Database Management System: Movie Collection

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Introduction

The Movie Collection Management System is a user-friendly database project designed for movie enthusiasts and collectors. It enables users to efficiently organize and access their movie collection, including details such as titles, release years, genres, cast and crew information, user ratings, and more. This system simplifies cataloging, searching, and sorting, making it easy to find specific movies, actors, directors, or genres within the collection. Users can also rate movies and assign actors, directors, and genres to each film.

Implementation of the Database and PL/SQL

Database Management System: Oracle

This Movie Collection Management System is built using the Oracle Database Management System, providing robust and reliable data management capabilities for efficient movie collection organization and retrieval.

Programming Language Choice: Python

The PL/SQL implementation is developed using the Python programming language, harnessing its versatility and extensive libraries to create a user-friendly and powerful application for managing movie collections.

Hardware Used

OS Name: Microsoft Windows 11 Home
OS Version: 10.0.22621 N/A Build 22621
OS Manufacturer: Microsoft Corporation
OS Configuration: Standalone Workstation
System Model: HP Pavilion Laptop 14-ce3xxx
System Type: x64-based PC
Processor: Intel(R) Core(TM) i7-1065G7 CPU @ 1.30GHz, 1498 Mhz, 4 Core(s), 8 Logical
Processor(s)
Installed Physical Memory (RAM): 16.0 GB
Total Physical Memory: 15 GB
Available Physical Memory: 5,414 MB
Virtual Memory: Max Size: 18,594 MB
Virtual Memory: Available: 4,849 MB
Virtual Memory: In Use: 13,745 MB

Software Used

IDE: JetBrains PyCharm 2022.2
Python version: Python 3.1.1
Database: Oracle Express Edition 21c, Oracle SQL Developer

