SET 11

Q1: Write a program to check if a number entered by the user is positive, negative, or zero..(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

```
#include <iostream>

using namespace std;


int main() {

   // Declare a variable to store the user input

   float number;


   // Prompt the user to enter a number

   cout << "Enter a number: ";

   cin >> number;


   // Check if the number is positive, negative, or zero

   if (number > 0) {

      cout << "The number is positive." << endl;

   } else if (number < 0) {

      cout << "The number is negative." << endl;

   } else {

      cout << "The number is zero." << endl;

   }


   return 0;

}
```

Q2Write a program to check if a student passes an exam. A student passes if their marks are 40 or above.(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

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

int main() {
   int marks;

   // Ask user for input marks
   cout << "Enter the student's marks: ";
   cin >> marks;

   // Check if the student has passed
   if (marks >= 40) {
      cout << "The student has passed the exam!" << endl;
   } else {
      cout << "The student has failed the exam!" << endl;
   }

   return 0;
}
```

Q3: Write a program to input a character and check if it is a vowel (a, e, i, o, u) or a consonant using a switch statement.(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

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

int main() {
   char ch;
```

```
    // Ask user for input character
    cout << "Enter a character: ";
    cin >> ch;

    // Convert the character to lowercase to handle both uppercase and lowercase inputs
    ch = tolower(ch);

    // Use switch case to check if the character is a vowel or consonant
    switch (ch) {
        case 'a':
        case 'e':
        case 'i':
        case 'o':
        case 'u':
            cout << ch << " is a vowel." << endl;
            break;
        default:
            cout << ch << " is a consonant." << endl;
    }

    return 0;
}
```

SET 12

Q1 : Write a program to input a number and print its multiplication table up to 10 using a for loop.(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

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

```
int main() {
   int number;

   // Ask the user to input a number
   cout << "Enter a number: ";
   cin >> number;

   // Loop to print multiplication table from 1 to 10
   for (int i = 1; i <= 10; i++) {
      cout << number << " x " << i << " = " << number * i << endl;
   }

   return 0;
}
```

Q2 :Write a program to swap the values of two variables and display the result(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

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

int main() {
   int a, b, temp;

   // Ask user to input two numbers
   cout << "Enter the value of a: ";
   cin >> a;
   cout << "Enter the value of b: ";
   cin >> b;
```

```
    // Swapping values using a temporary variable
    temp = a;
    a = b;
    b = temp;

    // Display the result after swapping
    cout << "After swapping, the value of a is: " << a << endl;
    cout << "After swapping, the value of b is: " << b << endl;

    return 0;
}
```

Q3 Write a program to input a string and extract a substring from it (starting from a specified position for a specified length).(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

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

int main() {
    string str;
    int start, length;

    // Input the string
    cout << "Enter a string: ";
    getline(cin, str);

    // Input the starting position and length of the substring
    cout << "Enter the starting position: ";
    cin >> start;
```

```
    cout << "Enter the length of the substring: ";
    cin >> length;

    // Check if the starting position and length are valid
    if (start >= 0 && start < str.length() && length > 0 && (start + length) <= str.length()) {
        // Extract the substring using the substr() method
        string substring = str.substr(start, length);

        // Display the extracted substring
        cout << "Extracted substring: " << substring << endl;
    } else {
        cout << "Invalid starting position or length." << endl;
    }

    return 0;
}
```

Set 13

Q1 Write a program to input two numbers and find the minimum using the min() function.(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

```
#include <iostream>
#include <algorithm>  // For the min() function
using namespace std;

int main() {
    int num1, num2;

    // Input two numbers
    cout << "Enter the first number: ";
    cin >> num1;
```

```
    cout << "Enter the second number: ";
    cin >> num2;

    // Find the minimum using the min() function
    int minimum = min(num1, num2);

    // Output the minimum value
    cout << "The minimum of " << num1 << " and " << num2 << " is: " << minimum << endl;

    return 0;
}
```

Q2 Write a program to input some text from the user and save it to a text file.(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

```
#include <iostream>
#include <fstream>  // For file handling
#include <string>
using namespace std;

int main() {
    string text;
    ofstream outFile;  // Create an output file stream object

    // Ask user for the text input
    cout << "Enter some text: ";
    getline(cin, text);  // Get the entire line of input, including spaces

    // Open the file in write mode (it creates the file if it doesn't exist)
    outFile.open("output.txt");
```

```
    // Check if the file is opened successfully
    if (outFile.is_open()) {
        // Write the input text to the file
        outFile << text;
        // Close the file after writing
        outFile.close();
        cout << "Text has been saved to 'output.txt'." << endl;
    } else {
        cout << "Error opening the file." << endl;
    }

    return 0;
}
```

