

# PROGRAM 6 / CSC1310

## SEARCHING & SORTING



### IMPORTANT DATES

**Assignment Date:** Monday, March 12, 2018

**Due Date:** Monday, March 19, 2018

### PROGRAM ASSIGNMENT DESCRIPTION

Take the Movie program that you did for program 1 (code provided for you in case your final version of program 1 didn't work) and modify it.

Your movie library should be changed to a linked list of movie pointers instead of an array of movie pointers. (you will use the provided LinkedList.h)

Then you will modify the program so that only uniquely titled movies are added to the list by writing a binary search function. This function will only work if you use a sort function after adding movies. You must use insertion sort to sort your movie library.

### FILES THAT SHOULD BE INCLUDED IN YOUR SUBMISSION

- crockett\_movie\_data.txt
- Driver.cpp
- LinkedList.h
- Makefile
- Movie.cpp
- Movie.h
- Movies.cpp
- Movies.h
- runProgram.bat
- TEST\_CASE.txt
- Text.cpp
- Text.h

### PROGRAM SPECIFICATIONS (DIRECTIONS ON HOW TO WRITE THE PROGRAM)

#### DRIVER.CPP

Make the necessary modification to Driver.cpp in order to call the modified Movies constructor.

#### MOVIES CLASS MODIFICATION – ARRAY CHANGED TO LINKED LIST

Change your Movies.cpp & Movies.h files so that you no longer create an array of Movie pointers. Instead, you will create a LinkedList of Movie pointers.

- You will only have one attribute – the linked list object which will hold Movie pointers
- The constructor/destructor will need to change due to the change in attributes

- You will no longer need the following functions: `getMaxMovies()`, `getMoviesArray()`, `getAMovieFromArray()`, and `resizeMovieArray()`.
- You should also rename any functions to say “List” instead of “Array” so that it makes more sense. You should also modify all functions that refer to the array and change it to the linked list.
- You will create two new functions
  - **insertionSort** – This function should sort the LinkedList of Movies in ascending order by Movie title. This function will call a function called `swap` in the `LinkedList` class to swap values in the linked list when necessary. Use the insertion sort algorithm to implement this function.
  - **binarySearch** – This function should search for a particular movie title to see if it is in the list. It should return -1 if the Movie title could not be found. Remember that Movie titles are of data type `Text*`. Use the binary search algorithm to implement this function.
- The **addMovieToList** function will need to be modified so that after this function gets the title of the movie from the user, it will check to see if this movie is already in the library (by calling `binarySearch` function).
  - If the title is not in the library, then the function will proceed to get the other movie information from the user and then add this movie to the linked list. Then, it will call the `insertionSort` function so that the movies are put in ascending order by title.
  - If the title is in the library then no other information will be asked from the user and the program will print “I’m sorry! [movie title] is already in in your movie library so it will not be added again.”
- The **readMoviesFromFile** function will need to be modified so that after this function reads one movie’s data from the file, it will check to see if this movie is already in the library (by calling `binarySearch` function).
  - If the title is not in the library, then the function will add this movie to the linked list. Then, it will call the `insertionSort` function so that the movies are put in ascending order by title.
  - If the title is in the library then the program will print “[movie title] was not added because it was already in the movie library.” Then it will release the memory for the three `Text` objects that were unnecessarily created.
- The **getNumMovies** function will need to be modified to return the number of nodes in the linked list.

## LINKEDLIST MODIFICATION

Add a function to the `LinkedList` template class (`LinkedList.h`) called `swap`. This function should accept two integers which represent two node positions that need to be swapped.

This function should swap the VALUES in the two nodes. You do not have to swap the whole node, just swap the values.

