter a positive integer: ";
    cin >> n;

    // Validate the input to ensure the number is positive
    if (n <= 0) {
        cout << "Please enter a positive integer greater than 0.\n";
        return 1;  // Exit the program if the input is invalid
    }

    // Outer loop for each line of the pattern
    for (int i = n; i >= 1; i--) {
        // Inner loop to print numbers from i down to 1
        for (int j = i; j >= 1; j--) {
            cout << j << " ";  // Print the number followed by a space
        }
```

```
        cout << endl;  // Move to the next line after printing a row
    }

    return 0;
}
```

PROGRAM 09:

```
#include <iostream>
#include <iomanip>  // For setting the output format
using namespace std;

int main() {
    int n;

    // Prompt the user to enter a positive integer
    cout << "Enter a positive integer: ";
    cin >> n;

    // Validate the input to ensure the number is positive
    if (n <= 0) {
        cout << "Please enter a positive integer greater than 0.\n";
        return 1;  // Exit the program if the input is invalid
    }

    // Display the header of the table
    cout << "Number\tSquare\tCube\n";
```

```
    // Use a for loop to calculate squares and cubes and display them
    for (int i = 1; i <= n; i++) {
        int square = i * i;  // Calculate the square
        int cube = i * i * i;  // Calculate the cube

        // Display the number, its square, and cube, formatted in columns
        cout << i << "\t" << square << "\t" << cube << endl;
    }

    return 0;
}
```