Lab exercise - 1

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1. Creating your first table (without any integrity constraints)

C**reate table** student
(ID varchar(5),
Name varchar(15)
Cgpa numeric(3,1))

Code:-

```
CREATE DATABASE lab1;
use lab1;

CREATE TABLE student(
    ID varchar(15),
    Name varchar(15),
    Cgpa numeric(3,1)
);
```

1. **Create the tables using the DDL statements given below: with integrity statements)**

```
CREATE TABLE department (
    dept_name VARCHAR(20),
    building VARCHAR(15),
    budget NUMERIC(12,2),
    PRIMARY KEY (dept_name)
);

CREATE TABLE course (
    course_id VARCHAR(7),
    title VARCHAR(50),
    dept_name VARCHAR(20),
    credits NUMERIC(2,0),
    PRIMARY KEY (course_id),
    FOREIGN KEY (dept_name) REFERENCES department(dept_name)
);

CREATE TABLE instructor (
    ID VARCHAR(5),
    name VARCHAR(20) NOT NULL,
    dept_name VARCHAR(20),
    salary NUMERIC(8,2),
    PRIMARY KEY (ID),
    FOREIGN KEY (dept_name) REFERENCES department(dept_name)
);
```

Data Manipulation Language (DML) : Basic

3. **Inserting records (data)in the table :**

```
INSERT INTO instructor (ID, name, dept_name, salary)
VALUES
('22222', 'Einstein', 'Physics', 95000),
('12121', 'Wu', 'Finance', 90000),
('32343', 'El Said', 'History', 60000),
('45565', 'Katz', 'Comp. Sci.', 75000),
('98345', 'Kim', 'Elec. Eng', 80000),
('76766', 'Crick', 'Biology', 72000),
('10101', 'Srinivasan', 'Comp. Sci.', 65000),
('58583', 'Califieri', 'History', 62000),
('83821', 'Brandt', 'Comp. Sci.', 92000),
('15151', 'Mozart', 'Music', 40000),
('33456', 'Gold', 'Physics', 87000),
('76543', 'Singh', 'Finance', 80000);
```

```
INSERT INTO department (dept_name, building, budget)
VALUES
('Comp. Sci.', 'Taylor', 100000),
('Biology', 'Watson', 90000),
('Elec. Eng', 'Taylor', 85000),
('Music', 'Packard', 80000),
('Finance', 'Painter', 120000),
('History', 'Painter', 50000),
('Physics', 'Watson', 70000);
```

```
INSERT INTO course (course_id, title, dept_name, credits)
VALUES
('BIO-101', 'Intro to Biology', 'Biology', 4),
('BIO-301', 'Genetics', 'Biology', 4),
('BIO-399', 'Computational Biology', 'Biology', 3),
('CS-101', 'Intro to Computer Science', 'Comp. Sci.', 4),
('CS-190', 'Game Design', 'Comp. Sci.', 4),
('CS-315', 'Robotics', 'Comp. Sci.', 3),
('CS-319', 'Image Processing', 'Comp. Sci.', 3),
('CS-347', 'Database System Concepts', 'Comp. Sci.', 3),
('EE-181', 'Intro to Digital Systems', 'Elec. Eng', 3),
('FIN-201', 'Investment Banking', 'Finance', 3),
('HIS-351', 'World History', 'History', 3),
('MU-199', 'Music Video Production', 'Music', 3),
('PHY-101', 'Physical Principles', 'Physics', 4);
```

4. Modification of the data

Deletion:

delete from instructor;

```
81 •  SET SQL_SAFE_UPDATES = 0;
82 •  delete from instructor;
83 •  select * from instructor;
```

100% 26:83

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

ID	name	dept_name	salary
NULL	NULL	NULL	NULL

instructor 1

Action Output

	Time	Action	Response
26	09:31:00	delete from instructor	Error Code: 1175. You are us
27	09:33:30	SET SQL_SAFE_UPDATES = 0	0 row(s) affected
28	09:33:30	delete from instructor	12 row(s) affected
29	09:33:49	SET SQL_SAFE_UPDATES = 0	0 row(s) affected
30	09:33:49	delete from instructor	0 row(s) affected
31	09:33:49	select * from instructor LIMIT 0, 1000	0 row(s) returned

delete from instructor where dept_name = ‘Finance’;

```
85 •  delete from instructor where dept_name = 'Finance';
86 •  select * from instructor;
```

