UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
DEHRADUN

DBMS LAB - 7

SQL Joins and Set Operations

MTECH-COMPUTER SCIENCE
ENGINEERING
CYBER SECURITY AND FORENSICS

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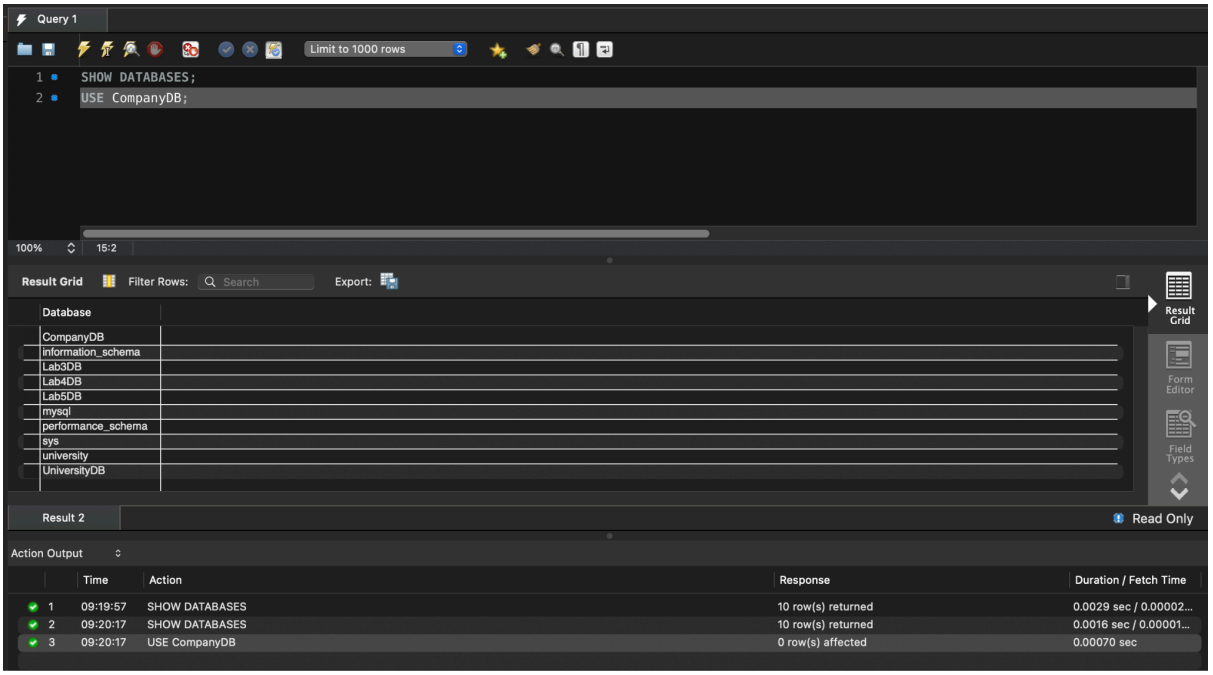
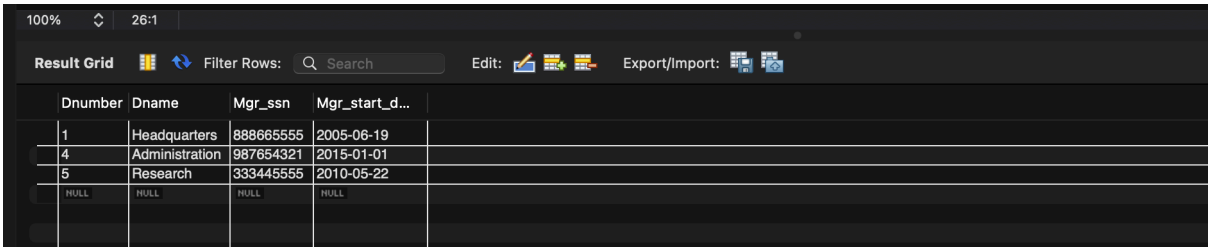
Objective: : To understand and implement various types of joins and set operations in SQL queries for combining data from multiple tables.