Q3 Write a program to convert a given string to uppercase without using the built-in upper() function.(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

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

int main() {
    string str;

    // Ask the user for input string
    cout << "Enter a string: ";
    getline(cin, str);

    // Convert each character to uppercase if it's a lowercase letter
    for (int i = 0; i < str.length(); i++) {
```

```
        if (str[i] >= 'a' && str[i] <= 'z') {
            str[i] = str[i] - ('a' - 'A'); // Convert to uppercase
        }
    }

    // Output the converted string
    cout << "The string in uppercase is: " << str << endl;

    return 0;
}
```

Set 14

Q1 Write a program to find whether a given year is a leap year.(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

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

int main() {
    int year;

    // Input the year from the user
    cout << "Enter a year: ";
    cin >> year;

    // Check if the year is a leap year
    if ((year % 400 == 0) || (year % 4 == 0 && year % 100 != 0)) {
        cout << year << " is a leap year." << endl;
    } else {
        cout << year << " is not a leap year." << endl;
    }
```

```
    return 0;
}
```

Q2 :Write a program to input some text from the user and save it to a text file.(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

```
#include <iostream>
#include <fstream>  // For file handling
#include <string>
using namespace std;

int main() {
    string text;
    ofstream outFile;  // Create an output file stream object

    // Ask user for the text input
    cout << "Enter some text: ";
    getline(cin, text);  // Get the entire line of input, including spaces

    // Open the file in write mode (it creates the file if it doesn't exist)
    outFile.open("output.txt");

    // Check if the file is opened successfully
    if (outFile.is_open()) {
        // Write the input text to the file
        outFile << text;
        // Close the file after writing
        outFile.close();
        cout << "Text has been saved to 'output.txt'." << endl;
    } else {
```

```
        cout << "Error opening the file." << endl;
    }

    return 0;
}
```

Q3 C:Write a program to read integers from a binary file and display them on the screen..(6 marks)
Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

```
#include <iostream>
#include <fstream>  // For file handling
using namespace std;

int main() {
    ifstream inFile;  // Create an input file stream object
    int number;

    // Open the binary file in input mode
    inFile.open("numbers.bin", ios::in | ios::binary);

    // Check if the file was opened successfully
    if (!inFile) {
        cout << "Error opening the file!" << endl;
        return 1;
    }

    // Read and display the integers from the file
    cout << "The integers read from the binary file are:" << endl;
    while (inFile.read(reinterpret_cast<char*>(&number), sizeof(number))) {
        cout << number << endl;
    }
```

```
    // Close the file
    inFile.close();

    return 0;
}
```

Set 15

Q1 : Write a program to convert a temperature from Celsius to Fahrenheit using the formula: F = \frac{9}{5}C + 32 .6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks

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

int main() {
    double celsius, fahrenheit;

    // Input temperature in Celsius
    cout << "Enter temperature in Celsius: ";
    cin >> celsius;

    // Convert Celsius to Fahrenheit
    fahrenheit = (9.0 / 5.0) * celsius + 32;

    // Output the result
    cout << celsius << " Celsius is equal to " << fahrenheit << " Fahrenheit." << endl;

    return 0;
```

}

Q2 Write a program to calculate the average of five numbers entered by the user..(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks

```
#include <iostream>

using namespace std;


int main() {

   double num1, num2, num3, num4, num5, average;


   // Input five numbers

   cout << "Enter five numbers: ";

   cin >> num1 >> num2 >> num3 >> num4 >> num5;


   // Calculate the average

   average = (num1 + num2 + num3 + num4 + num5) / 5;


   // Output the average

   cout << "The average of the five numbers is: " << average << endl;


   return 0;

}
```

Q3 : Write a program to input a number and use the -= operator to subtract 5 from the number, then display the updated value.(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

```
#include <iostream>

using namespace std;


int main() {

   int number;
```

```
    // Input a number from the user
    cout << "Enter a number: ";
    cin >> number;

    // Subtract 5 from the number using the -= operator
    number -= 5;

