CAB301 ASSIGNMNET 1 REPORT

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Contents

Designed Algorithm for Implementation of Display the top 10 Movies

```csharp
private HelperNode sortedMoviesByRentedTimesInsertion(HelperNode hNode, Movie objMovie)
{
    if(hNode == null)
    {
        return new HelperNode(objMovie);
    }
    if (objMovie.MovieTimesRented < hNode.Movie.MovieTimesRented)
    {
        hNode.LeftNode = sortedMoviesByRentedTimesInsertion(hNode.LeftNode, objMovie);
    }
    else
    {
        hNode.RightNode = sortedMoviesByRentedTimesInsertion(hNode.RightNode, objMovie);
    }

    return hNode;
}


private void mostTimesBorrowedOrderMovieNodeAddition(HelperNode hNode)
{
    if(hNode != null)
    {
        mostTimesBorrowedOrderMovieNodeAddition(hNode.RightNode);
        mostTimesBorrowedOrderMovieNode = sortedMoviesByRentedTimesInsertion(
            mostTimesBorrowedOrderMovieNode,
            hNode.Movie);
        mostTimesBorrowedOrderMovieNodeAddition(hNode.LeftNode);
    }

}


public void showingPopularMoviesRentedTenTimes()
{
    check = 0;
    mostTimesBorrowedOrderMovieNode = null;
    mostTimesBorrowedOrderMovieNodeAddition(root);
    showingPopularMoviesRentedTenTimes(mostTimesBorrowedOrderMovieNode);
}


private static void showTheTopTenPopularMovies()
{
    movieCollectionObj.showingPopularMoviesRentedTenTimes();
}
```

```csharp
private void showingPopularMoviesRentedTenTimes(HelperNode hNode)
    {
        if(hNode != null && check < 10)
        {
            check = check + 1;
            showingPopularMoviesRentedTenTimes(hNode.RightNode);
            Console.WriteLine(hNode.Movie.MovieTitle + " borrowed " +
                hNode.Movie.MovieTimesRented.ToString() + " times.");
            showingPopularMoviesRentedTenTimes(hNode.LeftNode);
        }

    }
```

Analysis of The Time Complexity of the Algorithm

The analysis of the time complexity of the algorithms is detailed below:

```
The above are all the functions that displays the top ten popular movies in ascending
order. I will write it's Pseudocode here which can be seen below. The below algorithm
takes an argument. It calls other functions inside it.
```

```csharp
private void showingPopularMoviesRentedTenTimes(HelperNode hNode)
        {
            if(hNode != null && check < 10)
            {
                check = check + 1;
                showingPopularMoviesRentedTenTimes(hNode.RightNode);
                Console.WriteLine(hNode.Movie.MovieTitle + " borrowed " +
                    hNode.Movie.MovieTimesRented.ToString() + " times.");
                showingPopularMoviesRentedTenTimes(hNode.LeftNode);
            }

        }
```

```
Algorithm showingPopularMoviesRentedTenTimes (HelperNode hNode)

If hNode != null and numberOfMovies < 10n

Check ← check + 1

Call some functions – helper functions

Cbest = 1n O(n)

Cworst = 10n

Caverage = Cbest + Cworst / 2
```

Therefore we can say that it's efficiency class can be $f(n) \in \Theta(n)$ and it can also be $f(n) \in O(n2$
). All of the functions above will allow the functionality of the display top 10 popular movies by
ascending order.

Functional Testing Results – Screenshots for each function Test

Login Functionality Test

This will show the functionality test for the login process both for the staff and members login.

The below picture shows the functional test for the staff login

The below picture shows the functional test for the member login

```
Welcome to the Community Library
==========Main Menu============
 1. Staff Login
 2. Membr Login
 0. Exit
=================================

 Please make a selection (1-2, or 0 to exit): 2
Enter Username: (LastnameFirstname): ChenMike
Enter Password: 1111



==========Member Menu===========
1. Display all movies
2. Borrow a movie DVD
3. Return a movie DVD
4. List current borrowed movie DVDs
5. Display top 10 most popular movies
0. Return to main menu
=================================

 Please make a selection (1-5 or 0 to return to main menu):
```

Staff-Menu Functionality Tests

This will show the functionality test for the staff functionality process.