ER Diagram
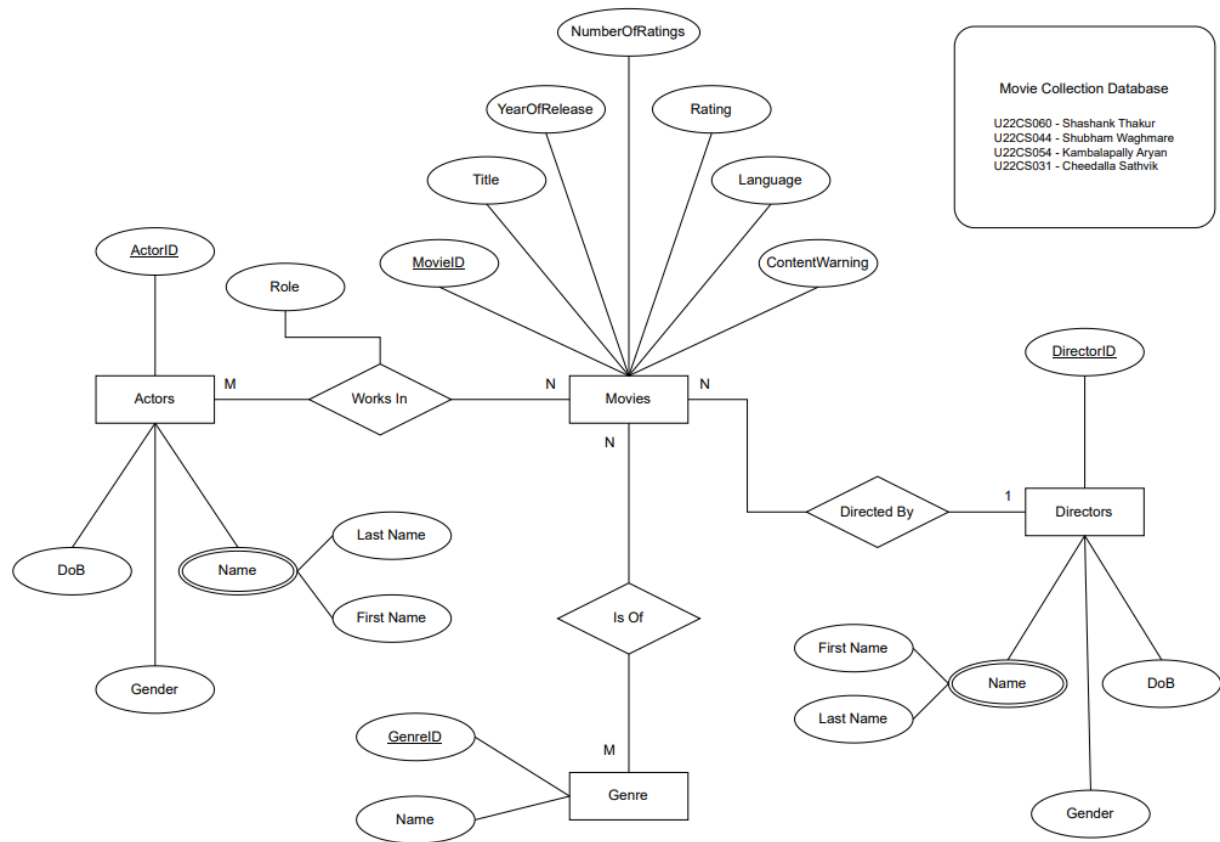
Normalization
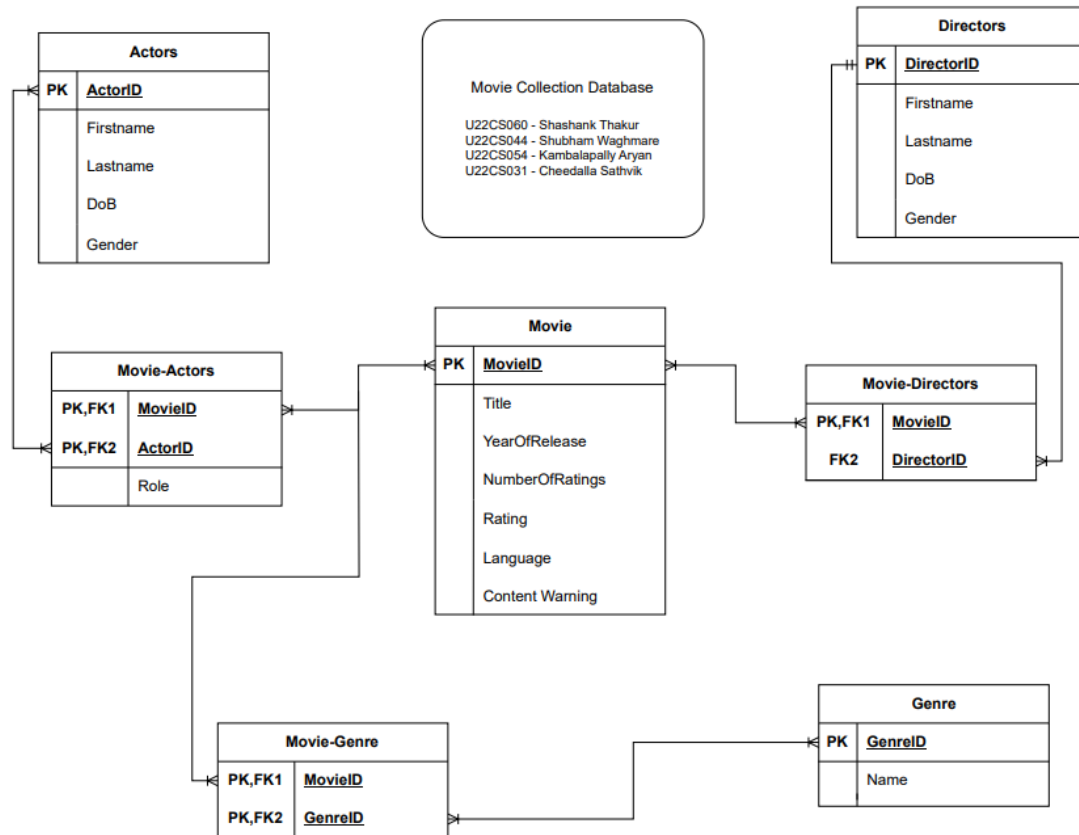
Movie-Genre (Many-to-Many relation):
    MovieID (Foreign Key) -> Movie
    GenreID (Foreign Key) -> Genre

Movie-Actor (Many-to-Many relation):
    MovieID (Foreign Key) -> Movie
    ActorID (Foreign Key) -> Actor
    Role

Movie-Director (Many-to-One relation):
    MovieID (Foreign Key) -> Movie
    DirectorID (Foreign Key) -> Director

