

Lab Assignment 05



Inspiring Excellence

Course Code:	CSE111
Course Title:	Programming Language II
Topic:	Multi-class Design
Number of Tasks:	10

[You are not allowed to change the driver codes of any of the tasks]

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 it 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
<pre>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 } }</pre>	<pre>1===== Title: Song-A Artist: Artist-A Length: 3 minutes 2=====</pre>

Task 2

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

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

Task 3 & 4

Create *addSong()* method and *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.addSong(s1); System.out.println("5====="); p1.info(); System.out.println("6====="); Song s2 = new Song("Song-B", "Artist-B", 4); Song s3 = new Song("Song-C", "Artist-C", 2); p1.addSong(s2); p1.addSong(s3); System.out.println("7====="); p1.info(); System.out.println("8=====");</pre>	<pre>3===== First Playlist has the following songs: No songs in First Playlist. 4===== Song-A added to First Playlist. 5===== First Playlist has the following songs: Song-1 Title: Song-A Artist: Artist-A Length: 3 minutes 6===== Song-B added to First Playlist. Song-C 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 8=====</pre>

Task 5

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

Driver Code	Output
<pre>System.out.println("8====="); // Continuation from Task 3&4 Song s4 = new Song("Song-D", "Artist-D", 3); Song s5 = new Song("Song-E", "Artist-E", 4); Song s6 = new Song("Song-F", "Artist-F", 2); Song s7 = new Song("Song-G", "Artist-G", 2); p1.addSong(s4, 0); p1.addSong(s5, 2); p1.addSong(s6, 5); p1.addSong(s7, 10); System.out.println("9====="); p1.info(); System.out.println("10=====");</pre>	<pre>8===== Song-D added to First Playlist. Song-E added to First Playlist. Song-F added to First Playlist. Cannot add song to Index 10. 9===== First Playlist has the following songs: Song-1 Title: Song-D Artist: Artist-D Length: 3 minutes Song-2 Title: Song-A Artist: Artist-A Length: 3 minutes Song-3 Title: Song-E Artist: Artist-E Length: 4 minutes Song-4 Title: Song-B Artist: Artist-B Length: 4 minutes Song-5 Title: Song-C Artist: Artist-C Length: 2 minutes Song-6 Title: Song-F Artist: Artist-F Length: 2 minutes 10=====</pre>

Task 6

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

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

Task 7

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

Driver Code	Output
<pre>System.out.println("11====="); // Continuation from Task 6 p1.playSong(0); p1.playSong(4); p1.playSong(8); System.out.println("12=====");</pre>	<pre>11===== Playing Song-D by Artist-D. Playing Song-C by Artist-C. Song at Index 8 not found in First Playlist. 12=====</pre>

Task 8

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

Driver Code	Output
<pre>System.out.println("12====="); // Continuation from Task 7 p1.deleteSong("Song-D"); p1.deleteSong("Song-B"); p1.deleteSong("Song-F"); p1.deleteSong("Song-K"); System.out.println("13====="); p1.info(); System.out.println("14=====");</pre>	<pre>12===== Song-D deleted from First Playlist. Song-B deleted from First Playlist. Song-F deleted from First Playlist. Song-K not found in First Playlist. 13===== First Playlist has the following songs: Song-1 Title: Song-A Artist: Artist-A Length: 3 minutes Song-2 Title: Song-E Artist: Artist-E Length: 4 minutes Song-3 Title: Song-C Artist: Artist-C Length: 2 minutes 14=====</pre>

Task 9

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

Driver Code	Output
<pre>System.out.println("14====="); // Continuation from Task 8 System.out.println(p1.name + " has "+p1.totalSong() +" songs"); System.out.println("15=====");</pre>	<pre>14===== First Playlist has 3 songs 15=====</pre>

Task 10

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

Driver Code	Output
<pre>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=====");</pre>	<pre>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-E Artist: Artist-E Length: 4 minutes Song-3 Title: Song-C Artist: Artist-C Length: 2 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</pre>

	Artist: Artist-A Length: 3 minutes Song-2 Title: Song-E Artist: Artist-E Length: 4 minutes Song-3 Title: Song-C Artist: Artist-C Length: 2 minutes Song-4 Title: Song-Z Artist: Artist-Z Length: 3 minutes Song-5 Title: Song-Y Artist: Artist-Y Length: 4 minutes Song-6 Title: Song-X Artist: Artist-X Length: 2 minutes 21=====
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Task 11 **Ungraded**

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-D Artist: Artist-D Length: 3 minutes Title: Song-C Artist: Artist-C Length: 2 minutes 22===== History of Second Playlist: No songs were played from Second Playlist. 23=====</pre>

Complete driver code and expected output:

