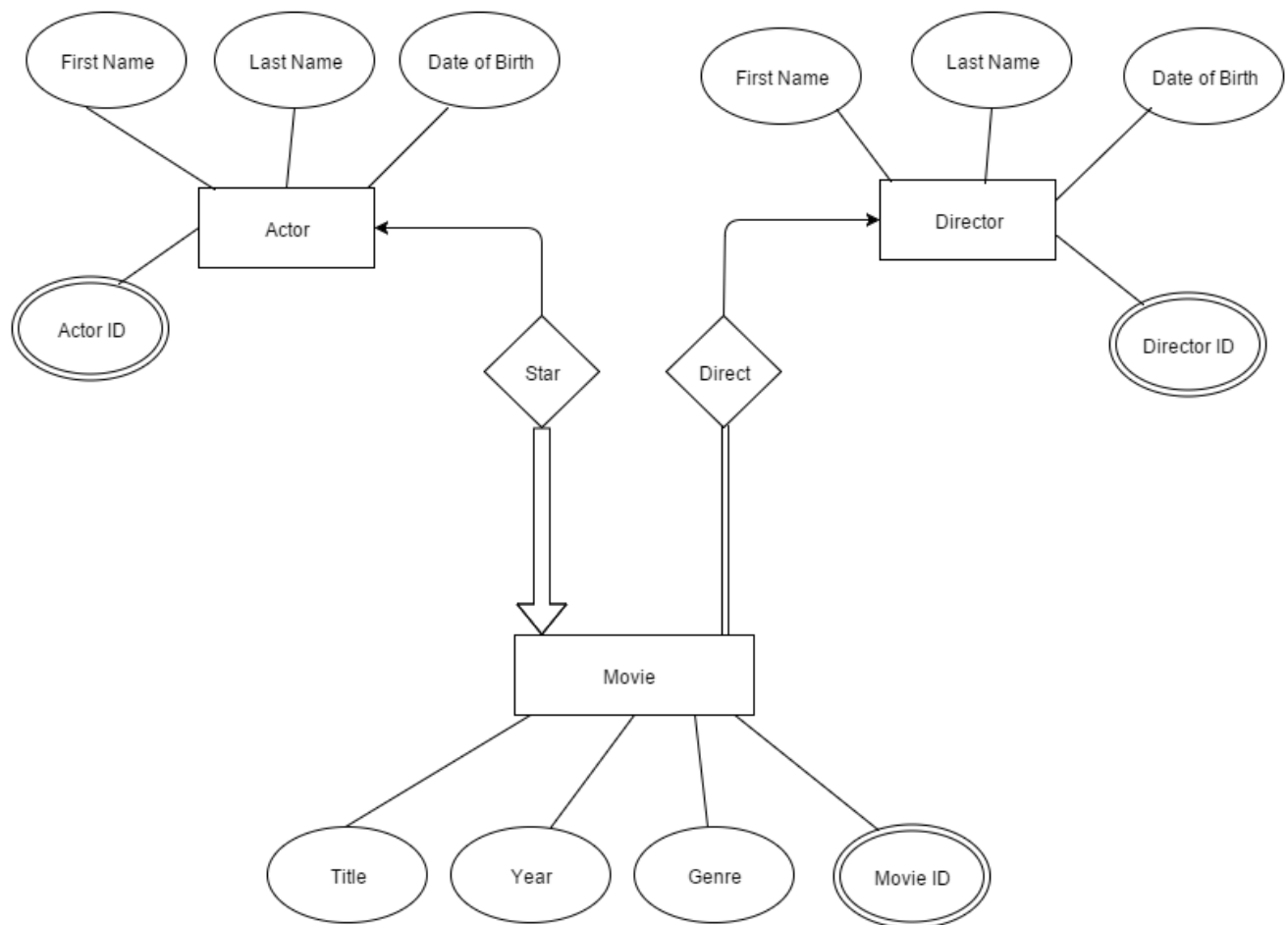# DATABASE MANAGEMENT SYSTEMS
ASSIGNMENT 1

