

COSC2436 hw2:

Smart Playlist Manager with Favorites

Problem Description

Implement a music playlist manager that helps users play their favorite songs within a time limit. If there's extra time after playing all possible favorite songs, the system should include non-favorite songs that fit within the remaining time.

Task 1: Implement the Basic Structure

Create a doubly linked list to store songs. Each song (structure) should have:

- Title
- Duration (in minutes)
- Favorite status (boolean)
- Next pointer
- Prev pointer

Create a class named 'Playlist' which manages all these songs (Doubly Linked List). This class should have the following functions:

1. AddSong(String title, int duration, bool fav_status): Adds the song structure to the end of the linked list.
2. PrintPlaylist(): Prints the playlist from the beginning to the end.
3. PrintReversedPlaylist(): Prints the playlist from the end to the beginning.
4. DeleteSong(String title): Deletes the song in the playlist with the Song title equal to the title given as the parameter.

Task 2: Implement Smart Song Selection

5. CreateSmartPlaylist(Integer time_limit): This function that finds the optimal sequence of songs within a time limit, prioritizing favorite songs. You should first try to include as many favorite songs as possible.
 - If you go through the whole list and there are no more favorite songs left, go back from the last favorite song added to the list and start adding normal songs. If there is still enough time left after adding all the normal songs from

before the last favorite song, start again from after the last favorite song. (See the example case and why we couldn't add the song 'Yesterday')

- If you can not add anymore favorite songs without exceeding the time_limit, then you should start adding normal songs from the last favorite song in the list until you are out of time again.

Example Case:

Input	Answer
AddSong(Happy, 3, True) AddSong(Let It Be, 3, False) AddSong(Hey Jude, 7, True) AddSong(Dancing Queen, 4, False) AddSong(Bohemian Rhapsody, 6, True) AddSong(Yesterday, 2, False) PrintPlaylist() DeleteSong(Dancing Queen) PrintReversedPlaylist() CreateSmartPlaylist(20)	[Happy, Let It Be, Hey Jude, Dancing Queen, Bohemian Rhapsody, Yesterday] [Yesterday, Bohemian Rhapsody, Hey Jude, Let It Be, Happy] [Happy, Hey Jude, Bohemian Rhapsody, Let It Be]

Happy, Hey Jude, and Bohemian Rhapsody have been added to the smart playlist with a total time of 16 minutes, meaning there is 4 minutes left. The next normal song starting from Bohemian Rhapsody going back is Let it Be (as Dancing Queen has been deleted). Now the total time is 19 minutes and the last normal song 'Yesterday' is 2 minutes, exceeding the time limit.

Turning it in:

Make sure to create a folder under your root directory, name it "hw2" (case sensitive), copy all your .cpp and .h file to this folder, "ArgumentManager.h" need to be included as well.

More information can be found here:

<https://uh.edu/nouhadrizk/about/courses/programming-and-data-structures/homework/>