

DBMS CASE STUDY

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SCENARIO :-

Subject = Game Development Company.

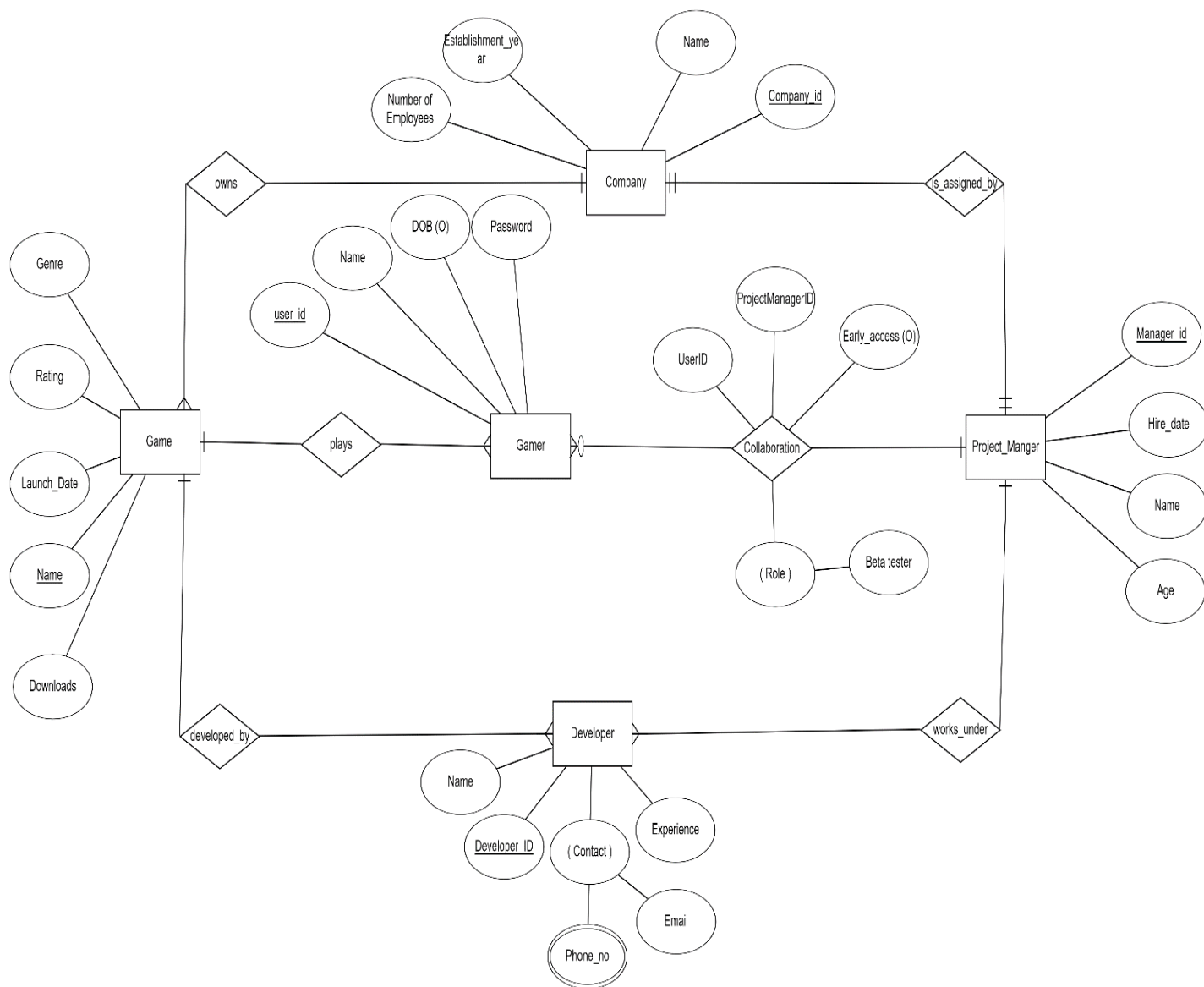
In the dynamic realm of game development, a company was established in 2014. This innovative game development company is uniquely identified by the `company_id` and boasts a dedicated team of employees. To embark on the exhilarating journey of creating a gaming marvel, the company assigns a project manager, distinguished by the unique `manager_id`.