    // Display the updated value
    cout << "The updated value after subtracting 5 is: " << number << endl;

    return 0;
}
```

Set 16

Q1 Write a program to calculate the sum of all numbers from 1 to n using recursion.(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

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

// Recursive function to calculate sum from 1 to n
int sum(int n) {
    // Base case: if n is 1, return 1
    if (n == 1) {
        return 1;
    }
    // Recursive case: sum of n is n + sum of n-1
    return n + sum(n - 1);
}

int main() {
```

```
    int n;

    // Input the value of n
    cout << "Enter a number n: ";
    cin >> n;

    // Call the recursive function to calculate the sum
    int result = sum(n);

    // Output the result
    cout << "The sum of numbers from 1 to " << n << " is: " << result << endl;

    return 0;
}
```

Q2 :Write a program to find the product of three numbers entered by the user.(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

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

int main() {
    double num1, num2, num3, product;

    // Input three numbers from the user
    cout << "Enter three numbers: ";
    cin >> num1 >> num2 >> num3;

    // Calculate the product of the three numbers
    product = num1 * num2 * num3;
```

```
    // Output the product
    cout << "The product of the three numbers is: " << product << endl;

    return 0;
}
```

Q3 : Write a program to calculate the average of five numbers entered by the user.(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

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

int main() {
    double num1, num2, num3, num4, num5, average;

    // Input five numbers from the user
    cout << "Enter five numbers: ";
    cin >> num1 >> num2 >> num3 >> num4 >> num5;

    // Calculate the average
    average = (num1 + num2 + num3 + num4 + num5) / 5;

    // Output the average
    cout << "The average of the five numbers is: " << average << endl;

    return 0;
}
```

Set 17

Q1 Write a program to check if a person is eligible to vote. The person must be at least 18 years old and a citizen of the country.(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

```
#include <iostream>
```

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

int main() {
   int age;
   string citizenship;

   // Input the age and citizenship status
   cout << "Enter your age: ";
   cin >> age;
   cout << "Are you a citizen of the country? (yes/no): ";
   cin >> citizenship;

   // Check if the person is eligible to vote
   if (age >= 18 && (citizenship == "yes" || citizenship == "Yes")) {
      cout << "You are eligible to vote." << endl;
   } else {
      cout << "You are not eligible to vote." << endl;
   }

   return 0;
}
```

Q2 : Write a program to check if a given number lies within a specific range (e.g., between 10 and 50 inclusive)..(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

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

int main() {
```

```
    int num;

    // Input a number from the user
    cout << "Enter a number: ";
    cin >> num;

    // Check if the number lies within the range 10 to 50 inclusive
    if (num >= 10 && num <= 50) {
        cout << "The number is within the range of 10 to 50." << endl;
    } else {
        cout << "The number is outside the range of 10 to 50." << endl;
    }

    return 0;
}
```

Q3 : Write a program to input two integers and display their quotient and remainder.(6Marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

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

int main() {
    int num1, num2;

    // Input two integers from the user
    cout << "Enter two integers: ";
    cin >> num1 >> num2;

    // Check if the second number is not zero to avoid division by zero
    if (num2 != 0) {
```

```
    // Calculate the quotient and remainder
    int quotient = num1 / num2;
    int remainder = num1 % num2;

    // Display the quotient and remainder
    cout << "Quotient: " << quotient << endl;
    cout << "Remainder: " << remainder << endl;
  } else {
    cout << "Error: Division by zero is not allowed!" << endl;
  }

  return 0;
}
```

Set 18

Q1 : Write a program to calculate the factorial of a number using iteration.(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

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

int main() {
  int num;
  long long factorial = 1;  // Use long long to handle large numbers

  // Input a number from the user
  cout << "Enter a number: ";
  cin >> num;

  // Check if the number is negative
  if (num < 0) {
```

```
        cout << "Factorial is not defined for negative numbers." << endl;
    } else {
        // Calculate factorial using iteration
        for (int i = 1; i <= num; i++) {
            factorial *= i;
        }

        // Output the factorial
        cout << "The factorial of " << num << " is: " << factorial << endl;
    }

    return 0;
}
```

Q2 : Write a program to calculate the average of five numbers entered by the user.(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

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

int main() {
    double num1, num2, num3, num4, num5, average;

    // Input five numbers from the user
    cout << "Enter five numbers: ";
    cin >> num1 >> num2 >> num3 >> num4 >> num5;

    // Calculate the average
    average = (num1 + num2 + num3 + num4 + num5) / 5;