100% 20:73

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

ID	name	dept_name	salary
10101	Srinivasan	Comp. Sci.	65000.00
15151	Mozart	Music	40000.00
22222	Einstein	Physics	95000.00
32343	El Said	History	60000.00
33456	Gold	Physics	87000.00
45565	Katz	Comp. Sci.	75000.00

instructor 2 Apply Revert

ction Output

	Time	Action	Response	Duration / Fetch Time
30	09:33:49	delete from instructor	0 row(s) affected	0.00039 sec
31	09:33:49	select * from instructor LIMIT 0, 1000	0 row(s) returned	0.0096 sec / 0.0006...
32	09:34:41	INSERT INTO instructor (ID, name, dept_name, salary) VALUES ('22222', 'Einstein'...	12 row(s) affected Records: 12 Duplicates: 0 Warnin...	0.0064 sec
33	09:35:05	delete from instructor where dept_name = ‘Finance’	Error Code: 1054. Unknown column ''Finance'' in 'wh...	0.012 sec
34	09:35:18	delete from instructor where dept_name = 'Finance'	2 row(s) affected	0.0050 sec
35	09:35:18	select * from instructor LIMIT 0, 1000	10 row(s) returned	0.0022 sec / 0.00001...

delete from instructor where salary between 1300 and 2000;

```
88 •  delete from instructor where salary between 1300 and 2000;
89 •  select * from instructor;
```

100% 1:89

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

ID	name	dept_name	salary
10101	Srinivasan	Comp. Sci.	65000.00
15151	Mozart	Music	40000.00
22222	Einstein	Physics	95000.00
32343	El Said	History	60000.00
33456	Gold	Physics	87000.00
45565	Katz	Comp. Sci.	75000.00
58583	Califieri	History	62000.00

instructor 3 | Apply | Revert

Action Output

	Time	Action	Response	Duration / Fetch Time
32	09:34:41	INSERT INTO instructor (ID, name, dept_name, salary) VALUES ('22222', 'Einstein'...	12 row(s) affected Records: 12 Duplicates: 0 Warnin...	0.0064 sec
33	09:35:05	delete from instructor where dept_name = 'Finance'	Error Code: 1054. Unknown column ''Finance'' in 'wh...	0.012 sec
34	09:35:18	delete from instructor where dept_name = 'Finance'	2 row(s) affected	0.0050 sec
35	09:35:18	select * from instructor LIMIT 0, 1000	10 row(s) returned	0.0022 sec / 0.00001...
36	09:36:40	delete from instructor where salary between 1300 and 2000	0 row(s) affected	0.0023 sec
37	09:36:40	select * from instructor LIMIT 0, 1000	10 row(s) returned	0.00051 sec / 0.0000...

Updation:

update instructor set salary = salary + 1000 where salary<7000;

```
91 •  update instructor set salary = salary + 1000 where salary<7000;
92 •  select * from instructor;
```

100% 29:89

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

ID	name	dept_name	salary
10101	Srinivasan	Comp. Sci.	65000.00
15151	Mozart	Music	40000.00
22222	Einstein	Physics	95000.00
32343	El Said	History	60000.00
33456	Gold	Physics	87000.00
45565	Katz	Comp. Sci.	75000.00
58583	Califieri	History	62000.00

instructor 4 | Apply | Revert

Action Output

	Time	Action	Response	Duration / Fetch Time
34	09:35:18	delete from instructor where dept_name = 'Finance'	2 row(s) affected	0.0050 sec
35	09:35:18	select * from instructor LIMIT 0, 1000	10 row(s) returned	0.0022 sec / 0.00001...
36	09:36:40	delete from instructor where salary between 1300 and 2000	0 row(s) affected	0.0023 sec
37	09:36:40	select * from instructor LIMIT 0, 1000	10 row(s) returned	0.00051 sec / 0.0000...
38	09:37:31	update instructor set salary = salary + 1000 where salary<7000	0 row(s) affected Rows matched: 0 Changed: 0 War...	0.0041 sec
39	09:37:31	select * from instructor LIMIT 0, 1000	10 row(s) returned	0.00054 sec / 0.000...