Tables

The SQL scripts for creating the tables are in the file named *creation.sql.*

Movie Table

Schema:

```
Name                    Null?       Type
----------------        --------    --------------
MOVIEID                 NOT NULL    NUMBER
TITLE                               VARCHAR2(255)
YEAROFRELEASE                       NUMBER
NUMBEROFRATINGS                     NUMBER
RATING                              NUMBER
LANGUAGE                            VARCHAR2(50)
CONTENTWARNING                      VARCHAR2(100)
```

Table contents:

	MOVIEID	TITLE	YEAROFRELEASE	NUMBEROFRATINGS	RATING	LANGUAGE	CONTENTWARNING
1	1	The Shawshank Redemption	1994	8900	9.3	English	Violence
2	2	The Godfather	1972	8000	9.2	English	Violence
3	3	Pulp Fiction	1994	7600	8.9	English	Strong Language
4	4	The Dark Knight	2008	9200	9	English	Violence
5	5	Forrest Gump	1994	7800	8.8	English	None
6	6	The Matrix	1999	7500	8.7	English	Violence
7	7	Inception	2010	8700	8.8	English	None
8	8	The Lord of the Rings: The Fellowship of the Ring	2001	9200	8.8	English	Fantasy Violence
9	9	Titanic	1997	9300	7.8	English	Nudity
10	10	The Silence of the Lambs	1991	7400	8.6	English	Violence
11	11	The Avengers	2012	8500	8	English	Action Violence
12	12	Interstellar	2014	9100	8.6	English	None
13	13	Gladiator	2000	8200	8.5	English	Violence
14	14	The Social Network	2010	7600	7.7	English	Strong Language
15	15	Avatar	2009	9500	7.8	English	Violence

Director Table

Schema:

```
Name          Null?     Type
-----------   --------  ------------
DIRECTORID    NOT NULL  NUMBER
FIRSTNAME               VARCHAR2(50)
LASTNAME                VARCHAR2(50)
DATEOFBIRTH             DATE
GENDER                  VARCHAR2(10)
```

Table contents:

	DIRECTORID	FIRSTNAME	LASTNAME	DATEOFBIRTH	GENDER
1	1	Frank	Darabont	28-JAN-59	Male
2	2	Francis Ford	Coppola	07-APR-39	Male
3	3	Quentin	Tarantino	27-MAR-63	Male
4	4	Christopher	Nolan	30-JUL-70	Male
5	5	Robert	Zemeckis	14-MAY-51	Male
6	6	Lana	Wachowski	21-JUN-65	Female
7	7	Peter	Jackson	31-OCT-61	Male
8	8	James	Cameron	16-AUG-54	Male
9	9	Jonathan	Demme	22-FEB-44	Male
10	10	Joss	Whedon	23-JUN-64	Male
11	11	Ridley	Scott	30-NOV-37	Male
12	12	David	Fincher	28-AUG-62	Male

Actor Table

Schema:

```
Name               Null?      Type
-----------        --------   ------------
ACTORID            NOT NULL   NUMBER
FIRSTNAME                     VARCHAR2(50)
LASTNAME                      VARCHAR2(50)
DATEOFBIRTH                   DATE
GENDER                        VARCHAR2(10)
```

Table contents:

	ACTORID	FIRSTNAME	LASTNAME	DATEOFBIRTH	GENDER
1	1	Morgan	Freeman	01-JUN-37	Male
2	2	Marlon	Brando	03-APR-24	Male
3	3	John	Travolta	18-FEB-54	Male
4	4	Heath	Ledger	04-APR-79	Male
5	5	Tom	Hanks	09-JUL-56	Male
6	6	Keanu	Reeves	02-SEP-64	Male
7	7	Leonardo	DiCaprio	11-NOV-74	Male
8	8	Elijah	Wood	28-JAN-81	Male
9	9	Jodie	Foster	19-NOV-62	Female
10	10	Robert	Downey Jr.	04-APR-65	Male
11	11	Matthew	McConaughey	04-NOV-69	Male
12	12	Russell	Crowe	07-APR-64	Male
13	13	Jesse	Eisenberg	05-OCT-83	Male
14	14	Sam	Worthington	02-AUG-76	Male

Genre Table

Schema:

```
Name      Null?     Type
-------   --------  -------------
GENREID   NOT NULL  NUMBER
NAME                VARCHAR2(50)
```

Table contents:

	GENREID	NAME
1	1	Drama
2	2	Crime
3	3	Action
4	4	Adventure
5	5	Comedy
6	6	Sci-Fi
7	7	Adventure
8	8	Romance
9	9	Crime
10	10	Biography

