

CS 284 Midterm

March 2022

1 Assignment

We want to recreate Spotify's music player. This means we should be able to add songs, remove songs as well as skip and go back to songs. In order to do this you will be using LinkedLists/Nodes to implement the said music player.

In `Spotify.java`, there is a `Music` class and a `Node` class, which describes a music object (contains the song name and the artist name) and a node object (contains a `Music` object and the pointer to the next `Node` in the linked list).

```
class Node {
    Music song;
    Node next;

    public Node(Music song) {
        this.song = song;
    }
    public Node() {
    }

    @Override
    public String toString() {
        if(song == null){
            return "";
        }
        return song.toString();
    }
}

public class Spotify {
    Node current;
    Node last;
```

Figure 1: Caption

In all functions you implement below, you will need to maintain two pointers

in `Spotify.java`:

- `current`: it should point to the **first node** in the linked list;
- `last`: it should point to the **last node** in the linked list;
- The next node for `last` is `current`. That is, at the end of all functions, **you need to make sure `last.next = current`**;

Lets talk about the specific parts of the music player.

1.1 Add multiple songs

Say we have some songs playing and we want to add a playlist to our current queue. What we will do is take a list of songs and add them to the end of our queue.

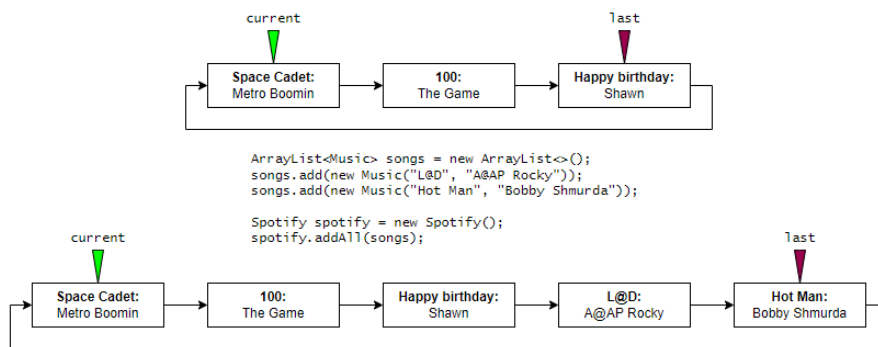


Figure 2: Add multiple songs

```
1 public void addAll(Collection<Music> listOfSongs)
```

1.2 Add or remove a song

If we want to add a song to the queue of song we shall add it to the end. If we want to remove a song we will remove the current playing song. The current song is the song in the 1st position in the queue.

