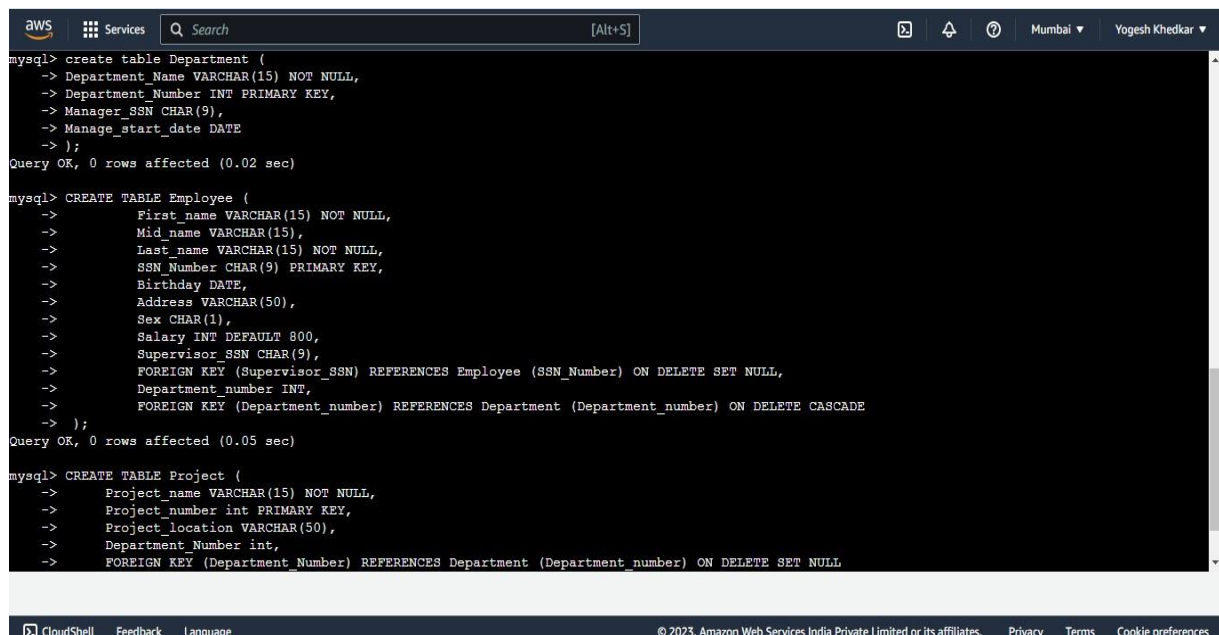


ASSESSMENT 5 – SQL QUERY

- **To create employee Table:**

```
CREATE TABLE Employee (
    FName VARCHAR(15) NOT NULL,
    MName CHAR(2),
    LName VARCHAR(15) NOT NULL,
    SSN CHAR(9) PRIMARY KEY,
    BDate DATE,
    Address VARCHAR(50),
    Sex CHAR(1) CHECK (Sex IN ('M', 'F', 'm', 'f')),
    Salary NUMBER(7) DEFAULT 800,
    SuperSSN CHAR(9) REFERENCES Employee(SSN) ON DELETE SET NULL,
    DepNo NUMBER(5) REFERENCES Department(DepNo) ON DELETE CASCADE
);
```



