GTU
Department of Computer Engineering
CSE 414 - Spring 2022
Project Report

Movie Management System

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1) Project Definition

Project aims to making a movie database management system for users interactively. Project contains different types of users, actors , movies, tv shows, directors, and their information. Project has capabilities for enlarging the datas within time.

Movies has very important role in our life more than hundred years, and they have very big economic capabilities in world. Project tries to give general idea about these important topics and datas.

Project provides different operations about movies and also tv shows. Their features are taken into account for this project. Project consists different database mangement techniques with this topic.

2) User Requirements

General user requirements:

- Users can enter to system with using their informations
- Users can list the different tables on UI with using the menu of the views
- Users can make searching informations about movies at least 5 different search type on dataset with using search menu
- Users can add new data to the database with using add data menu with entering manuel informations.
- Users can see their manually added datas from views.
- Users can search for their manually added datas from search menu.
- Users can navigate between menus and can exit anytime they want.

3) E-R Diagram of System

Project ER diagram as below, tried to show it organized as possible , showed primary keys and relations clearly. Table entities also shown.
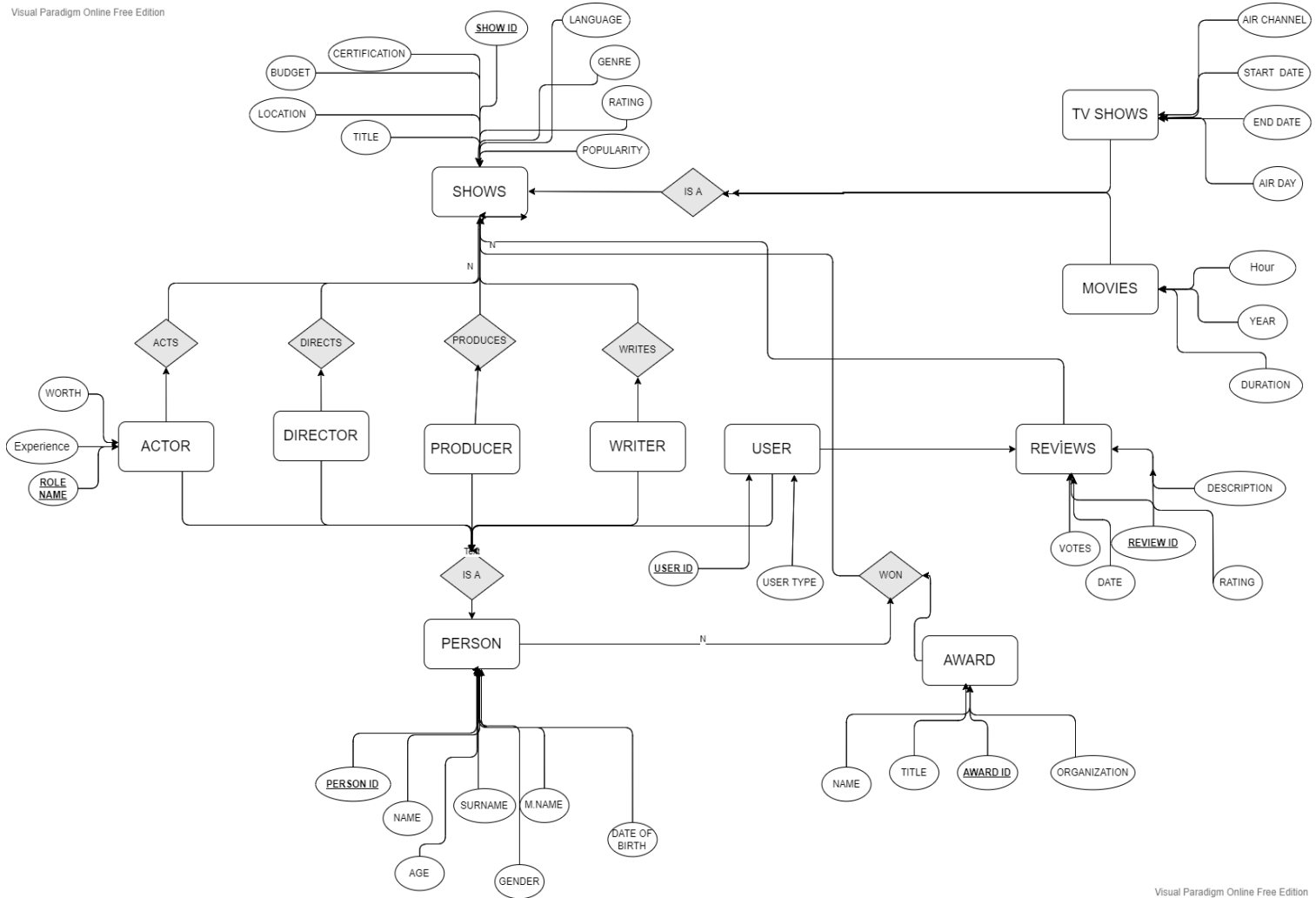
4) Normalization

