



# Movie Database Management Service.

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# User interface

Movie Database Service

produced by soojin woo

Start

# What is Movie Database Management Service?

## Why?

다양한 영화 관련 서비스가 제공되고 있다. 그러나 기존의 서비스는 보통 영화 예매나 결제를 지원하며, 이에 대한 시청 기록이 남는 형태 정도로 영화 정보가 관리된다.

또한 관람 장소, Device 등에 따라 영화 정보가 여기저기 저장된다는 한계도 있다.

## Purpose

고객들이 자신이 시청한 영화를 한 개의 서비스에서 한 번에 관리할 수 있도록 하고자 하였으며, 이에 'Movie Database Management Service'를 개발하게 되었다.



# Mainly Used Data structure

- Queue
- Sorted Circular Doubly Linked List
- Binary Search Tree

# 시간 복잡도

- **Queue**

삽입, 삭제:  $O(1)$

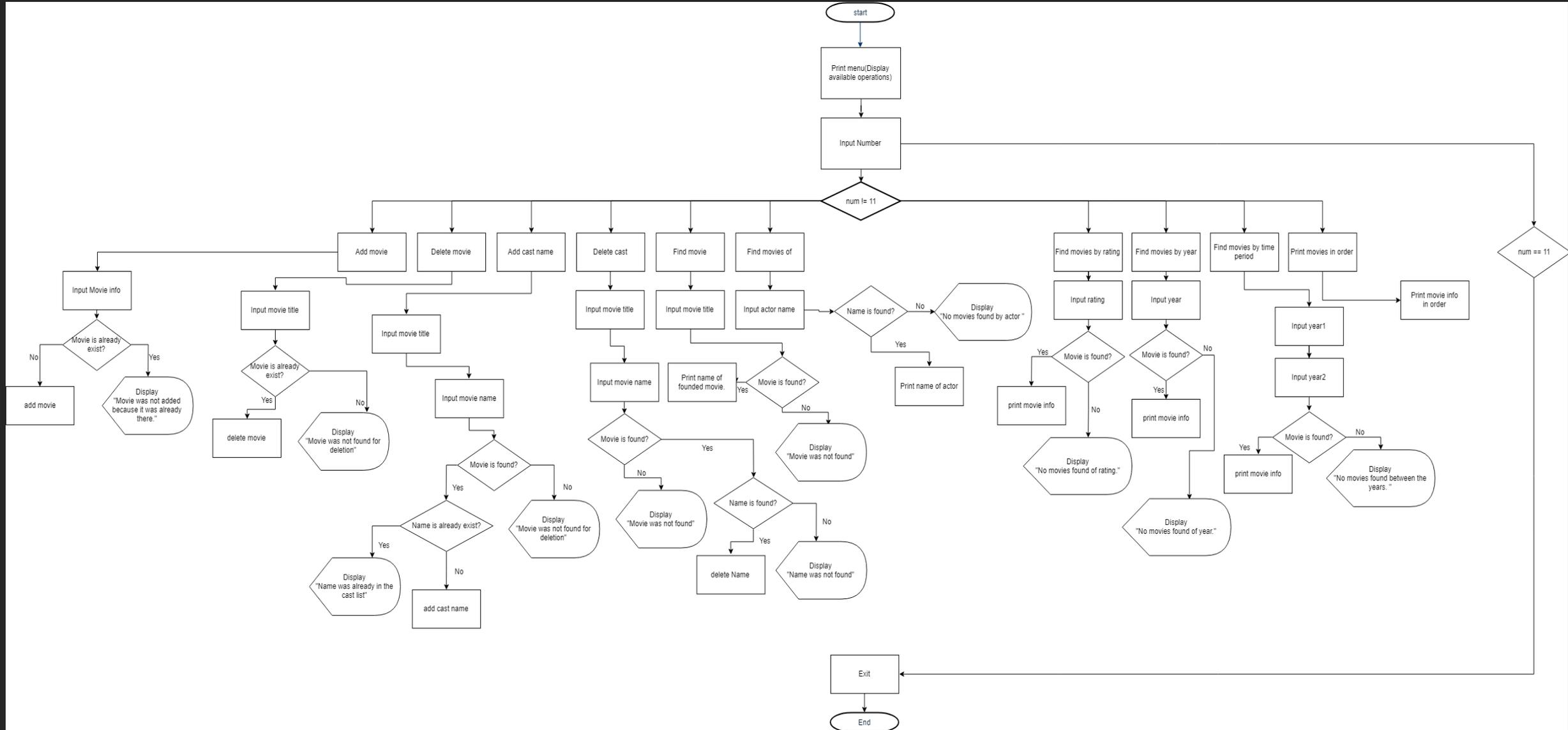
- **Sorted Circular Doubly Linked List**