Name: - Rahul Sonanis
Roll No: - 13CS10049

ER Diagram –

CREATE TABLE COMMANDS:-

1) actor

```
CREATE TABLE actor(
        act_id INT UNSIGNED NOT NULL PRIMARY KEY,
        first_name VARCHAR(50) NOT NULL,
        last_name VARCHAR(50) NULL,
        dob DATE NOT NULL
        );
```

Field	Type	Null	Key	Default	Extra
act_id	int(10) unsigned	NO	PRI	NULL	
first_name	varchar(50)	NO		NULL	
last_name	varchar(50)	YES		NULL	
dob	date	NO		NULL	

2) director

```
CREATE TABLE director(
        dir_id INT UNSIGNED NOT NULL PRIMARY KEY,
        first_name VARCHAR(50) NOT NULL,
        last_name VARCHAR(50) NULL,
        dob DATE NOT NULL
        );
```

Field	Type	Null	Key	Default	Extra
dir_id	int(10) unsigned	NO	PRI	NULL	
first_name	varchar(50)	NO		NULL	
last_name	varchar(50)	YES		NULL	
dob	date	NO		NULL	

3) movie

```
CREATE TABLE movie(
        mov_id INT UNSIGNED NOT NULL PRIMARY KEY,
        title VARCHAR(50) NOT NULL,
        year YEAR NOT NULL,
        genre VARCHAR(100) NOT NULL
        );
```

```
+---------+------------------+------+-----+---------+-------+
| Field   | Type             | Null | Key | Default | Extra |
+---------+------------------+------+-----+---------+-------+
| mov_id  | int(10) unsigned | NO   | PRI | NULL    |       |
| title   | varchar(50)      | NO   |     | NULL    |       |
| year    | year(4)          | NO   |     | NULL    |       |
| genre   | varchar(100)     | NO   |     | NULL    |       |
+---------+------------------+------+-----+---------+-------+
```

4) acts

CREATE TABLE acts(

      act_id INT UNSIGNED NOT NULL,

      mov_id INT UNSIGNED NOT NULL,

      FOREIGN KEY(act_id) REFERENCES actor(act_id),

      FOREIGN KEY(mov_id) REFERENCES movie(mov_id)

      );

```
+---------+------------------+------+-----+---------+-------+
| Field   | Type             | Null | Key | Default | Extra |
+---------+------------------+------+-----+---------+-------+
| act_id  | int(10) unsigned | NO   | MUL | NULL    |       |
| mov_id  | int(10) unsigned | NO   | MUL | NULL    |       |
+---------+------------------+------+-----+---------+-------+
```

5) directs

CREATE TABLE directs(

      dir_id INT UNSIGNED NOT NULL,

      mov_id INT UNSIGNED NOT NULL,

      FOREIGN KEY(dir_id) REFERENCES director(dir_id),

      FOREIGN KEY(mov_id) REFERENCES movie(mov_id)

      );

```
+---------+------------------+------+-----+---------+-------+
| Field   | Type             | Null | Key | Default | Extra |
+---------+------------------+------+-----+---------+-------+
| dir_id  | int(10) unsigned | NO   | MUL | NULL    |       |
| mov_id  | int(10) unsigned | NO   | MUL | NULL    |       |
+---------+------------------+------+-----+---------+-------+
```

INSERT TABLE COMMANDS –

1) **Insert into actor-**
   INSERT INTO actor VALUES(0,"Amitabh","Bacchan","1942-10-11");
   INSERT INTO actor VALUES(1,"Aamir","Khan","1965-03-14");
   INSERT INTO actor VALUES(2,"Abhay","Deol","1976-03-15");
   INSERT INTO actor VALUES(3,"Akshay","Kumar","1967-09-09");
   INSERT INTO actor VALUES(4,"Shahrukh","Khan","1965-11-02");
   INSERT INTO actor VALUES(5,"Aishwarya","Rai","1973-11-01");
   INSERT INTO actor VALUES(6,"Bipasha","Basu","1979-01-07");
   INSERT INTO actor VALUES(7,"Deepika","Padukone","1986-01-05");
   INSERT INTO actor VALUES(8,"Katrina","Kaif","1984-07-16");
   INSERT INTO actor VALUES(9,"Priyanka","Chopra","1982-07-18");
   INSERT INTO actor VALUES(10,"Anushka","Sharma","1988-05-01");
   INSERT INTO actor VALUES(11,"Salman","Khan","1965-12-27");
   INSERT INTO actor VALUES(12,"Ajay","Devgn","1969-04-02");