Using previously created CompanyDB



DESCRIBE Department;

SELECT * FROM Department;



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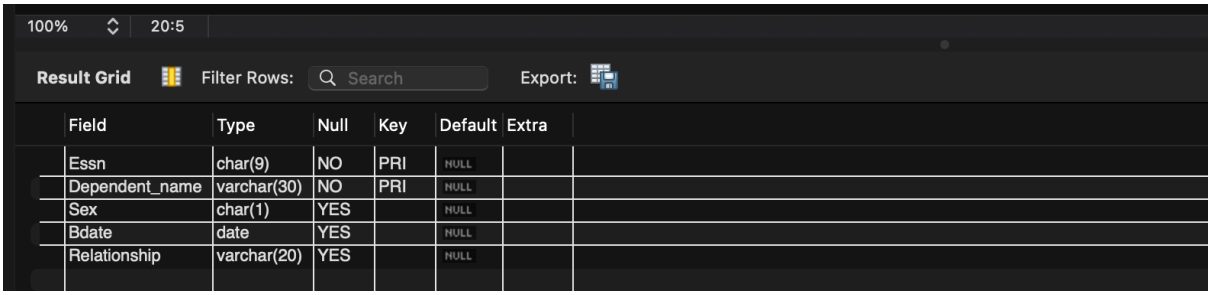
DESCRIBE Dependent;



100% 20:5

Result Grid Filter Rows: Search Export:

Field	Type	Null	Key	Default	Extra
Essn	char(9)	NO	PRI	NULL	
Dependent_name	varchar(30)	NO	PRI	NULL	
Sex	char(1)	YES		NULL	
Bdate	date	YES		NULL	
Relationship	varchar(20)	YES		NULL	

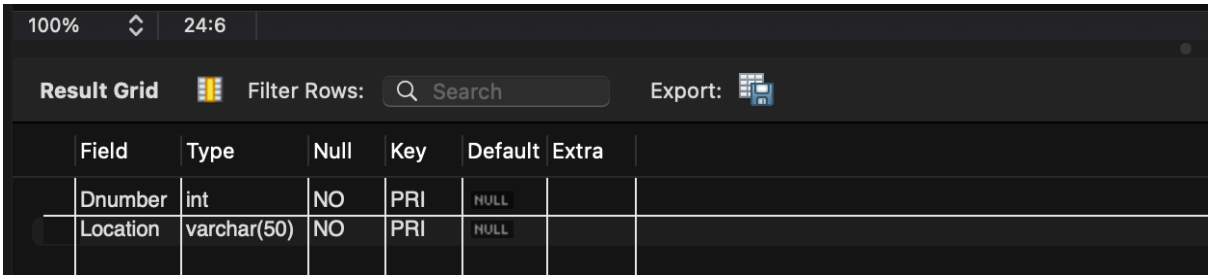
SELECT * FROM Dependent;

100% 25:5

Result Grid Filter Rows: Search Edit: Export/Import:

Essn	Dependent_name	Sex	Bdate	Relationship
123456789	Aarav	M	2010-04-05	Son
123456789	Neha	F	1987-05-05	Spouse
333445555	Sanya	F	1978-12-30	Spouse
333445555	Vivaan	M	2005-01-04	Son
987654321	Kabir	M	1982-02-28	Spouse
NULL	NULL	NULL	NULL	NULL

DESCRIBE Dept_Location;



100% 24:6

Result Grid Filter Rows: Search Export:

Field	Type	Null	Key	Default	Extra
Dnumber	int	NO	PRI	NULL	
Location	varchar(50)	NO	PRI	NULL	

SELECT * FROM Dept_Location;

100% 29:6

Result Grid Filter Rows: Search Edit: Export/Import:

Dnumber	Location
1	Bengaluru
1	Mumbai
4	Chennai
4	Delhi
4	Hyderabad
5	Bangalore
5	Chennai
5	Hyderabad
5	Mumbai
5	Pune
NULL	NULL