삽입, 삭제, 탐색:  $O(N)$  단, 노드가 없을 때 삽입:  $O(1)$ , 노드가 1개 일 때 삭제:  $O(1)$

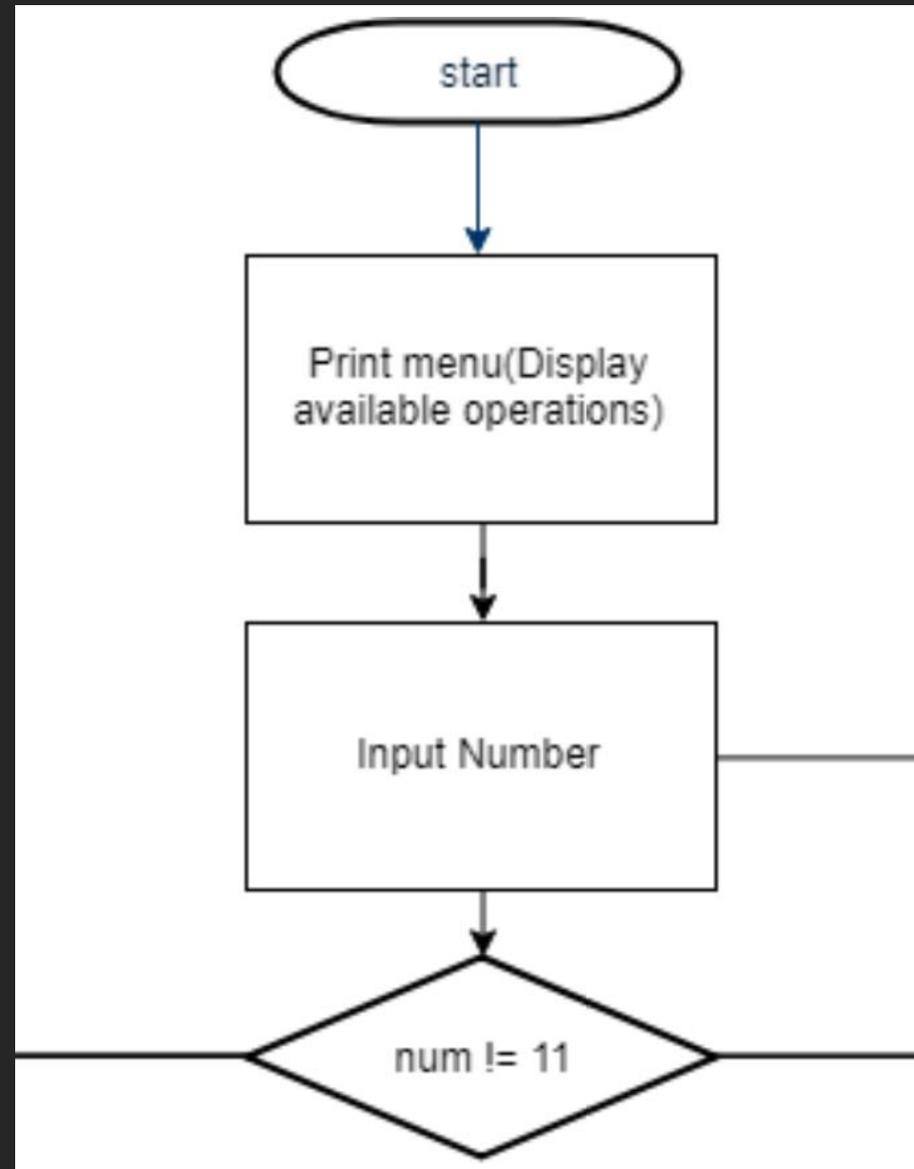
- **Binary Search Tree**

삽입, 삭제, 탐색:  $O(\log N)$  단, 최악의 경우(Skewed) 시간 복잡도는  $O(N)$ 이 될 수 있다.