Driver Code	Output
<pre>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.addSong(s1); System.out.println("5====="); p1.info(); System.out.println("6====="); Song s2 = new Song("Song-B", "Artist-B", 4); Song s3 = new Song("Song-C", "Artist-C", 2); p1.addSong(s2); p1.addSong(s3); System.out.println("7====="); p1.info(); System.out.println("8====="); Song s4 = new Song("Song-D", "Artist-D", 3); Song s5 = new Song("Song-E", "Artist-E", 4); Song s6 = new Song("Song-F", "Artist-F", 2); Song s7 = new Song("Song-G", "Artist-G", 2); p1.addSong(s4, 0); p1.addSong(s5, 2); p1.addSong(s6, 5); p1.addSong(s7, 10); System.out.println("9====="); p1.info(); System.out.println("10====="); p1.playSong("Song-F"); p1.playSong("Song-G"); p1.playSong("Song-B"); System.out.println("11====="); p1.playSong(0); p1.playSong(4); p1.playSong(8); System.out.println("12====="); p1.deleteSong("Song-D"); p1.deleteSong("Song-B"); p1.deleteSong("Song-F"); p1.deleteSong("Song-K"); } }</pre>	<pre>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===== Song-A added to First Playlist. 5===== First Playlist has the following songs: Song-1 Title: Song-A Artist: Artist-A Length: 3 minutes 6===== Song-B added to First Playlist. Song-C 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 8===== Song-D added to First Playlist. Song-E added to First Playlist. Song-F added to First Playlist. Cannot add song to Index 10.</pre>

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System.out.println("13=====");
p1.info();
System.out.println("14=====");
System.out.println(p1.name + " has " +
p1.totalSong() + " songs");
System.out.println("15=====");
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=====");
}
}

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9=====
First Playlist has the following songs:
Song-1
Title: Song-D
Artist: Artist-D
Length: 3 minutes
Song-2
Title: Song-A
Artist: Artist-A
Length: 3 minutes
Song-3
Title: Song-E
Artist: Artist-E
Length: 4 minutes
Song-4
Title: Song-B
Artist: Artist-B
Length: 4 minutes
Song-5
Title: Song-C
Artist: Artist-C
Length: 2 minutes
Song-6
Title: Song-F
Artist: Artist-F
Length: 2 minutes
10=====
Playing Song-F by Artist-F.
Song-G not found in playlist First
Playlist.
Playing Song-B by Artist-B.
11=====
Playing Song-D by Artist-D.
Playing Song-C by Artist-C.
Song at Index 8 not found in First
Playlist.
12=====
Song-D deleted from First Playlist.
Song-B deleted from First Playlist.
Song-F deleted from First Playlist.
Song-K not found in First Playlist.
13=====

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	<p>First Playlist has the following songs:</p> <p>Song-1 Title: Song-A Artist: Artist-A Length: 3 minutes</p> <p>Song-2 Title: Song-E Artist: Artist-E Length: 4 minutes</p> <p>Song-3 Title: Song-C Artist: Artist-C Length: 2 minutes</p> <p>14=====</p> <p>First Playlist has 3 songs</p> <p>15=====</p> <p>16=====</p> <p>Second Playlist created. Song-Z added to Second Playlist. Song-Y added to Second Playlist. Song-X added to Second Playlist.</p> <p>17=====</p> <p>First Playlist has the following songs:</p> <p>Song-1 Title: Song-A Artist: Artist-A Length: 3 minutes</p> <p>Song-2 Title: Song-E Artist: Artist-E Length: 4 minutes</p> <p>Song-3 Title: Song-C Artist: Artist-C Length: 2 minutes</p> <p>18=====</p> <p>Second Playlist has the following songs:</p> <p>Song-1 Title: Song-Z Artist: Artist-Z Length: 3 minutes</p>
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	<p>Song-2 Title: Song-Y Artist: Artist-Y Length: 4 minutes</p> <p>Song-3 Title: Song-X Artist: Artist-X Length: 2 minutes</p> <p>19=====</p> <p>Merge Completed!</p> <p>20=====</p> <p>First Playlist has the following songs:</p> <p>Song-1 Title: Song-A Artist: Artist-A Length: 3 minutes</p> <p>Song-2 Title: Song-E Artist: Artist-E Length: 4 minutes</p> <p>Song-3 Title: Song-C Artist: Artist-C Length: 2 minutes</p> <p>Song-4 Title: Song-Z Artist: Artist-Z Length: 3 minutes</p> <p>Song-5 Title: Song-Y Artist: Artist-Y Length: 4 minutes</p> <p>Song-6 Title: Song-X Artist: Artist-X Length: 2 minutes</p> <p>21=====</p> <p>History of First Playlist:</p> <p>Title: Song-F Artist: Artist-F Length: 2 minutes</p> <p>Title: Song-B</p>
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	<div>Artist: Artist-B</div> <div>Length: 4 minutes</div> <div>Title: Song-D</div> <div>Artist: Artist-D</div> <div>Length: 3 minutes</div> <div>Title: Song-C</div> <div>Artist: Artist-C</div> <div>Length: 2 minutes</div> <div>22=====</div> <div>History of Second Playlist:</div> <div>No songs were played from Second Playlist.</div> <div>23=====</div>
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