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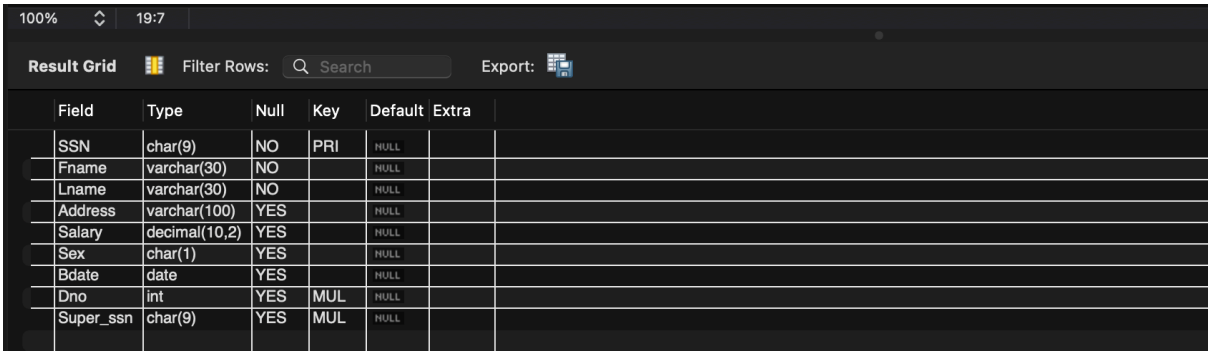
DESCRIBE Employee;

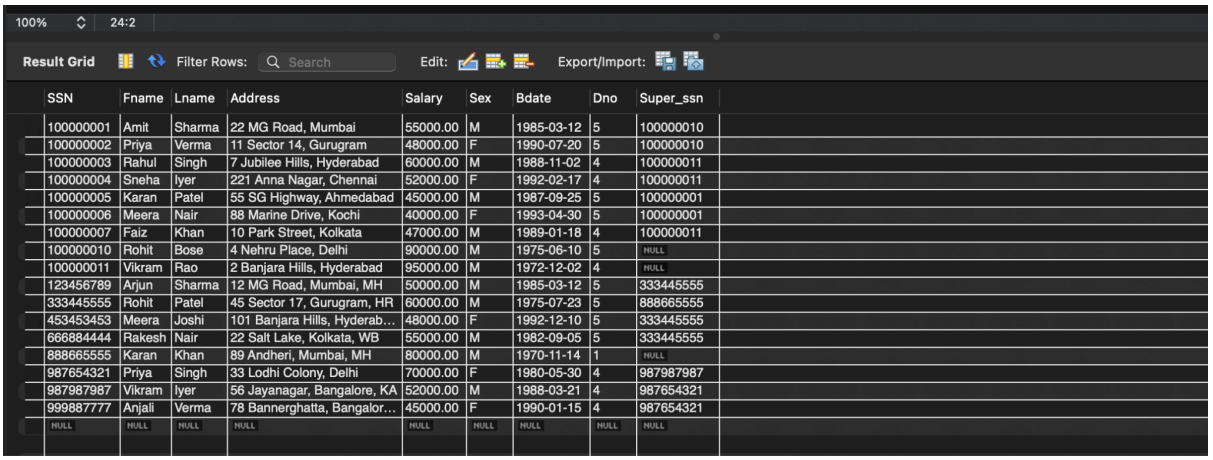


100% 19:7

Result Grid Filter Rows: Search Export:

Field	Type	Null	Key	Default	Extra
SSN	char(9)	NO	PRI	NULL	
Fname	varchar(30)	NO		NULL	
Lname	varchar(30)	NO		NULL	
Address	varchar(100)	YES		NULL	
Salary	decimal(10,2)	YES		NULL	
Sex	char(1)	YES		NULL	
Bdate	date	YES		NULL	
Dno	int	YES	MUL	NULL	
Super_ssn	char(9)	YES	MUL	NULL	

SELECT * FROM Employee;