Normalization is the process of organizing the data in the database. Normalization is used to minimize the redundancy from a relation or set of relations. It is also used to eliminate undesirable characteristics like Insertion, update, and deletion anomalies. It divides the larger table into smaller and links them using relationships. Tried to use the normal forms for the reducing the redundancy in database. Made examples below for the normal forms and their examples from the database.

- **First normal form (1NF):** For the first normal form tried to make each attribute of a tables have single values for atomicity as for the rule of the 1NF.

Person_Id	Worth	StartDate
1	90	1969
2	300	1970
3	30	2000
5	28	2004
6	10	2004
8	15	1995
9	3	2013
10	6	2008
11	13	2009
21	16	2004
22	50	1995
23	20	2013
24	60	2008
25	50	2009
26	10	2009
30	14657575	1989

This actor table from database follows the 1 Normal form, with has one value for every attributes as for atomacity.   All of database follows this. Colums are unique and their values are compatible with them with no duplicate.

- **Second normal form (2NF):** For the Second normal form tried to make table compatible with the 1NF initially for the rule of 2NF. Then looked at the dependent non prime attributes, and prevented them to recurrence in one table. Tried to divide tables if I saw condition like this.

Show_Id	Duration	Year
1	109	2006
2	147	2016
3	90	2018
4	141	2022
5	128	2016
12	95	2003
13	95	2010
14	95	2010
15	95	2010
16	105	2017
17	149	2018

This movies table satisfies the 2NF, because all attributes are full funct. Dependent on primary key, and so no partial dependency in this table.

- **Third Normal form (3NF):** For the Third normal form tried to make table compatible with the 1NF and 2NF initially for the rule of 3NF. Then I tried to focus transitive dependency on superkeys of table. Then decided to divide some tables to comply with rule.

Show_Id	Duration	Year
1	109	2006
2	147	2016
3	90	2018
4	141	2022
5	128	2016
12	95	2003
13	95	2010
14	95	2010
15	95	2010
16	105	2017
17	149	2018

This movies table satisfies the 3NF, because there is trivial functional dependency with primarykey show_id, and so no transitive dependency in this table.

- **4th Normal Form** (Additional case for Project): A relation will be in 4NF if it is in Boyce Codd normal form and has no multi-valued dependency. For a dependency A → B, if for a single value of A, multiple values of B exists, then the relation will be a multi-valued dependency.

  When we decompose the Awards table Shows table , and connected them in Shows nominated table , they follows the BCNF , and also they doesn't have multivalued dependency.

Show_Id	Title	Language	Rating	Certification	Budget
1	The Shawshank Redemption	English	9.3	PG-13	35000000
2	Avengers:End Game	English	8.5	PG-13	850000000
3	Avengers: Infinity War	English	8.3	PG-13	321000000
4	A Quiet Place	English	7.6	PG-15	17000000
5	The Dark Knight	English	9	PG-13	30000000
6	Last Dance	English	9.1	TV-14	123674
7	Game of Thrones	English	9.5	TV-MA	2343231
8	Breaking Bad	English	9.5	TV-MA	NULL
9	Chernobyl	English	9.3	TV-PG	123232
10	Sherlock	English	8.6	TV-14	64654
11	Rick and Morty	English	9.1	TV-14	NULL
12	Se7en	English	8.8	PG	62000000
13	Fight Club	English	8.9	PG	175070000
14	Pulp Fiction	English	8.6	R	18000000
15	Before We Go	English	6.8	PG-13	NULL
16	I am a Legend	English	7.4	PG	11000000
17	Black Panther	English	7.9	PG-13	123000000
18	Lord Of The Rings	English	9	PG	57000000
19	Avatar	English	7.2	PG	978000000
20	Inception	English	8.9	PG-13	290000000
21	Shutter Island	English	8.6	PG-15	263000
26	Gotfather	English	8.6	PG	263000
27	Star Wars	English	8.5	PG	23487422

