Lab Assignment 05

Course Code:	CSE111
Course Title:	Programming Language II
Topic:	Multi-class Design
Number of Tasks:	10 (Classwork: 05, Homework: 05)

CLASSWORK

After YouTube Music, Spotify has decided to redesign their Playlist system. However, they decided to **not use arrays** to store their music, instead, they will use OOP concepts to create the new Playlist system. You have been assigned to build the system by using 3 classes (**Song**, **Playlist,** and **SpotifyTester**).

Each song will have the *name of the song*, *artist name*, *length of the song in minutes* and *the next song*. Each playlist will have a *name* and the *first* song. Playlists can contain multiple songs. Both classes will have some features which will be demonstrated in each task.

[You are not allowed to use Array or any built-in libraries for this assignment]

Task 1

Design the **Song** class with *constructor* and *songInfo()* method along with necessary attributes in such a way that it produces the following output.

Driver Code	Output
```java public class SpotifyTester { public static void main(String[] args) { Song s1 = new Song("Song-A", "Artist-A", 3); System.out.println("1=========="); s1.songInfo(); System.out.println("2=========="); // More lines will be added in this Tester class ```	```1========== Title: Song-A, Artist: Artist-A Length: 3 minutes 2==========```

Task 2

Design the **Playlist** class *constructor* along with necessary attributes in such a way that it produces the following output.

Driver Code	Output
``` System.out.println("2=========="); // Continuation from Task 1 Playlist p1 = new Playlist("First Playlist"); System.out.println("3=========="); ```	```2========== First Playlist created. 3==========```

Task 3

Create *info()* method inside the **Playlist** class to produce the following output.

Driver Code	Output

<pre>   System.out.println("3==========");
// Continuation from Task 2
    p1.info();
    System.out.println("4==========");
    p1.start = s1;
    p1.info();
    System.out.println("5==========");
    Song s2 = new Song("Song-B", "Artist-B", 4);
    Song s3 = new Song("Song-C", "Artist-C", 2);
    p1.start.next = s2;
    p1.start.next.next = s3;
    p1.info();
    System.out.println("6==========");</pre>
	<pre>3==========
	First Playlist has the following
	songs:
	No songs in First Playlist.
	4==========
	First Playlist has the following
	songs:
	Song-1
	Title: Song-A, Artist: Artist-A
	Length: 3 minutes
	5==========
	First Playlist has the following
	songs:
	Song-1
	Title: Song-A, Artist: Artist-A
	Length: 3 minutes
	Song-2
	Title: Song-B, Artist: Artist-B
	Length: 4 minutes
	Song-3
	Title: Song-C, Artist: Artist-C
	Length: 2 minutes
	6==========</pre>

Task 4

Create *addSong()* method inside the **Playlist** class to produce the following output.

Driver Code	Output

``
    System.out.println("6==========");
// Continuation from Task 3
    Song s4 = new Song("Song-D","Artist-D",3);
    Song s5 = new Song("Song-E","Artist-E",4);
    p1.addSong(s4);
    p1.addSong(s5);
    System.out.println("7==========");
    p1.info();
    System.out.println("8==========");
``
	``
	6==========
	Song-D added to First Playlist.
	Song-E added to First Playlist.
	7==========
	First Playlist has the following
	songs:
	Song-1
	Title: Song-A, Artist: Artist-A
	Length: 3 minutes
	Song-2
	Title: Song-B, Artist: Artist-B
	Length: 4 minutes
	Song-3
	Title: Song-C, Artist: Artist-C
	Length: 2 minutes
	Song-4
	Title: Song-D, Artist: Artist-D
	Length: 3 minutes
	Song-5
	Title: Song-E, Artist: Artist-E
	Length: 4 minutes
	8==========
	``

Task 5

Create *addSong()* [overloaded] method inside the **Playlist** class to produce the following output.

