

## Lab Purpose

Practice creating, manipulating linked lists, BGLinux.

## Always bring to class

1. Gaddis' book, How-to handouts from Canvas and your class notes.
2. This assignment sheet & the grade sheet for this lab already printed out.
3. USB Flash drive(s) or other storage media.

## Mandatory Instructions

A new DVD store in your neighborhood is about to pen. However, it does not have a program to keep track of its DVDs. You have been asked to write a program for their store. The program should be able to perform the following operations:

1. Rent a DVD; that is, check out a DVD
2. Return, or check in a DVD
3. Display a list of DVDs owned by the store
4. Show the details of a particular DVD
5. Check whether a particular DVD is in the store

DVDs have the following information that will need to be stored for each DVD owned by the store:

Title of the movie, genre, movie rating, number of copies owned by the store. Define Node structure to store the necessary information. Data should be allocated dynamically. All such allocated data must be deallocated when program is finished.

The following functions must be implemented:

CreateDVDLinkedList– read the data file and create the linked list of DVD nodes. List will be maintained in the order data is organized, i.e., do not sort the list.

ShowDVDInformation – given pointer to the node, display the DVD information

DisplayDVDLibrary – given pointer to the first node, display all DVDs owned by the store (tabular form)

FindDVDbyTitle – given pointer to the first node and the title, find and return pointer to the appropriate node in the list or nullptr otherwise. Linear search should be utilized to find given movie title.

CheckOut – given pointer to the DVD node, decrement number of DVDs currently in the store, if DVD owned by the store and if not 0 already.

CheckIn – given pointer to the DVD node, increment number of DVDs currently in the store if DVD owned by the store.

DeleteList – given pointer to the first node deallocate all memory holding the list.

Function Prototypes:

```
void CreateDVDLinkedList(Node* &); // note head pointer is passed by reference
void ShowDVDInformation(Node*);
void DisplayDVDLibrary(Node*);
Node* FindDVDbyTitle(Node*, string);
void CheckOut(Node*);
void CheckIn(Node*);
void DeleteList(Node*);
```

Show ERROR messages when movie is not found, when check out cannot be performed because all DVDs are rented out.

Copy data file dvds.txt from the lib directory to your cs2020 directory. Add more movies to your data file so that there is exactly 10 DVDs in the file. Add titles that are not already in the file. Make sure each of the required elements are present (title, genre, rating, number of copies).

Read the data file and create the linked list. Allow the user to select from the following menu of options:

1. Rent a DVD --- user enters title, find DVD, decrement number of DVDs in the store
2. Return a DVD --- user enters title, find DVD, increment number of DVDs in the store
3. Find a DVD – user enters title, find DVD, display all DVD information
4. Listing of all DVDs – produce listing of all DVD data
5. Quit

Utilize an enumerated type to define user menu choices such as RENT, RETURN, FIND, LIST, QUIT. Use this enumerated type in your code.

## Optional Instructions

Sometimes these will be worth some bonus points. None this time.

## What to turn in?

Place lab6.cpp, dvds.txt, and lab6.txt in your CS2020 BGLinux directory. Make sure you have added more DVD data into the data file.

```
$ photo lab6.log
$ ls -l
$ cat lab6.cpp
$ g++ lab6.cpp
$ ./a.out < lab6.txt
$ Ctrl+d
$ logout
```

Upload grade sheet to Canvas!!!

```

1. Rent
2. Return
3. Find
4. Listing
5. Quit
Choice? [1, 2, 3, 4, or 5] 3
Title? Hobbit-The Battle of the Five Armies
Hobbit-The Battle of the Five Armies not found in the library.
1. Rent
2. Return
3. Find
4. Listing
5. Quit
Choice? [1, 2, 3, 4, or 5] 3
Title? Lord of the Rings-The Fellowship of the Ring
Title
Director
Rating
Count
Lord of the Rings-The Fellowship of the Ring Peter Jackson PG13 1
1. Rent
2. Return
3. Find
4. Listing
5. Quit
Choice? [1, 2, 3, 4, or 5] 1
Title? Lord of the Rings-The Fellowship of the Ring
1. Rent
2. Return
3. Find
4. Listing
5. Quit
Choice? [1, 2, 3, 4, or 5] 1
Title? Lord of the Rings-The Fellowship of the Ring
ERROR: All DVDs for this movie are currently rented out.
1. Rent
2. Return
3. Find
4. Listing
5. Quit
Choice? [1, 2, 3, 4, or 5] 3
Title? Lord of the Rings-The Fellowship of the Ring
Title
Director
Rating
Count
Lord of the Rings-The Fellowship of the Ring Peter Jackson PG13 0

```

```
2. Return
3. Find
4. Listing
5. Quit
Choice? [1, 2, 3, 4, or 5] 2
Title? Lord of the Rings-The Fellowship of the Ring
1. Rent
2. Return
3. Find
4. Listing
5. Quit
Choice? [1, 2, 3, 4, or 5] 3
Title? Lord of the Rings-The Fellowship of the Ring
Title          Director          Rating    Count
Lord of the Rings-The Fellowship of the Ring Peter Jackson PG13      1
1. Rent
2. Return
3. Find
4. Listing
5. Quit
Choice? [1, 2, 3, 4, or 5] 4
Title          Director          Rating    Count
Lord of the Rings-Two Towers          Peter Jackson PG13      3
Lord of the Rings-Return of the King   Peter Jackson PG13      4
Lord of the Rings-The Fellowship of the Ring Peter Jackson PG13      1
1. Rent
2. Return
3. Find
4. Listing
5. Quit
Choice? [1, 2, 3, 4, or 5] 5
Press any key to continue . . . _
```