Movie-DirectorTable

Schema:

```
Name        Null?     Type
----------  --------  ------
MOVIEID     NOT NULL  NUMBER
DIRECTORID  NOT NULL  NUMBER
```

Table contents:

	MOVIEID	DIRECTORID
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	4
8	8	7
9	9	8
10	10	9
11	11	10
12	12	4
13	13	11
14	14	12
15	15	8

Movie-Actor Table

Schema:

```
Name       Null?      Type
-------    --------   ------------
MOVIEID    NOT NULL   NUMBER
ACTORID    NOT NULL   NUMBER
ROLE                  VARCHAR2(50)
```

Table contents:

	MOVIEID	ACTORID	ROLE
1	1	1	Lead Actor
2	2	2	Lead Actor
3	3	3	Lead Actor
4	4	4	Lead Actor
5	5	5	Lead Actor
6	6	6	Lead Actor
7	7	7	Lead Actor
8	8	8	Lead Actor
9	9	7	Lead Actor
10	10	9	Lead Actor
11	11	10	Lead Actor
12	12	11	Lead Actor
13	13	12	Lead Actor
14	14	13	Lead Actor
15	15	14	Lead Actor

Movie-Genre Table

Schema:

```
Name     Null?     Type
-------  --------  ------
MOVIEID  NOT NULL  NUMBER
GENREID  NOT NULL  NUMBER
```

Table contents:

MOVIEID	GENREID
1	1
2	2
3	1
4	3
4	2
5	1
5	8
6	3
6	6
7	3
7	4
8	4
9	1
9	8
10	2
10	7
11	3
11	4
11	6
12	6
12	4
13	3
13	4
13	1
14	10
14	1
15	3
15	4
15	6

PL/SQL Through Python Scripts

The PL/SQL implemented in Oracle SQL script is in the file called *plsql.sql*
The python implementation is in the file named *main.py*

```
PS C:\Users\Shash\Desktop> python main1.py
+--------+----------------------------------+
| Option | Action                           |
+--------+----------------------------------+
| 1      | Add New Movie                    |
| 2      | Add New Actor                    |
| 3      | Add New Director                 |
| 4      | Assign Actor to Movie            |
| 5      | Assign Director to Movie         |
| 6      | Assign Genre to Movie            |
| 7      | Add Movie Rating                 |
| 8      | Display Top Rated Movies         |
| 9      | Search Movies by Title           |
| 10     | Search Movies by Genre           |
| 11     | Search Movies by Actor           |
| 12     | Search Movies by Director         |
| 13     | Search Movies by Rating Range    |
| 14     | Display all Movies               |
| 15     | Display all Actors               |
| 16     | Display all Directors            |
| 17     | Display all Genres               |
| 0      | Exit                             |
+--------+----------------------------------+

Enter your choice: |
```

Adding a new movie

```
PS C:\Users\Shash\Desktop> python main1.py
+--------+-----------------------------+
| Option | Action                      |
+--------+-----------------------------+
| 1      | Add New Movie               |
| 2      | Add New Actor               |
| 3      | Add New Director            |
| 4      | Assign Actor to Movie       |
| 5      | Assign Director to Movie    |
| 6      | Assign Genre to Movie       |
| 7      | Add Movie Rating            |
| 8      | Display Top Rated Movies    |
| 9      | Search Movies by Title      |
| 10     | Search Movies by Genre      |
| 11     | Search Movies by Actor      |
| 12     | Search Movies by Director   |
| 13     | Search Movies by Rating Range |
| 14     | Display all Movies          |
| 15     | Display all Actors          |
| 16     | Display all Directors       |
| 17     | Display all Genres          |
| 0      | Exit                        |
+--------+-----------------------------+

Enter your choice: 1


Enter the movie ID: 16
Enter the movie title: Shutter Island
Enter the year of release: 2010
Enter the language: English
Enter content warning: Nudity


Movie added successfully.
```

