



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
DEHRADUN

DBMS LAB - 6

Use of Inbuilt Functions and Relational Algebra Operations

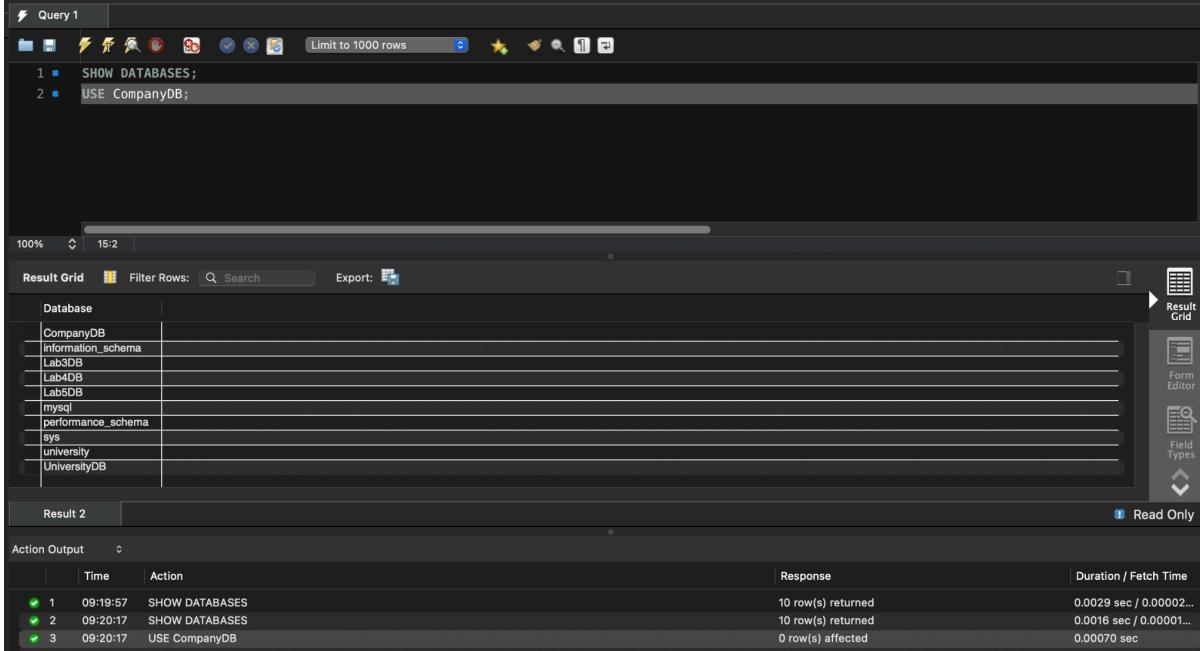
MTECH-COMPUTER SCIENCE
ENGINEERING
CYBER SECURITY AND FORENSICS

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Objective: : To understand the use of inbuilt functions and relational algebra operations with SQL queries using the COMPANY database schema.