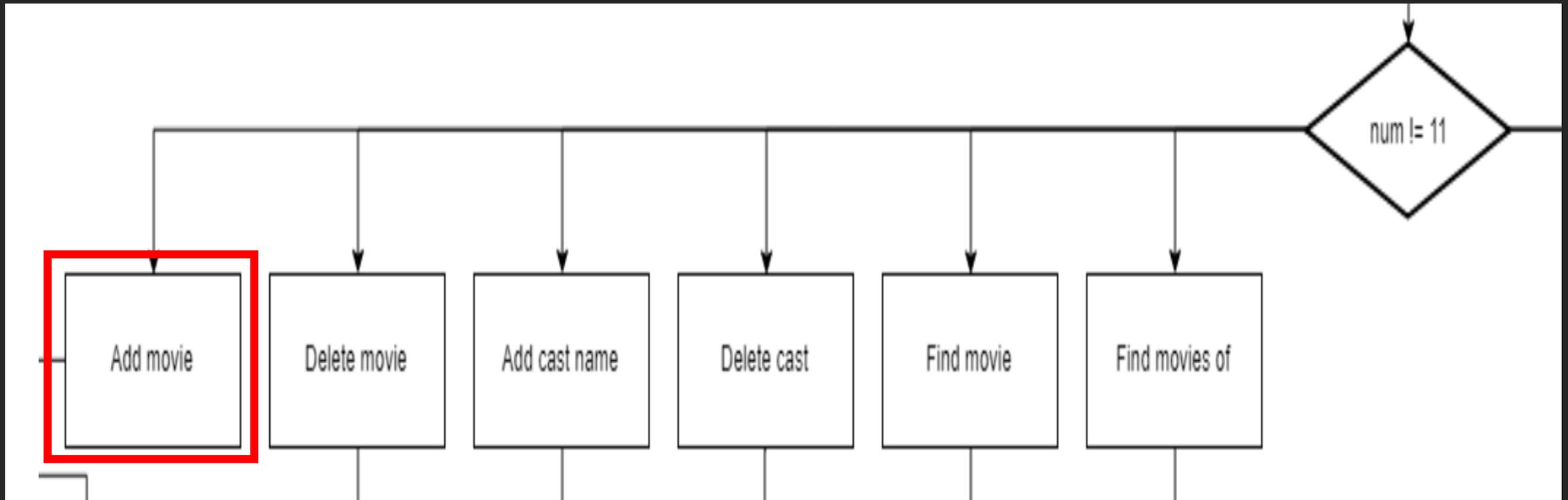
# Flow chart



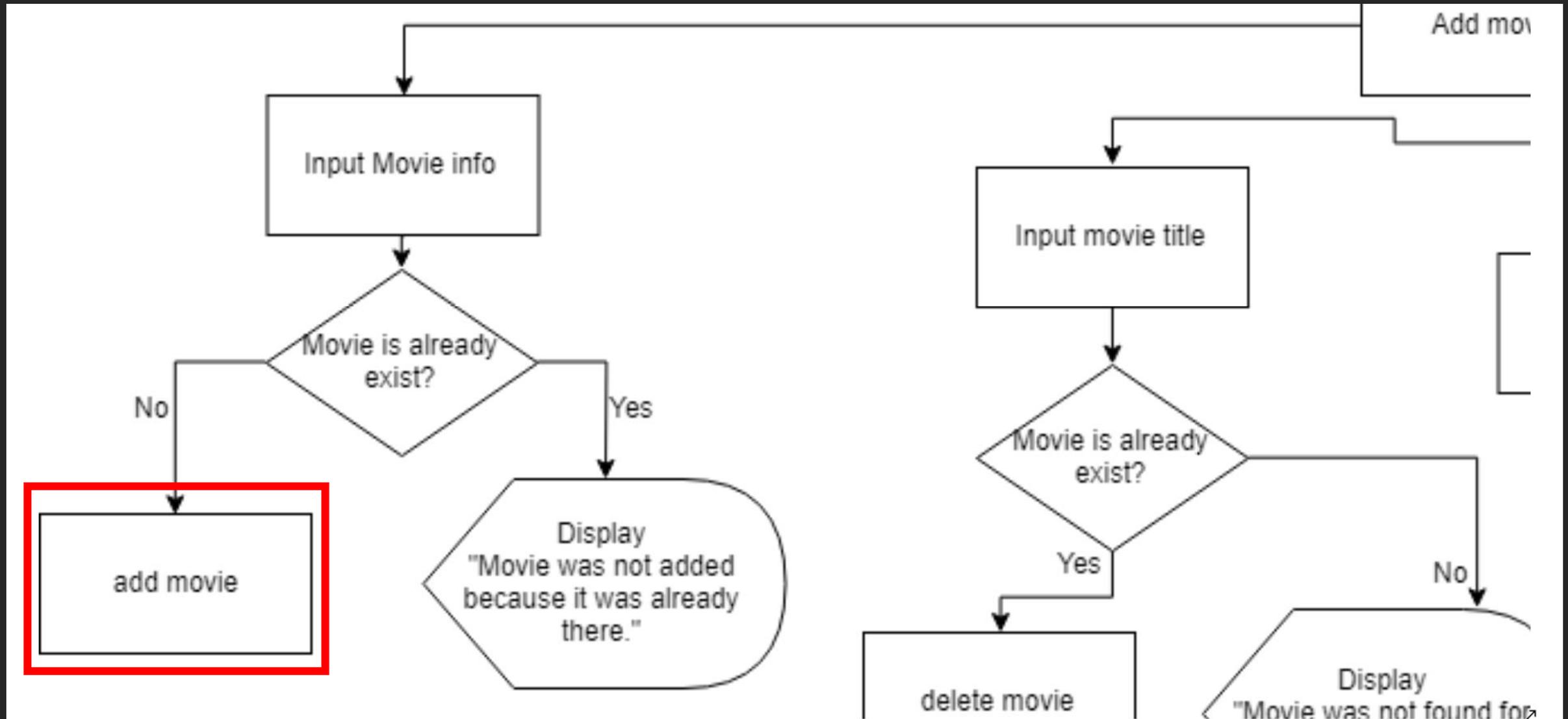
Ex) Input num == 1



Ex) Input num == 1

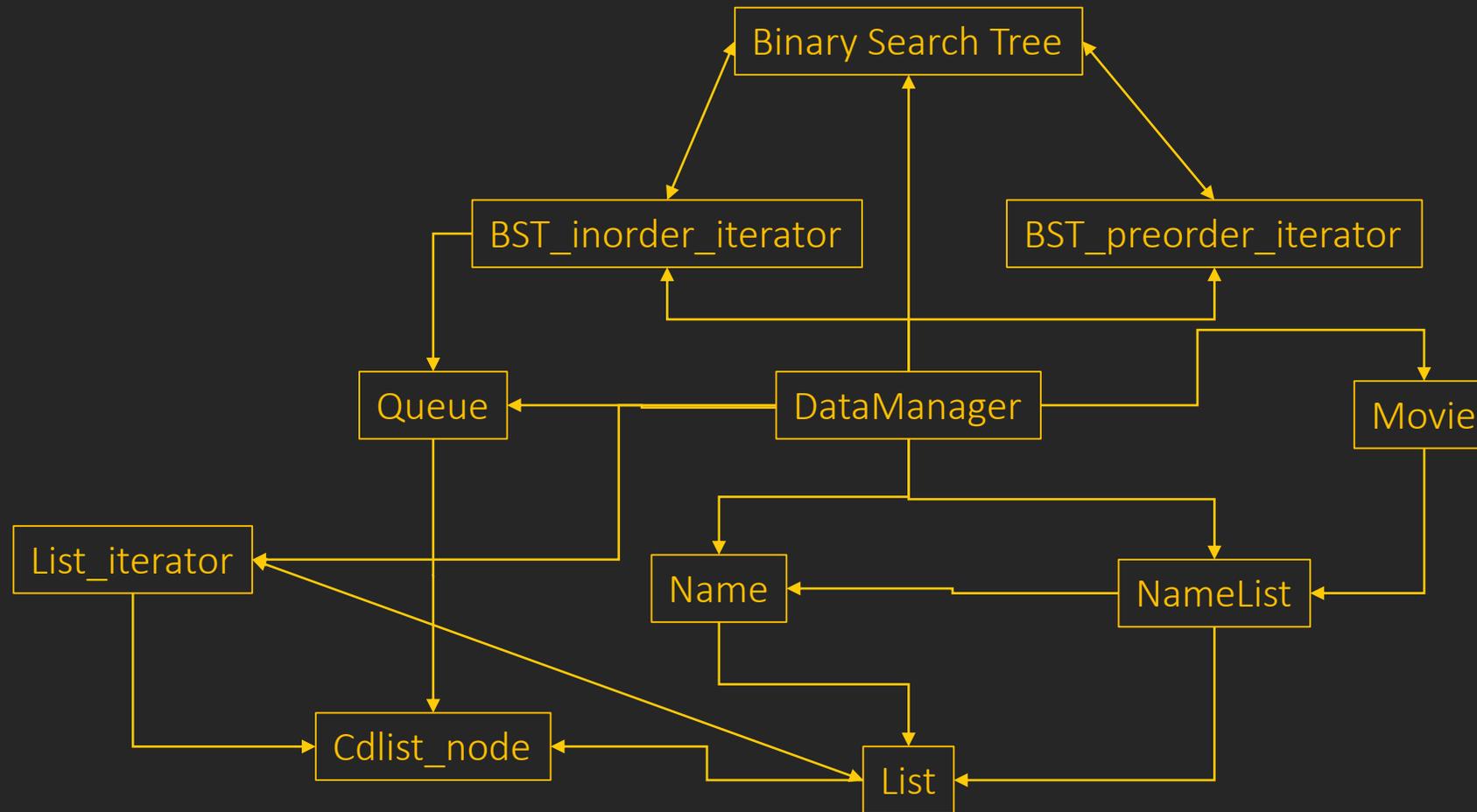


Ex) Input num == 1





# Class Diagram (Simple ver.)



# Data manager class

## DataManager

```
- movie_bst: BinarySearchTree<Movie, string>

- print_tree_height() const: void
+ DataManager()
+ add_movie(const movie: Movie &): int
+ add_new_cast(const title: string &, const name: Name &): int
+ delete_movie(const title: string &): int
+ delete_cast(const title: string &, const name: Name &): int
+ find_movie(const title: string &, const name: Name &): int
+ find_movies_of(const name: Name &) const: List<Movie>
+ find_moviesRated(const rating:string &) const: List<Movie>
+ find_movies_released(year: year) const: List<Movie>
+ find_movies_between(year1: int, year2: int) const: List<Movie>
+ print_movies_forward(out: ostream &) const: void
```

# Welcome to the movie information database program.

## Interface

```