Shows Table

Show_Id	Award_Id
4	13
5	9
5	10
6	15
7	14
10	4
13	3

ShowsNominated Table

Award_Id	Name	Title	Year
1	Golden Globe	Best Actress in Support Role	2015
2	Oscar	Best Actress in Support Role	2015
3	Oscar	Best Picture	2015
4	Oscar	Best Animated Feature Film	2022
5	Oscar	Best Actress	2022
6	Oscar	Best Film Music	2022
7	Oscar	Best Short Movie	2022
8	Oscar	Best Actress	2022
9	Oscar	Best Director	2022
10	Golden Globe	Best Actress in Support Role	2022
11	Oscar	Best Cinematography	2022
12	Oscar	Best Director	2022
13	Oscar	Best Picture	2022
14	Oscar	Best Actor	2022
15	Oscar	Best Costume Design	2022
16	Oscar	Best Actor in Support Role	2022
17	Oscar	Best Actor in Support Role	2022
18	Critics Choice	Best Picture	2016
19	Critics Choice	Best Movie	2022
20	Golden Globe	Best TV Series - Drama	2022
21	Critics Choice	Best Drama Series	2022
22	Critics Choice	Best Support Actor	2022

Awards Table

5) Tables with Functional Dependencies
*Listed tables and functional dependencies around them.

Shows Table

Show_Id	Title	Language	Rating	Certification	Budget	Popularity	Location
1	The Shawshank Redemption	English	9.3	PG-13	35000000	350.93	USA
2	Avengers:End Game	English	8.5	PG-13	850000000	8500.85	USA
3	Avengers: Infinity War	English	8.3	PG-13	321000000	3210.83	USA
4	A Quiet Place	English	7.6	PG-15	17000000	170.76	USA
5	The Dark Knight	English	9	PG-13	30000000	300.9	USA
6	Last Dance	English	9.1	TV-14	6709874	68.0087	USA
7	Game of Thrones	English	9.5	TV-MA	98709874	988.049	USA
8	Breaking Bad	English	9.5	TV-MA	528874	6.23874	USA
9	Chernobyl	English	9.3	TV-PG	129874	2.22874	USA
10	Sherlock	English	8.6	TV-14	769874	8.55874	USA
11	Rick and Morty	English	9.1	TV-14	879874	9.70874	USA
12	Se7en	English	8.8	PG	62000000	620.88	USA
13	Fight Club	English	8.9	PG	175070000	1751.59	USA
14	Pulp Fiction	English	8.6	R	18000000	180.86	USA
15	Before We Go	English	6.8	PG-13	209874	2.77874	USA
16	I am a Legend	English	7.4	PG	11000000	110.74	USA
17	Black Panther	English	7.9	PG-13	123000000	1230.79	USA
18	Lord Of The Rings	English	9	PG	57000000	570.9	USA
19	Avatar	English	7.2	PG	978000000	9780.72	USA
20	Inception	English	8.9	PG-13	290000000	2900.89	USA

{Show_ID, Title} → Language, Rating, Certification, Budget

,Title,Popularity,location,

{ Language, Rating, Certification, Budget,Popularity,Location }

Show_ID → Title, Language, Rating, Certification, Budget.