## READABILITY OF OUTPUT & CODE DOCUMENTATION

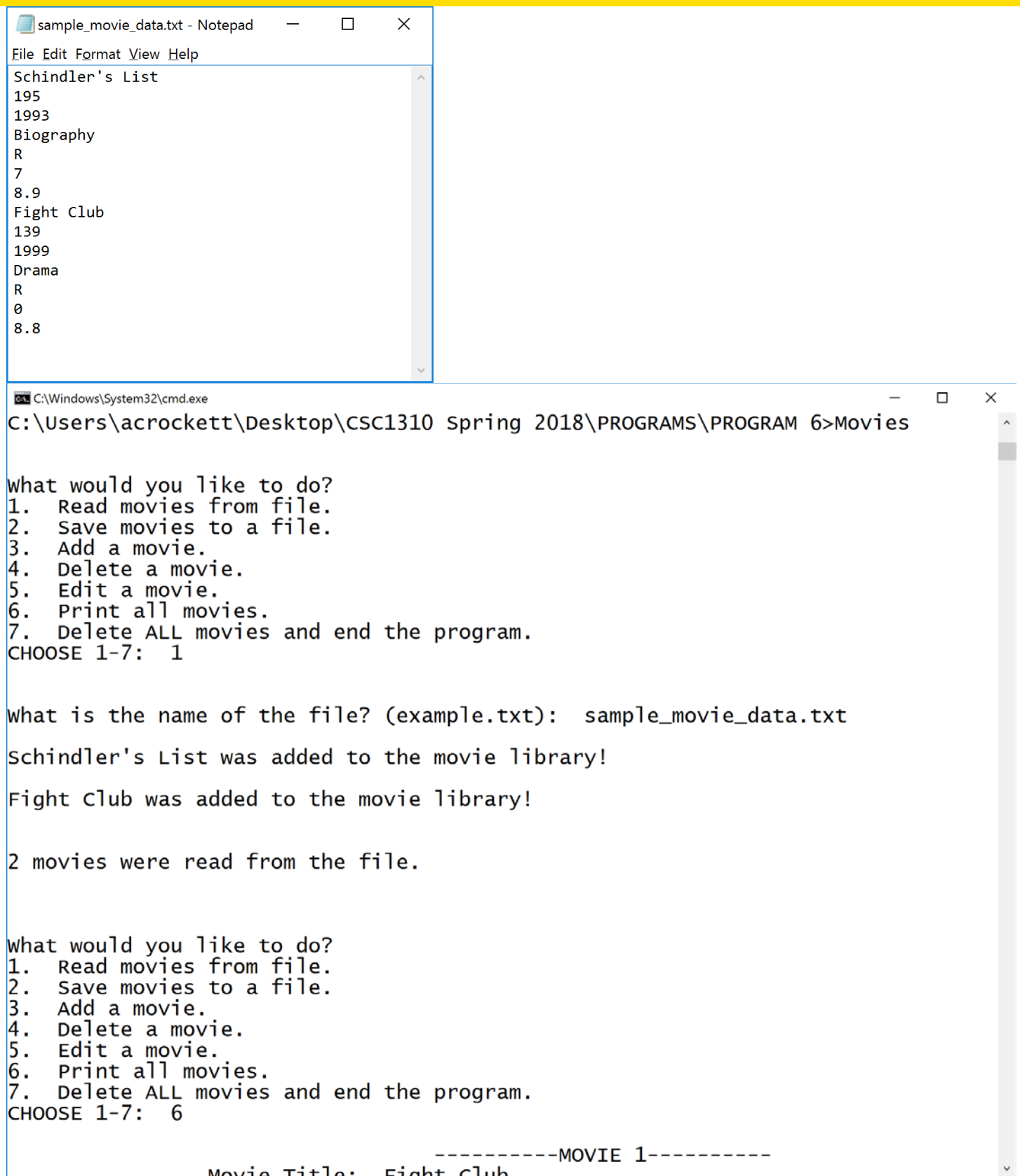
- Make sure that your output looks similar to my sample output (below). When I run your program, it shouldn’t make me want to scream. It should be extremely readable and user-friendly.
- **For this program, don’t worry about comments except put your NAME at the top of all files that you modify!!!**

## WHAT TO TURN IN

**Zip ALL the files required to compile & run the program**, in a single zipped file named whatever you want.

Then, upload this zip file to the assignment folder in ilearn. **I will remove one point if you turn in unzipped files. Programs that do not include all the files listed in the “FILES” section above will not be graded.**

## SAMPLE OUTPUT



The image shows two windows side-by-side. The top window is a Notepad editor titled 'sample\_movie\_data.txt - Notepad'. It contains the following text:

```
Schindler's List
195
1993
Biography
R
7
8.9
Fight Club
139
1999
Drama
R
0
8.8
```