The below picture shows the functional test for the staff successfully adding a movie to the system.2

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```
 Please make a selection (1-2, or 0 to exit): 1
Enter Username: (LastnameFirstname): staff
Enter Password: today123


===========Staff Menu============
1. Add a new movie DVD
2. Remove a movie DVD
3. Register a new member
4. Find a registered member's phone number
0. Return to main menu
================================

 Please make a selection (1-4 or 0 to return to main menu): 1
Enter the movie title: Movie 1
Enter the starring actor(s): Actor 1
Enter the director(s): Dire 1
Select the genre:
1. Drama
2. Adventure
3. Family
4. Action
5. Sci-Fi
6. Comedy
7. Thriller
8. Other
Make selection(1-8): 1
Select the classification:
1. General (G)
2. Parental Guidance (PG)
3. Mature (M15+)
4. Mature Accompanied (MA15+)
Make selection(l - 4): 2
Enter the duration (minutes): 90
Enter the release date (year): 2019
Enter the number of copies available: 5
Movie Movie 1 was added.


===========Staff Menu============
1. Add a new movie DVD
2. Remove a movie DVD
3. Register a new member
4. Find a registered member's phone number
0. Return to main menu
================================

 Please make a selection (1-4 or 0 to return to main menu):
```

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The below picture shows the functionality of the delete button. Which proves that staff can remove movies from the system.

```
==========Staff Menu============
1. Add a new movie DVD
2. Remove a movie DVD
3. Register a new member
4. Find a registered member's phone number
0. Return to main menu
=================================

 Please make a selection (1-4 or 0 to return to main menu): 2
Enter movie title: Movie 1
Movie 1 was deleted successfully.


==========Staff Menu============
1. Add a new movie DVD
2. Remove a movie DVD
3. Register a new member
4. Find a registered member's phone number
0. Return to main menu
=================================

 Please make a selection (1-4 or 0 to return to main menu):
```

The below functional test is for the staff-menu and checking whether staff can register a person or not.

```
===========Staff Menu============
1. Add a new movie DVD
2. Remove a movie DVD
3. Register a new member
4. Find a registered member's phone number
0. Return to main menu
=================================

 Please make a selection (1-4 or 0 to return to main menu): 3
Enter member's first name: Miky
Enter member's last name: Cheny
Enter member's address: 78 Qut Street Stakerplace
Enter member's phone number: 0415929999999
Enter member's password(4 digits): 1111
Successfully added Miky Cheny



===========Staff Menu============
1. Add a new movie DVD
2. Remove a movie DVD
3. Register a new member
4. Find a registered member's phone number
0. Return to main menu
=================================

 Please make a selection (1-4 or 0 to return to main menu):
```

The below functional test is for the staff-menu for the staff to find a member's phone number by typing their first and last name.

```
===========Staff Menu============
1. Add a new movie DVD
2. Remove a movie DVD
3. Register a new member
4. Find a registered member's phone number
0. Return to main menu
=================================

 Please make a selection (1-4 or 0 to return to main menu): 4
Enter member's first name: Miky
Enter member's last name: Cheny
Miky Cheny's  phone number is: 0415929999999


===========Staff Menu============
1. Add a new movie DVD
2. Remove a movie DVD
3. Register a new member
4. Find a registered member's phone number
0. Return to main menu
=================================

 Please make a selection (1-4 or 0 to return to main menu):
```

The below functional test shows that staff can successfully navigate back to the main-menu by typing zero. This will take them to the home screen.