Genres Table

Genre_Id	Name
1	Action
2	Comedy
3	SCI-FI
4	Romance
5	Drama
6	Adventure
7	Family
8	Mystery
9	Musical
10	Fantasy
11	Animation
12	Horror

GenreID → Name

Person Table

Person_Id	Gender	First_Name	Middle_Name	Last_Name	DOB
3	F	Demet	NULL	Akbag	1959-01-23
4	F	Adile	NULL	Nasit	1939-01-23
5	M	Tuncel	NULL	Kurtiz	1979-10-20
6	F	Anna	Taylor	Joy	1988-06-26
7	F	Emily	NULL	Blunt	1983-01-23
8	M	Chris	NULL	Evans	1981-03-13
9	M	Tom	NULL	Holland	1997-08-26
10	M	Robert	Downey	Jr	1965-04-04
11	M	Ryan	NULL	Gosling	1980-11-12
12	F	Margot	NULL	Robbie	1990-06-02
13	F	Sienna	NULL	Miller	1980-04-11
14	F	Emma	NULL	Stone	1988-11-06
15	F	Gal	NULL	Gadot	1985-04-30
16	M	Tom	NULL	Hanks	1969-10-20
17	F	Jennifer	NULL	Lawrence	1982-07-24
18	M	Matt	NULL	Damon	1971-07-24
19	F	Turkan	NULL	Soray	1979-10-20
20	F	Jennifer	Brown	Aniston	1977-07-24
21	M	Robert	NULL	Pattinson	1971-07-24
22	M	Damien	NULL	Chazelle	1985-01-19
23	M	Ramin	NULL	Djawadi	1974-07-14
24	M	Brad	NULL	Pitt	1984-02-15
25	F	Emilia	NULL	Clarke	1971-07-24

PersonID→Gender,Fname,Mname,Lname,DOB

Actor Table

Person_Id	Worth	StartDate
1	90	1969
2	300	1970
3	30	2000
5	28	2004
6	10	2004
8	15	1995
9	3	2013
10	6	2008
11	13	2009
21	16	2004
22	50	1995
23	20	2013
24	60	2008
25	50	2009
26	10	2009
30	14657575	1989

PersonID→ Worth,StartDate

Acting Table

Actor_Id	Show_Id	Role_First_Name	Role_Last_Name
2	2	Tony	Stark
2	12	Tony	Stark
3	3	Don	Carlone
3	11	Jim	Halpert
5	5	Mia	Cheby
5	13	Samy	Joe
6	4	Hermonie	Granger
8	7	Gandalf	NULL
9	6	Black	Panther
10	8	Ginny	Williams
11	7	Daenerys	Targaryen
21	1	Emily	NULL
21	3	Jack	Carlone
22	2	Steve	Rogers
22	12	Steve	Rogers
22	14	Nick	NULL
23	4	Steve	Trevor
24	5	Sebastian	Vettel
24	17	Noah	NULL
25	9	Fiona	NULL
25	11	Michael	Scott
26	15	Rebecca	Pearson
26	16	Jamie	Sullivan

ActorID → RoleFname, RoleFname

Director Table

Person_Id	Direction_Type	StartDate
3	Movie	2010
4	Movie	1994
7	Movie	1995
12	Movie	2009
13	Music	1998
14	Movie	2005
15	Movie	2005
22	Movie	2014
28	Movie	1994
29	Movie	1989
31	Movie	1987

PersonID → DirectionType, StartDate

Awards Table

Award_Id	Name	Title	Year
1	Golden Globe	Best Actress in Support Role	2015
2	Oscar	Best Actress in Support Role	2015
3	Oscar	Best Picture	2015
4	Oscar	Best Animated Feature Film	2022
5	Oscar	Best Actress	2022
6	Oscar	Best Film Music	2022
7	Oscar	Best Short Movie	2022
8	Oscar	Best Actress	2022
9	Oscar	Best Director	2022
10	Golden Globe	Best Actress in Support Role	2022
11	Oscar	Best Cinematography	2022
12	Oscar	Best Director	2022
13	Oscar	Best Picture	2022
14	Oscar	Best Actor	2022
15	Oscar	Best Costume Design	2022
16	Oscar	Best Actor in Support Role	2022
17	Oscar	Best Actor in Support Role	2022
18	Critics Choice	Best Picture	2016
19	Critics Choice	Best Movie	2022
20	Golden Globe	Best TV Series - Drama	2022
21	Critics Choice	Best Drama Series	2022
22	Critics Choice	Best Support Actor	2022