2) **Insert into director –**
   INSERT INTO director VALUES(0,"Aaditya","Chopra","1971-05-21");
   INSERT INTO director VALUES(1,"Farah","Khan","1970-09-18");
   INSERT INTO director VALUES(2,"Karan","Johar","1965-09-28");
   INSERT INTO director VALUES(3,"Ram Gopal","Verma","1957-01-02");
   INSERT INTO director VALUES(4,"Yash","Chopra","1929-06-12");
   INSERT INTO director VALUES(5,"Sanjay Leela","Bansali","1955-11-08");
   INSERT INTO director VALUES(6,"Rohit","Shetty","1974-03-14");
   INSERT INTO director VALUES(7,"Shahrukh","Khan","1965-11-02");

3) **Insert into movie –**
   INSERT INTO movie VALUES(0,"Happy New Year","2014","Comedy/Thriller");
   INSERT INTO movie VALUES(1,"Om Shanti Om","2007","Drama/Romance");
   INSERT INTO movie VALUES(2,"Main Hoon Na","2004","Action/Comedy");
   INSERT INTO movie VALUES(3,"Rab Ne Bana Di Jodi","2008","Romance");
   INSERT INTO movie VALUES(4,"Mohabbatein","2000","Romance");
   INSERT INTO movie VALUES(5,"Dilwale Dulhaniya Le Jayenge","1995","Romance");
   INSERT INTO movie VALUES(6,"Kabhi Alvida Na kehna","2006","Drama");
   INSERT INTO movie VALUES(7,"Kabhi Khushi Kabhi Gam","2001","Drama");
   INSERT INTO movie VALUES(8,"Kuch Kuch Hota Hai","1998","Drama/Romance");
   INSERT INTO movie VALUES(9,"My Name Is Khan","2010","Drama");
   INSERT INTO movie VALUES(10,"Aag","2007","Comedy");
   INSERT INTO movie VALUES(11,"Nishabd","2007","Romance");
   INSERT INTO movie VALUES(12,"Sarkar","2005","Drama");
   INSERT INTO movie VALUES(13,"Jab Tak Hai Jaan","2012","Romance");
   INSERT INTO movie VALUES(14,"Veer Zaara","2004","Crime");

```sql
INSERT INTO movie VALUES(15,"Dil To Pagal Hai","1997","Romance/Thriller");
INSERT INTO movie VALUES(16,"Bajirao Mastani","2015","Period");
INSERT INTO movie VALUES(17,"Tamasha","2015","Drama");
INSERT INTO movie VALUES(18,"Wanted","2009","Action/Comedy");
INSERT INTO movie VALUES(19,"Dabangg","2010","Action/Comedy");
INSERT INTO movie VALUES(20,"Bajrangi Bhaijaan","2015","Comedy/Drama");
INSERT INTO movie VALUES(21,"Singham","2011","Action/Drama");
```