    // Output the average
```

```
    cout << "The average of the five numbers is: " << average << endl;


    return 0;
}
```

Q3 Write a program to check if a number entered by the user is positive, negative, or zero.6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

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

int main() {
    int num;

    // Input a number from the user
    cout << "Enter a number: ";
    cin >> num;

    // Check if the number is positive, negative, or zero
    if (num > 0) {
        cout << "The number is positive." << endl;
    } else if (num < 0) {
        cout << "The number is negative." << endl;
    } else {
        cout << "The number is zero." << endl;
    }

    return 0;
}
```

Set 19

Q1 : Write a program to check if a year entered by the user is a leap year.(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

```
#include <iostream>

using namespace std;


int main() {

   int year;


   // Input the year from the user

   cout << "Enter a year: ";

   cin >> year;


   // Check if the year is a leap year

   if ((year % 4 == 0 && year % 100 != 0) || (year % 400 == 0)) {

      cout << year << " is a leap year." << endl;

   } else {

      cout << year << " is not a leap year." << endl;

   }


   return 0;

}
```

Q2 Write a program to input a number (1 to 7) and display the corresponding day of the week using a switch statement..(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

```
#include <iostream>

using namespace std;


int main() {

   int day;
```

```
// Input a number between 1 and 7 from the user
cout << "Enter a number (1 to 7): ";
cin >> day;

// Display the corresponding day of the week using a switch statement
switch (day) {
   case 1:
      cout << "Monday" << endl;
      break;
   case 2:
      cout << "Tuesday" << endl;
      break;
   case 3:
      cout << "Wednesday" << endl;
      break;
   case 4:
      cout << "Thursday" << endl;
      break;
   case 5:
      cout << "Friday" << endl;
      break;
   case 6:
      cout << "Saturday" << endl;
      break;
   case 7:
      cout << "Sunday" << endl;
      break;
   default:
      cout << "Invalid input! Please enter a number between 1 and 7." << endl;
```

```
    }


    return 0;
}
```

Q3 Write a program to input a number (1 to 12) and display the corresponding month name using a switch statement (6Marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks

```
#include <iostream>

using namespace std;


int main() {
    int month;


    // Input a number between 1 and 12 from the user
    cout << "Enter a number (1 to 12): ";
    cin >> month;


    // Display the corresponding month name using a switch statement
    switch (month) {
        case 1:
            cout << "January" << endl;
            break;
        case 2:
            cout << "February" << endl;
            break;
        case 3:
            cout << "March" << endl;
            break;
        case 4:
```

```
        cout << "April" << endl;
        break;
    case 5:
        cout << "May" << endl;
        break;
    case 6:
        cout << "June" << endl;
        break;
    case 7:
        cout << "July" << endl;
        break;
    case 8:
        cout << "August" << endl;
        break;
    case 9:
        cout << "September" << endl;
        break;
    case 10:
        cout << "October" << endl;
        break;
    case 11:
        cout << "November" << endl;
        break;
    case 12:
        cout << "December" << endl;
        break;
    default:
        cout << "Invalid input! Please enter a number between 1 and 12." << endl;
}
```

```
    return 0;
}
```

Set 20

Q1 A: Write a program to check if a number entered by the user is positive, negative, or zero. or not.(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

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

int main() {
    int num;

    // Input a number from the user
    cout << "Enter a number: ";
    cin >> num;

    // Check if the number is positive, negative, or zero
    if (num > 0) {
        cout << "The number is positive." << endl;
    } else if (num < 0) {
        cout << "The number is negative." << endl;
    } else {
        cout << "The number is zero." << endl;
    }

    return 0;
}
```

Q2 Write a program to find the largest number in 3 numbers(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks

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

int main() {
   int num1, num2, num3;

   // Input three numbers from the user
   cout << "Enter three numbers: ";
   cin >> num1 >> num2 >> num3;

   // Determine the largest number
   if (num1 >= num2 && num1 >= num3) {
      cout << "The largest number is: " << num1 << endl;
   } else if (num2 >= num1 && num2 >= num3) {
      cout << "The largest number is: " << num2 << endl;
   } else {
      cout << "The largest number is: " << num3 << endl;
   }

   return 0;
}
```

Q3 Write a program to print the multiplication table of a number.(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks

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

int main() {
   int num;
```

```
    // Input the number from the user
    cout << "Enter a number to print its multiplication table: ";
    cin >> num;

    // Print the multiplication table for the entered number
    cout << "Multiplication table of " << num << " is:" << endl;

    for (int i = 1; i <= 10; i++) {
        cout << num << " x " << i << " = " << num * i << endl;
    }

    return 0;
}
```