Driver Code	Output

``java
    System.out.println("8===========");
// Continuation from Task 4
    Song s6 = new Song("Song-F", "Artist-F", 2);
    Song s7 = new Song("Song-G", "Artist-G", 2);
    Song s8 = new Song("Song-H", "Artist-H", 4);
    Song s9 = new Song("Song-I", "Artist-I", 3);
    p1.addSong(s6, false);
    p1.addSong(s7, true);
    p1.addSong(s8, false);
    p1.addSong(s9, false);
    System.out.println("9===========");
    p1.info();
    System.out.println("10=========");
``
	``
	8===========
	Song-F added to First Playlist.
	Song-G added to First Playlist.
	Song-H added to First Playlist.
	Song-I added to First Playlist.
	9===========
	First Playlist has the following songs:
	Song-1
	Title: Song-G, Artist: Artist-G
	Length: 2 minutes
	Song-2
	Title: Song-A, Artist: Artist-A
	Length: 3 minutes
	Song-3
	Title: Song-B, Artist: Artist-B
	Length: 4 minutes
	Song-4
	Title: Song-C, Artist: Artist-C
	Length: 2 minutes
	Song-5
	Title: Song-D, Artist: Artist-D
	Length: 3 minutes
	Song-6
	Title: Song-E, Artist: Artist-E
	Length: 4 minutes
	Song-7
	Title: Song-F, Artist: Artist-F
	Length: 2 minutes
	Song-8
	Title: Song-H, Artist: Artist-H
	Length: 4 minutes
	Song-9
	Title: Song-I, Artist: Artist-I
	Length: 3 minutes
	10=========
	``

HOMEWORK

Task 6

Create *playSong()* method inside the **Playlist** class to produce the following output.

Driver Code	Output
``System.out.println("10=========");
//   Continuation from Task 5
p1.playSong("Song-F");
p1.playSong("Song-Z");
p1.playSong("Song-B");
System.out.println("11=========");```	```10==========
Playing Song-F by Artist-F.
Song-Z not found in First Playlist.
Playing Song-B by Artist-B.
11==========```

Task 7

Create the *playSong()* [overloaded] method inside the **Playlist** class to produce the following output.

Driver Code	Output
``System.out.println("11=========");
// Continuation from Task 6
p1.playSong(0);
p1.playSong(4);
p1.playSong(10);
System.out.println("12=========");```	```11==========
Playing Song-G by Artist-G.
Playing Song-D by Artist-D.
Song at Index 10 not found in First
Playlist.
12==========```

Task 8

Create the *deleteSong()* method and its overloaded version inside the **Playlist** class to produce the following output.

Driver Code	Output
```System.out.println("12=========");p1.deleteSong();p1.deleteSong();p1.deleteSong(false);p1.deleteSong(true);System.out.println("13=========");p1.info();System.out.println("14=========");```	```12=========Song-I deleted from First PlaylistSong-H deleted from First PlaylistSong-F deleted from First PlaylistFirst Song Deleted!13=========First Playlist has the following songs:Song-1Title: Song-A, Artist: Artist-ALength: 3 minutesSong-2Title: Song-B, Artist: Artist-BLength: 4 minutesSong-3Title: Song-C, Artist: Artist-CLength: 2 minutesSong-4Title: Song-D, Artist: Artist-DLength: 3 minutesSong-5Title: Song-E, Artist: Artist-ELength: 4 minutes14=========```

Task 9

Create the *totalSong()* method inside the **Playlist** class to produce the following output.

Driver Code	Output
```System.out.println("14=========");// Continuation from Task 8System.out.println(p1.name +" has "+p1.totalSong()+" songs");System.out.println("15=========");```	```14=========First Playlist has 5 songs15=========```

Task 10

Create the *merge()* method inside the **Playlist** class to produce the following output.