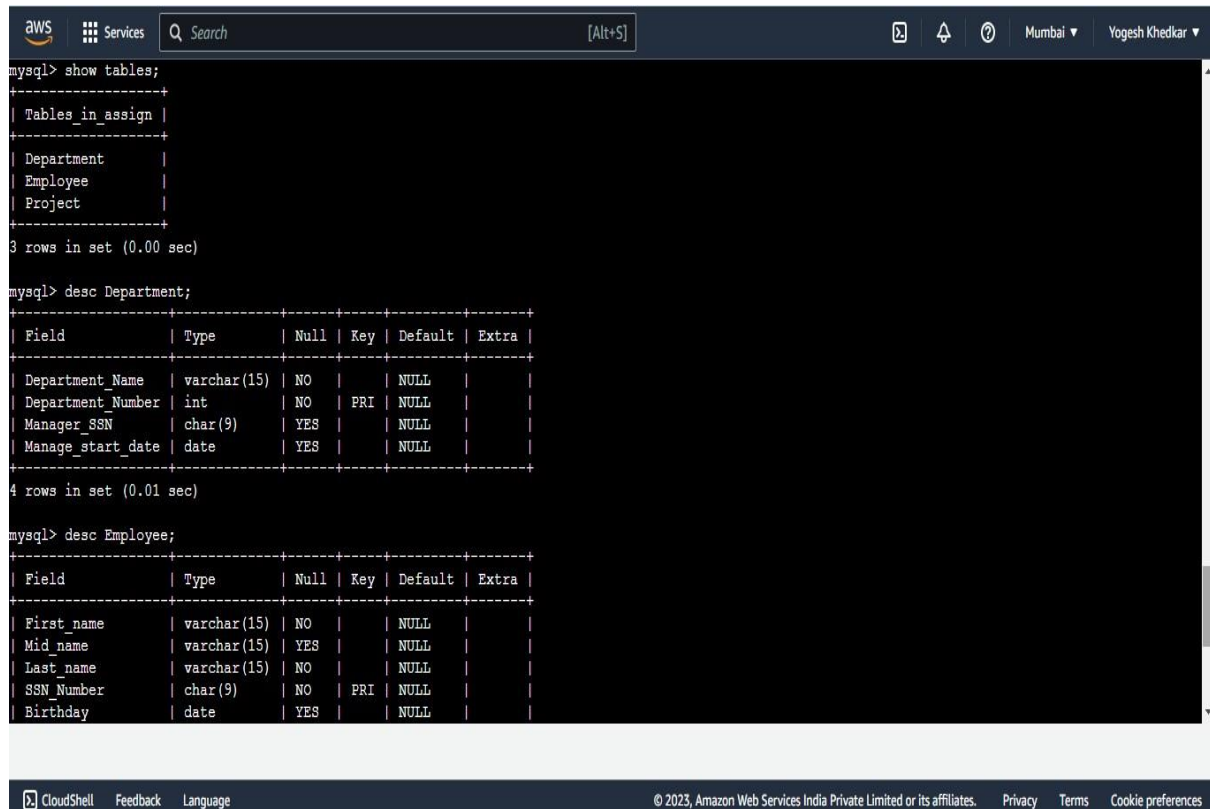
```
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mysql> create table Department (
-> Department_Name VARCHAR(15) NOT NULL,
-> Department_Number INT PRIMARY KEY,
-> Manager_SSN CHAR(9),
-> Manage_start_date DATE
-> );
Query OK, 0 rows affected (0.02 sec)

mysql> CREATE TABLE Employee (
-> First_name VARCHAR(15) NOT NULL,
-> Mid_name VARCHAR(15),
-> Last_name VARCHAR(15) NOT NULL,
-> SSN Number CHAR(9) PRIMARY KEY,
-> Birthday DATE,
-> Address VARCHAR(50),
-> Sex CHAR(1),
-> Salary INT DEFAULT 800,
-> Supervisor_SSN CHAR(9),
-> FOREIGN KEY (Supervisor_SSN) REFERENCES Employee (SSN_Number) ON DELETE SET NULL,
-> Department_number INT,
-> FOREIGN KEY (Department_number) REFERENCES Department (Department_number) ON DELETE CASCADE
-> );
Query OK, 0 rows affected (0.05 sec)

mysql> CREATE TABLE Project (
-> Project_name VARCHAR(15) NOT NULL,
-> Project_number int PRIMARY KEY,
-> Project_location VARCHAR(50),
-> Department_Number int,
-> FOREIGN KEY (Department_Number) REFERENCES Department (Department_number) ON DELETE SET NULL
```