Welcome to the movie information database program.
*****
Available Operations:
  1. Add movie
  2. Delete movie
  3. Add cast name to movie
  4. Delete cast name from movie
  5. Find movie
  6. Find movies by actor name
  7. Find movies by rating
  8. Find movies by year
  9. Find movies by time period
 10. Print movies in order
 11. Exit
*****
Enter your option number:
```

## Provided Functions

1. Add Movie
2. Delete Movie
3. Add cast
4. Delete cast
5. Find Movie
6. Find Movie Actor
7. Find Movie Rating
8. Find Movie Year
9. Find Movie Period
10. Print Movies
11. Exit



# Welcome to the movie information database program.

## Interface

```
Welcome to the movie information database program.
*****
Available Operations:
1. Add movie
2. Delete movie
3. Add cast name to movie
4. Delete cast name from movie
5. Find movie
6. Find movies by actor name
7. Find movies by rating
8. Find movies by year
9. Find movies by time period
10. Print movies in order
11. Exit
*****
Enter your option number: 11
Thanks for using movie information database program!
```

Before you Enter the input number 11,  
The Service will not be exterminated.

```
int get_option() {
    int num = 0;
    cout << "Enter your option number: ";
    cin.clear();
    cin >> num;

    if (num == 11) {
        return 0;
    }
    else {
        return num;
    }
}
```



# Ex) 1. Add Movie

```
*****
Enter your option number: 1
Enter the movie information
Enter the movie title: Titanic
Enter the movie year: 1997
Enter the movie duration: 194
Enter the movie rating: G
Enter the cast name list: 2
Leonardo DiCaprio
Kate Winslet
Movie information to be added:
***** Movie Info *****
Movie title: Titanic
Movie year: 1997
Movie duration: 194
Movie rating: G
Movie cast:
Kate Winslet
Leonardo DiCaprio
*****
BST Height: 1
Movie was successfully added.
*****
Available Operations:
1. Add movie
2. Delete movie
```

## Function of 'Add Movie'

- Key: movie title
- Pre order
- Binary Search Tree에서 Key값에 부합하는 값 존재 유무 판단
- 존재하지 않으면, Recursive하게 Movie정보 저장