```
==========Staff Menu===========
1. Add a new movie DVD
2. Remove a movie DVD
3. Register a new member
4. Find a registered member's phone number
0. Return to main menu
=================================

 Please make a selection (1-4 or 0 to return to main menu): 0


Welcome to the Community Library
==========Main Menu===========
 1. Staff Login
 2. Membr Login
 0. Exit
=================================

 Please make a selection (1-2, or 0 to exit):
```

Member – Menu Functionality Tests

This part will show all the functional tests for the member-menu.

The below picture shows when a staff enters correct logins it will log them in.

```
Welcome to the Community Library
===========Main Menu============
 1. Staff Login
 2. Membr Login
 0. Exit
================================

 Please make a selection (1-2, or 0 to exit): 2
Enter Username: (LastnameFirstname): ChenyMiky
Enter Password: 1111




===========Member Menu============
1. Display all movies
2. Borrow a movie DVD
3. Return a movie DVD
4. List current borrowed movie DVDs
5. Display top 10 most popular movies
0. Return to main menu
=================================

 Please make a selection (1-5 or 0 to return to main menu):
```

This picture shows when a staff enters an incorrect password or username they will not be able to login.

```
Welcome to the Community Library
==========Main Menu============
 1. Staff Login
 2. Membr Login
 0. Exit
===============================

 Please make a selection (1-2, or 0 to exit): 2
Enter Username: (LastnameFirstname): Miky
Enter Password: Che
Incorrect Password or Username! Try again.


Welcome to the Community Library
==========Main Menu============
 1. Staff Login
 2. Membr Login
 0. Exit
===============================

 Please make a selection (1-2, or 0 to exit):
```

The below picture will show when the user displays all the available movies:

```
===========Member Menu============
1. Display all movies
2. Borrow a movie DVD
3. Return a movie DVD
4. List current borrowed movie DVDs
5. Display top 10 most popular movies
0. Return to main menu
==================================

 Please make a selection (1-5 or 0 to return to main menu): 1
Title: Movie 1
Starring: Actor 1
Director: Director 1
Genre: Action
Classification: Mature (M15+)
Duration: 110
Release Date: 2020
Copies Available: 10
Times Rented: 0




===========Member Menu============
1. Display all movies
2. Borrow a movie DVD
3. Return a movie DVD
4. List current borrowed movie DVDs
5. Display top 10 most popular movies
0. Return to main menu
==================================

 Please make a selection (1-5 or 0 to return to main menu):
```

The below functional test's picture shows that a member can successfully borrow a movie from the library.

```
==========Member Menu============
1. Display all movies
2. Borrow a movie DVD
3. Return a movie DVD
4. List current borrowed movie DVDs
5. Display top 10 most popular movies
0. Return to main menu
================================

 Please make a selection (1-5 or 0 to return to main menu): 2
Enter movie title: Movie 1
You borrowed Movie 1


==========Member Menu============
1. Display all movies
2. Borrow a movie DVD
3. Return a movie DVD
4. List current borrowed movie DVDs
5. Display top 10 most popular movies
0. Return to main menu
================================

 Please make a selection (1-5 or 0 to return to main menu):
```

The below picture is the functional testing for the member-menu which show members can borrow movies and return them.

```
===========Member Menu============
1. Display all movies
2. Borrow a movie DVD
3. Return a movie DVD
4. List current borrowed movie DVDs
5. Display top 10 most popular movies
0. Return to main menu
==================================

 Please make a selection (1-5 or 0 to return to main menu): 3
Enter movie title: Movie 1
You have successfully returned Movie DVD




===========Member Menu============
1. Display all movies
2. Borrow a movie DVD
3. Return a movie DVD
4. List current borrowed movie DVDs
5. Display top 10 most popular movies
0. Return to main menu
==================================

 Please make a selection (1-5 or 0 to return to main menu): 2
Enter movie title: Movie 1
You borrowed Movie 1
```

If a user tries to borrow a movie they already have rented. They will be denied and printed a message saying they've already borrowed that movie.