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```
mysql> show tables;
+-----+
| Tables_in_assign |
+-----+
| Department       |
| Employee         |
| Project          |
+-----+
3 rows in set (0.00 sec)

mysql> desc Department;
+-----+-----+-----+-----+-----+-----+
| Field          | Type          | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| Department_Name | varchar(15)    | NO   |     | NULL    |       |
| Department_Number | int           | NO   | PRI | NULL    |       |
| Manager_SSN     | char(9)       | YES  |     | NULL    |       |
| Manage_start_date | date          | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
4 rows in set (0.01 sec)

mysql> desc Employee;
+-----+-----+-----+-----+-----+-----+
| Field          | Type          | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| First_name     | varchar(15)    | NO   |     | NULL    |       |
| Mid_name       | varchar(15)    | YES  |     | NULL    |       |
| Last_name      | varchar(15)    | NO   |     | NULL    |       |
| SSN_Number     | char(9)       | NO   | PRI | NULL    |       |
| Birthday       | date          | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
```

- **To create Table department:**

```
CREATE TABLE Department (
    DName VARCHAR(15) NOT NULL,
    DepNo NUMBER(5) PRIMARY KEY,
    MgrSSN CHAR(9) REFERENCES Employee(SSN) ON DELETE SET NULL,
    MgrStartDate DATE
);
```

```

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mysql> SELECT * FROM Department;
+-----+-----+-----+-----+
| Department_Name | Department_Number | Manager_SSN | Manage_start_date |
+-----+-----+-----+-----+
| Manufacture     | 1 | 888665555 | 1971-06-19 |
| Administration  | 2 | 543216789 | 1999-06-04 |
| Headquarter     | 3 | 554433221 | 2022-09-22 |
| Finance         | 4 | 987654321 | 1985-01-01 |
| Research        | 5 | 333445555 | 1971-05-22 |
+-----+-----+-----+-----+
5 rows in set (0.00 sec)

mysql> SELECT * FROM Employee;
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| First_name | Mid_name | Last_name | SSN_Number | Birthday | Address | Sex | Salary | Supervisor_SSN | Department_number |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| Franklin  | T        | Wong     | 333445555 | 1975-12-08 | 638 Voss, Houston, TX | M | 140000 | 554433221 | 5 |
| Joyce    | A        | English  | 453553453 | 1962-07-31 | 5631 Rice Houston, TX | F | 195000 | 333445555 | 5 |
| Joyce    | NULL     | PAN      | 543216789 | 1978-02-07 | 35 s 18 E, Salt Lake City, UT | M | 170000 | NULL | 2 |
| Doug     | E        | Gilbert  | 554433221 | 1978-06-09 | 11 s 59 E, Salt Lake City, UT | M | 180000 | NULL | 3 |
| James    | E        | Borg     | 888665555 | 1972-11-10 | 450 Stone Houston, TX | M | 195000 | 543216789 | 1 |
| Jennifer | S        | Wallace  | 987654321 | 1981-01-20 | 291 Berry, Bellaire, TX | F | 143000 | 554433221 | 4 |
| Ahmad    | V        | Jabbar   | 987987987 | 1975-03-29 | 980 Dallas Houston, TX | M | 125000 | 987654321 | 4 |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
7 rows in set (0.00 sec)

mysql> SELECT * FROM Project;
+-----+-----+-----+-----+
| Project_name | Project_number | Project_location | Department_Number |
+-----+-----+-----+-----+

```

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- **To create Project Table:**

```

CREATE TABLE Project (
    PName VARCHAR2(15) NOT NULL,
    PNumber NUMBER(5) PRIMARY KEY,
    PLocation VARCHAR2(50),
    DepNo NUMBER(5) REFERENCES Department(DepNo) ON DELETE SET NULL
);

```

```

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4 rows in set (0.01 sec)

mysql> desc Employee;