# Ex) 1. Add Movie

```
*****
Enter your option number: 1
Enter the movie information
Enter the movie title: Titanic
Enter the movie year: 1997
Enter the movie duration: 194
Enter the movie rating: G
Enter the cast name list: 2
Leonardo DiCaprio
Kate Winslet
Movie information to be added:
**** Movie Info ****
Movie title: Titanic
Movie year: 1997
Movie duration: 194
Movie rating: G
Movie cast:
Kate Winslet
Leonardo DiCaprio
*****
BST Height: 1
Movie was successfully added.
*****
Available Operations:
1. Add movie
2. Delete movie
```

Movie
- title: string
- year: int
- duration: int
- rating: string
- castlist: NameList



# Ex) 10. Print movies in order

```
*****  
Enter your option number: 10  
List of movies (in order):  
BST Height: 3  
***** Movie Info *****  
Movie title: 3Idiots  
Movie year: 2009  
Movie duration: 141  
Movie rating: G  
Movie cast:  
Sharman Joshi  
Kareena Kapoor  
Aamir Khan  
*****  
***** Movie Info *****  
Movie title: TheMazeRunner  
Movie year: 2009  
Movie duration: 113  
Movie rating: G  
Movie cast:  
KiHong Lee  
Dylan O'Brien  
*****  
***** Movie Info *****  
Movie title: Titanic  
Movie year: 1997  
Movie duration: 194  
Movie rating: G  
Movie cast:  
Leonardo DiCaprio  
Kate Winslet  
*****  
*****
```



## Function of 'Print movies in order'

- In order
- Binary Search Tree의 data에 순차적 접근
- 저장된 영화 정보 출력



# Ex) 2. Delete movie

```
*****
Available Operations:
  1. Add movie
  2. Delete movie
  3. Add cast name to movie
  4. Delete cast name from movie
  5. Find movie
  6. Find movies by actor name
  7. Find movies by rating
  8. Find movies by year
  9. Find movies by time period
 10. Print movies in order
 11. Exit
*****
Enter your option number: 2
Enter the movie title
Titanic
Searching for movie: Titanic
BST Height: 3
Movie Titanic was successfully deleted.
*****
```

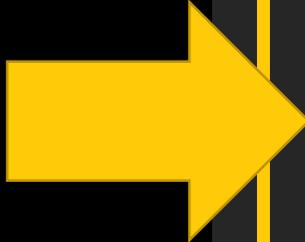
## Function of 'Delete movie'

- Key: movie title
- Pre order
- Binary Search Tree에서 Key값에  
부합하는 값 존재 유무 판단
- 존재하면 Recursive하게 제거



# Ex) 2. Delete movie

```
*****  
Enter your option number: 10  
List of movies (in order):  
BST Height: 3  
***** Movie Info *****  
Movie title: 3Idiots  
Movie year: 2009  
Movie duration: 141  
Movie rating: G  
Movie cast:  
Sharman Joshi  
Kareena Kapoor  
Aamir Khan  
*****  
***** Movie Info *****  
Movie title: TheMazeRunner  
Movie year: 2009  
Movie duration: 113  
Movie rating: G  
Movie cast:  
KiHong Lee  
Dylan O'Brien  
*****  
***** Movie Info *****  
Movie title: Titanic  
Movie year: 1997  
Movie duration: 194  
Movie rating: G  
Movie cast:  
Leonardo DiCaprio  
Kate Winslet  
*****
```



```
*****  
10. Print movies in order  
11. Exit  
*****  
Enter your option number: 10  
List of movies (in order):  
BST Height: 2  
***** Movie Info *****  
Movie title: 3Idiots  
Movie year: 2009  
Movie duration: 141  
Movie rating: G  
Movie cast:  
Aamir Khan  
Kareena Kapoor  
Sharman Joshi  
*****  
***** Movie Info *****  
Movie title: TheMazeRunner  
Movie year: 2009  
Movie duration: 113  
Movie rating: G  
Movie cast:  
KiHong Lee  
Dylan O'Brien  
Kaya Scodelario  
*****  
*****
```



# Ex) 3. Add cast name to movie

```
*****
Available Operations:
 1. Add movie
 2. Delete movie
 3. Add cast name to movie
 4. Delete cast name from movie
 5. Find movie
 6. Find movies by actor name
 7. Find movies by rating
 8. Find movies by year
 9. Find movies by time period
10. Print movies in order
11. Exit
*****
Enter your option number: 3
Enter the movie title: TheMazeRunner
Enter the cast name: Kaya Scodelario
Adding cast name Kaya Scodelario to movie TheMazeRunner
BST Height: 3
Name Kaya Scodelario was successfully added to the cast list for movie TheMazeRunner.
*****
```