4) Insert into acts-

```sql
INSERT INTO acts VALUES(4,0);
INSERT INTO acts VALUES(7,0);
INSERT INTO acts VALUES(4,1);
INSERT INTO acts VALUES(7,1);
INSERT INTO acts VALUES(4,2);
INSERT INTO acts VALUES(4,3);
INSERT INTO acts VALUES(10,3);
INSERT INTO acts VALUES(4,4);
INSERT INTO acts VALUES(5,4);
INSERT INTO acts VALUES(4,5);
INSERT INTO acts VALUES(4,6);
INSERT INTO acts VALUES(0,7);
INSERT INTO acts VALUES(4,7);
INSERT INTO acts VALUES(4,8);
INSERT INTO acts VALUES(4,9);
INSERT INTO acts VALUES(0,10);
INSERT INTO acts VALUES(0,11);
INSERT INTO acts VALUES(0,12);
INSERT INTO acts VALUES(4,13);
INSERT INTO acts VALUES(8,13);
INSERT INTO acts VALUES(10,13);
INSERT INTO acts VALUES(4,14);
INSERT INTO acts VALUES(4,15);
INSERT INTO acts VALUES(7,16);
INSERT INTO acts VALUES(7,17);
INSERT INTO acts VALUES(11,18);
INSERT INTO acts VALUES(11,19);
INSERT INTO acts VALUES(11,20);
INSERT INTO acts VALUES(12,21);
```

5) Insert into directs-

```
INSERT INTO directs VALUES(7,0);
INSERT INTO directs VALUES(7,1);
INSERT INTO directs VALUES(1,2);
INSERT INTO directs VALUES(0,3);
INSERT INTO directs VALUES(0,4);
INSERT INTO directs VALUES(0,5);
INSERT INTO directs VALUES(2,6);
INSERT INTO directs VALUES(2,7);
INSERT INTO directs VALUES(2,8);
INSERT INTO directs VALUES(2,9);
INSERT INTO directs VALUES(3,10);
INSERT INTO directs VALUES(3,11);
INSERT INTO directs VALUES(3,12);
INSERT INTO directs VALUES(4,13);
INSERT INTO directs VALUES(4,14);
INSERT INTO directs VALUES(4,15);
INSERT INTO directs VALUES(5,16);
INSERT INTO directs VALUES(6,17);
INSERT INTO directs VALUES(7,18);
INSERT INTO directs VALUES(7,19);
INSERT INTO directs VALUES(6,20);
INSERT INTO directs VALUES(6,21);
```

SQL QUERY COMMANDS-

1) SELECT movie.title "Movie Title"
   FROM movie
   JOIN acts ON acts.mov_id = movie.mov_id
   JOIN actor ON actor.act_id = acts.act_id
   WHERE actor.first_name='Shahrukh' AND actor.last_name='Khan';

```
+-----------------------------+
| Movie Title                 |
+-----------------------------+
| Happy New Year              |
| Om Shanti Om                |
| Main Hoon Na                |
| Rab Ne Bana Di Jodi         |
| Mohabbatein                 |
| Dilwale Dulhaniya Le Jayenge |
| Kabhi Alvida Na kehna       |
| Kabhi Khushi Kabhi Gam      |
| Kuch Kuch Hota Hai          |
| My Name Is Khan             |
| Jab Tak Hai Jaan            |
| Veer Zaara                  |
| Dil To Pagal Hai            |
+-----------------------------+
13 rows in set (0.00 sec)
```

2) SELECT movie.title "Movie Title"
   FROM movie
   JOIN directs ON movie.mov_id = directs.mov_id
   JOIN acts ON acts.mov_id = directs.mov_id
   JOIN actor ON actor.act_id = acts.act_id
   JOIN director ON directs.dir_id = director.dir_id
   WHERE actor.first_name='Shahrukh' AND actor.last_name='Khan' AND
         director.first_name = "Shahrukh" AND director.last_name = "Khan";

```
+----------------+
| Movie Title    |
+----------------+
| Happy New Year |
| Om Shanti Om   |
+----------------+
2 rows in set (0.00 sec)
```

3) SELECT movie.title "Movie Title"
   FROM movie
   JOIN acts ON acts.mov_id = movie.mov_id
   JOIN actor ON actor.act_id = acts.act_id
   WHERE actor.first_name='Shahrukh' AND actor.last_name='Khan' AND
          movie.year>2000 AND (movie.genre LIKE '%Thriller%');

```
+----------------+
| Movie Title    |
+----------------+
| Happy New Year |
+----------------+
1 row in set (0.00 sec)
```

