

CSCI 2170 Open Lab 8 (Due: midnight, last day of class, Wednesday, December 2nd. No late program is accepted)

This program aims to write a C++ program that uses the pointer based *List class* to maintain the top songs in the past four years. First, your program reads from a data file named “topsongs.dat”. Each song in this data file is described by four information: (1) the rank of the song at the end of the year, (2) the name of the artist, (3) the title of the song, and (4) the year the song debut. An example song record is shown below:

1	← number 1 ranked song
Katy Perry	← artist name
Dark Horse	← song title
2014	← billboard year

There can be a maximum of 500 song records in the data file. You can copy this file into your project folder with the command: **cp ~cen/data/topsongs.dat workspace directory/project directory/.**

To allow the user to interact with the program, display a menu as the following. The program should allow the user to continually interact with the program by selecting menu choices ‘1’ – ‘4’ repeatedly. The program only terminates when the user selects the menu choice ‘5’.

Billboard Top Song (2012-2015) Management

Please select from the following menu choices:

1. Look up an artist
2. Add a song
3. Delete a song
4. Print
5. Exit

- If the user selects choice ‘1’, (s)he should be prompted to enter the name of the artist. The program then displays ALL the songs by this artist that have appeared in the billboard charts in the past 4 years. If the artist does not have any top songs in the past 4 years, a message should be displayed; Display information about the songs in tabular format using **setw(number)**. For example if the name of the artist entered is: **Beyonce**, the output of the program should be:

Here are the songs by Beyonce

Title	Rank	Year
Drunk in Love	22	2015
Partition	72	2015
Best Thing I Never Had	57	2012
Countdown	100	2012

- If the user selects choice ‘2’, (s)he should be prompted to enter the information about: (1) the title; (2) the artist name, (3) the rank, and (4) the year of a **new song**. This new song record should then be added to the end of list of songs.
- If the user selects choice ‘3’, (s)he should be prompted to enter the title of the song to be deleted. The program then deletes the song from the array. If no such song is found, display an error message.
- If the user selects choice ‘4’, (s)he should be prompted to enter the year value. The program displays all the top songs in that year. The output should include: (1) artist name, (2) title of the song, and (3) the ranking of the song.
- If the user selects ‘5’, the program terminates.

Programming requirements

1. The List class with sorted linked list implementation should be used for this program. The List class includes the following methods:

- | | |
|-----------------|-----------------|
| a. constructors | e. ListRetrieve |
| b. destructor | f. GetLength |
| c. ListInsert | g. IsEmpty |
| d. ListDelete | |

You may add the method

- h. "Find", and
- i. "Display"

to the List class developed in class and in the closed lab.

It is important to keep this List class implementation generic, where ListItemType should be used throughout to pass item in and out of the methods developed.

2. Define a struct type to store information of a song record. Make "ListItemType" an alias of this type.
 - a. Define the overloaded < operator, == operator or != operator for this struct so that it facilitates the implementation of List class methods for ListItemType comparisons.
3. In the client program, **write separate user defined function** for each of the following:
 - a. Display a menu
 - b. Read the information from a data file and build a list
 - c. Prompt the user for the name of an artist and displays the songs by this artist
 - d. Prompt the user for the title of a song and deletes the song
 - e. Prompt the user for the year value and displays all the top songs in that year

Documentation requirements for programs involving Abstract Data Type

For a client to use one ADT type, (s)he only needs to look at the specification file to find out what methods are available, and what each methods do. There is no need to know the details of how each method is implemented. Therefore for the client of the ADT, it is essential that the specification file a well documented about how to use this ADT.

All the description for the methods should be kept in the specification program (aka in the header file). This means for each method in the class, a description of what this method does need to be placed before the declaration statement of that method, inside the class definition. Please refer to the handout given in class for example on how to write the description.

For the implementation file/program, you are not required to place description in front of the definitions of individual methods. But, for logically related statements, for example a loop, a decision statement, or a group of statements for achieving a coherent task, a description need to be given to explain what that group of statement does.

For the client program, the documentation requirements we had before applies.

<https://www.cs.mtsu.edu/~cen/2170/private/ola/programrequirements.pdf>.

Electronically submit the program in D2L Dropbox named "Open Lab 8". You are required to submit three files: List.h, List.cpp and songs.cpp