Lab Assignment 05

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

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** |
| 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 & 4**

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

|  |  |
| --- | --- |
| **Driver Code** | **Output** |
| 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==========="); | 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=========== |

# 

# **Task 5**

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

|  |  |
| --- | --- |
| **Driver Code** | **Output** |
| 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=========="); | 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========== |

# 

# **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-G");  p1.playSong("Song-B");  System.out.println("11=========="); | 10==========  Playing Song-F by Artist-F.  Song-G not found in playlist 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(8);  System.out.println("12=========="); | 11==========  Playing Song-D by Artist-D.  Playing Song-C by Artist-C.  Song at Index 8 not found in First Playlist.  12========== |

# 

# 

# 

# 

# **Task 8**

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

|  |  |
| --- | --- |
| **Driver Code** | **Output** |
| 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=========="); | 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========== |

# **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 8  System.out.println(p1.name +" has "+p1.totalSong() +" songs");  System.out.println("15=========="); | 14==========  First Playlist has 3 songs  15========== |

# 

# **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-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  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========== |

# 

# **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** |
| System.out.println("21==========");  // Continuation from Task 10  p1.showHistory();  System.out.println("22==========");  p2.showHistory();  System.out.println("23==========");  }  } | 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========== |

Complete driver code and expected output:

|  |  |
| --- | --- |
| Driver Code | Output |
| 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");  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==========");  }  } | 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.  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==========  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==========  First Playlist has 3 songs  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  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==========  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========== |