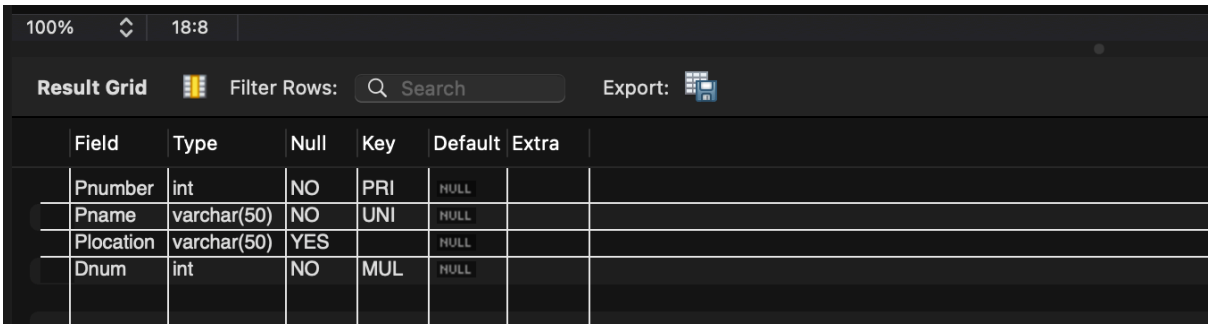


100% 24:2

Result Grid Filter Rows: Search Edit: Export/Import:

SSN	Fname	Lname	Address	Salary	Sex	Bdate	Dno	Super_ssn
100000001	Amit	Sharma	22 MG Road, Mumbai	55000.00	M	1985-03-12	5	100000010
100000002	Priya	Verma	11 Sector 14, Gurugram	48000.00	F	1990-07-20	5	100000010
100000003	Rahul	Singh	7 Jubilee Hills, Hyderabad	60000.00	M	1988-11-02	4	100000011
100000004	Sneha	Iyer	221 Anna Nagar, Chennai	52000.00	F	1992-02-17	4	100000011
100000005	Karan	Patel	55 SG Highway, Ahmedabad	45000.00	M	1987-09-25	5	100000001
100000006	Meera	Nair	88 Marine Drive, Kochi	40000.00	F	1993-04-30	5	100000001
100000007	Faiz	Khan	10 Park Street, Kolkata	47000.00	M	1989-01-18	4	100000011
100000010	Rohit	Bose	4 Nehru Place, Delhi	90000.00	M	1975-06-10	5	NULL
100000011	Vikram	Rao	2 Banjara Hills, Hyderabad	95000.00	M	1972-12-02	4	NULL
123456789	Arjun	Sharma	12 MG Road, Mumbai, MH	50000.00	M	1985-03-12	5	333445555
333445555	Rohit	Patel	45 Sector 17, Gurugram, HR	60000.00	M	1975-07-23	5	888665555
453453453	Meera	Joshi	101 Banjara Hills, Hyderab...	48000.00	F	1992-12-10	5	333445555
666884444	Rakesh	Nair	22 Salt Lake, Kolkata, WB	55000.00	M	1982-09-05	5	333445555
888665555	Karan	Khan	89 Andheri, Mumbai, MH	80000.00	M	1970-11-14	1	NULL
987654321	Priya	Singh	33 Lodhi Colony, Delhi	70000.00	F	1980-05-30	4	987987987
987987987	Vikram	Iyer	56 Jayanagar, Bangalore, KA	52000.00	M	1988-03-21	4	987654321
999887777	Anjali	Verma	78 Bannerghatta, Bangalor...	45000.00	F	1990-01-15	4	987654321
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

DESCRIBE Project;



100% 18:8

Result Grid Filter Rows: Search Export:

Field	Type	Null	Key	Default	Extra
Pnumber	int	NO	PRI	NULL	
Pname	varchar(50)	NO	UNI	NULL	
Plocation	varchar(50)	YES		NULL	
Dnum	int	NO	MUL	NULL	

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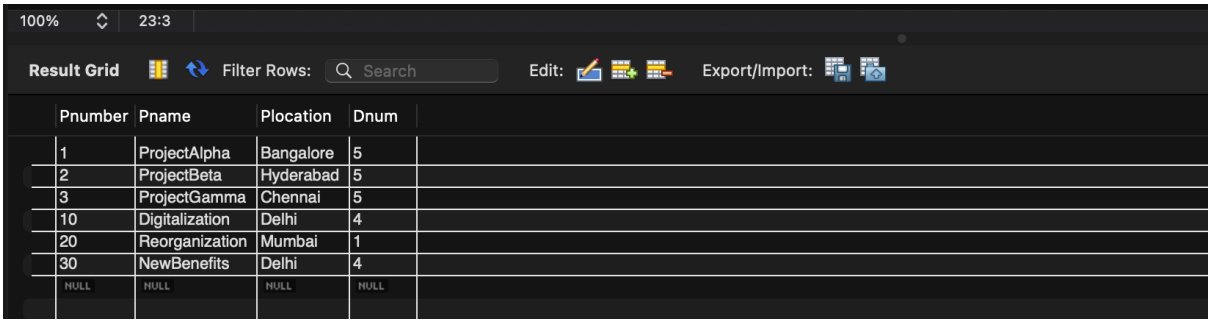
SELECT * FROM Project;