Driver Code	Output

```System.out.println("15=========");```
 `// Continuation from Task 9`
 `Song ns1 = new Song("Song-Z", "Artist-Z", 3);`
 `Song ns2 = new Song("Song-Y", "Artist-Y", 4);`
 `Song ns3 = new Song("Song-X", "Artist-X", 2);`
 `System.out.println("16=========");`
 `Playlist p2 = new Playlist("Second Playlist");`
 `p2.addSong(ns1);`
 `p2.addSong(ns2);`
 `p2.addSong(ns3);`
 `System.out.println("17=========");`
 `p1.info();`
 `System.out.println("18=========");`
 `p2.info();`
 `System.out.println("19=========");`
 `p1.merge(p2);`
 `System.out.println("20=========");`
 `p1.info();`
 `System.out.println("21=========");`
	```15==========```
	 `16==========`
	 `Second Playlist created.`
	 `Song-Z added to Second Playlist.`
	 `Song-Y added to Second Playlist.`
	 `Song-X added to Second Playlist.`
	 `17==========`
	 `First Playlist has the following`
	 `songs:`
	 `Song-1`
	 `Title: Song-A,  Artist: Artist-A`
	 `Length: 3 minutes`
	 `Song-2`
	 `Title: Song-B,  Artist: Artist-B`
	 `Length: 4 minutes`
	 `Song-3`
	 `Title: Song-C,  Artist: Artist-C`
	 `Length: 2 minutes`
	 `Song-4`
	 `Title: Song-D,  Artist: Artist-D`
	 `Length: 3 minutes`
	 `Song-5`
	 `Title: Song-E,  Artist: Artist-E`
	 `Length: 4 minutes`
	 `18==========`
	 `Second Playlist has the following`
	 `songs:`
	 `Song-1`
	 `Title: Song-Z,  Artist: Artist-Z`
	 `Length: 3 minutes`
	 `Song-2`
	 `Title: Song-Y,  Artist: Artist-Y`
	 `Length: 4 minutes`
	 `Song-3`
	 `Title: Song-X,  Artist: Artist-X`
	 `Length: 2 minutes`
	 `19==========`
	 `Merge Completed!`
	 `20==========`
	 `First Playlist has the following`
	 `songs:`
	 `Song-1`
	 `Title: Song-A,  Artist: Artist-A`