Award ID → Name, Title, Year

Movies Table

Show_Id	Duration	Year
1	109	2006
2	147	2016
3	90	2018
4	141	2022
5	128	2016
12	95	2003
13	95	2010
14	95	2010
15	95	2010
16	105	2017
17	149	2018

ShowID → Duration,Year

Tv Series Table

Show_Id	Start_date	End_date	Air_Channel	Air_Day
6	2020-07-15	2020-07-15	Netflix	Wednesday
7	2014-04-06	2019-06-28	HBO	Sunday
8	2013-04-06	2018-06-20	Exxen	Sunday
9	2019-04-06	2022-08-25	BluTv	Sunday
10	2018-04-06	2020-04-12	Disney+	Sunday
11	2015-09-20	2019-06-10	Amazon	Tuesday

ShowID → StartDate,EndDate,AirChannel,AirDay

Review Table

Review_Id	User_Name	Show_Id	UpVotes	DownVotes	Rating	Review_Description	Review_Date
1	jennifer	1	5	0	5	very good movie, must watch	2018-09-15
2	kristen	4	5	0	5	the best female superhero movie of all timer	2022-07-15
3	jennifer	6	5	0	5	Best show i have ever seen	2016-04-15
4	kristen	2	5	0	5	the best marvel movie so far	2022-07-15

ReviewID→ ShowID,UpVote,DownVote,Rating,ReviwDescription,ReviewDate

{ReviewID ,ShowID}→ UpVote,DownVote,Rating,ReviwDescription,ReviewDate

Users Table

User_Id	User_Name	Pswrd
1	admin	0
2	bond	7
3	kristen	1234
4	jennifer	1234

User_Id→User_Name , Pswrd

Award Table

Award_Id	Name	Title	Year
1	Golden Globe	Best Actress in Support Role	2015
2	Oscar	Best Actress in Support Role	2015
3	Oscar	Best Picture	2015
4	Oscar	Best Animated Feature Film	2022
5	Oscar	Best Actress	2022
6	Oscar	Best Film Music	2022
7	Oscar	Best Short Movie	2022
8	Oscar	Best Actress	2022
9	Oscar	Best Director	2022
10	Golden Globe	Best Actress in Support Role	2022
11	Oscar	Best Cinematography	2022
12	Oscar	Best Director	2022
13	Oscar	Best Picture	2022
14	Oscar	Best Actor	2022
15	Oscar	Best Costume Design	2022
16	Oscar	Best Actor in Support Role	2022
17	Oscar	Best Actor in Support Role	2022
18	Critics Choice	Best Picture	2016
19	Critics Choice	Best Movie	2022
20	Golden Globe	Best TV Series - Drama	2022
21	Critics Choice	Best Drama Series	2022
22	Critics Choice	Best Support Actor	2022

Award_Id →Name,Title, Year

Shows Nominated Table

Show_Id	Award_Id
4	13
5	9
5	10
6	15
7	14
10	4
13	3

Show_Id→Award_Id
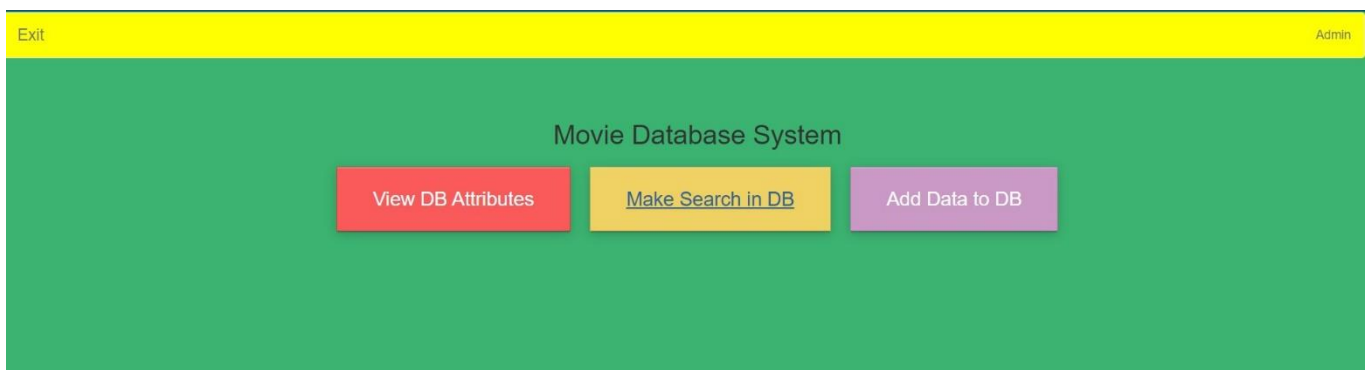
6) User Interface for System