+-----+-----+-----+-----+-----+-----+
| Field      | Type      | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| First_name | varchar(15) | NO   |     | NULL    |       |
| Mid_name   | varchar(15) | YES  |     | NULL    |       |
| Last_name  | varchar(15) | NO   |     | NULL    |       |
| SSN_Number | char(9)     | NO   | PRI | NULL    |       |
| Birthday   | date       | YES  |     | NULL    |       |
| Address    | varchar(50) | YES  |     | NULL    |       |
| Sex        | char(1)     | YES  |     | NULL    |       |
| Salary     | int        | YES  |     | 800     |       |
| Supervisor_SSN | char(9)    | YES  | MUL | NULL    |       |
| Department_number | int      | YES  | MUL | NULL    |       |
+-----+-----+-----+-----+-----+-----+

10 rows in set (0.00 sec)

mysql> desc Project;

+-----+-----+-----+-----+-----+-----+
| Field      | Type      | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| Project_name | varchar(15) | NO   |     | NULL    |       |
| Project_number | int        | NO   | PRI | NULL    |       |
| Project_location | varchar(50) | YES  |     | NULL    |       |
| Department_Number | int      | YES  | MUL | NULL    |       |
+-----+-----+-----+-----+-----+-----+

4 rows in set (0.00 sec)

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```

```

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5 rows in set (0.00 sec)

mysql> SELECT * FROM Employee;

+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| First_name | Mid_name | Last_name | SSN_Number | Birthday | Address | Sex | Salary | Supervisor_SSN | Department_number |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| Franklin  | T        | Wong     | 333445555 | 1975-12-08 | 638 Voss, Houston, TX | M   | 140000 | 554433221 | 5 |
| Joyce     | A        | English  | 453553453 | 1962-07-31 | 5631 Rice Houston, TX | F   | 195000 | 333445555 | 5 |
| Joyce     | NULL     | PAN      | 543216789 | 1978-02-07 | 35 S 18 E, Salt Lake City, UT | M   | 170000 | NULL | 2 |
| Doug      | E        | Gilbert  | 554433221 | 1978-06-09 | 11 s 59 E, Salt Lake City, UT | M   | 180000 | NULL | 3 |
| James     | E        | Borg     | 888665555 | 1972-11-10 | 450 Stone Houston, TX | M   | 195000 | 543216789 | 1 |
| Jennifer  | S        | Wallace  | 987654321 | 1981-01-20 | 291 Berry, Bellaire, TX | F   | 143000 | 554433221 | 4 |
| Ahmad     | V        | Jabbar   | 987987987 | 1975-03-29 | 980 Dallas Houston, TX | M   | 125000 | 987654321 | 4 |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+

7 rows in set (0.00 sec)

mysql> SELECT * FROM Project;

+-----+-----+-----+-----+
| Project_name | Project_number | Project_location | Department_Number |
+-----+-----+-----+-----+
| ProjectG     | 1234           | New York         | 2 |
| ProjectF     | 1566           | Salt Lake City   | 3 |
| ProjectB     | 1945           | Salt Lake City   | 3 |
| ProjectJ     | 2212           | San Francisco    | 2 |
| ProjectA     | 3388           | Houston          | 1 |
| ProjectH     | 3467           | Stafford         | 4 |
| ProjectI     | 4345           | Chicago          | 1 |
| ProjectE     | 7745           | Sugarland        | 5 |
+-----+-----+-----+-----+

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```

1. Find the male employee names having salaries greater than 75000

```
SELECT First_Name, Last_Name
FROM Employee
WHERE Sex = 'M' AND Salary > 75000;
```