## Function of 'Add cast'

- Pre order
- BST 내에 cast가 저장될 movie의 존재 유무 판단
- Circular Doubly Linked Sorted List에 추가하고자 하는 name 존재 유무 판단
- 없으면 Name 추가(sorted)



## Ex) 3. Add cast name to movie

```
*****  
***** Movie Info *****  
Movie title: TheMazeRunner  
Movie year: 2009  
Movie duration: 113  
Movie rating: G  
Movie cast:  
KiHong Lee  
Dylan O'Brien  
*****
```

```
*****  
***** Movie Info *****  
Movie title: TheMazeRunner  
Movie year: 2009  
Movie duration: 113  
Movie rating: G  
Movie cast:  
KiHong Lee  
Dylan O'Brien  
Kaya Scodelario  
*****
```



# Ex) 4. Delete cast name from movie

```
*****
Available Operations:
 1. Add movie
 2. Delete movie
 3. Add cast name to movie
 4. Delete cast name from movie
 5. Find movie
 6. Find movies by actor name
 7. Find movies by rating
 8. Find movies by year
 9. Find movies by time period
10. Print movies in order
11. Exit
*****
Enter your option number: 4
Enter the movie title: Titanic
Enter the cast name: Leonardo DiCaprio
Deleting cast name Leonardo DiCaprio from movie Titanic
BST Height: 3
Name Leonardo DiCaprio was successfully deleted from the cast list for movie Titanic.
*****
```

## Function of 'Delete cast'

- Pre order
- BST 내에 cast가 저장될 movie의 존재 유무 판단
- Circular Doubly Linked Sorted List에 추가하고자 하는 name 존재 유무 판단
- 있으면 Name 제거



## Ex) 4. Delete cast name from movie

```
*****  
***** Movie Info *****  
Movie title: Titanic  
Movie year: 1997  
Movie duration: 194  
Movie rating: G  
Movie cast:  
Leonardo DiCaprio  
Kate Winslet  
*****
```

```
*****  
***** Movie Info *****  
Movie title: Titanic  
Movie year: 1997  
Movie duration: 194  
Movie rating: G  
Movie cast:  
Kate Winslet  
*****
```



# Ex) 5. Find movie

```
*****
Available Operations:
  1. Add movie
  2. Delete movie
  3. Add cast name to movie
  4. Delete cast name from movie
  5. Find movie
  6. Find movies by actor name
  7. Find movies by rating
  8. Find movies by year
  9. Find movies by time period
 10. Print movies in order
 11. Exit
```

```
*****
```

```
Enter your option number: 5
Enter the movie title: Titanic
```

```
Finding movie: Titanic
```

```
BST Height: 3
```

```
***** Movie Info *****
```

```
Movie title: Titanic
```

```
Movie year: 1997
```

```
Movie duration: 194
```

```
Movie rating: G
```

```
Movie cast:
```

```
Kate Winslet
```

```
Leonardo DiCaprio
```

```
*****
```

## Function of 'Find movie'

- Key: title
- Pre order
- BST내에 찾고자 하는 movie의 존재 유무 판단
- 있으면 입력한 title과 일치하는 Movie 정보 출력



# Ex) 6. Find movies by actor name

```
*****
Available Operations:
 1. Add movie
 2. Delete movie
 3. Add cast name to movie
 4. Delete cast name from movie
 5. Find movie
 6. Find movies by actor name
 7. Find movies by rating
 8. Find movies by year
 9. Find movies by time period
10. Print movies in order
11. Exit
*****
Enter your option number: 6
Enter the actor name: KiHong Lee
Finding movies by actor: KiHong Lee
BST Height: 3
***** Movie Info *****
Movie title: TheMazeRunner
Movie year: 2009
Movie duration: 113
Movie rating: G
Movie cast:
KiHong Lee
Dylan O'Brien
*****
```