```
==========Member Menu============
1. Display all movies
2. Borrow a movie DVD
3. Return a movie DVD
4. List current borrowed movie DVDs
5. Display top 10 most popular movies
0. Return to main menu
=================================

 Please make a selection (1-5 or 0 to return to main menu): 2
Enter movie title: Movie 1
You borrowed Movie 1




==========Member Menu============
1. Display all movies
2. Borrow a movie DVD
3. Return a movie DVD
4. List current borrowed movie DVDs
5. Display top 10 most popular movies
0. Return to main menu
=================================

 Please make a selection (1-5 or 0 to return to main menu): Movie 1
 Please make a selection (1-5 or 0 to return to main menu): 2
Enter movie title: Movie 1
You have already borrowed movie.




==========Member Menu============
1. Display all movies
2. Borrow a movie DVD
3. Return a movie DVD
4. List current borrowed movie DVDs
5. Display top 10 most popular movies
0. Return to main menu
=================================

 Please make a selection (1-5 or 0 to return to main menu):
```

The below functional test is for the member-menu which shows that users are allowed to return movies.

```
===========Member Menu============
1. Display all movies
2. Borrow a movie DVD
3. Return a movie DVD
4. List current borrowed movie DVDs
5. Display top 10 most popular movies
0. Return to main menu
==================================

 Please make a selection (1-5 or 0 to return to main menu): 3
Enter movie title: Movie 1
You have successfully returned Movie DVD



===========Member Menu============
1. Display all movies
2. Borrow a movie DVD
3. Return a movie DVD
4. List current borrowed movie DVDs
5. Display top 10 most popular movies
0. Return to main menu
==================================

 Please make a selection (1-5 or 0 to return to main menu):
```

The below functionality will show all the movies a user have currently rented.

```
==========Member Menu===========
1. Display all movies
2. Borrow a movie DVD
3. Return a movie DVD
4. List current borrowed movie DVDs
5. Display top 10 most popular movies
0. Return to main menu
================================

 Please make a selection (1-5 or 0 to return to main menu): 3
Enter movie title: Movie 1
You have successfully returned Movie DVD




==========Member Menu===========
1. Display all movies
2. Borrow a movie DVD
3. Return a movie DVD
4. List current borrowed movie DVDs
5. Display top 10 most popular movies
0. Return to main menu
================================

 Please make a selection (1-5 or 0 to return to main menu): 4
You are currently borrowing:
Movie 2


==========Member Menu===========
1. Display all movies
2. Borrow a movie DVD
3. Return a movie DVD
4. List current borrowed movie DVDs
5. Display top 10 most popular movies
0. Return to main menu
================================

 Please make a selection (1-5 or 0 to return to main menu):
```

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The below picture is the for the functional testing of viewing the top ten movies most popular movies in descending order:

```
==========Member Menu============
1. Display all movies
2. Borrow a movie DVD
3. Return a movie DVD
4. List current borrowed movie DVDs
5. Display top 10 most popular movies
0. Return to main menu
=================================

 Please make a selection (1-5 or 0 to return to main menu): 5
Movie 1 borrowed 2 times.
Movie 2 borrowed 1 times.
Movie 5 borrowed 0 times.
Movie 4 borrowed 0 times.
Movie 3 borrowed 0 times.
Moive Scary borrowed 0 times.


==========Member Menu============
1. Display all movies
2. Borrow a movie DVD
3. Return a movie DVD
4. List current borrowed movie DVDs
5. Display top 10 most popular movies
0. Return to main menu
=================================

 Please make a selection (1-5 or 0 to return to main menu):
```
0

The below picture is for the functional testing for the member going back to the main menu:

```
==========Member Menu============
1. Display all movies
2. Borrow a movie DVD
3. Return a movie DVD
4. List current borrowed movie DVDs
5. Display top 10 most popular movies
0. Return to main menu
=================================

 Please make a selection (1-5 or 0 to return to main menu): 0


Welcome to the Community Library
==========Main Menu============
 1. Staff Login
 2. Membr Login
 0. Exit
=================================

 Please make a selection (1-2, or 0 to exit):
```