| | ```
Length: 3 minutes
Song-2
Title: Song-B,  Artist: Artist-B
Length: 4 minutes
Song-3
Title: Song-C,  Artist: Artist-C
Length: 2 minutes
Song-4
Title: Song-D,  Artist: Artist-D
Length: 3 minutes
Song-5
Title: Song-E,  Artist: Artist-E
Length: 4 minutes
Song-6
Title: Song-Z,  Artist: Artist-Z
Length: 3 minutes
Song-7
Title: Song-Y,  Artist: Artist-Y
Length: 4 minutes
Song-8
Title: Song-X,  Artist: Artist-X
Length: 2 minutes
21=========
``` |

Task 11

Create the *showHistory()* method inside the **Playlist** class to produce the following output.
[Hint: showHistory() only shows the songs which were played from the playlist. So you might need to update the method which is used to play Songs.]

Driver Code	Output

<pre>   System.out.println("21=========");
//   Continuation from Task 10
   p1.showHistory();
   System.out.println("22=========");
   p2.showHistory();
   System.out.println("23=========");
 }
}</pre>
	<pre>21==========
	History of First Playlist:
	Title: Song-F, Artist: Artist-F
	Length: 2 minutes
	Title: Song-B, Artist: Artist-B
	Length: 4 minutes
	Title: Song-G, Artist: Artist-G
	Length: 2 minutes
	Title: Song-D, Artist: Artist-D
	Length: 3 minutes
	22==========
	History of Second Playlist:
	No songs played in Second Playlist.
	23==========</pre>

Complete driver code and expected output:

Driver Code	Output
| ```java
public class SpotifyTester {
  public static void main(String[] args) {
    Song s1 = new Song("Song-A", "Artist-A", 3);
    System.out.println("1==========");
    s1.songInfo();
    System.out.println("2==========");
    Playlist p1 = new Playlist("First Playlist");
    System.out.println("3==========");
    p1.info();
    System.out.println("4==========");
    p1.start = s1;
    p1.info();
    System.out.println("5==========");
    Song s2 = new Song("Song-B", "Artist-B", 4);
    Song s3 = new Song("Song-C", "Artist-C", 2);
    p1.start.next = s2;
    p1.start.next.next = s3;
    p1.info();
    System.out.println("6==========");
    Song s4 = new Song("Song-D",  "Artist-D", 3);
    Song s5 = new Song("Song-E", "Artist-E", 4);
    p1.addSong(s4);
    p1.addSong(s5);
    System.out.println("7==========");
    p1.info();
    System.out.println("8==========");
    Song s6 = new Song("Song-F", "Artist-F", 2);
    Song s7 = new Song("Song-G", "Artist-G", 2);
    Song s8 = new Song("Song-H", "Artist-H", 4);
    Song s9 = new Song("Song-I", "Artist-I", 3);
    p1.addSong(s6, false);
    p1.addSong(s7, true);
    p1.addSong(s8, false);
    p1.addSong(s9, false);
    System.out.println("9==========");
    p1.info();
    System.out.println("10=========");
    p1.playSong("Song-F");
    p1.playSong("Song-Z");
    p1.playSong("Song-B");
    System.out.println("11=========");
    p1.playSong(0);
``` | ```
1==========
Title: Song-A,  Artist: Artist-A
Length: 3 minutes
2==========
First Playlist created.
3==========
First Playlist has the following songs:
No songs in First Playlist.
4==========
First Playlist has the following songs:
Song-1
Title: Song-A,  Artist: Artist-A
Length: 3 minutes
5==========
First Playlist has the following songs:
Song-1
Title: Song-A,  Artist: Artist-A
Length: 3 minutes
Song-2
Title: Song-B,  Artist: Artist-B
Length: 4 minutes
Song-3
Title: Song-C,  Artist: Artist-C
Length: 2 minutes
6==========
Song-D added to First Playlist.
Song-E added to First Playlist.
7==========
First Playlist has the following songs:
Song-1
Title: Song-A,  Artist: Artist-A
Length: 3 minutes
Song-2
Title: Song-B,  Artist: Artist-B
Length: 4 minutes
Song-3
Title: Song-C,  Artist: Artist-C
Length: 2 minutes
Song-4
``` |

```
      p1.playSong(4);
      p1.playSong(10);
    System.out.println("12=========");
    p1.deleteSong();
    p1.deleteSong();
    p1.deleteSong(false);
    p1.deleteSong(true);
    System.out.println("13=========");
    p1.info();
    System.out.println("14=========");
     System.out.println(p1.name +" has
"+p1.totalSong() +" songs");
    Song ns1 = new Song("Song-Z", "Artist-Z", 3);
    Song ns2 = new Song("Song-Y", "Artist-Y", 4);
    Song ns3 = new Song("Song-X", "Artist-X", 2);
    System.out.println("16=========");
    Playlist p2 = new Playlist("Second Playlist");
    p2.addSong(ns1);
    p2.addSong(ns2);
    p2.addSong(ns3);
    System.out.println("17=========");
    p1.info();
    System.out.println("18=========");
    p2.info();
    System.out.println("19=========");
    p1.merge(p2);
    System.out.println("20=========");
    p1.info();
    System.out.println("21=========");
     //Ungraded Task
    p1.showHistory();
    System.out.println("22=========");
    p2.showHistory();
    System.out.println("23=========");
  }
}
```

