1. Suppose you want to create a program that manages a library, where each book has the following

information: title, author, subject, and book ID. Write a C++ program using structures that

allows a user to add a new book to the library and display the details of all the books in the library.

Code:

```
#include <iostream>

using namespace std;

int MAX_BOOKS = 100;

struct Book {
   string title;
   string author;
   string subject;
   int bookID;
};

int main() {
   Book library[MAX_BOOKS];
   int numBooks = 0;
   while (true) {
      cout << "Library Management System" << endl;
      cout << "1. Add a new book" << endl;
      cout << "2. Display all books" << endl;
      cout << "3. Exit" << endl;
      cout << "Enter your choice: ";
      int choice;
      cin >> choice;


      if (choice == 1) {
```

```
    if (numBooks < MAX_BOOKS) {
        Book newBook;
        cout << "Enter book title: ";
       cin >> newBook.title;
        cout << "Enter author: ";
        cin >> newBook.author;
        cout << "Enter subject: ";
        cin >> newBook.subject;
        cout << "Enter book ID: ";
        cin >> newBook.bookID;
        library[numBooks] = newBook; // Add the new book to the library

        cout << "Book added to the library." << endl;
    } else {
        cout << "Library is full. Cannot add more books." << endl;
    }
} else if (choice == 2) {
    if (numBooks == 0) {
        cout << "The library is empty." << endl;
    } else {
        cout << "Library Books:" << endl;
        for (int i = 0; i < numBooks; i++) {
            cout << "Title: " << library[i].title << endl;
            cout << "Author: " << library[i].author << endl;
            cout << "Subject: " << library[i].subject << endl;
            cout << "Book ID: " << library[i].bookID << endl;
            ;
```

```
            }
        }
    } else if (choice == 3) {
        cout << "Exiting the program. Thank you" << endl;
        break;
    } else {
        cout << "Invalid choice. Please try again." << endl;
    }
}

return 0;
}
```

2. Design a structure called 'Student' with the following members: name, roll number, and marks in 3 subjects.

Write a C++ program to read and display the information of n students, where the value of n is provided by the

user. Additionally, compute the total marks and average marks of each student and display this information as well.

Code:

```
#include <iostream>
using namespace std;
struct Student {
    string name;
    int rollNumber;
    int marks[3];
    int totalMarks;
    float averageMarks;
```

```
};
int main() {
    int n;
    cout << "Enter the number of students: ";
    cin >> n;
    Student students[n];
    for (int i = 0; i < n; i++) {
        cout << "Enter information for Student  :" << endl;
        cout << "Name: ";
        cin >> students[i].name;
        cout << "Roll Number: ";
        cin >> students[i].rollNumber;
        students[i].totalMarks = 0;
        for (int j = 0; j < 3; j++) {
            cout << "Enter marks for Subject : ";
            cin >> students[i].marks[j];
            students[i].totalMarks += students[i].marks[j];
        }
        students[i].averageMarks = students[i].totalMarks / 3.0;
    }
    for (int i = 0; i < n; i++) {
        cout << "Information for Student :" << endl;
        cout << "Name: " << students[i].name << endl;
        cout << "Roll Number: " << students[i].rollNumber << endl;

        cout << "Marks in 3 Subjects: ";
        for (int j = 0; j < 3; j++) {
```

```
            cout << students[i].marks[j];
        }
        cout << endl;
        cout << "Total Marks: " << students[i].totalMarks << endl;
        cout << "Average Marks: " << students[i].averageMarks << endl;

    }
    return 0;
}
```