## Function of 'Find movie by actor name'

- In order
- BST내에 찾고자 하는 movie의 존재 유무 판단
- 있으면 입력한 name과 일치하는 Movie 정보 출력



# Ex) 7. Find movies by rating

```
7. Find movies by rating
8. Find movies by year
9. Find movies by time period
10. Print movies in order
11. Exit
```

```
*****
```

```
Enter your option number: 7
```

```
Enter the movie rating: G
```

```
Finding movies rated: G
```

```
BST Height: 3
```

```
***** Movie Info *****
```

```
Movie title: 3 Idiots
```

```
Movie year: 2009
```

```
Movie duration: 141
```

```
Movie rating: G
```

```
Movie cast:
```

```
Sharman Joshi
```

```
Kareena Kapoor
```

```
Aamir Khan
```

```
*****
```

## Function of 'Find movie by rating'

- In order
- BST내에 찾고자 하는 movie의 존재 유무 판단
- 있으면 입력한 rating과 일치하는 Movie정보 출력



# Ex) 8. Find movies by year

```
*****
Available Operations:
 1. Add movie
 2. Delete movie
 3. Add cast name to movie
 4. Delete cast name from movie
 5. Find movie
 6. Find movies by actor name
 7. Find movies by rating
 8. Find movies by year
 9. Find movies by time period
10. Print movies in order
11. Exit
*****
Enter your option number: 8
Enter the movie year: 1997
Finding movies made in the year: 1997
BST Height: 3
***** Movie Info *****
Movie title: Titanic
Movie year: 1997
Movie duration: 194
Movie rating: G
Movie cast:
Leonardo DiCaprio
Kate Winslet
*****
```

## Function of 'Find movie by year'

- In order
- BST내에 찾고자 하는 movie의 존재 유무 판단
- 있으면 입력한 year와 일치하는 Movie 정보 출력



# Ex) 9. Find movies by time period

```
*****
Enter your option number: 9
Enter the first year: 1998
Enter the second year: 2010
Finding movies maded between the years 1998 and 2010
BST Height: 3
***** Movie Info *****
Movie title: 3ldiots
Movie year: 2009
Movie duration: 141
Movie rating: G
Movie cast:
Sharman Joshi
Kareena Kapoor
Aamir Khan
*****
***** Movie Info *****
Movie title: TheMazeRunner
Movie year: 2009
Movie duration: 113
Movie rating: G
Movie cast:
KiHong Lee
Dylan O'Brien
*****
```

## Function of 'Find movie by time period'

- In order
- BST내에 찾고자 하는 movie의 존재 유무 판단
- 있으면 입력한 time period내에 존재 하는 Movie 정보 출력



# Doubly Linked List

Q. Array? Linked List?

A. Linked List, Array는 index를 알 때 데이터 접근 속도가 빠르다. 그러나 삽입 및 삭제의 경우 Linked List가 훨씬 용이하다.

Q. Linked List? Doubly Linked List?

A. Doubly Linked List, Linked List는 다음 노드에 대한 탐색만 가능하지만, Doubly Linked List는 두 개의 포인터가 있어 앞뒤로 탐색이 가능하다. 따라서 일반적인 Linked List에 비해 효율적인 탐색이 가능하다. (최대 탐색 시간 반으로 단축)

# Binary Search Tree

Q. Binary Search Tree? List?

A. Binary Search Tree, Binary Search Tree는 Binary Search(이진 탐색)와 Linked List(연결 리스트)를 결합한 자료구조의 일종이다. Binary Search Tree의 경우 균형이 잡혀있는 한, 검색 경로가 Linked List 보다 훨씬 짧다.( $O(\log N)$ )

그러나 Name 정보를 다룰 때에는  
검색보다 삽입 및 삭제가 더 빈번하게 발생하므로  
List를 이용하는 것이 더 적절하다고 판단하였다.

Name
- lastname: string
- firstname: string

# User interface

## Movie Database Service

1. Add movie
2. Delete movie
3. Add cast name to movie
4. Delete cast name from movie
5. Find movie
6. Find movies by actor name
7. Find movies by rating
8. Find movies by year
9. Find movies by time period
10. Print movies in order

# User interface

## Movie Database Webpage

1. Add movie

2. Delete movie

3. Add cast name to movie

4. Delete cast name from movie

5. Find movie

6. Find movies by actor name

7. Find movies by rating

8. Find movies by year

9. Find movies by time period

10. Print movies in order

---

Enter the movie title:

Enter the movie year:

Enter the movie duration:

Enter the movie title rating:

Enter the cast name list:



Thank You

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