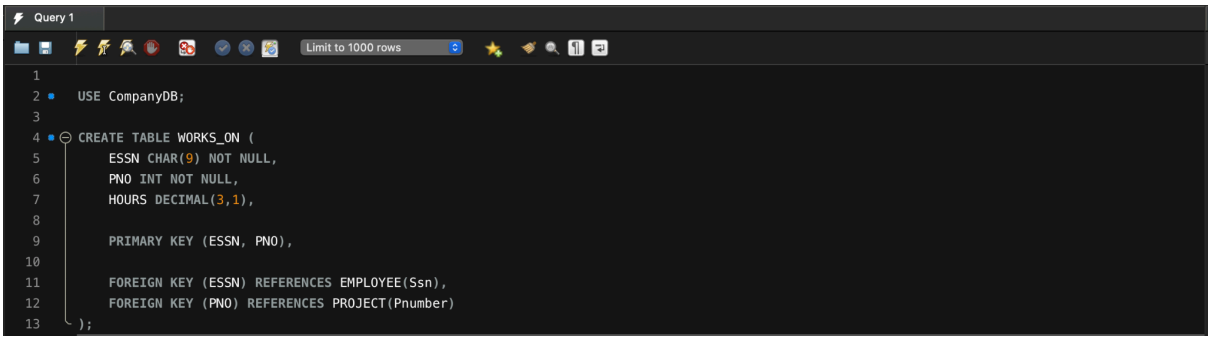


100% 23:3

Result Grid Filter Rows: Search Edit: Export/Import:

Pnumber	Pname	Plocation	Dnum
1	ProjectAlpha	Bangalore	5
2	ProjectBeta	Hyderabad	5
3	ProjectGamma	Chennai	5
10	Digitalization	Delhi	4
20	Reorganization	Mumbai	1
30	NewBenefits	Delhi	4
NULL	NULL	NULL	NULL

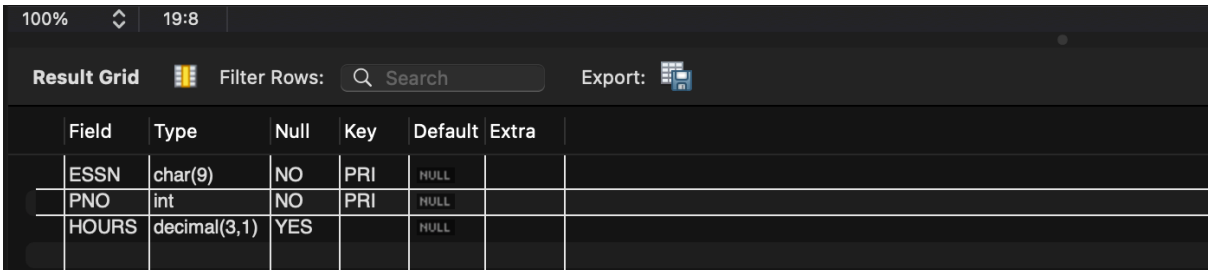
Perviously we didn't created Works_on table so i created a new table with given constraints inside the CompanyDB



Query 1 — Limit to 1000 rows

```
1
2   USE CompanyDB;
3
4   CREATE TABLE WORKS_ON (
5       ESSN CHAR(9) NOT NULL,
6       PNO INT NOT NULL,
7       HOURS DECIMAL(3,1),
8
9       PRIMARY KEY (ESSN, PNO),
10
11      FOREIGN KEY (ESSN) REFERENCES EMPLOYEE(Ssn),
12      FOREIGN KEY (PNO) REFERENCES PROJECT(Pnumber)
13  );
```