4) SELECT DISTINCT concat(b.first_name,concat(" ",b.last_name)) "Co-Actors"
   FROM (actor a,actor b)
   JOIN acts c ON a.act_id = c.act_id
   JOIN acts d ON c.mov_id = d.mov_id
   WHERE b.act_id = d.act_id AND a.first_name='Shahrukh' AND a.last_name='Khan'
          AND DATEDIFF(b.dob,a.dob)>=3650;

```
+-------------------+
| Co-Actors         |
+-------------------+
| Deepika Padukone  |
| Anushka Sharma    |
| Katrina Kaif      |
+-------------------+
3 rows in set (0.00 sec)
```

5) SELECT DISTINCT concat(director.first_name,concat(" ",director.last_name))
   "Director"
   FROM actor
   JOIN acts ON actor.act_id = acts.act_id
   JOIN movie ON acts.mov_id = movie.mov_id
   JOIN directs ON directs.mov_id = movie.mov_id
   JOIN director ON director.dir_id = directs.dir_id
   WHERE actor.first_name ='Shahrukh' AND actor.last_name='Khan'
           GROUP BY director.dir_id
           ORDER BY count(*) desc limit 1;

```
+---------------+
| Director      |
+---------------+
| Karan Johar   |
+---------------+
1 row in set (0.00 sec)
```

RELATIONAL ALGEBRA QUERIES-

1)

$$\textcircled{1} \quad \pi_{title}\left(\pi_{mov\_id}\left(\pi_{act\_id}\left(\sigma_{\substack{first\_name='Shahrukh' \\ AND\ last\_name='Khan'}}(actor)\right) \bowtie acts\right) \bowtie movies\right)$$

2)

$$\textcircled{2} \quad \pi_{title}\left(\left(\left(\pi_{mov\_id}\left(\pi_{act\_id}\left(\sigma_{\substack{first\_name='Shahrukh' \\ AND\ last\_name='Khan'}}(actor)\right)\right) \bowtie acts\right) \bowtie \left(\pi_{mov\_id}\left(\pi_{dir\_id}\left(\sigma_{\substack{first\_name='Shahrukh' \\ AND\ last\_name='Khan'}}(director)\right)\right) \bowtie directs\right)\right) \bowtie movies\right)$$

3)

$$\textcircled{3} \quad \pi_{title}\left(\sigma_{\substack{genre="thriller" \\ AND\ year>2000}}\left(\left(\pi_{act\_id}\ \sigma_{\substack{first\_name='Shahrukh' \\ last\_name='Khan'}}(actor) \bowtie acts\right) \bowtie movies\right)\right)$$

4)

$$\textcircled{4} \quad \pi_{\text{concat}(b.\text{firstname},\, \text{concat}(" ",\, b.\text{last\_name}))} \left(\sigma_{\substack{\text{datediff}(b.\text{dob},\, a.\text{dob}) \\ \geq 3650}} \left(\pi_{\text{act\_id}} \left(\pi_{\text{mov\_id}} \left(\pi_{\text{act\_id}} \left(\sigma_{\substack{\text{first\_name}='\text{Shahrukh}' \\ \text{AND last\_name}='\text{Khan}'}} \rho_a(\text{actor}) \right) \bowtie \rho_c(\text{acts}) \right) \bowtie \rho_d(\text{acts}) \right) \bowtie \rho_b(\text{actor}) \right) \right) $$

5)

$$\textcircled{5} \quad {}_{\text{MAX}} \, _{\substack{\text{concat(first\_name,} \\ \text{concat(" ", last\_name))}}} \text{dir\_id} \left(\pi_{\text{dir\_id}} \left(\pi_{\text{mov\_id}} \left(\pi_{\text{act\_id}} \left(\sigma_{\substack{\text{first\_name}='\text{Shahrukh}' \\ \text{AND last\_name}='\text{Khan}'}} (\text{actor}) \right) \bowtie \text{acts} \right) \bowtie \text{directs} \right) \bowtie \text{director} \right) $$