

SE-COMP A Batch-C		Roll number : 9913	
Experiment no. : 4 (part3)		Date of Implementation : 12/2/23	
Aim : To implement Integrity constraints			
Tool Used : PostgreSQL			
Related Course outcome : At the end of the course, Students will be able to Use			
SQL : Standard language of relational database			
Rubrics for assessment of Experiment:			
Indicator	Poor	Average	Good
Timeliness <ul style="list-style-type: none">• Maintains assignment deadline (3)	Assignment not done (0)	One or More than One week late (1-2)	Maintains deadline (3)
Completeness and neatness <ul style="list-style-type: none">• Complete all parts of QUERY assignment(3)	N/A	< 80% complete (1-2)	100% complete (3)
Originality <ul style="list-style-type: none">• Extent of plagiarism(2)	Copied it from someone else(0)	At least few questions have been done without copying(1)	Assignment has been solved completely without copying (2)
Knowledge <ul style="list-style-type: none">• In depth knowledge of the QUERY assignment(2)	Unable to answer 2 questions(0)	Unable to answer 1 question (1)	Able to answer 2 questions (2)

Assessment Marks :

Timeliness(3)	
Completeness and neatness(3)	
Originality (2)	
Knowledge (2)	
Total (Out of 10)	

Remark:**Teacher's Sign :**

Experiment No. 4- Integrity Constraints

AIM:

- To implement database for relational model using DDL statement
- Apply Integrity Constraints for the specified system

Objective of the Experiment:

After completing this experiment you will be able to:

Create database.

Create table with constraints

Modify the schema of the table.

Theory :

Pre Lab/ Prior Concepts:

The Data Definition Language (DDL) is used to create and modify the relational schema. Also it is used to add various constraints to the table like the primary key, foreign key, check constraint, not null constraint and unique constraint.

The DDL statements are:

CREATE

DROP

ALTER

SQL supports the standard int, smallint, real, double precision, char(N), varchar(N), date, time, timestamp, and interval for creating tables.

Procedure / Algorithm:

Create Database and use it:

```
$ createdb mydb
```

```
$ psql mydb
```

Delete a database:

```
$ dropdb mydb
```

Create table:

```
CREATE TABLE my_first_table  
( first_column text,  
  second_column integer  
);
```

```
CREATE TABLE products (  
  product_no integer, name  
  text, price numeric);
```

Drop Table:

```
DROP TABLE my_first_table;  
DROP TABLE products;
```

Default Value:

```
CREATE TABLE products (  
  product_no integer, name text,  
  price numeric DEFAULT 9.99 );
```

Constraints:

1. Primary Key CREATE TABLE

```
products ( product_no integer  
PRIMARY KEY, name text,  
  price numeric );
```

Primary keys can also constrain more than one column.

```
CREATE TABLE example (
```

a integer,

b integer,

c integer,

PRIMARY KEY (a, c)

);

2. Check Constraint

CREATE TABLE products (

product_no integer, name text, price

numeric **CHECK (price > 0)**);

3. Not Null Constraint

CREATE TABLE products (

product_no integer **NOT NULL**,

name text **NOT NULL**, price

numeric);

4. Unique Constraint

CREATE TABLE products (

product_no integer **UNIQUE**,

name text, price numeric);

5. Foreign Key Constarint CREATE TABLE products (product_no integer PRIMARY KEY,
name text, price numeric);

CREATE TABLE orders (

order_id integer PRIMARY KEY,

product_no integer **REFERENCES** products (product_no),

quantity integer

);

Here a foreign key constraint in the order table references the products table.