Using previously created CompanyDB



```

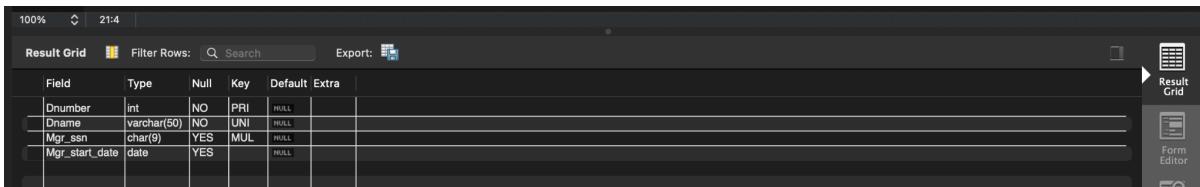
Query 1
1 • SHOW DATABASES;
2 • USE CompanyDB;

Result Grid
Database
CompanyDB
information_schema
Lab3DB
Lab4DB
Lab5DB
mysql
performance_schema
sys
university
UniversityDB

Result 2
Action Output
Time Action Response Duration / Fetch Time
1 09:19:57 SHOW DATABASES 10 row(s) returned 0.0029 sec / 0.00002...
2 09:20:17 SHOW DATABASES 10 row(s) returned 0.0016 sec / 0.00001...
3 09:20:17 USE CompanyDB 0 row(s) affected 0.00070 sec

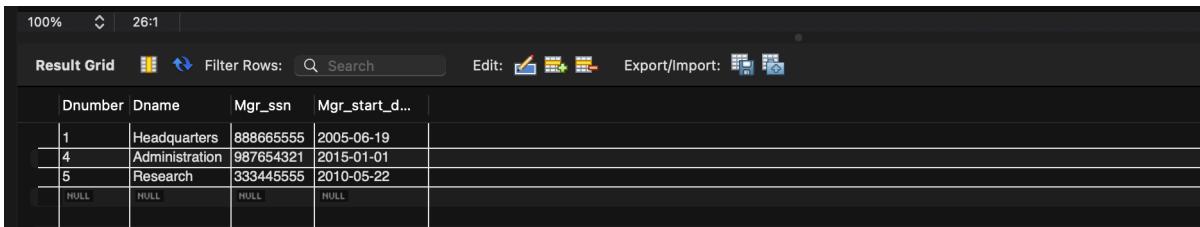
```

DESCRIBE Department;



Field	Type	Null	Key	Default	Extra
Dnumber	int	NO	PRI	NULL	
Dname	varchar(50)	NO	UNI	NULL	
Mgr_ssn	char(9)	YES	MUL	NULL	
Mgr_start_date	date	YES		NULL	

SELECT * FROM Department;



Dnumber	Dname	Mgr_ssn	Mgr_start_d...
1	Headquarters	888665555	2005-06-19
4	Administration	987654321	2015-01-01
5	Research	333445555	2010-05-22
NULL	NULL	NULL	NULL

DESCRIBE Dependent;

The screenshot shows the MySQL Workbench interface with the 'Result Grid' tab selected. The title bar indicates '100%' and '20:5'. The main area displays the results of the DESCRIBE command for the 'Dependent' table. The table has six columns: Field, Type, Null, Key, Default, and Extra. The data rows are as follows:

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;

The screenshot shows the MySQL Workbench interface with the 'Result Grid' tab selected. The title bar indicates '100%' and '25:5'. The main area displays the results of the SELECT * command for the 'Dependent' table. The table has five columns: Essn, Dependent_name, Sex, Bdate, and Relationship. The data rows are as follows:

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;

The screenshot shows the MySQL Workbench interface with the 'Result Grid' tab selected. The title bar indicates '100%' and '24:6'. The main area displays the results of the DESCRIBE command for the 'Dept_Location' table. The table has three columns: Dnumber, Location, and another unnamed column. The data rows are as follows:

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

SELECT * FROM Dept_Location;

The screenshot shows the MySQL Workbench interface with the 'Result Grid' tab selected. The title bar indicates '100%' and '29:6'. The main area displays the results of the SELECT * command for the 'Dept_Location' table. The table has two columns: Dnumber and Location. The data rows are as follows:

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

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	10000001
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, Hyderabad...	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 Lodi Colony, Delhi	70000.00	F	1980-05-31	4	987987987
987987987	Vikram	Iyer	56 Jayanagar, Bangalore, KA	52000.00	M	1988-03-21	4	987654321
999887777	Anjali	Verma	78 Bannerghatta, Bangalore...	45000.00	F	1990-01-15	4	987654321
HULL	HULL	HULL	HULL	HULL	HULL	HULL	HULL	HULL

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	

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

1 USE CompanyDB;

2

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

Query 1: Retrieve the names of all employees in department 5 who work more than 10 hours per week on the 'ProjectAlpha' project.

```

    SELECT E.FNAME, E.LNAME
    FROM EMPLOYEE E
    JOIN WORKS_ON W ON E.SSN = W.ESSN
    JOIN PROJECT P ON W.PNO = P.PNUMBER
    WHERE E.DNO = 5
        AND W.HOURS > 10
        AND P.PNAME = 'ProjectAlpha';
  
```

The screenshot shows the Oracle SQL Developer interface with a query window titled "Query 1". The query itself is displayed above the result grid. The result grid shows one row with the values "Amit" and "Sharma" for the columns "FNAME" and "LNAME" respectively. The interface includes various toolbar icons and a status bar at the bottom.