DESCRIBE Works_On;

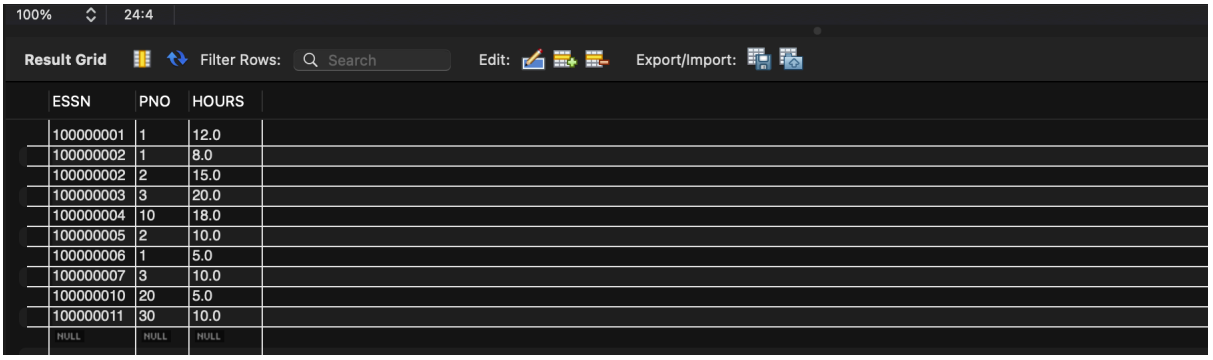


100% 19:8

Result Grid Filter Rows: Search Export:

Field	Type	Null	Key	Default	Extra
ESSN	char(9)	NO	PRI	NULL	
PNO	int	NO	PRI	NULL	
HOURS	decimal(3,1)	YES		NULL	

SELECT * FROM Works_On;



100% 24:4

Result Grid Filter Rows: Search Edit: Export/Import:

ESSN	PNO	HOURS
100000001	1	12.0
100000002	1	8.0
100000002	2	15.0
100000003	3	20.0
100000004	10	18.0
100000005	2	10.0
100000006	1	5.0
100000007	3	10.0
100000010	20	5.0
100000011	30	10.0
NULL	NULL	NULL

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Query 1: Retrieve average salary of all employees.

```
1   -- Author: Jigesh SHeoran
2   -- Lab 7 : Database Management Systems
3
4   USE CompanyDB;
5   -- Query 1: Average Salary
6   SELECT AVG(Salary) AS AverageSalary
7   FROM Employee;
8
```

100% 15:7

Result Grid | Filter Rows: Search | Export:

AverageSalary
58352.941176

Query 2: Retrieve the number of employees.

```
2   -- Lab 7 : Database Management Systems
3
4   USE CompanyDB;
5   -- Query 2: No. of Employees
6   SELECT COUNT(*) AS TotalEmployees
7   FROM Employee;
8
9
```

100% 1:8

Result Grid | Filter Rows: Search | Export:

TotalEmployees
17

Query 3: Retrieve distinct number of employees

```
1   -- Author: Jigesh SHeoran
2   -- Lab 7 : Database Management Systems
3
4   USE CompanyDB;
5   -- Query 3: Retrieve distinct number of employees
6   SELECT COUNT(DISTINCT SSN) AS DistinctEmployees
7   FROM Employee;
8
```

100% 1:8

Result Grid | Filter Rows: Search | Export:

DistinctEmployees
17

Query 4: Retrieve total salary of employee group by job.

```sql
-- Author: Jigesh SHeoran
-- Lab 7 : Database Management Systems

USE CompanyDB;
-- Query 4: Retrieve total salary of employee group by job
ALTER TABLE Employee
ADD Job VARCHAR(30);

UPDATE Employee SET Job = 'Software Engineer' WHERE SSN = '100000001';
UPDATE Employee SET Job = 'Software Engineer' WHERE SSN = '100000002';
UPDATE Employee SET Job = 'Senior Engineer' WHERE SSN = '100000003';
UPDATE Employee SET Job = 'Senior Engineer' WHERE SSN = '100000004';
UPDATE Employee SET Job = 'Accountant' WHERE SSN = '100000005';
UPDATE Employee SET Job = 'HR Executive' WHERE SSN = '100000006';
UPDATE Employee SET Job = 'Analyst' WHERE SSN = '100000007';
UPDATE Employee SET Job = 'Manager' WHERE SSN = '100000010';
UPDATE Employee SET Job = 'Manager' WHERE SSN = '100000011';

SELECT Job, SUM(Salary) AS TotalSalary
FROM Employee
GROUP BY Job;
```