Created an user interface with php and mysql languages. Tried to make it simple user interface because not have much experience also with theese languages. For servering used xamp program. Created database using the sql then used it with connecting from php and it's query engine. Made login page, users can login with their username and passwords. User interface has operations for view, search and adding data. All of them interactive, they start with buttons. For views buttons starts queries , for search and add operations after input submitted queries working background. On views page used prepared views.

- Login page: Users enters their informations to login system.

- Main page: Users can navigate for three main menu.

- Views page: Users can view different tables info.

Database View Operations

| View Movies | View TV Shows | View Actors | View Directors |

| View Persons | View Reviews |

- Search page: User can search in DB with 6 different transaction.

Database Search Operations

| Search Actor's Shows | Search Director's Shows | Search Movie's Actors |

| Search highest budget Movie | Search Movie by year | Search Movie by Genre |

- Add data page: User can add new datas to database as

Database Add Operations

| Add Movie | Add Actor | Add Director |

7) Outer Queries

Made three of outer joins as below instances. Background running queries also added on top of tables.

- Outer right: The right outer join preserves tuples only in the relation named after (to the right of) the right outer join operation.

```
SELECT * FROM shows s1 Right Outer Join tvseries t1 ON t1.Show_ID = s1.Show_Id;
```

Success

TV Show	Rating	Air Channel	Language	Start Date	Certification
Last Dance	9.1	Netflix	English	2020-07-15	TV-14
Game of Thrones	9.5	HBO	English	2014-04-06	TV-MA
Breaking Bad	9.5	Exxen	English	2013-04-06	TV-MA
Chernobyl	9.3	BluTv	English	2019-04-06	TV-PG
Sherlock	8.6	Disney+	English	2018-04-06	TV-14
Rick and Morty	9.1	Amazon	English	2015-09-20	TV-14

- Outer left: The left outer join preserves tuples only in the relation named before (to the left of) the left outer join operation.

```
SELECT * FROM Movies m1 Left Outer Join Shows s1 on m1.Show_ID = s1.Show_Id;
```

Success

Movie	Rating	Certification	Language	Released Year	Duration	Budget
The Shawshank Redemption	9.3	PG-13	English	2006	109	35000000
Avengers:End Game	8.5	PG-13	English	2016	147	850000000
Avengers: Infinity War	8.3	PG-13	English	2018	90	321000000
A Quiet Place	7.6	PG-15	English	2022	141	17000000
The Dark Knight	9	PG-13	English	2016	128	30000000
Se7en	8.8	PG	English	2003	95	62000000
Fight Club	8.9	PG	English	2010	95	175070000
Pulp Fiction	8.6	R	English	2010	95	18000000
Before We Go	6.8	PG-13	English	2010	95	
I am a Legend	7.4	PG	English	2017	105	11000000
Black Panther	7.9	PG-13	English	2018	149	123000000

- **Full outer query:** The full outer join preserves tuples in both relations. Mysql was not supports this, provided this with using left and right outer joins and connected them with union operation as below.

```
SELECT * FROM Actor a1 Left Outer Join Person p2 on a1.Person_Id = p2.Person_Id UNION ALL SELECT *
FROM Actor a1 Right Outer Join Person p2 on a1.Person_Id = p2.Person_Id;
```

Success

First Name	Last Name	Date Of Birth	Start Date	Gender
Haluk	Bilginer	1954-10-20	1969	M
Sener	Sen	1944-10-20	1970	M
Demet	Akbag	1959-01-23	2000	F
Tuncel	Kurtiz	1979-10-20	2004	M
Anna	Joy	1988-06-26	2004	F
Chris	Evans	1981-03-13	1995	M
Tom	Holland	1997-08-26	2013	M
Robert	Jr	1965-04-04	2008	M
Ryan	Gosling	1980-11-12	2009	M
Robert	Pattinson	1971-07-24	2004	M
Damien	Chazelle	1985-01-19	1995	M
Ramin	Djawadi	1974-07-14	2013	M
Brad	Pitt	1984-02-15	2008	M
Emilia	Clarke	1971-07-24	2009	F

