LAB SESSION 11

Question 1: Composition

Create a Book class that has title, author, and a Date object for the publication date. Implement a method to display the book details.

Code:

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

int startlab11()
{
    cout << "Name: Saad Ali Khan(SE-23083)" << endl;
    cout << "Start of Lab 11" << endl;
    return 0;
}
class Date
{
public:
    int day, month, year;

    Date(int d, int m, int y) : day(d), month(m), year(y) {}
};

class Book
{
private:
    string title;
    string author;
    Date publicationDate;

public:
    Book(const string &t, const string &a, const Date &d) : title(t), author(a),
publicationDate(d) {}

    void display() const
    {
        cout << "Title: " << title << "\nAuthor: " << author
             << "\nPublication Date: " << publicationDate.day << "/"
             << publicationDate.month << "/" << publicationDate.year << endl;
    }
};

int l11q1()
```

```
{
    Date date(15, 7, 2021);
    Book book("The Great Gatsby", "F. Scott Fitzgerald", date);
    book.display();
    return 0;
    return 0;
}

int main()
{
    startlab11();
    l11q1();
    return 0;
}
```

Output:

```
Name: Saad Ali Khan(SE-23083)
Start of Lab 11
Title: The Great Gatsby
Author: F. Scott Fitzgerald
Publication Date: 15/7/2021
PS D:\SE\oops_labs>
```

Question 2: Aggregation

Create a Library class that can hold multiple Book objects. Implement methods to add books and display all books in the library.

Code:

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

int startlab11()
{
    cout << "Name: Saad Ali Khan(SE-23083)" << endl;
    cout << "Lab 11" << endl;
    return 0;
}
class Date
```

```
{
public:
    int day, month, year;

    Date(int d, int m, int y) : day(d), month(m), year(y) {}
};

class Book
{
private:
    string title;
    string author;
    Date publicationDate;

public:
    Book(const string &t, const string &a, const Date &d) : title(t), author(a),
publicationDate(d) {}

    void display() const
    {
        cout << "Title: " << title << "\nAuthor: " << author
             << "\nPublication Date: " << publicationDate.day << "/"
             << publicationDate.month << "/" << publicationDate.year << endl;
    }
};

class Library
{
private:
    vector<Book> books;

public:
    void addBook(const Book &book)
    {
        books.push_back(book);
    }

    void displayBooks() const
    {
        for (const auto &book : books)
        {
            book.display();
            cout << endl;
        }
    }
```

```
};

int l11q2()
{
    Library library;
    Date date1(15, 7, 2021);
    Book book1("The Great Gatsby", "F. Scott Fitzgerald", date1);
    Date date2(1, 1, 2000);
    Book book2("Harry Potter and the Philosopher's Stone", "J.K. Rowling",
date2);

    library.addBook(book1);
    library.addBook(book2);

    library.displayBooks();
    return 0;
    return 0;
}

int main()
{
    startlab11();
    l11q2();
    return 0;
}
```

Output:

```
Name: Saad Ali Khan(SE-23083)
Lab 11
Title: The Great Gatsby
Author: F. Scott Fitzgerald
Publication Date: 15/7/2021

Title: Harry Potter and the Philosopher's Stone
Author: J.K. Rowling
Publication Date: 1/1/2000

PS D:\SE\oops_labs>
```

Question 3: Composition with push_back

Create a Playlist class that contains a collection of Song objects. Each Song object should have a title, artist, and duration. Implement methods to add songs and display the playlist.

Code:

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

int startlab11()
{
    cout << "Name: Saad Ali Khan(SE-23083)" << endl;
    cout << "Lab 11" << endl;
    return 0;
}
class Song
{
private:
    string title;
    string artist;
    int duration; // duration in seconds

public:
    Song(const string &t, const string &a, int d) : title(t), artist(a),
duration(d) {}

    void display() const
    {
        cout << "Title: " << title << "\nArtist: " << artist << "\nDuration: " <<
duration << " seconds" << endl;
    }
};

class Playlist
{
private:
    vector<Song> songs;

public:
    void addSong(const Song &song)
    {
        songs.push_back(song);
    }
```

```
    void displayPlaylist() const
    {
        for (const auto &song : songs)
        {
            song.display();
            cout << endl;
        }
    }
};

int l11q3()
{
    Playlist playlist;
    Song song1("Shape of You", "Ed Sheeran", 263);
    Song song2("Blinding Lights", "The Weeknd", 200);

    playlist.addSong(song1);
    playlist.addSong(song2);

    playlist.displayPlaylist();
    return 0;
}

int main()
{
    startlab11();
    l11q3();
    return 0;
}
```

Output:

```
Name: Saad Ali Khan(SE-23083)
Lab 11
Title: Shape of You
Artist: Ed Sheeran
Duration: 263 seconds

Title: Blinding Lights
Artist: The Weeknd
Duration: 200 seconds

PS D:\SE\oops_labs>
```