A group of developers, each bearing their own `developer_id` provided by the company, joins forces with the project manager. Together, they set out on the thrilling adventure of bringing a new game to life. The game has the flexibility to embrace various genres and modes, characterized by its distinctive game name, impressive rating, and remarkable download records. Ownership of the game rests with the development company.

Turning our attention to gamers, players immerse themselves in the game and obtain their in-game identification, represented by the `user_id`. The project manager emerges as the catalyst, fostering collaboration between themselves and the gamers while leading the

charge in game testing and feedback sessions. Individuals who actively participate alongside the project manager are rewarded with exclusive early access privileges.

ER Diagram :-



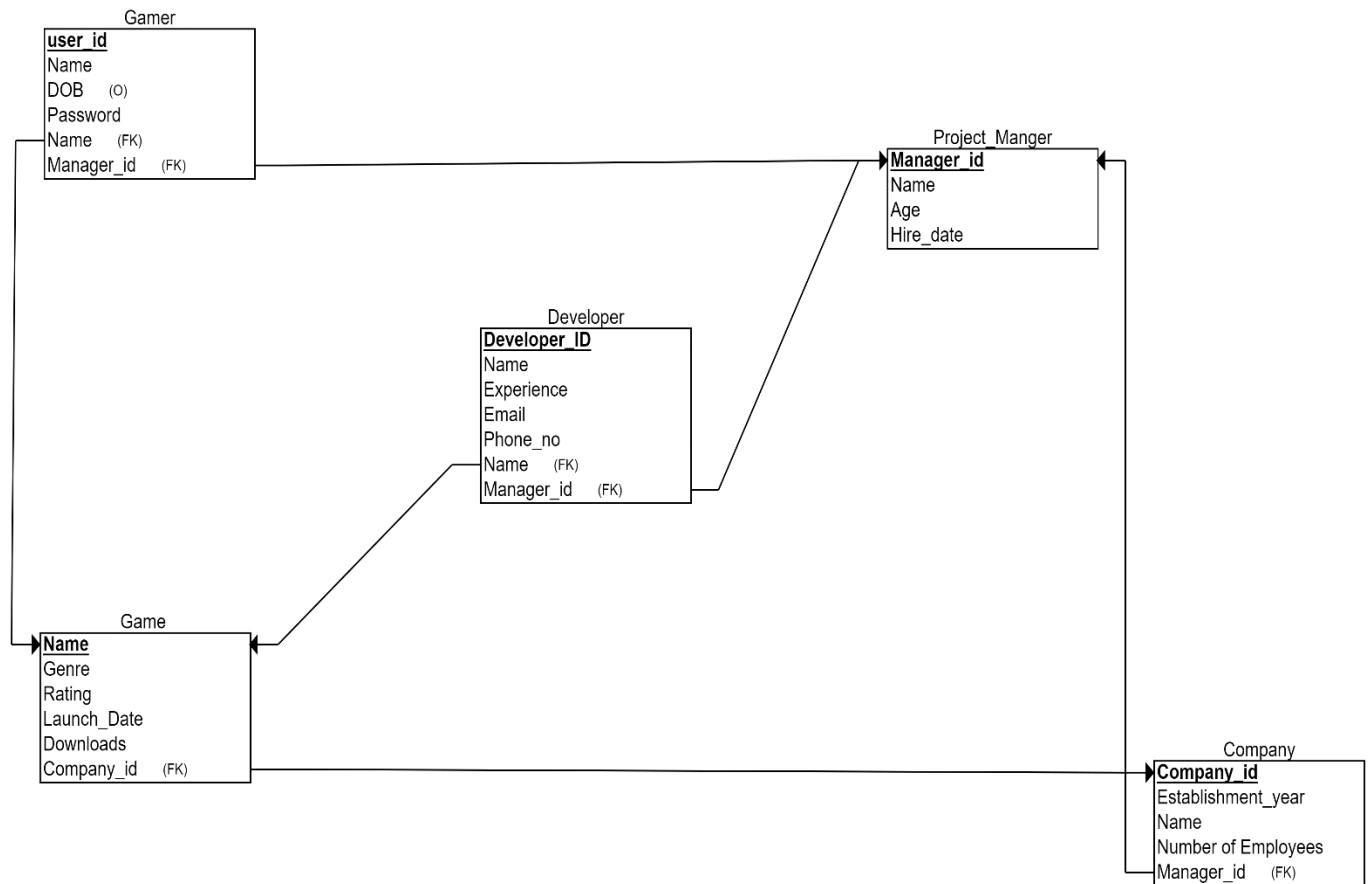
Relationships:-

- 1) Company —————> Owns —————> Game
- 2) Game Is —————> Developed by —————> Developer
- 3) Developer —————> Works Under —————> Project Manager
- 4) Project Manager —————> Is assigned by —————> Company
- 5) Gamer —————> Plays —————> Game
- 6) Gamer —————> Collaborates with —————> Project Manager

Cardinalities:-

- 1) One Company Owns Many Games
- 2) One Game is Developed by Many Developers
- 3) Many Developers Works Under One Project Manager
- 4) One Project Manager is Assigned By One Company
- 5) Many Gamer Plays One Game
- 6) Many Gamer (O) Collaborates with One Project Manager

