Subject:- C++
LAB Assignment - 3

1. Write a C++ program that accepts and display values into two data members a and b using class.

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

class Data {
private:
	int a; // First data member
	int b; // Second data member

public:
	// Function to accept values
	void acceptValues() {
	cout << "Enter value for a: ";
	cin >> a;
	cout << "Enter value for b: ";
	cin >> b;
	}

	// Function to display values
	void displayValues() {
	cout << "Value of a: " << a << endl;
	cout << "Value of b: " << b << endl;
	}
};

int main() {
	Data data; // Create an object of the Data class

	data.acceptValues(); // Accept values from the user
	data.displayValues(); // Display the values
```

```
    return 0;
}
```

Output:-

2. Write a C++ program that creates a class ‘sum’ to perform sum operation using two integer and two float data members.

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

// Class definition
class Sum {
private:
    int intNum1, intNum2;     // Integer data members
    float floatNum1, floatNum2; // Float data members

public:
    // Constructor to initialize integer and float values
    Sum(int a, int b, float c, float d) {
    intNum1 = a;
    intNum2 = b;
    floatNum1 = c;
    floatNum2 = d;
    }

    // Function to sum two integers
    int sumIntegers() {
    return intNum1 + intNum2;
    }

    // Function to sum two floats
    float sumFloats() {
    return floatNum1 + floatNum2;
    }
```

```
        // Function to display the sums
        void display() {
        cout << "Sum of integers: " << sumIntegers() << endl;
        cout << "Sum of floats: " << sumFloats() << endl;
        }
};

int main() {
        // Create an object of class Sum
        Sum s(10, 20, 3.5, 4.5);

        // Call the display function to show the results
        s.display();

        return 0;
}
```

Output:-

3. Write a C++ program to accept and display data using in class ‘student’ with three data members. StudentID, Name and Age with five details of students using an array of objects.

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

// Class definition
class Student {
private:
        int studentID;        // Student ID
        string name;          // Student Name
        int age;        // Student Age

public:
        // Function to accept student details
```

```
        void accept() {
        cout << "Enter Student ID: ";
        cin >> studentID;
        cout << "Enter Student Name: ";
        cin.ignore();   // Clear input buffer
        getline(cin, name);
        cout << "Enter Student Age: ";
        cin >> age;
        }

        // Function to display student details
        void display() const {
        cout << "Student ID: " << studentID << endl;
        cout << "Name: " << name << endl;
        cout << "Age: " << age << endl;
        }
};

int main() {
        const int numStudents = 5;  // Number of students
        Student students[numStudents];  // Array of Student objects

        // Accept details for each student
        for (int i = 0; i < numStudents; ++i) {
        cout << "Enter details for student " << (i + 1) << ":" << endl;
        students[i].accept();
        cout << endl;
        }

        // Display details of each student
        cout << "Student Details:" << endl;
        for (int i = 0; i < numStudents; ++i) {
        cout << "Details of student " << (i + 1) << ":" << endl;
        students[i].display();
        cout << endl;
        }
```

```
    return 0;
}
```

Output:-

4. Write a program to define a class ‘cube’ with following members length, width and depth and volume(). Calculate volume of cuboid and display it on screen.

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

// Class definition
class Cube {
private:
    float length, width, depth; // Data members for dimensions of the cuboid

public:
    // Function to accept dimensions of the cuboid
    void acceptDimensions() {
    cout << "Enter length: ";
    cin >> length;
    cout << "Enter width: ";
    cin >> width;
    cout << "Enter depth: ";
    cin >> depth;
    }

    // Function to calculate the volume of the cuboid
    float volume() {
    return length * width * depth;
    }

    // Function to display the volume of the cuboid
    void displayVolume() {
```

```
        cout << "The volume of the cuboid is: " << volume() << " cubic units." <<
endl;
        }
};

int main() {
        Cube cuboid; // Create an object of class Cube

        // Accept dimensions of the cuboid
        cuboid.acceptDimensions();

        // Display the calculated volume
        cuboid.displayVolume();

        return 0;
}
```

Output:-

5. Write a C++ program to prepare a marksheet for 3 subjects using a class. The program should include functions to calculate the total marks, average marks, and grade. Use nesting of member functions to ensure that each calculation depends on the previous one. Specifically, implement the following:
Class Marksheet with:
o Private data members:
int marks[3]: an array to store marks for 3 subjects.
int total: to store the total marks.float average: to store the average marks.
char grade: to store the grade.
Public Member Functions:
o void accept(): Accepts marks for the 3 subjects from the user and initiates the nested function calls.
ovoid calculateTotal(): Calculates the total marks.
ovoid calculateAverage(): Calls calculateTotal() and then calculates

the average marks.
ovoid calculateGrade(): Calls calculateAverage() and then determines the grade based on the average marks.
o void display(): Displays the marks, total, average, and grade.

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

// Class definition
class Marksheet {
private:
        int marks[3];// Array to store marks for 3 subjects
        int total;       // To store total marks
        float average;   // To store average marks
        char grade;          // To store grade

public:
        // Function to accept marks from the user and initiate nested function calls
        void accept() {
        cout << "Enter marks for 3 subjects: " << endl;
        for (int i = 0; i < 3; ++i) {
        cout << "Subject " << (i + 1) << ": ";
        cin >> marks[i];
        }
        // Initiating nested function calls
        calculateGrade();
        }

        // Function to calculate total marks
        void calculateTotal() {
        total = 0;
        for (int i = 0; i < 3; ++i) {
        total += marks[i];
        }
        }
```

```
        // Function to calculate average marks, calls calculateTotal() first
        void calculateAverage() {
        calculateTotal(); // Nested call to calculateTotal()
        average = static_cast<float>(total) / 3;
        }

        // Function to calculate grade, calls calculateAverage() first
        void calculateGrade() {
        calculateAverage(); // Nested call to calculateAverage()
        if (average >= 90)
        grade = 'A';
        else if (average >= 75)
        grade = 'B';
        else if (average >= 50)
        grade = 'C';
        else
        grade = 'F';
        }

        // Function to display the marksheet details
        void display() {
        cout << "\nMarksheet: " << endl;
        for (int i = 0; i < 3; ++i) {
        cout << "Marks for subject " << (i + 1) << ": " << marks[i] << endl;
        }
        cout << "Total Marks: " << total << endl;
        cout << "Average Marks: " << average << endl;
        cout << "Grade: " << grade << endl;
        }
};

int main() {
        Marksheet student;  // Create an object of class Marksheet

        // Accept marks and display the marksheet
        student.accept();
        student.display();
```

```
        return 0;
}
```

Output:-