```
Title: Song-D,  Artist: Artist-D
Length: 3 minutes
Song-5
Title: Song-E,  Artist: Artist-E
Length: 4 minutes
8==========
Song-F added to First Playlist.
Song-G added to First Playlist.
Song-H added to First Playlist.
Song-I added to First Playlist.
9==========
First Playlist has the following songs:
Song-1
Title: Song-G,  Artist: Artist-G
Length: 2 minutes
Song-2
Title: Song-A,  Artist: Artist-A
Length: 3 minutes
Song-3
Title: Song-B,  Artist: Artist-B
Length: 4 minutes
Song-4
Title: Song-C,  Artist: Artist-C
Length: 2 minutes
Song-5
Title: Song-D,  Artist: Artist-D
Length: 3 minutes
Song-6
Title: Song-E,  Artist: Artist-E
Length: 4 minutes
Song-7
Title: Song-F,  Artist: Artist-F
Length: 2 minutes
Song-8
Title: Song-H,  Artist: Artist-H
Length: 4 minutes
Song-9
Title: Song-I,  Artist: Artist-I
Length: 3 minutes
10=========
Playing Song-F by Artist-F.
Song-Z not found in First Playlist.
```

```
Playing Song-B by Artist-B.
11=========
Playing Song-G by Artist-G.
Playing Song-D by Artist-D.
Song at Index 10 not found in First
Playlist.
12=========
Song-I deleted from First Playlist
Song-H deleted from First Playlist
Song-F deleted from First Playlist
First Song Deleted!
13=========
First Playlist has the following songs:
Song-1
Title: Song-A,  Artist: Artist-A
Length: 3 minutes
Song-2
Title: Song-B,  Artist: Artist-B
Length: 4 minutes
Song-3
Title: Song-C,  Artist: Artist-C
Length: 2 minutes
Song-4
Title: Song-D,  Artist: Artist-D
Length: 3 minutes
Song-5
Title: Song-E,  Artist: Artist-E
Length: 4 minutes
14=========
First Playlist has 5 songs
16=========
Second Playlist created.
Song-Z added to Second Playlist.
Song-Y added to Second Playlist.
Song-X added to Second Playlist.
17=========
First Playlist has the following songs:
Song-1
Title: Song-A,  Artist: Artist-A
Length: 3 minutes
Song-2
Title: Song-B,  Artist: Artist-B
```

```
                                        Length: 4 minutes
                                        Song-3
                                        Title: Song-C,  Artist: Artist-C
                                        Length: 2 minutes
                                        Song-4
                                        Title: Song-D,  Artist: Artist-D
                                        Length: 3 minutes
                                        Song-5
                                        Title: Song-E,  Artist: Artist-E
                                        Length: 4 minutes
                                        18==========
                                        Second Playlist has the following songs:
                                        Song-1
                                        Title: Song-Z,  Artist: Artist-Z
                                        Length: 3 minutes
                                        Song-2
                                        Title: Song-Y,  Artist: Artist-Y
                                        Length: 4 minutes
                                        Song-3
                                        Title: Song-X,  Artist: Artist-X
                                        Length: 2 minutes
                                        19==========
                                        Merge Completed!
                                        20==========
                                        First Playlist has the following songs:
                                        Song-1
                                        Title: Song-A,  Artist: Artist-A
                                        Length: 3 minutes
                                        Song-2
                                        Title: Song-B,  Artist: Artist-B
                                        Length: 4 minutes
                                        Song-3
                                        Title: Song-C,  Artist: Artist-C
                                        Length: 2 minutes
                                        Song-4
                                        Title: Song-D,  Artist: Artist-D
                                        Length: 3 minutes
                                        Song-5
                                        Title: Song-E,  Artist: Artist-E
                                        Length: 4 minutes
                                        Song-6
                                        Title: Song-Z,  Artist: Artist-Z
```

	Length: 3 minutes Song-7 Title: Song-Y, Artist: Artist-Y Length: 4 minutes Song-8 Title: Song-X, Artist: Artist-X Length: 2 minutes 21========= History of First Playlist: Title: Song-F, Artist: Artist-F Length: 2 minutes Title: Song-B, Artist: Artist-B Length: 4 minutes Title: Song-G, Artist: Artist-G Length: 2 minutes Title: Song-D, Artist: Artist-D Length: 3 minutes 22========= History of Second Playlist: No songs played in Second Playlist. 23=========