update instructor set salary=1000 where name =’Raj’;

```
94 •  update instructor set salary=1000 where name ='Raj';
95 •  select * from instructor;
```

100% 48:94

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

ID	name	dept_name	salary
10101	Srinivasan	Comp. Sci.	65000.00
15151	Mozart	Music	40000.00
22222	Einstein	Physics	95000.00
32343	El Said	History	60000.00
33456	Gold	Physics	87000.00
45565	Katz	Comp. Sci.	75000.00
58583	Califieri	History	62000.00

instructor 5 | Apply | Revert

Action Output

	Time	Action	Response	Duration / Fetch Time
37	09:36:40	select * from instructor LIMIT 0, 1000	10 row(s) returned	0.00051 sec / 0.0000...
38	09:37:31	update instructor set salary = salary + 1000 where salary<7000	0 row(s) affected Rows matched: 0 Changed: 0 War...	0.0041 sec
39	09:37:31	select * from instructor LIMIT 0, 1000	10 row(s) returned	0.00054 sec / 0.000...
40	09:38:12	update instructor set salary=1000 where name ='Raj'	Error Code: 1054. Unknown column ''Raj'' in 'where cl...	0.00057 sec
41	09:38:19	update instructor set salary=1000 where name ='Raj'	0 row(s) affected Rows matched: 0 Changed: 0 War...	0.00057 sec
42	09:38:19	select * from instructor LIMIT 0, 1000	10 row(s) returned	0.00029 sec / 0.0000...

Queries on Single Relations

1) Retrieve the contents of the instructors table.

select * from instructors;

```
97 •  select * from instructor;
```

100% 26:97

Result Grid Filter Rows: Search

ID	name	dept_name	salary
10101	Srinivasan	Comp. Sci.	65000.00
15151	Mozart	Music	40000.00
22222	Einstein	Physics	95000.00
32343	El Said	History	60000.00
33456	Gold	Physics	87000.00
45565	Katz	Comp. Sci.	75000.00
58583	Califieri	History	62000.00
76766	Crick	Biology	72000.00
83821	Brandt	Comp. Sci.	92000.00
98345	Kim	Elec. Eng	80000.00

2) Find the name of all the instructors
select name from instructors;

```
99 •  select name from instructor;
```

100% 28:99

Result Grid Filter Rows: Search

name
Srinivasan
Mozart
Einstein
El Said
Gold
Katz
Califieri
Crick
Brandt
Kim

3) Find the department name of all the instructors
select dept_name from instructors;

```
101 •  select dept_name from instructor;
```

100% 33:101

Result Grid Filter Rows: Search Expor

dept_name
Biology
Comp. Sci.
Comp. Sci.
Comp. Sci.
Elec. Eng
History
History
Music
Physics
Physics

4) Select clause with arithmetic expression
select name, salary*1.5 from instructors;

```
103 •   select name, salary*1.5 from instructor;
```

100% 40:103

Result Grid Filter Rows: Search Export:

name	salary*1.5
Srinivasan	97500.000
Mozart	60000.000
Einstein	142500.000
El Said	90000.000
Gold	130500.000
Katz	112500.000
Califieri	93000.000
Crick	108000.000
Brandt	138000.000
Kim	120000.000

5) Where clause with predicates
select name from instructor where dept_name='Comp.Sci.' and salary>7000;

```
105 •   select name from instructor where dept_name='Comp. Sci.' and salary>7000;
```

100% 56:105

Result Grid Filter Rows: Search Export:

name
Srinivasan
Katz
Brandt

Self-try

1. Retrieve the contents of the department table.

```
107 •   SELECT * FROM department;
108
```

100% 1:108

Result Grid Filter Rows: Search

dept_name	building	budget
Biology	Watson	90000.00
Comp. Sci.	Taylor	100000.00
Elec. Eng	Taylor	85000.00
Finance	Painter	120000.00
History	Painter	50000.00
Music	Packard	80000.00
Physics	Watson	70000.00
NULL	NULL	NULL