Relational Schema :-



Creating Tables And Inserting Values :-

Creating Tables :-

```
1 v CREATE TABLE Project_Manager (  
2     Manager_id NUMERIC(20) PRIMARY KEY,  
3     Name VARCHAR2(255),  
4     Age NUMERIC(20),  
5     Hire_date DATE  
6 );  
7
```

```
8 v CREATE TABLE Developer (  
9     Developer_ID NUMERIC(20) PRIMARY KEY,  
10    Name VARCHAR2(255),  
11    Experience NUMERIC(20),  
12    Email VARCHAR2(255),  
13    Phone_no VARCHAR2(20),  
14    Manager_id NUMERIC(20),  
15    FOREIGN KEY (Manager_id) REFERENCES Project_Manager(Manager_id)  
16 );
```

```
18 v CREATE TABLE Company (  
19     Company_id NUMERIC(20) PRIMARY KEY,  
20     Establishment_year NUMERIC(20),  
21     Name VARCHAR2(255),  
22     Number_of_Employees NUMERIC(20),  
23     Manager_id NUMERIC(20),  
24     FOREIGN KEY (Manager_id) REFERENCES Project_Manager(Manager_id)  
25 );
```

```
27 v CREATE TABLE Game (  
28     Name VARCHAR2(255) PRIMARY KEY,  
29     Genre VARCHAR2(100),  
30     Rating DECIMAL(3, 2),  
31     Launch_Date DATE,  
32     Downloads NUMERIC(20),  
33     Company_id NUMERIC(20),  
34     FOREIGN KEY (Company_id) REFERENCES Company(Company_id)  
35 );
```

```
17  
18 v CREATE TABLE Gamer (  
19     user_id NUMERIC(20) PRIMARY KEY,  
20     DOB DATE,  
21     Password VARCHAR2(255),  
22     Name VARCHAR2(255),  
23     Manager_id NUMERIC(20),  
24     FOREIGN KEY (Manager_id) REFERENCES Project_Manager(Manager_id)  
25 );  
26
```