8) Triggers

1) This trigger makes convertion duration to hour format when the new movie is added with its duration as minute type and not added as hour type.

```
DELIMITER |
CREATE TRIGGER calcduration
before INSERT on Movies  FOR EACH ROW
BEGIN
 IF new.Hour IS NULL THEN
 set new.Hour  = Floor(new.duration / 60) + (new.duration % 60)/100;
END IF;
END |
DELIMITER ;
```

2) This trigger calculates a popularity score for the movie with using a formula based on it's rating and budget.

```
DELIMITER |
CREATE TRIGGER calcpopularity
before INSERT ON Shows
FOR EACH ROW
BEGIN
  IF new.Popularity IS NULL    THEN
    SET new.Popularity  = (new.Rating / 10) + new.Budget / 100000 ;
  END IF;
END |
DELIMITER ;
```

3) This trigger finds how old is actor by looking its date of birth

```
DELIMITER |
CREATE TRIGGER calcpersonage
before INSERT on Person  for each row
BEGIN
  IF new.Age IS NULL THEN
    set new.Age  = 2022 - Year(new.DOB) ;
  END IF;
END |
DELIMITER ;
```

4) This trigger finds how many year experience an director has, by looking start date.

```
DELIMITER |
CREATE TRIGGER calcdirectorexperience
before INSERT on Director   for each row
BEGIN
  IF new.experience IS NULL THEN
    set new.experience  = 2022- new.StartDate ;
  END IF;
END |
DELIMITER ;
```

5) This trigger finds how many year experience an actor has, by looking start date.

```
DELIMITER |
CREATE TRIGGER calcactorexperienceup
before UPDATE on Actor   for each row
BEGIN
  IF new.experience IS NULL THEN
    set new.experience  = 2022- new.StartDate ;
  END IF;
END |
DELIMITER ;
```

9) Views

Created 6 different views. On user interface there is views part for them, when user click the button of view , results can be seen on user interface. I also used queries with outer join features. Their sql codes as below.

```sql
/**VIEWS PART**/
/*Movie View*/

CREATE VIEW movie_view AS
SELECT * FROM Movies m1 Left Outer Join Shows s1 on m1.Show_Id = s1.Show_Id;

/*Tv Show View*/
CREATE VIEW tv_view AS
SELECT * FROM shows s1 Right Outer Join tvseries t1  ON t1.Show_ID = s1.Show_Id;


/*Actor View*/
CREATE VIEW actor_view AS
SELECT * FROM Actor a1 Left Outer Join Person p2 on a1.Person_Id = p2.Person_Id
UNION ALL
SELECT * FROM Actor a1 Right Outer Join Person p2 on a1.Person_Id = p2.Person_Id;

/*director View*/
CREATE VIEW director_view AS
SELECT * FROM Director t1 JOIN Person t2 ON t1.Person_Id = t2.Person_Id;

/*person View*/
CREATE VIEW person_view AS
SELECT * FROM Person;

/*review View*/
CREATE VIEW review_view AS
SELECT * FROM Reviews t1 JOIN Shows t2 ON t1.Show_Id = t2.Show_Id;
```

10) Additional works

Project has inheritance feature between some tables like movies and tv shows are subtype of the shows, they use foreign key and also actor director producer writer are all inherited from person as drawed on ER diagram. Also for the normalization made bcnf and 4nf forms additionally as mentioned on normalization section of this report.

Also tried to add login check in ui with using users table.

11)

Resources:

- https://www.javatpoint.com/dbms-normalization

- https://beginnersbook.com/2015/05/normalization-in-dbms/

- https://www.guru99.com/er-diagram-tutorial-dbms.html

- https://beginnersbook.com/2015/04/transitive-dependency-in-dbms/

- https://www.geeksforgeeks.org/difference-between-left-right-and-full-outer-join/

- https://www.apachefriends.org/tr/index.html