Modifying table:

Adding column

ALTER TABLE products ADD COLUMN description text;

Removing column

ALTER TABLE products DROP COLUMN description;

Adding Constraint

ALTER TABLE products ADD CONSTRAINT some_name UNIQUE (product_no); ALTER TABLE products ADD FOREIGN KEY (product_group_id) REFERENCES product_groups;

Removing Constraint

ALTER TABLE products DROP CONSTRAINT some_name;

Adding Not Null Constraint

ALTER TABLE products ALTER COLUMN product_no SET NOT NULL;

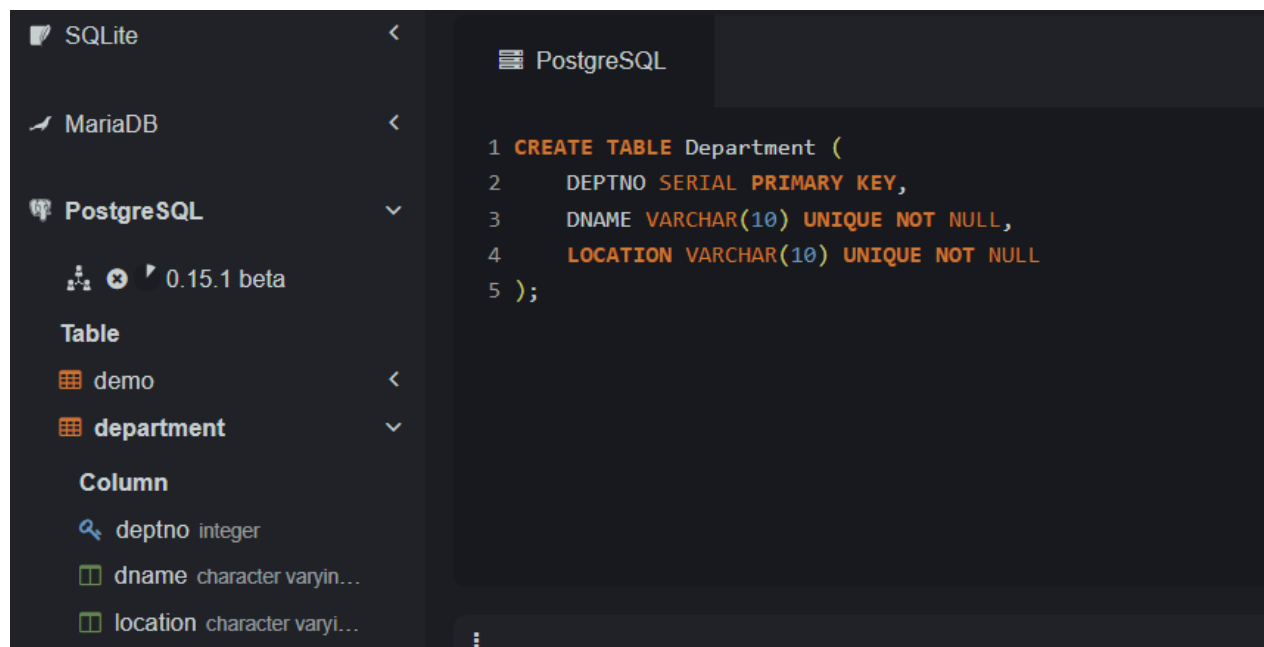
Removing Not Null Constraint

ALTER TABLE products ALTER COLUMN product_no DROP NOT NULL;

Task1: Exercise –

1. Create table DEPT with the following columns and constraints

Column name	Data type	Size	Constraint
DEPTNO	NUMBER	2	PRIMARY KEY
DNAME	VARCHAR2	10	UNIQUE + NOT NULL
LOCATION	VARCHAR2	10	UNIQUE + NOT NULL