Inserting Values In Table :-

```
46
47 INSERT INTO Project_Manager (Manager_id, Name, Age, Hire_date) VALUES (1, 'Manager1', 35, TO_DATE('2010-01-15', 'YYYY-MM-DD'));
48
49 INSERT INTO Project_Manager (Manager_id, Name, Age, Hire_date) VALUES (2, 'Manager2', 40, TO_DATE('2008-05-20', 'YYYY-MM-DD'));
50
51 INSERT INTO Project_Manager (Manager_id, Name, Age, Hire_date) VALUES (3, 'Manager3', 45, TO_DATE('2005-11-10', 'YYYY-MM-DD'));
52
53 INSERT INTO Project_Manager (Manager_id, Name, Age, Hire_date) VALUES (4, 'Manager4', 38, TO_DATE('2012-09-05', 'YYYY-MM-DD'));
54
55 INSERT INTO Project_Manager (Manager_id, Name, Age, Hire_date) VALUES (5, 'Manager5', 42, TO_DATE('2007-03-25', 'YYYY-MM-DD'));
56
57 INSERT INTO Project_Manager (Manager_id, Name, Age, Hire_date) VALUES (6, 'Manager6', 36, TO_DATE('2009-07-12', 'YYYY-MM-DD'));
58
59 INSERT INTO Project_Manager (Manager_id, Name, Age, Hire_date) VALUES (7, 'Manager7', 41, TO_DATE('2015-04-30', 'YYYY-MM-DD'));
60
61 INSERT INTO Project_Manager (Manager_id, Name, Age, Hire_date) VALUES (8, 'Manager8', 39, TO_DATE('2013-10-18', 'YYYY-MM-DD'));
62
63 INSERT INTO Project_Manager (Manager_id, Name, Age, Hire_date) VALUES (9, 'Manager9', 37, TO_DATE('2011-02-22', 'YYYY-MM-DD'));
64
65 INSERT INTO Project_Manager (Manager_id, Name, Age, Hire_date) VALUES (10, 'Manager10', 43, TO_DATE('2016-08-08', 'YYYY-MM-DD'));
```

```
16
17 INSERT INTO Developer (Developer_ID, Name, Experience, Email, Phone_no, Manager_id) VALUES (1, 'Developer1', 5, 'developer1@example.com', '123-456-7890', 1);
18
19 INSERT INTO Developer (Developer_ID, Name, Experience, Email, Phone_no, Manager_id) VALUES (2, 'Developer2', 8, 'developer2@example.com', '987-654-3210', 1);
20
21 INSERT INTO Developer (Developer_ID, Name, Experience, Email, Phone_no, Manager_id) VALUES (3, 'Developer3', 3, 'developer3@example.com', '111-222-3333', 2);
22
23 INSERT INTO Developer (Developer_ID, Name, Experience, Email, Phone_no, Manager_id) VALUES (4, 'Developer4', 6, 'developer4@example.com', '444-555-6666', 2);
24
25 INSERT INTO Developer (Developer_ID, Name, Experience, Email, Phone_no, Manager_id) VALUES (5, 'Developer5', 4, 'developer5@example.com', '777-888-9999', 3);
26
27 INSERT INTO Developer (Developer_ID, Name, Experience, Email, Phone_no, Manager_id) VALUES (6, 'Developer6', 7, 'developer6@example.com', '555-444-3333', 3);
28
29 INSERT INTO Developer (Developer_ID, Name, Experience, Email, Phone_no, Manager_id) VALUES (7, 'Developer7', 2, 'developer7@example.com', '666-777-8888', 4);
30
31 INSERT INTO Developer (Developer_ID, Name, Experience, Email, Phone_no, Manager_id) VALUES (8, 'Developer8', 9, 'developer8@example.com', '222-333-4444', 4);
32
33 INSERT INTO Developer (Developer_ID, Name, Experience, Email, Phone_no, Manager_id) VALUES (9, 'Developer9', 4, 'developer9@example.com', '999-888-7777', 5);
34
35 INSERT INTO Developer (Developer_ID, Name, Experience, Email, Phone_no, Manager_id) VALUES (10, 'Developer10', 6, 'developer10@example.com', '333-222-1111', 5);
36
```



```

INSERT INTO Company (Company_id, Establishment_year, Name, Number_of_Employees, Manager_id) VALUES (1, 2000, 'Company1', 200, 1);
INSERT INTO Company (Company_id, Establishment_year, Name, Number_of_Employees, Manager_id) VALUES (2, 2005, 'Company2', 150, 2);
INSERT INTO Company (Company_id, Establishment_year, Name, Number_of_Employees, Manager_id) VALUES (3, 2010, 'Company3', 300, 3);
INSERT INTO Company (Company_id, Establishment_year, Name, Number_of_Employees, Manager_id) VALUES (4, 2015, 'Company4', 180, 4);
INSERT INTO Company (Company_id, Establishment_year, Name, Number_of_Employees, Manager_id) VALUES (5, 2018, 'Company5', 250, 5);
INSERT INTO Company (Company_id, Establishment_year, Name, Number_of_Employees, Manager_id) VALUES (6, 2002, 'Company6', 220, 6);
INSERT INTO Company (Company_id, Establishment_year, Name, Number_of_Employees, Manager_id) VALUES (7, 2007, 'Company7', 170, 7);
INSERT INTO Company (Company_id, Establishment_year, Name, Number_of_Employees, Manager_id) VALUES (8, 2012, 'Company8', 280, 8);
INSERT INTO Company (Company_id, Establishment_year, Name, Number_of_Employees, Manager_id) VALUES (9, 2017, 'Company9', 190, 9);
INSERT INTO Company (Company_id, Establishment_year, Name, Number_of_Employees, Manager_id) VALUES (10, 2019, 'Company10', 260, 10);

