Se1 1

Q1A: Write a program to input two numbers and display their sum.(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 variables to store input numbers

  float num1, num2, sum;


  // Input two numbers from the user

  cout << "Enter the first number: ";

  cin >> num1;


  cout << "Enter the second number: ";

  cin >> num2;


  // Calculate the sum of the two numbers

  sum = num1 + num2;


  // Display the sum

  cout << "The sum of " << num1 << " and " << num2 << " is: " << sum << endl;


  return 0;

}
```

Q2Write a program to check if 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 year from 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;
}
```

Q3: Write a program to demonstrate simple inheritance by creating a base class Animal with an attribute name and a derived class Dog that adds a method bark(). (6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

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

// Base class Animal
class Animal {
public:
   // Attribute for the animal's name
   string name;
```

```
    // Constructor to initialize the name
    Animal(string n) : name(n) {}

    // Method to display the name of the animal
    void display() {
        cout << "Animal Name: " << name << endl;
    }
};

// Derived class Dog inheriting from Animal
class Dog : public Animal {
public:
    // Constructor to initialize the name (calls base class constructor)
    Dog(string n) : Animal(n) {}

    // Method to make the dog bark
    void bark() {
        cout << name << " says: Woof! Woof!" << endl;
    }
};

int main() {
    // Create an object of the Dog class
    Dog myDog("Buddy");

    // Call the display method of Animal class
    myDog.display();

    // Call the bark method of Dog class
```

```
    myDog.bark();

    return 0;
}
```

Set2

Q1Write a program to calculate the area of a rectangle by taking its length and width as input. (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 variables for length, width, and area
    float length, width, area;

    // Input the length of the rectangle
    cout << "Enter the length of the rectangle: ";
    cin >> length;

    // Input the width of the rectangle
    cout << "Enter the width of the rectangle: ";
    cin >> width;

    // Calculate the area of the rectangle
    area = length * width;

    // Output the area of the rectangle
    cout << "The area of the rectangle is: " << area << endl;

    return 0;
```

```
}
```

Q2: Write a program to check if a person is eligible to vote (age 18 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() {
   // Declare a variable to store the person's age
   int age;


   // Prompt the user to enter their age
   cout << "Enter your age: ";
   cin >> age;


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


   return 0;
}
```

Q3: Write a program to input a positive integer N and calculate the sum of the first N natural numbers 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() {
```

```
    // Declare a variable to store the number N and the sum
    int N, sum = 0;

    // Input the value of N
    cout << "Enter a positive integer N: ";
    cin >> N;

    // Check if the entered number is positive
    if (N <= 0) {
        cout << "Please enter a positive integer." << endl;
        return 1; // Exit the program if the input is not positive
    }

    // Use a for loop to calculate the sum of the first N natural numbers
    for (int i = 1; i <= N; i++) {
        sum += i; // Add the current number to sum
    }

    // Output the sum
    cout << "The sum of the first " << N << " natural numbers is: " << sum << endl;

    return 0;
}
```

Set3

Q1: 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() {
   // Declare variables to store three numbers
   float num1, num2, num3, product;

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

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

   cout << "Enter the third number: ";
   cin >> num3;

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

   // Output the result
   cout << "The product of " << num1 << ", " << num2 << " and " << num3 << " is: " << product << endl;

   return 0;
}
```

Q2Write a program to check if a password is valid. A password is valid if it has at least 8 characters and does not contain any spaces.(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() {
   // Declare a variable to store the password
   string password;

   // Input the password from the user
   cout << "Enter your password: ";
   getline(cin, password);  // Use getline to read spaces

   // Check if the password has at least 8 characters and contains no spaces
   if (password.length() >= 8 && password.find(' ') == string::npos) {
      cout << "Password is valid." << endl;
   } else {
      cout << "Password is invalid." << 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() {
   // Declare a variable to store the number
   int number;

   // Input the number from the user
   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;
}
```

Set4

Q1: Write a program to take two boolean inputs (1 for true, 0 for false) and display the results of AND (&&) and OR (||) operations.(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() {
    // Declare two boolean variables to store the inputs
    bool a, b;

    // Input two boolean values (1 for true, 0 for false)
    cout << "Enter the first boolean value (1 for true, 0 for false): ";
    cin >> a;

    cout << "Enter the second boolean value (1 for true, 0 for false): ";
    cin >> b;
```

```
    // Perform AND (&&) operation
    bool andResult = a && b;
    cout << "The result of AND (a && b) is: " << andResult << endl;

    // Perform OR (||) operation
    bool orResult = a || b;
    cout << "The result of OR (a || b) is: " << orResult << endl;

    return 0;
}
```

Q2Write a program to assign a grade based on marks: •90 and above: A •80 to 89 : B •70 to 79 : C •Below 70 : Fail. (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() {
    // Declare a variable to store marks
    int marks;

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

    // Check the range of marks and assign a grade
    if (marks >= 90) {
        cout << "Grade: A" << endl;
    } else if (marks >= 80) {
```

```
        cout << "Grade: B" << endl;
    } else if (marks >= 70) {
        cout << "Grade: C" << endl;
    } else {
        cout << "Grade: Fail" << endl;
    }

    return 0;
}
```

Q3: Write a program to calculate the factorial of a number 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 factorial
int factorial(int n) {
    if (n <= 1) {
        return 1;  // Base case: factorial of 0 or 1 is 1
    } else {
        return n * factorial(n - 1);  // Recursive call
    }
}

int main() {
    // Declare a variable to store the number
    int num;

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

```
    cin >> num;

    // Check for non-negative input
    if (num < 0) {
        cout << "Factorial is not defined for negative numbers." << endl;
    } else {
        // Call the recursive function and display the result
        cout << "The factorial of " << num << " is: " << factorial(num) << endl;
    }

    return 0;
}
```

Set5

Q1Write a program to check if a number is divisible by 5 and 3..(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 number
    int number;

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

    // Check if the number is divisible by both 5 and 3
    if (number % 5 == 0 && number % 3 == 0) {
        cout << "The number is divisible by both 5 and 3." << endl;
```

```
    } else {
        cout << "The number is NOT divisible by both 5 and 3." << endl;
    }

    return 0;
```

Q2: 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() {
    // Declare a variable to store the month number
    int month;

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

    // Use switch statement to display the corresponding month name
    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;
            break;
        }

    return 0;
}
```

Q3Write a program to find the largest number among 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() {
    // Declare variables to store three numbers
    int num1, num2, num3;

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

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

    cout << "Enter the third number: ";
    cin >> num3;

    // Compare the three numbers to find the largest
    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;
}
```