Assigning an actor to the movie

```
+--------+-----------------------------+
| Option | Action                      |
+--------+-----------------------------+
| 1      | Add New Movie               |
| 2      | Add New Actor               |
| 3      | Add New Director            |
| 4      | Assign Actor to Movie       |
| 5      | Assign Director to Movie    |
| 6      | Assign Genre to Movie       |
| 7      | Add Movie Rating            |
| 8      | Display Top Rated Movies    |
| 9      | Search Movies by Title      |
| 10     | Search Movies by Genre      |
| 11     | Search Movies by Actor      |
| 12     | Search Movies by Director   |
| 13     | Search Movies by Rating Range |
| 14     | Display all Movies          |
| 15     | Display all Actors          |
| 16     | Display all Directors       |
| 17     | Display all Genres          |
| 0      | Exit                        |
+--------+-----------------------------+

Enter your choice: 4


Enter the MovieID: 16
Enter the ActorID: 7
Enter the role of the actor in the movie: Lead Actor


Actor assigned to the movie successfully.
```

MovieID 16 is the new movie we just created, Shutter Island.
ActorID 7 is Leonardo Di Caprio, the lead actor of the movie.

Creating a new Director

```
+--------+------------------------------+
| Option | Action                       |
+--------+------------------------------+
| 1      | Add New Movie                |
| 2      | Add New Actor                |
| 3      | Add New Director             |
| 4      | Assign Actor to Movie        |
| 5      | Assign Director to Movie     |
| 6      | Assign Genre to Movie        |
| 7      | Add Movie Rating             |
| 8      | Display Top Rated Movies     |
| 9      | Search Movies by Title       |
| 10     | Search Movies by Genre       |
| 11     | Search Movies by Actor       |
| 12     | Search Movies by Director    |
| 13     | Search Movies by Rating Range |
| 14     | Display all Movies           |
| 15     | Display all Actors           |
| 16     | Display all Directors        |
| 17     | Display all Genres           |
| 0      | Exit                         |
+--------+------------------------------+

Enter your choice: 3


Enter the director's ID: 13
Enter the director's first name: Martin
Enter the director's last name: Scorsese
Enter the director's date of birth (YYYY-MM-DD): 1942-11-17
Enter the director's gender: Male


Director added successfully.
```

Martin Scorsese is the director of the movie Shutter Island. This director wasn't already in the database so we had to create a new entry for the director, with directorID 13.

Assigning the director to the movie

```
+--------+-----------------------------------+
| Option | Action                            |
+--------+-----------------------------------+
| 1      | Add New Movie                     |
| 2      | Add New Actor                     |
| 3      | Add New Director                  |
| 4      | Assign Actor to Movie             |
| 5      | Assign Director to Movie          |
| 6      | Assign Genre to Movie             |
| 7      | Add Movie Rating                  |
| 8      | Display Top Rated Movies          |
| 9      | Search Movies by Title            |
| 10     | Search Movies by Genre            |
| 11     | Search Movies by Actor            |
| 12     | Search Movies by Director         |
| 13     | Search Movies by Rating Range     |
| 14     | Display all Movies                |
| 15     | Display all Actors                |
| 16     | Display all Directors             |
| 17     | Display all Genres                |
| 0      | Exit                              |
+--------+-----------------------------------+

Enter your choice: 5


Enter the MovieID: 16
Enter the DirectorID: 13


Director assigned to the movie successfully.
```

Assigning a genre to the movie

```
+--------+------------------------------+        +--------+------------------------------+
| Option | Action                       |        | Option | Action                       |
+--------+------------------------------+        +--------+------------------------------+
| 1      | Add New Movie                |        | 1      | Add New Movie                |
| 2      | Add New Actor                |        | 2      | Add New Actor                |
| 3      | Add New Director             |        | 3      | Add New Director             |
| 4      | Assign Actor to Movie        |        | 4      | Assign Actor to Movie        |
| 5      | Assign Director to Movie     |        | 5      | Assign Director to Movie     |
| 6      | Assign Genre to Movie        |        | 6      | Assign Genre to Movie        |
| 7      | Add Movie Rating             |        | 7      | Add Movie Rating             |
| 8      | Display Top Rated Movies     |        | 8      | Display Top Rated Movies     |
| 9      | Search Movies by Title       |        | 9      | Search Movies by Title       |
| 10     | Search Movies by Genre       |        | 10     | Search Movies by Genre       |
| 11     | Search Movies by Actor       |        | 11     | Search Movies by Actor       |
| 12     | Search Movies by Director    |        | 12     | Search Movies by Director    |
| 13     | Search Movies by Rating Range|        | 13     | Search Movies by Rating Range|
| 14     | Display all Movies           |        | 14     | Display all Movies           |
| 15     | Display all Actors           |        | 15     | Display all Actors           |
| 16     | Display all Directors        |        | 16     | Display all Directors        |
| 17     | Display all Genres           |        | 17     | Display all Genres           |
| 0      | Exit                         |        | 0      | Exit                         |
+--------+------------------------------+        +--------+------------------------------+

Enter your choice: 6                             Enter your choice: 6


Enter the MovieID: 16                            Enter the MovieID: 13
Enter the GenreID: 1                             Enter the GenreID: 2


Genre assigned to the movie successfully.        Genre assigned to the movie successfully.
```