FNAME	LNAME
Amit	Sharma

Query 2: List the names of all employees who have a dependent with the same first name as themselves.

```

    SELECT E.FNAME, E.LNAME
    FROM EMPLOYEE E
    JOIN DEPENDENT D ON E.SSN = D.ESSN
    WHERE E.FNAME = D.DEPENDENT_NAME;
  
```

The screenshot shows the Oracle SQL Developer interface with a query window titled "Query 1". The query is shown above the result grid. The result grid displays two rows with the values "Amit" and "Sharma" for the columns "FNAME" and "LNAME" respectively. The interface includes a progress bar indicating the query is running.

FNAME	LNAME
Amit	Sharma
Sneha	Iyer

Query 3: Find the names of employees who are directly supervised by 'Rohit Bose'.

```

    SELECT e.Fname, e.Lname
    FROM EMPLOYEE e
    WHERE e.Super_ssn = (
        SELECT Ssn FROM EMPLOYEE WHERE Fname='Rohit' AND Lname='Bose'
    );
  
```

The screenshot shows the Oracle SQL Developer interface with a query window titled "Query 1". The query is displayed above the result grid. The result grid shows two rows with the values "Amit" and "Sharma" for the columns "Fname" and "Lname" respectively. The interface includes a status bar at the bottom.

Fname	Lname
Amit	Sharma
Priya	Verma

Query 4: Retrieve the names of employees who work on every project.

```

Query 1
SELECT e.Fname, e.Lname
FROM Employee e
JOIN Works_On w ON e.Ssn = w.Essn
GROUP BY e.Ssn, e.Fname, e.Lname
HAVING COUNT(DISTINCT w.Pno) = (SELECT COUNT(*) FROM Project);

```

Result Grid | Filter Rows: | Export: |

Fname	Lname
Meera	Nair

Query 5: Retrieve the names of employees who do not work on any project.

```

Query 1
SELECT Fname, Lname
FROM Employee
WHERE Ssn NOT IN (SELECT Essn FROM Works_On);

```

Result Grid | Filter Rows: | Export: |

Fname	Lname
Arjun	Sharma
Rohit	Patel
Meera	Joshi
Rakesh	Nair
Karan	Khan
Priya	Singh
Vikram	Iyer
Anjali	Verma

Query 6: Retrieve the names and addresses of all employees who work on at least one project located in Houston but whose department has no location in Houston.

```

Query 1
SELECT DISTINCT E.Fname, E.Lname, E.Address
FROM Employee E
JOIN Works_On W ON E.Ssn = W.Essn
JOIN Project P ON W.Pno = P.Pnumber
WHERE P.Plocation = 'Houston'
AND E.Dno NOT IN (
    SELECT Dnumber
    FROM Dept_Location
    WHERE Location = 'Houston'
);

```

Result Grid | Filter Rows: | Export: |

Fname	Lname	Address
Amit	Sharma	22 MG Road, Mumbai

Query 7: Retrieve the last names of all department managers who have no dependents.

The screenshot shows the MySQL Workbench interface. The top bar has a title 'Query 1' and various toolbar icons. Below the toolbar, the SQL editor contains the following query:

```
1 •  SELECT E.Lname  
2   FROM Employee E  
3  WHERE E.Ssn IN (SELECT Mgr_ssn FROM Department)  
4    AND E.Ssn NOT IN (SELECT Essn FROM Dependent);  
5
```

The result grid below shows one row of data:

Lname
Khan

-----END OF DOCUMENT-----