```

```

5
7 INSERT INTO Game (Name, Genre, Rating, Launch_Date, Downloads, Company_id) VALUES ('Game1', 'Action', 4.5, TO_DATE('2022-03-10', 'YYYY-MM-DD'), 1000000, 1);
3
9 INSERT INTO Game (Name, Genre, Rating, Launch_Date, Downloads, Company_id) VALUES ('Game2', 'Adventure', 4.2, TO_DATE('2021-07-20', 'YYYY-MM-DD'), 800000, 2);
9
11 INSERT INTO Game (Name, Genre, Rating, Launch_Date, Downloads, Company_id) VALUES ('Game3', 'Puzzle', 4.0, TO_DATE('2023-01-05', 'YYYY-MM-DD'), 1200000, 3);
2
13 INSERT INTO Game (Name, Genre, Rating, Launch_Date, Downloads, Company_id) VALUES ('Game4', 'Strategy', 4.7, TO_DATE('2020-11-15', 'YYYY-MM-DD'), 1500000, 4);
4
15 INSERT INTO Game (Name, Genre, Rating, Launch_Date, Downloads, Company_id) VALUES ('Game5', 'Simulation', 4.3, TO_DATE('2024-02-01', 'YYYY-MM-DD'), 500000, 5);
5
17 INSERT INTO Game (Name, Genre, Rating, Launch_Date, Downloads, Company_id) VALUES ('Game6', 'Racing', 4.1, TO_DATE('2023-09-18', 'YYYY-MM-DD'), 900000, 1);
3
19 INSERT INTO Game (Name, Genre, Rating, Launch_Date, Downloads, Company_id) VALUES ('Game7', 'Role-Playing', 4.6, TO_DATE('2022-05-30', 'YYYY-MM-DD'), 1100000, 2);
9
21 INSERT INTO Game (Name, Genre, Rating, Launch_Date, Downloads, Company_id) VALUES ('Game8', 'Sports', 4.4, TO_DATE('2021-12-25', 'YYYY-MM-DD'), 1300000, 3);
2
23 INSERT INTO Game (Name, Genre, Rating, Launch_Date, Downloads, Company_id) VALUES ('Game9', 'Fighting', 4.2, TO_DATE('2020-08-08', 'YYYY-MM-DD'), 700000, 4);
4
25 INSERT INTO Game (Name, Genre, Rating, Launch_Date, Downloads, Company_id) VALUES ('Game10', 'Simulation', 4.8, TO_DATE('2024-06-15', 'YYYY-MM-DD'), 1800000, 5);
:

```



```
26
27 INSERT INTO Gamer (user_id, DOB, Password, Name, Manager_id) VALUES (1, TO_DATE('1990-05-15', 'YYYY-MM-DD'), 'password1', 'John', 1);
28
29 INSERT INTO Gamer (user_id, DOB, Password, Name, Manager_id) VALUES (2, TO_DATE('1988-09-23', 'YYYY-MM-DD'), 'password2', 'Alice', 1);
30
31 INSERT INTO Gamer (user_id, DOB, Password, Name, Manager_id) VALUES (3, TO_DATE('1995-02-10', 'YYYY-MM-DD'), 'password3', 'Bob', 2);
32
33 INSERT INTO Gamer (user_id, DOB, Password, Name, Manager_id) VALUES (4, TO_DATE('1992-11-30', 'YYYY-MM-DD'), 'password4', 'Carol', 2);
34
35 INSERT INTO Gamer (user_id, DOB, Password, Name, Manager_id) VALUES (5, TO_DATE('1997-07-18', 'YYYY-MM-DD'), 'password5', 'David', 3);
36
37 INSERT INTO Gamer (user_id, DOB, Password, Name, Manager_id) VALUES (6, TO_DATE('1985-03-20', 'YYYY-MM-DD'), 'password6', 'Emma', 3);
38
39 INSERT INTO Gamer (user_id, DOB, Password, Name, Manager_id) VALUES (7, TO_DATE('1993-08-12', 'YYYY-MM-DD'), 'password7', 'Frank', 4);
40
41 INSERT INTO Gamer (user_id, DOB, Password, Name, Manager_id) VALUES (8, TO_DATE('1987-04-25', 'YYYY-MM-DD'), 'password8', 'Grace', 4);
42
43 INSERT INTO Gamer (user_id, DOB, Password, Name, Manager_id) VALUES (9, TO_DATE('1991-10-05', 'YYYY-MM-DD'), 'password9', 'Henry', 5);
44
45 INSERT INTO Gamer (user_id, DOB, Password, Name, Manager_id) VALUES (10, TO_DATE('1989-06-28', 'YYYY-MM-DD'), 'password10', 'Ivy', 5);
46
```

Select (10 codes):-

1).

```
150 select * from Game;
151
```

NAME	GENRE	RATING	LAUNCH_DATE	DOWNLOADS	COMPANY_ID
Game1	Action	4.5	10-MAR-22	1000000	1
Game2	Adventure	4.2	20-JUL-21	800000	2
Game3	Puzzle	4.6	05-JAN-23	1200000	3
Game4	Strategy	4.7	15-NOV-20	1500000	4
Game5	Simulation	4.3	01-FEB-24	500000	5
Game6	Racing	4.1	18-SEP-23	900000	1
Game7	Role-Playing	4.6	30-MAY-22	1100000	2
Game8	Sports	4.4	25-DEC-21	1300000	3
Game9	Fighting	4.2	08-AUG-20	700000	4
Game10	Simulation	4.8	15-JUN-24	1800000	5

2).

```
147 select * from Project_Manager;
```

```
148
```



MANAGER_ID	NAME	AGE	HIRE_DATE
1	Manager1	35	15-JAN-10
2	Manager2	40	20-MAY-08
3	Manager3	42	10-NOV-05
4	Manager4	38	05-SEP-12
5	Manager5	42	25-MAR-07
6	Manager6	36	12-JUL-09
7	Manager7	41	30-APR-15
8	Manager8	39	18-OCT-13
9	Manager9	37	22-FEB-11
10	Manager10	43	08-AUG-16

3).

```
148 select * from Developer;
149
```

DEVELOPER_ID	NAME	EXPERIENCE	EMAIL	PHONE_NO	MANAGER_ID
1	Developer1	5	developer1@example.com	123-456-7890	1
2	Developer2	8	developer2@example.com	987-654-3210	1
3	Developer3	3	developer3@example.com	111-222-3333	2
4	Developer4	6	developer4@example.com	444-555-6666	2
5	Developer5	4	newemail@example.com	777-888-9999	3
6	Developer6	7	developer6@example.com	555-444-3333	3
7	Developer7	2	developer7@example.com	666-777-8888	4
8	Developer8	9	developer8@example.com	222-333-4444	4
9	Developer9	4	developer9@example.com	999-888-7777	5
10	Developer10	6	developer10@example.com	333-222-1111	5