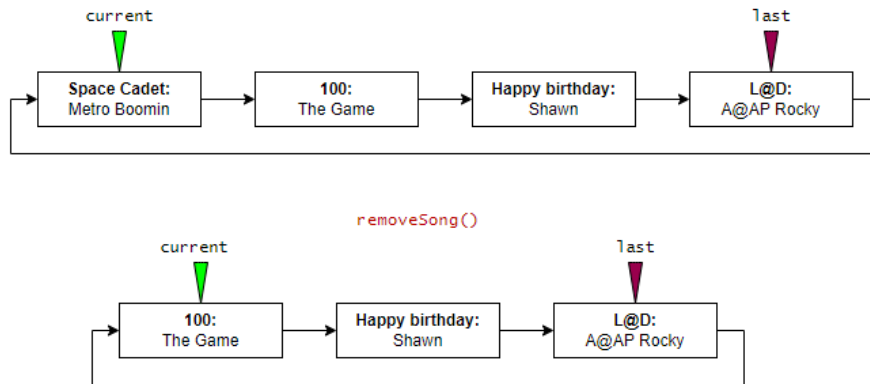


Figure 3: Remove Song

```
1 public void removeSong()
```

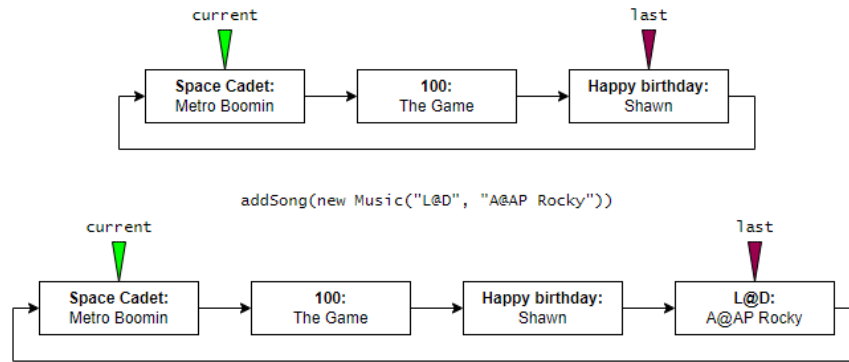


Figure 4: Add song

```
1 public void addSong(Music song)
```

1.3 Go to the next song

On our music player we want to skip the current song and move on the next song in the queue of songs. We want to go through the current queue of song and when we hit the end of the list we shall start over by going back to the start of the list. In other words we want an infinite loop of songs in queue.

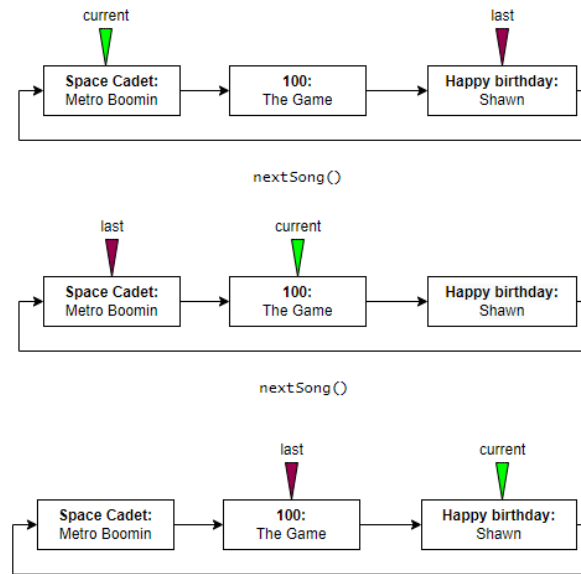


Figure 5: Next Song

```
1 public void nextSong()
```

1.4 Go to the prev song

On our music player we want to go back to the previous song and move back in the queue of songs. In the case where we run out of previous songs we start to rotate songs in the queue of songs as seen below.

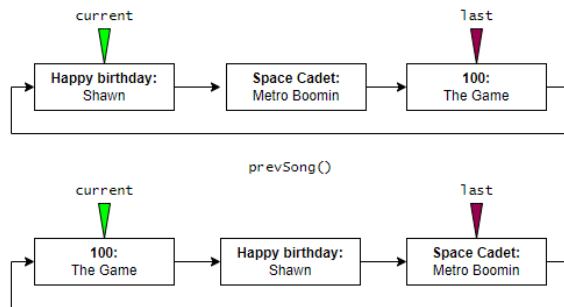


Figure 6: Previous Song

```
1 public void prevSong()
```

1.5 Get the current song at play

On our music player we want to get the current song. Get the current song at position 1.

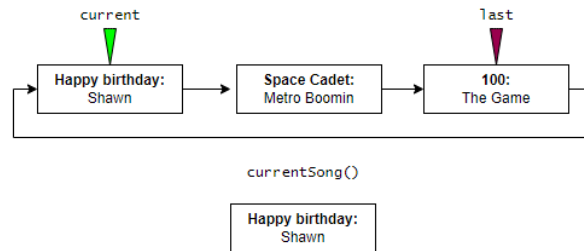


Figure 7: Current Song Example 1

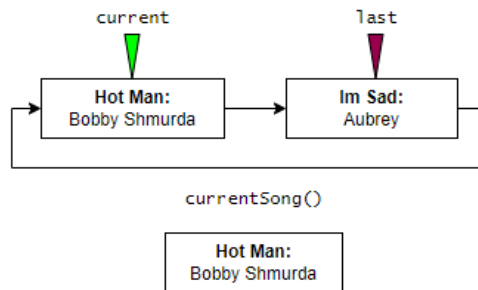


Figure 8: Current Song Example 2

```
1 public Music currentSong()
```

1.6 Edge Cases

You may assume that all the inputs will be valid. Though we will test for empty/null values. By this we mean if there are no songs in the queue of song what should happen when you get the current song or print the queue? In the case of getting the current song, you can return `null`. In the case of printing the queue of song, it is done for you. Please do not modify it.

```
1 =====[Current Queue]=====
2 no songs
```