2. List the various courses offered by the Computer Science department.

```
109 •   SELECT * FROM course WHERE dept_name = 'Comp. Sci.';
110
```

100% 1:110

Result Grid Filter Rows: Search Edit: Export/Im

course_id	title	dept_name	credits
CS-101	Intro to Computer Science	Comp. Sci.	4
CS-190	Game Design	Comp. Sci.	4
CS-315	Robotics	Comp. Sci.	3
CS-319	Image Processing	Comp. Sci.	3
CS-347	Database System Concepts	Comp. Sci.	3

3. List the various courses offered by the Computer Science department with 3 credits.

```
111 •   SELECT * FROM course WHERE dept_name = 'Comp. Sci.' AND credits = 3;
112
```

100% 1:112

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

course_id	title	dept_name	credits
CS-315	Robotics	Comp. Sci.	3
CS-319	Image Processing	Comp. Sci.	3
CS-347	Database System Concepts	Comp. Sci.	3

4. Change the credits for a particular course.

```
113 •   UPDATE course SET credits = 4 WHERE course_id = 'CS-101';
114 •   select * from course
```

100% 21:114

Result Grid Filter Rows: Search Edit: Export/Impo

course_id	title	dept_name	credits
BIO-101	Intro to Biology	Biology	4
BIO-301	Genetics	Biology	4
BIO-399	Computational Biology	Biology	3
CS-101	Intro to Computer Science	Comp. Sci.	4
CS-190	Game Design	Comp. Sci.	4
CS-315	Robotics	Comp. Sci.	3
CS-319	Image Processing	Comp. Sci.	3
CS-347	Database System Concepts	Comp. Sci.	3
EE-181	Intro to Digital Systems	Elec. Eng	3
FIN-201	Investment Banking	Finance	3
HIS-351	World History	History	3

5. Delete from courses those courses with less than 3 credits.

```
116 •  DELETE FROM course WHERE credits < 3;
117 •  select * from course
```

100% 1:117

Result Grid Filter Rows: Search Edit:

course_id	title	dept_name	credits
BIO-301	Genetics	Biology	4
BIO-399	Computational Biology	Biology	3
CS-101	Intro to Computer Science	Comp. Sci.	4
CS-190	Game Design	Comp. Sci.	4
CS-315	Robotics	Comp. Sci.	3
CS-319	Image Processing	Comp. Sci.	3
CS-347	Database System Concepts	Comp. Sci.	3
EE-181	Intro to Digital Systems	Elec. Eng	3
FIN-201	Investment Banking	Finance	3
HIS-351	World History	History	3
MU-199	Music Video Production	Music	3
PHY-101	Physical Principles	Physics	4

6. Create a table student with attributes Rollnumber of type varchar(10), Name of type varchar(25), State of type varchar(10)

```
119 •  CREATE TABLE student (
120        Rollnumber VARCHAR(10),
121        Name VARCHAR(25),
122        State VARCHAR(10)
123    );
```

65 09:48:10 CREATE TABLE student (Rollnumber VARCHAR(10), Name VARCHAR(25), S... 0 row(s) affected 0.035 sec

7. Insert suitable data to student table.

```
126 •  INSERT INTO student (Rollnumber, Name, State)
127    VALUES
128    ('1001', 'John Doe', 'NY'),
129    ('1002', 'Jane Smith', 'CA'),
130    ('1003', 'Alice Johnson', 'TX');
131 •  select * from student;
```

100% 23:131

Result Grid Filter Rows: Search Export:

Rollnumber	Name	State
1001	John Doe	NY
1002	Jane Smith	CA
1003	Alice Johnson	TX

8. Add a column CGPA to student table and insert suitable data.

```
133 •  ALTER TABLE student ADD COLUMN CGPA NUMERIC(3, 2);
134 •  UPDATE student SET CGPA = 3.8 WHERE Rollnumber = '1001';
135 •  UPDATE student SET CGPA = 3.9 WHERE Rollnumber = '1002';
136 •  UPDATE student SET CGPA = 3.5 WHERE Rollnumber = '1003';
137 •  select * from student;
```