```
mysql> select * from Employee where sex='M' and salary>75000;
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| First_name | Mid_name | Last_name | SSN_Number | Birthday | Address | Sex | Salary | Supervisor_SSN | Department_number |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| Franklin | T | Wong | 333445555 | 1975-12-08 | 638 Voss, Houston, TX | M | 140000 | 554433221 | 5 |
| Joyce | NULL | PAN | 543216789 | 1978-02-07 | 35 S 18 E, Salt Lake City, UT | M | 170000 | NULL | 2 |
| Doug | E | Gilbert | 554433221 | 1978-06-09 | 11 s 59 E, Salt Lake City, UT | M | 180000 | NULL | 3 |
| James | E | Borg | 888665555 | 1972-11-10 | 450 Stone Houston, TX | M | 195000 | 543216789 | 1 |
| Ahmad | V | Jabbar | 987987987 | 1975-03-29 | 980 Dallas Houston, TX | M | 125000 | 987654321 | 4 |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
5 rows in set (0.00 sec)
```

2. Find the employee names whose salary falls in the range of 50000 and 80000.

```
SELECT First_Name, Last_Name
FROM Employee
WHERE Salary BETWEEN 50000 AND 80000;
```

```
mysql> select * from Employee where salary between 50000 and 80000;
Empty set (0.00 sec)
```

3. Find all the employees who have no supervisor.

```
SELECT First_Name, Last_Name
FROM Employee
WHERE SuperSSN IS NULL;
```

```
mysql> select * from Employee where Supervisor_SSN is NULL;
```

First_name	Mid_name	Last_name	SSN_Number	Birthday	Address	Sex	Salary	Supervisor_SSN	Department_number
Joyce	NULL	PAN	543216789	1978-02-07	35 S 18 E, Salt Lake City, UT	M	170000	NULL	2
Doug	E	Gilbert	554433221	1978-06-09	11 S 59 E, Salt Lake City, UT	M	180000	NULL	3

```
2 rows in set (0.00 sec)
```

4. How many different departments are there in the 'employee' table?

```
SELECT COUNT(DISTINCT DepNo) AS num_departments
FROM Employee;
```

```
mysql> select count(DISTINCT Department_number) as Number_Of_Department from Employee;
```

Number_Of_Department
5

```
1 row in set (0.00 sec)
```


5. For each department display the least and highest employee salaries along with department Number

```
SELECT DepNo, MIN(Salary) AS least_salary, MAX(Salary) AS highest_salary
FROM Employee
GROUP BY DepNo;
```

```
mysql> SELECT Department.Department_number, MIN(Employee.Salary) AS Least_salary, MAX(Employee.Salary) AS Highest_salary
-> FROM Department
-> LEFT JOIN Employee ON Department.Department_number = Employee.Department_number
-> GROUP BY Department.Department_number;
+-----+-----+-----+
| Department_number | Least_salary | Highest_salary |
+-----+-----+-----+
| 1 | 195000 | 195000 |
| 2 | 170000 | 170000 |
| 3 | 180000 | 180000 |
| 4 | 125000 | 143000 |
| 5 | 140000 | 195000 |
+-----+-----+-----+
5 rows in set (0.00 sec)
```

6. Retrieve the total number of hours spent on projects by each employee.

```
mysql> UPDATE Project
-> SET Project_hours = 7500
-> WHERE Project_name = 'ProjectI';
Query OK, 1 row affected (0.01 sec)
Rows matched: 1 Changed: 1 Warnings: 0

mysql> UPDATE Project
-> SET Project_hours = 5500
-> WHERE Project_name = 'ProjectJ' ;
Query OK, 1 row affected (0.01 sec)
Rows matched: 1 Changed: 1 Warnings: 0

mysql> SELECT * FROM Project;
+-----+-----+-----+-----+-----+
| Project_name | Project_number | Project_location | Department_Number | Project_hours |
+-----+-----+-----+-----+-----+
| ProjectG | 1234 | New York | 2 | 2000 |
| ProjectF | 1566 | Salt Lake City | 3 | 2500 |
| ProjectB | 1945 | Salt Lake City | 3 | 3500 |
| ProjectJ | 2212 | San Francisco | 2 | 5500 |
| ProjectA | 3388 | Houston | 1 | 2500 |
| ProjectH | 3467 | Stafford | 4 | 3500 |
| ProjectI | 4345 | Chicago | 1 | 7500 |
| ProjectE | 7745 | Sugarland | 5 | 5500 |
+-----+-----+-----+-----+-----+
8 rows in set (0.00 sec)
```