We have assigned two genres to the movie: Drama and Crime, with GenreIDs 1 and 2 respectively.

Addin a rating to the movie

```
+--------+----------------------------------+
| Option | Action                           |
+--------+----------------------------------+
| 1      | Add New Movie                    |
| 2      | Add New Actor                    |
| 3      | Add New Director                 |
| 4      | Assign Actor to Movie            |
| 5      | Assign Director to Movie         |
| 6      | Assign Genre to Movie            |
| 7      | Add Movie Rating                 |
| 8      | Display Top Rated Movies         |
| 9      | Search Movies by Title           |
| 10     | Search Movies by Genre           |
| 11     | Search Movies by Actor           |
| 12     | Search Movies by Director        |
| 13     | Search Movies by Rating Range    |
| 14     | Display all Movies               |
| 15     | Display all Actors               |
| 16     | Display all Directors            |
| 17     | Display all Genres               |
| 0      | Exit                             |
+--------+----------------------------------+

Enter your choice: 7


Enter MovieID for rating: 16
Enter the new rating: 8.2


Rating added successfully.
```

We have added a rating of 8.2 to the movie.

Result of the PL/SQL through Python

	MOVIEID	TITLE	YEAROFRELEASE	NUMBEROFRATINGS	RATING	LANGUAGE	CONTENTWARNING
1	1	The Shawshank Redemption	1994	8900	9.3	English	Violence
2	2	The Godfather	1972	8000	9.2	English	Violence
3	3	Pulp Fiction	1994	7600	8.9	English	Strong Language
4	4	The Dark Knight	2008	9200	9	English	Violence
5	5	Forrest Gump	1994	7800	8.8	English	None
6	6	The Matrix	1999	7500	8.7	English	Violence
7	7	Inception	2010	8700	8.8	English	None
8	8	The Lord of the Rings: The Fellowship of the Ring	2001	9200	8.8	English	Fantasy Violence
9	9	Titanic	1997	9300	7.8	English	Nudity
10	10	The Silence of the Lambs	1991	7400	8.6	English	Violence
11	11	The Avengers	2012	8500	8	English	Action Violence
12	16	Shutter Island	2010	1	8.2	English	Nudity
13	12	Interstellar	2014	9100	8.6	English	None
14	13	Gladiator	2000	8200	8.5	English	Violence
15	14	The Social Network	2010	7600	7.7	English	Strong Language
16	15	Avatar	2009	9500	7.8	English	Violence