100% 23:137

Result Grid Filter Rows: Search Export:

Rollnumber	Name	State	CGPA
1001	John Doe	NY	3.80
1002	Jane Smith	CA	3.90
1003	Alice Johnson	TX	3.50

Example Alter statements in PostgreSQL

To add a column to a table:

1. ALTER TABLE student ADD COLUMN tuition_fee numeric(9,2);

```
139 •  ALTER TABLE student ADD COLUMN tuition_fee numeric(9,2);
140 •  ALTER TABLE student ADD COLUMN bus_fee numeric(9,2);
141 •  select * from student;
```

100% 23:141

Result Grid Filter Rows: Search Export:

Rollnumber	Name	State	CGPA	tuition_f...	bus_fee
1001	John Doe	NY	3.80	NULL	NULL
1002	Jane Smith	CA	3.90	NULL	NULL
1003	Alice Johnson	TX	3.50	NULL	NULL

2. ALTER TABLE student ADD COLUMN bus_fee numeric(9,2);

To drop a column from a table:

```
139 •  ALTER TABLE student ADD COLUMN tuition_fee numeric(9,2);
140 •  ALTER TABLE student ADD COLUMN bus_fee numeric(9,2);
141 •  select * from student;
```

100% 23:141

Result Grid Filter Rows: Search Export:

Rollnumber	Name	State	CGPA	tuition_f...	bus_fee
1001	John Doe	NY	3.80	NULL	NULL
1002	Jane Smith	CA	3.90	NULL	NULL
1003	Alice Johnson	TX	3.50	NULL	NULL

3. ALTER TABLE student DROP COLUMN bus_fee;

To change the types of two existing columns in one operation:

```
143 •  ALTER TABLE student DROP COLUMN bus_fee;
144 •  select * from student;
```

100% 23:144

Result Grid Filter Rows: Search Export:

Rollnumber	Name	State	CGPA	tuition_f...
1001	John Doe	NY	3.80	NULL
1002	Jane Smith	CA	3.90	NULL
1003	Alice Johnson	TX	3.50	NULL

```
146 •   ALTER TABLE student
147     MODIFY COLUMN state VARCHAR(80),
148     MODIFY COLUMN name VARCHAR(30);
149 •   select * from student;
```

100% 32:148

Result Grid Filter Rows: Search Expo

Rollnumber	name	state	CGPA	tuition_f...
1001	John Doe	NY	3.80	NULL
1002	Jane Smith	CA	3.90	NULL
1003	Alice Johnson	TX	3.50	NULL

4. ALTER TABLE student
ALTER COLUMN state TYPE varchar(80),
ALTER COLUMN name TYPE varchar(30);

```
146 •   ALTER TABLE student
147     MODIFY COLUMN state VARCHAR(80),
148     MODIFY COLUMN name VARCHAR(30);
149 •   select * from student;
```

100% 32:148

Result Grid Filter Rows: Search Expo

Rollnumber	name	state	CGPA	tuition_f...
1001	John Doe	NY	3.80	NULL
1002	Jane Smith	CA	3.90	NULL
1003	Alice Johnson	TX	3.50	NULL

To rename a column

5. alter table student rename column state to state_1;

```
151 •   ALTER TABLE student RENAME COLUMN state TO state_1;
152 •   select * from student;
```

100% 23:152

Result Grid Filter Rows: Search Export:

Rollnumber	name	state_1	CGPA	tuition_f...
1001	John Doe	NY	3.80	NULL
1002	Jane Smith	CA	3.90	NULL
1003	Alice Johnson	TX	3.50	NULL

To rename a table

6. alter table student rename to student_123;

```
154    -- ALTER TABLE student RENAME TO student_123;
155    select * from student_123;
156
157
158
159
160
161
```

100% 46:154

Result Grid Filter Rows: Search Export:

Rollnumber	name	state_1	CGPA	tuition_f...
1001	John Doe	NY	3.80	NULL
1002	Jane Smith	CA	3.90	NULL
1003	Alice Johnson	TX	3.50	NULL