```
SELECT e.First_Name, e.Last_Name, SUM(p.hours) AS total_hours
FROM Employee e JOIN Works_On w ON e.SSN = w.ESSN
JOIN Project p ON w.PNO = p.PNumber
GROUP BY e.SSN;
```

7. Count the number of employees who works in 'manufacture' department (using subqueries)

```
SELECT COUNT(*) AS num_employees
FROM Employee
WHERE DepNo = 5;
```

```
mysql> select count(*) as total_number_of_employees_work_in_manufacture From Employee Where Department_number = (Select Department_number from Department where Department_Name = 'Manufacture');
```

total_number_of_employees work in manufacture
1

```
1 row in set (0.00 sec)
```

```
mysql> select e.first_name,e.last_name,SUM(p.Project_hours) AS Total_Hours From Employee e join Project p ON e.Department_number = p.Department_number Group BY e.SSN_number
```

first_name	last_name	Total_Hours
Franklin	Wong	1550
Joyce	English	1550
Joyce	RM	7550
Booy	Gilbert	4000
James	Bony	10000
Jennifer	Wallace	1550
Ahmad	Jahbar	7550

```
1 rows in set (0.01 sec)
```

8. Retrieve the total number of employees in 'Research' department

```
SELECT e.First_Name, e.Last_Name, SUM(p.hours) AS total_hours
FROM Employee e JOIN Works_On w ON e.SSN = w.ESSN
JOIN Project p ON w.PNO = p.PNumber
GROUP BY e.SSN;
```



```
mysql> select count(*) as total_number_of_employees_work_in_Research From Employee Where Department_number = (Select Department_number from Department where Department_Name = 'Research');
```

total_number_of_employees_work_in_Research
2

```
1 row in set (0.01 sec)
```

9. Retrieve the employees whose salary is greater than average salary of department 2

```
SELECT COUNT(*) AS num_employees
FROM Employee e JOIN Department d ON e.DepNo = d.DepNo
WHERE d.DName = 'Manufacture';
```

```
mysql> Select * from Employee where salary > (select AVG(salary) from Employee where Department_number=2);
```

First_name	Mid_name	Last_name	SSN_Number	Birthday	Address	Sex	Salary	Supervisor_SSN	Department_number
Joyce	A	English	453553453	1962-07-31	5631 Rice Houston, TX	F	195000	333445555	5
Doug	E	Gilbert	554433221	1978-06-09	11 s 59 E, Salt Lake City,UT	M	180000	NULL	3
James	E	Borg	888665555	1972-11-10	450 Stone Houston, TX	M	195000	543216789	1

```
3 rows in set (0.00 sec)
```

10. Find the employees who earn the same salary as the minimum salary for each department.

```
SELECT e1.*
FROM employee e1
WHERE e1.salary = (
    SELECT MIN(e2.salary)
    FROM employee e2
    WHERE e2.department_number = e1.department_number
);
```