The bottom window is a Command Prompt titled 'C:\Windows\System32\cmd.exe'. It shows the execution of a program named 'Movies'. The prompt is 'C:\Users\acrockett\Desktop\CSC1310 Spring 2018\PROGRAMS\PROGRAM 6>Movies'. The program displays a menu of options and processes user input.

```
C:\Users\acrockett\Desktop\CSC1310 Spring 2018\PROGRAMS\PROGRAM 6>Movies

what would you like to do?
1. Read movies from file.
2. Save movies to a file.
3. Add a movie.
4. Delete a movie.
5. Edit a movie.
6. Print all movies.
7. Delete ALL movies and end the program.
CHOOSE 1-7: 1

what is the name of the file? (example.txt): sample_movie_data.txt
Schindler's List was added to the movie library!
Fight Club was added to the movie library!

2 movies were read from the file.

what would you like to do?
1. Read movies from file.
2. Save movies to a file.
3. Add a movie.
4. Delete a movie.
5. Edit a movie.
6. Print all movies.
7. Delete ALL movies and end the program.
CHOOSE 1-7: 6

-----MOVIE 1-----
Movie Title: Fight Club
```

C:\Windows\System32\cmd.exe

```
-----MOVIE 1-----  
Movie Title: Fight Club  
Length (minutes): 139  
Year Released: 1999  
Genre: Drama  
Rating: R  
Number of Oscars Won: 0  
Number of Stars: 8.8
```

```
-----MOVIE 2-----  
Movie Title: Schindler's List  
Length (minutes): 195  
Year Released: 1993  
Genre: Biography  
Rating: R  
Number of Oscars Won: 7  
Number of Stars: 8.9
```

What would you like to do?

1. Read movies from file.
2. Save movies to a file.
3. Add a movie.
4. Delete a movie.
5. Edit a movie.
6. Print all movies.
7. Delete ALL movies and end the program.

CHOOSE 1-7: 1

C:\Windows\System32\cmd.exe

What is the name of the file? (example.txt): sample\_movie\_data.txt

Schindler's List was not added because it was already in the movie library.

Fight Club was not added because it was already in the movie library.

2 movies were read from the file.

What would you like to do?

1. Read movies from file.
2. Save movies to a file.
3. Add a movie.
4. Delete a movie.
5. Edit a movie.
6. Print all movies.
7. Delete ALL movies and end the program.

CHOOSE 1-7: 3

MOVIE TITLE: Coco

MOVIE LENGTH (in minutes): 119

MOVIE YEAR: 2017

MOVIE GENRE: Animated, Drama

MOVIE RATING: PG

NUMBER OF OSCARS WON: 2

STAR RATING (out of 10): 8.6

C:\Windows\System32\cmd.exe

Coco was added to the movie library!

What would you like to do?

1. Read movies from file.
2. Save movies to a file.
3. Add a movie.
4. Delete a movie.
5. Edit a movie.
6. Print all movies.
7. Delete ALL movies and end the program.

CHOOSE 1-7: 6

-----MOVIE 1-----

Movie Title: Coco  
Length (minutes): 119  
Year Released: 2017  
Genre: Animated, Drama  
Rating: PG  
Number of Oscars Won: 2  
Number of Stars: 8.6

-----MOVIE 2-----

Movie Title: Fight Club  
Length (minutes): 139  
Year Released: 1999  
Genre: Drama  
Rating: R  
Number of Oscars Won: 0  
Number of Stars: 8.8

-----MOVIE 3-----

Movie Title: Schindler's List  
Length (minutes): 195  
Year Released: 1993

Genre: Biography  
Rating: R  
Number of Oscars Won: 7  
Number of Stars: 8.9

What would you like to do?

1. Read movies from file.
2. Save movies to a file.
3. Add a movie.
4. Delete a movie.
5. Edit a movie.
6. Print all movies.
7. Delete ALL movies and end the program.

CHOOSE 1-7: 3

MOVIE TITLE: Schindler's List

I'm sorry! Schindler's List is already in your movie library and so it will not be added again.

What would you like to do?

1. Read movies from file.
2. Save movies to a file.
3. Add a movie.
4. Delete a movie.
5. Edit a movie.
6. Print all movies.
7. Delete ALL movies and end the program.

CHOOSE 1-7: 7

GOODBYE!