Job	TotalSalary
Software Engineer	103000.00
Senior Engineer	112000.00
Accountant	45000.00
HR Executive	40000.00
Analyst	47000.00
Manager	185000.00
NULL	460000.00

Query 5: Display the employee information with maximum salary

```sql
-- Author: Jigesh SHeoran
-- Lab 7 : Database Management Systems

USE CompanyDB;
-- Query 5: Display the employee information with maximum salary
SELECT *
FROM Employee
WHERE Salary = (SELECT MAX(Salary) FROM Employee);
```

100% 1:9

Result Grid Filter Rows: Search Edit: Export/Import:

SSN	Fname	Lname	Address	Salary	Sex	Bdate	Dno	Super_ssn	Job
100000011	Vikram	Rao	2 Banjara Hills, Hyderabad	95000.00	M	1972-12-02	4	NULL	Manager
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

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Query 6: Find the highest paid employee in department 5

```sql
-- Author: Jigesh SHeoran
-- Lab 7 : Database Management Systems

USE CompanyDB;
-- Query 6: Find the highest paid employee in department 10
SELECT *
FROM Employee
WHERE Dno = 5
  AND Salary = (SELECT MAX(Salary) FROM Employee WHERE Dno = 5);
```

100% 65:9

Result Grid | Filter Rows: Search | Edit: | Export/Import:

SSN	Fname	Lname	Address	Salary	Sex	Bdate	Dno	Super_ssn	Job
100000010	Rohit	Bose	4 Nehru Place, Delhi	90000.00	M	1975-06-10	5	NULL	Manager
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Query 7: List the employees whose salary is equal to the average of max and minimum.

Result: NULL (No employee has salary equal to average salary)

```sql
-- Author: Jigesh SHeoran
-- Lab 7 : Database Management Systems

USE CompanyDB;
-- Query 7
SELECT *
FROM Employee
WHERE Salary = (
    (SELECT MAX(Salary) FROM Employee) +
    (SELECT MIN(Salary) FROM Employee)
) / 2;
```

100% 7:11

Result Grid | Filter Rows: Search | Edit: | Export/Import:

SSN	Fname	Lname	Address	Salary	Sex	Bdate	Dno	Super_ssn	Job
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Query 8: List the employees who joined the company on the same date.

```sql
-- Author: Jigesh SHeoran
-- Lab 7 : Database Management Systems

USE CompanyDB;
-- Query 8
SELECT Fname, Lname, Bdate
FROM Employee
WHERE Bdate IN (
    SELECT Bdate
    FROM Employee
    GROUP BY Bdate
    HAVING COUNT(*) > 1
);
```

100% 1:14

Result Grid Filter Rows: Search Export:

Fname	Lname	Bdate
Amit	Sharma	1985-03-12
Arjun	Sharma	1985-03-12

Query 9: Display the employee names in upper and lower case.

```sql
-- Author: Jigesh SHeoran
-- Lab 7 : Database Management Systems

USE CompanyDB;
-- Query 9
SELECT Fname AS Original_First,
       Lname AS Original_Last,
       UPPER(Fname) AS First_Upper,
       LOWER(Fname) AS First_Lower,
       UPPER(Lname) AS Last_Upper,
       LOWER(Lname) AS Last_Lower
FROM Employee;
```

100% 1:13

Result Grid Filter Rows: Search Export:

Original_First	Original_Last	First_Upper	First_Lower	Last_Upper	Last_Lower
Amit	Sharma	AMIT	amit	SHARMA	sharma
Priya	Verma	PRIYA	priya	VERMA	verma
Rahul	Singh	RAHUL	rahul	SINGH	singh
Sneha	Iyer	SNEHA	sneha	IYER	iyer
Karan	Patel	KARAN	karan	PATEL	patel
Meera	Nair	MEERA	meera	NAIR	nair
Faiz	Khan	FAIZ	faiz	KHAN	khan
Rohit	Bose	ROHIT	rohit	BOSE	bose
Vikram	Rao	VIKRAM	vikram	RAO	rao
Arjun	Sharma	ARJUN	arjun	SHARMA	sharma
Rohit	Patel	ROHIT	rohit	PATEL	patel
Meera	Joshi	MEERA	meera	JOSHI	joshi
Rakesh	Nair	RAKESH	rakesh	NAIR	nair
Karan	Khan	KARAN	karan	KHAN	khan
Priya	Singh	PRIYA	priya	SINGH	singh
Vikram	Iyer	VIKRAM	vikram	IYER	iyer
Anjali	Verma	ANJALI	anjali	VERMA	verma

Query 10: Find the date of 3 days later from Hire Date.

As you can see HireDate was not previously added in the Employee table. So we will now add a new column “HireDaye” in the Employee Table and then fill the values.

```
1   -- Author: Jigesh SHeoran
2   -- Lab 7 : Database Management Systems
3
4   USE CompanyDB;
5   DESCRIBE Employee;
6   ALTER TABLE Employee
7   ADD HireDate DATE;
8
```

100% 19:5

Result Grid | Filter Rows: Search | Export:

Field	Type	Null	Key	Default	Extra
SSN	char(9)	NO	PRI	NULL	
Fname	varchar(30)	NO		NULL	
Lname	varchar(30)	NO		NULL	
Address	varchar(100)	YES		NULL	
Salary	decimal(10,2)	YES		NULL	
Sex	char(1)	YES		NULL	
Bdate	date	YES		NULL	
Dno	int	YES	MUL	NULL	
Super_ssn	char(9)	YES	MUL	NULL	
Job	varchar(30)	YES		NULL	
HireDate	date	YES		NULL	

```
4   USE CompanyDB;
5   UPDATE Employee SET HireDate = '2015-03-10' WHERE Ssn = '100000001';
6   UPDATE Employee SET HireDate = '2016-07-22' WHERE Ssn = '100000002';
7   UPDATE Employee SET HireDate = '2014-11-15' WHERE Ssn = '100000003';
8   UPDATE Employee SET HireDate = '2017-02-05' WHERE Ssn = '100000004';
9   UPDATE Employee SET HireDate = '2018-09-01' WHERE Ssn = '100000005';
10  UPDATE Employee SET HireDate = '2019-04-18' WHERE Ssn = '100000006';
11  UPDATE Employee SET HireDate = '2016-01-09' WHERE Ssn = '100000007';
12  UPDATE Employee SET HireDate = '2010-06-30' WHERE Ssn = '100000010';
13  UPDATE Employee SET HireDate = '2008-12-12' WHERE Ssn = '100000011';
14
```

Now we can successfully fetch the date of 3 days later from HireDate.

```sql
-- Author: Jigesh SHeoran
-- Lab 7 : Database Management Systems

USE CompanyDB;
-- Query 10
SELECT
    Fname,Lname, HireDate,
    DATE_ADD(HireDate, INTERVAL 3 DAY) AS Date_After_3_Days
FROM Employee;
```

100% 1:11

Result Grid Filter Rows: Search Export:

Fname	Lname	HireDate	Date_After_3_Days
Amit	Sharma	2015-03-10	2015-03-13
Priya	Verma	2016-07-22	2016-07-25
Rahul	Singh	2014-11-15	2014-11-18
Sneha	Iyer	2017-02-05	2017-02-08
Karan	Patel	2018-09-01	2018-09-04
Meera	Nair	2019-04-18	2019-04-21
Faiz	Khan	2016-01-09	2016-01-12
Rohit	Bose	2010-06-30	2010-07-03
Vikram	Rao	2008-12-12	2008-12-15
Arjun	Sharma	NULL	NULL
Rohit	Patel	NULL	NULL
Meera	Joshi	NULL	NULL
Rakesh	Nair	NULL	NULL
Karan	Khan	NULL	NULL
Priya	Singh	NULL	NULL
Vikram	Iyer	NULL	NULL
Anjali	Verma	NULL	NULL

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