4).

```
149 select * from Company;  
150
```

COMPANY_ID	ESTABLISHMENT_YEAR	NAME	NUMBER_OF_EMPLOYEES	MANAGER_ID
1	2000	Company1	200	1
2	2005	Company2	300	2
3	2010	Company3	300	3
4	2015	Company4	180	4
5	2018	Company5	250	5
6	2002	Company6	220	6
7	2007	Company7	170	7
8	2012	Company8	280	8
9	2017	Company9	190	9
10	2019	Company10	260	10

5).

```
151 select * from Gamer;
```

```
152
```

```
<
```

USER_ID	DOB	PASSWORD	NAME	MANAGER_ID
1	15-MAY-90	newpassword	John	1
2	23-SEP-88	password2	Alice	1
3	10-FEB-95	password3	Bob	2
4	30-NOV-92	password4	Carol	2
5	18-JUL-97	password5	David	3
6	20-MAR-85	password6	Emma	3
7	12-AUG-93	password7	Frank	4
8	25-APR-87	password8	Grace	4
9	05-OCT-91	password9	Henry	5
10	28-JUN-89	password10	Ivy	5

6).

```
151 SELECT G.Name AS Game_Name, G.Genre, G.Rating, G.Launch_Date, G.Downloads, C.Name AS Company_Name  
152 FROM Game G  
153 JOIN Company C ON G.Company_id = C.Company_id;
```

GAME_NAME	GENRE	RATING	LAUNCH_DATE	DOWNLOADS	COMPANY_NAME
Game1	Action	4.5	10-MAR-22	1000000	Company1
Game2	Adventure	4.2	20-JUL-21	800000	Company2
Game3	Puzzle	4	05-JAN-23	1200000	Company3
Game4	Strategy	4.7	15-NOV-20	1500000	Company4
Game5	Simulation	4.3	01-FEB-24	500000	Company5
Game6	Racing	4.1	18-SEP-23	900000	Company1
Game7	Role-Playing	4.6	30-MAY-22	1100000	Company2
Game8	Sports	4.4	25-DEC-21	1300000	Company3
Game9	Fighting	4.2	08-AUG-20	700000	Company4
Game10	Simulation	4.8	15-JUN-24	1800000	Company5

7).

```
155 ✓ SELECT D.Developer_ID, D.Name AS Developer_Name, D.Experience, D.Email, D.Phone_no, PM.Name AS Manager_Name
156 FROM Developer D
157 JOIN Project_Manager PM ON D.Manager_id = PM.Manager_id;
```

DEVELOPER_ID	DEVELOPER_NAME	EXPERIENCE	EMAIL	PHONE_NO	MANAGER_NAME
1	Developer1	5	developer1@example.com	123-456-7890	Manager1
2	Developer2	8	developer2@example.com	987-654-3210	Manager1
3	Developer3	3	developer3@example.com	111-222-3333	Manager2
4	Developer4	6	developer4@example.com	444-555-6666	Manager2
5	Developer5	4	developer5@example.com	777-888-9999	Manager3
6	Developer6	7	developer6@example.com	555-444-3333	Manager3
7	Developer7	2	developer7@example.com	666-777-8888	Manager4
8	Developer8	9	developer8@example.com	222-333-4444	Manager4
9	Developer9	4	developer9@example.com	999-888-7777	Manager5
10	Developer10	6	developer10@example.com	333-222-1111	Manager5

8).

SQL Worksheet

```
163 v SELECT C.Company_id, C.Name AS Company_Name, COUNT(G.Name) AS Total_Games_Developed
164 FROM Company C
165 LEFT JOIN Game G ON C.Company_id = G.Company_id
166 GROUP BY C.Company_id, C.Name;
```

COMPANY_ID	COMPANY_NAME	TOTAL_GAMES_DEVELOPED
1	Company1	2
2	Company2	2
4	Company4	2
5	Company5	2
3	Company3	2
6	Company6	0
7	Company7	0
8	Company8	0
9	Company9	0

9).

```
158
159 ✓ SELECT PM.Manager_id, PM.Name AS Manager_Name, PM.Age, PM.Hire_date, C.Number_of_Employees
160 FROM Project_Manager PM
161 JOIN Company C ON PM.Manager_id = C.Manager_id;
```

MANAGER_ID	MANAGER_NAME	AGE	HIRE_DATE	NUMBER_OF_EMPLOYEES
1	Manager1	35	15-JAN-10	200
2	Manager2	40	20-MAY-08	150
3	Manager3	45	10-NOV-05	300
4	Manager4	38	05-SEP-12	180
5	Manager5	42	25-MAR-07	250
6	Manager6	36	12-JUL-09	220
7	Manager7	41	30-APR-15	170
8	Manager8	39	18-OCT-13	280
9	Manager9	37	22-FEB-11	190

Download CSV

10).