1.7 Larger Test Case

```
1 No Songs
2 Current Song: null
3 =====[Current Queue]=====
4 no songs
5
6 Add Songs
7 =====[Current Queue]=====
8 1) Happy birthday      : shawn
9 2) Space Cadet         : Metro Boomin
10 3) 100                 : The Game
11 4) L@D                : A@AP Rocky
12 5) Hot Man            : Bobby Shmurda
13 6) Men in Paris       : Kanye East and Jay-Y
14 7) Im Sad             : Aubrey
15
16 Current Song: Happy birthday      : shawn
17 Go back: 3
18 =====[Current Queue]=====
19 1) Hot Man            : Bobby Shmurda
20 2) Men in Paris       : Kanye East and Jay-Y
21 3) Im Sad             : Aubrey
22 4) Happy birthday     : shawn
23 5) Space Cadet        : Metro Boomin
24 6) 100                : The Game
25 7) L@D               : A@AP Rocky
26
27 Go back: 4
28 =====[Current Queue]=====
29 1) Happy birthday     : shawn
30 2) Space Cadet        : Metro Boomin
31 3) 100                : The Game
32 4) L@D               : A@AP Rocky
33 5) Hot Man            : Bobby Shmurda
34 6) Men in Paris       : Kanye East and Jay-Y
35 7) Im Sad             : Aubrey
36
37 Go forward: 12
38 =====[Current Queue]=====
39 1) Men in Paris       : Kanye East and Jay-Y
40 2) Im Sad             : Aubrey
41 3) Happy birthday     : shawn
42 4) Space Cadet        : Metro Boomin
43 5) 100                : The Game
44 6) L@D               : A@AP Rocky
45 7) Hot Man            : Bobby Shmurda
46
47 Go back: 12
48 =====[Current Queue]=====
49 1) Happy birthday     : shawn
50 2) Space Cadet        : Metro Boomin
51 3) 100                : The Game
52 4) L@D               : A@AP Rocky
53 5) Hot Man            : Bobby Shmurda
54 6) Men in Paris       : Kanye East and Jay-Y
55 7) Im Sad             : Aubrey
```

```

56
57 Add songs
58 =====[Current Queue]=====
59 1) Happy birthday      : shawn
60 2) Space Cadet         : Metro Boomin
61 3) 100                  : The Game
62 4) L@D                 : A@AP Rocky
63 5) Hot Man              : Bobby Shmurda
64 6) Men in Paris        : Kanye East and Jay-Y
65 7) Im Sad              : Aubrey
66 8) Nikes On My Feet    : Mac Miller
67 9) Life Is Good        : Future
68 10) SICKO MODE          : Travis Scott
69
70 Go forward: 8
71 =====[Current Queue]=====
72 1) Life Is Good        : Future
73 2) SICKO MODE          : Travis Scott
74 3) Happy birthday      : shawn
75 4) Space Cadet         : Metro Boomin
76 5) 100                  : The Game
77 6) L@D                 : A@AP Rocky
78 7) Hot Man              : Bobby Shmurda
79 8) Men in Paris        : Kanye East and Jay-Y
80 9) Im Sad              : Aubrey
81 10) Nikes On My Feet    : Mac Miller
82
83 Current Song: Life Is Good      : Future
84 Go back: 15
85 =====[Current Queue]=====
86 1) L@D                 : A@AP Rocky
87 2) Hot Man              : Bobby Shmurda
88 3) Men in Paris        : Kanye East and Jay-Y
89 4) Im Sad              : Aubrey
90 5) Nikes On My Feet    : Mac Miller
91 6) Life Is Good        : Future
92 7) SICKO MODE          : Travis Scott
93 8) Happy birthday      : shawn
94 9) Space Cadet         : Metro Boomin
95 10) 100                 : The Game
96
97
98 Process finished with exit code 0

```