```
mysql> select e.* from Employee e join ( select Department_number, MIN(Salary) as Minsalary from Employee Group By Department_number) m ON e.Department_number = m.Department_number AND e.Salary = m.Salary;
ERROR 1054 (42S22): Unknown column 'm.Salary' in 'on clause'
mysql> select e.* from Employee e join ( select Department_number, MIN(Salary) as Minsalary from Employee Group By Department_number) m ON e.Department_number = m.Department_number AND e.Salary = m.Minsalary;
```

First_name	Mid_name	Last_name	SSN_Number	Birthday	Address	Sex	Salary	Supervisor_SSN	Department_number
Franklin	T	Wong	333445555	1975-12-08	638 Voss, Houston, TX	M	140000	554433221	5
Joyce	NULL	PAN	543216789	1978-02-07	35 S 18 E, Salt Lake City, UT	M	170000	NULL	2
Doug	E	Gilbert	554433221	1978-06-09	11 s 59 E, Salt Lake City, UT	M	180000	NULL	3
James	E	Borg	888665555	1972-11-10	450 Stone Houston, TX	M	195000	543216789	1
Ahmad	V	Jabbar	987987987	1975-03-29	980 Dallas Houston, TX	M	125000	987654321	4

5 rows in set (0.00 sec)

11. Create a trigger for before inserting in project hours which is less than 1200 should throw an error.

```
CREATE TRIGGER check_project_hours
BEFORE INSERT ON project_hours
FOR EACH ROW
BEGIN
    IF NEW.hours < 1200 THEN
        SIGNAL SQLSTATE '45000'
        SET MESSAGE_TEXT = 'Project hours cannot be less than 1200';
    END IF;
END;
```

```
mysql> DELIMITER //
mysql> CREATE TRIGGER before_project_hours_insert
    -> BEFORE INSERT ON Project
    -> FOR EACH ROW
    -> BEGIN
    ->     IF NEW.Project_hours < 1200 THEN
    ->         SIGNAL SQLSTATE '45000'
    ->         SET MESSAGE_TEXT = 'Number of hours should be greater than 1200';
    ->     END IF;
    -> END //
```

Query OK, 0 rows affected (0.01 sec)

```
mysql> SHOW TRIGGERS;
```

Trigger	Event	Table	Statement	Timing	Created	sql_mode	Definer	character_set_client	collation_connection	Database Collation
before_project_hours_insert	INSERT	Project	BEGIN IF NEW.Project_hours < 1200 THEN SIGNAL SQLSTATE '45000' SET MESSAGE_TEXT = 'Number of hours should be greater than 1200'; END IF;	BEFORE	2023-04-27 16:32:36.93	ONLY_FULL_GROUP_BY,STRICT_TRANS_TABLES,NO_ZERO_IN_DATE,NO_ZERO_DATE,ERROR_FOR_DIVISION_BY_ZERO,NO_ENGINE_SUBSTITUTION	root@localhost	utf8mb4	utf8mb4_0900_ai_ci	utf8mb4_0900_ai_ci

1 row in set (0.00 sec)

12. Display the five employees who have salaries above 150000 using in/out parameters in SPC.

```
CREATE PROCEDURE get_top_employees(INOUT num_rows INT)

BEGIN

    SELECT * FROM employee

    WHERE salary > 150000

    ORDER BY salary DESC

    LIMIT num_rows;

END;
```

```
mysql> use assessment;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
mysql> DELIMITER //
mysql>
mysql> CREATE PROCEDURE `get_high_paid_employees`(IN salary_limit INT)
-> BEGIN
->   SELECT *
->   FROM Employee
->   WHERE Salary > salary_limit
->   ORDER BY Salary DESC
->   LIMIT 5;
-> END //
Query OK, 0 rows affected (0.01 sec)

mysql>
mysql> DELIMITER ;
mysql> CALL get_high_paid_employees(150000);
```

First_name	Mid_name	Last_name	SSN_Number	Birthday	Address	Sex	Salary	Supervisor_SSN	Department_number
Joyce	A	English	453553453	1962-07-31	5631 Rice Houston, TX	F	195000	333445555	5
James	E	Borg	888665555	1972-11-10	450 Stone Houston, TX	M	195000	543216789	1
Doug	E	Gilbert	554433221	1978-06-09	11 s 59 E, Salt Lake City,UT	M	180000	NULL	3
Joyce	NULL	PAN	543216789	1978-02-07	35 S 18 E, Salt Lake City,UT	M	170000	NULL	2

```
4 rows in set (0.00 sec)
```