SQL Worksheet

```
147 ✓ SELECT G.user_id, G.Name AS Gamer_Name, G.DOB, G.Password, PM.Name AS Manager_Name
148 FROM Gamer G
149 JOIN Project Manager PM ON G.Manager id = PM.Manager id;
```

USER_ID	GAMER_NAME	DOB	PASSWORD	MANAGER_NAME
1	John	15-MAY-90	password1	Manager1
2	Alice	23-SEP-88	password2	Manager1
3	Bob	10-FEB-95	password3	Manager2
4	Carol	30-NOV-92	password4	Manager2
5	David	18-JUL-97	password5	Manager3
6	Emma	20-MAR-85	password6	Manager3
7	Frank	12-AUG-93	password7	Manager4
8	Grace	25-APR-87	password8	Manager4
9	Henry	05-OCT-91	password9	Manager5
10	Ivy	28-JUN-89	password10	Manager5

Update(5 Codes) :-


```
UPDATE Gamer  
SET Password = 'newpassword'  
WHERE user_id = 1;
```

```
UPDATE Project_Manager  
SET Age = 42  
WHERE Manager_id = 3;
```

```
UPDATE Developer  
SET Email = 'newemail@example.com'  
WHERE Developer_ID = 5;
```

```
UPDATE Game  
SET Rating = 4.6  
WHERE Name = 'Game3';
```

```
UPDATE Company  
SET Number_of_Employees = 300  
WHERE Company_id = 2;
```



```
1 row(s) updated.
```

```
1 row(s) updated.
```

```
1 row(s) updated.
```

```
1 row(s) updated.
```

```
1 row(s) updated.
```


Subqueries(5 Codes) :-

1).

```
210  ),  
211  
212  SELECT Name  
213  FROM Game  
214  WHERE Rating > (SELECT AVG(Rating) FROM Game);  
215
```

NAME
Game1
Game3
Game4
Game7
Game10

Download CSV

5 rows selected.

2).

```
188 v SELECT Name, Age
189 FROM Project_Manager
190 WHERE Age = (SELECT MIN(Age) FROM Project_Manager);
191
```

NAME	AGE
Manager1	35

Download CSV

3).

```
230
231 v SELECT G.Name AS Gamer_Name
232 FROM Gamer G
233 WHERE G.Manager_id IN (
234     SELECT Manager_id
235     FROM Project_Manager
236     WHERE Age < 40
237 );
238
239
```

GAMER_NAME
John
Alice
Frank
Grace

4).

```
191
192 v SELECT C.Name AS Company_Name,
193      (SELECT COUNT(*) FROM Game G WHERE G.Company_id = C.Company_id) AS Total_Games_Developed
194 FROM Company C;
195 |
```

COMPANY_NAME	TOTAL_GAMES_DEVELOPED
Company1	2
Company2	2
Company3	2
Company4	2
Company5	2
Company6	0
Company7	0
Company8	0
Company9	0

5).

```
195  
196 ✓ SELECT PM.Name AS Manager_Name,  
197       (SELECT AVG(G.Rating) FROM Game G  
198        JOIN Developer D ON G.Name = D.Name  
199        WHERE D.Manager_id = PM.Manager_id) AS Average_Rating  
200 FROM Project_Manager PM;  
201
```

MANAGER_NAME	AVERAGE_RATING
Manager6	-
Manager1	-
Manager7	-
Manager2	-
Manager8	-
Manager4	-
Manager5	-
Manager10	-
Manager3	-
Manager9	-

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