	DIRECTORID	FIRSTNAME	LASTNAME	DATEOFBIRTH	GENDER
1	1	Frank	Darabont	28-JAN-59	Male
2	2	Francis Ford	Coppola	07-APR-39	Male
3	3	Quentin	Tarantino	27-MAR-63	Male
4	4	Christopher	Nolan	30-JUL-70	Male
5	5	Robert	Zemeckis	14-MAY-51	Male
6	6	Lana	Wachowski	21-JUN-65	Female
7	13	Martin	Scorsese	17-NOV-42	Male
8	7	Peter	Jackson	31-OCT-61	Male
9	8	James	Cameron	16-AUG-54	Male
10	9	Jonathan	Demme	22-FEB-44	Male
11	10	Joss	Whedon	23-JUN-64	Male
12	11	Ridley	Scott	30-NOV-37	Male
13	12	David	Fincher	28-AUG-62	Male

```
+--------+------------------------------+
| Option | Action                       |
+--------+------------------------------+
| 1      | Add New Movie                |
| 2      | Add New Actor                |
| 3      | Add New Director             |
| 4      | Assign Actor to Movie        |
| 5      | Assign Director to Movie     |
| 6      | Assign Genre to Movie        |
| 7      | Add Movie Rating             |
| 8      | Display Top Rated Movies     |
| 9      | Search Movies by Title       |
| 10     | Search Movies by Genre       |
| 11     | Search Movies by Actor       |
| 12     | Search Movies by Director    |
| 13     | Search Movies by Rating Range|
| 14     | Display all Movies           |
| 15     | Display all Actors           |
| 16     | Display all Directors        |
| 17     | Display all Genres           |
| 0      | Exit                         |
+--------+------------------------------+

Enter your choice: 12


Enter the director name to search for: Martin

Movies matching the director:
+----------+----------------+
| MovieID  |     Title      |
+----------+----------------+
|    16    | Shutter Island |
+----------+----------------+
```

```
+--------+--------------------------------+
| Option | Action                         |
+--------+--------------------------------+
| 1      | Add New Movie                  |
| 2      | Add New Actor                  |
| 3      | Add New Director               |
| 4      | Assign Actor to Movie          |
| 5      | Assign Director to Movie       |
| 6      | Assign Genre to Movie          |
| 7      | Add Movie Rating               |
| 8      | Display Top Rated Movies       |
| 9      | Search Movies by Title         |
| 10     | Search Movies by Genre         |
| 11     | Search Movies by Actor         |
| 12     | Search Movies by Director      |
| 13     | Search Movies by Rating Range  |
| 14     | Display all Movies             |
| 15     | Display all Actors             |
| 16     | Display all Directors          |
| 17     | Display all Genres             |
| 0      | Exit                           |
+--------+--------------------------------+

Enter your choice: 11


Enter the actor name to search for: Leonardo

Movies matching the actor:
+----------+----------------+
| MovieID  |     Title      |
+----------+----------------+
|    7     |   Inception    |
|    9     |    Titanic     |
|    16    | Shutter Island |
+----------+----------------+
```

```
+--------+-------------------------------+        +--------+-------------------------------+
| Option | Action                        |        | Option | Action                        |
+--------+-------------------------------+        +--------+-------------------------------+
| 1      | Add New Movie                 |        | 1      | Add New Movie                 |
| 2      | Add New Actor                 |        | 2      | Add New Actor                 |
| 3      | Add New Director              |        | 3      | Add New Director              |
| 4      | Assign Actor to Movie         |        | 4      | Assign Actor to Movie         |
| 5      | Assign Director to Movie      |        | 5      | Assign Director to Movie      |
| 6      | Assign Genre to Movie         |        | 6      | Assign Genre to Movie         |
| 7      | Add Movie Rating              |        | 7      | Add Movie Rating              |
| 8      | Display Top Rated Movies      |        | 8      | Display Top Rated Movies      |
| 9      | Search Movies by Title        |        | 9      | Search Movies by Title        |
| 10     | Search Movies by Genre        |        | 10     | Search Movies by Genre        |
| 11     | Search Movies by Actor        |        | 11     | Search Movies by Actor        |
| 12     | Search Movies by Director     |        | 12     | Search Movies by Director     |
| 13     | Search Movies by Rating Range |        | 13     | Search Movies by Rating Range |
| 14     | Display all Movies            |        | 14     | Display all Movies            |
| 15     | Display all Actors            |        | 15     | Display all Actors            |
| 16     | Display all Directors         |        | 16     | Display all Directors         |
| 17     | Display all Genres            |        | 17     | Display all Genres            |
| 0      | Exit                          |        | 0      | Exit                          |
+--------+-------------------------------+        +--------+-------------------------------+

Enter your choice: 13                             Enter your choice: 10


Enter the minimum rating: 8.0                     Enter the genre name to search for: Drama
Enter the maximum rating: 8.5
                                                  Movies matching the genre:
Movies in the specified rating range:             +----------+----------------------------+
+----------+------------------+--------+          | MovieID  |          Title             |
| MovieID  |      Title       | Rating |          +----------+----------------------------+
+----------+------------------+--------+          |    1     |  The Shawshank Redemption  |
|    11    |   The Avengers   |   8    |          |    3     |        Pulp Fiction        |
|    16    |  Shutter Island  |  8.2   |          |    5     |        Forrest Gump        |
|    13    |    Gladiator     |  8.5   |          |    9     |          Titanic           |
+----------+------------------+--------+          |    16    |       Shutter Island       |
                                                  |    13    |         Gladiator          |
                                                  |    14    |     The Social Network     |
                                                  +----------+----------------------------+
```