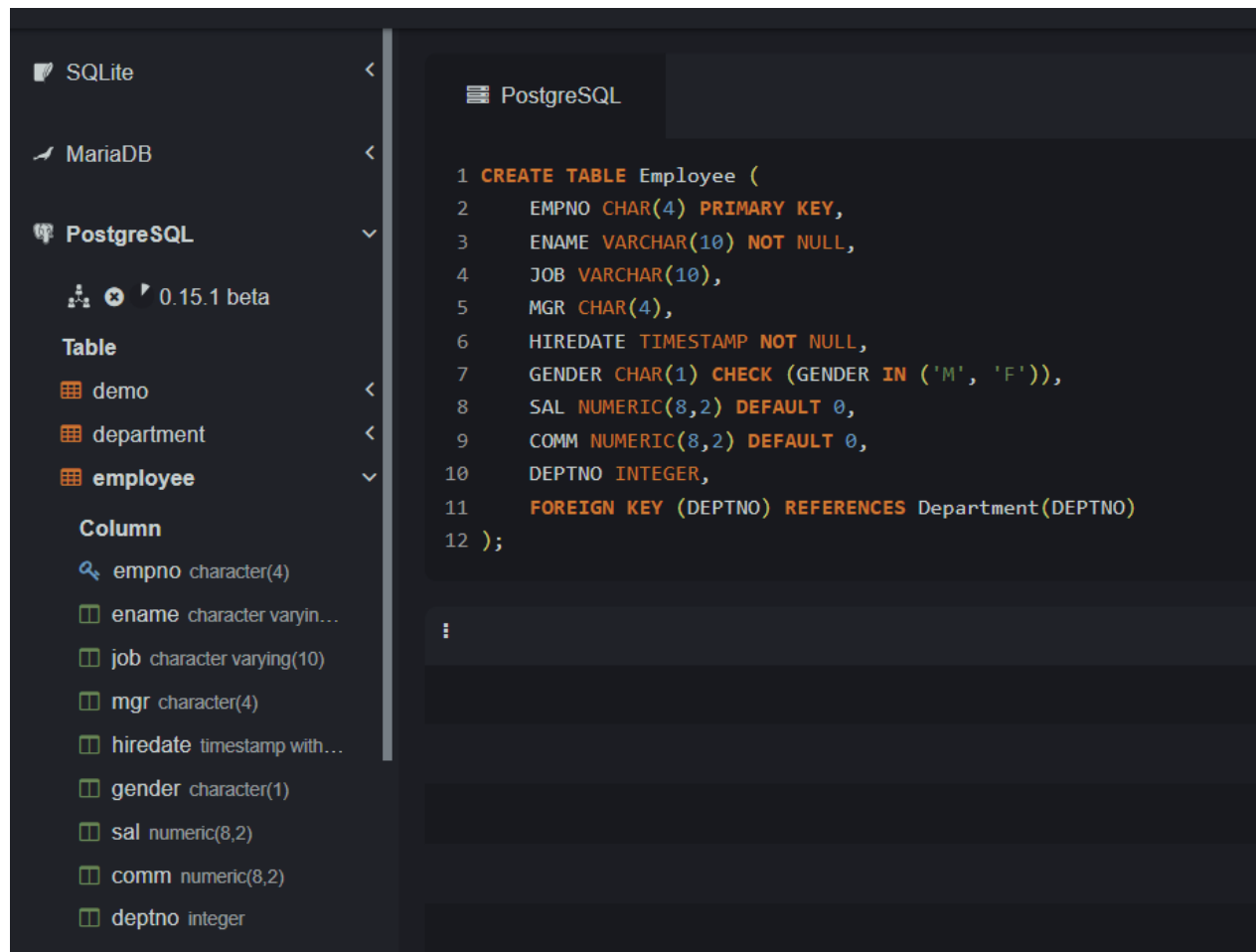


2. Create table EMPLOYEE with the following columns and constraints

Column name	Data type	Size	Constraint
EMPNO	CHAR	4	PRIMARY KEY
ENAME	VARCHAR2	10	NOT NULL
JOB	VARCHAR2	10	
MGR	CHAR	4	
HIREDATE	TIMESTAMP		NOT NULL
GENDER	CHAR	1	'M' OR 'F' ONLY
SAL	NUMBER	8,2	DEFAULT 0
COMM	NUMBER	8,2	DEFAULT 0
DEPTNO	NUMBER	2	FOREIGN KEY REFERRING TO DEPTNO of DEPT table

3. Insert 5 records in both the tables.

Q.2)



Q.3)

```
1 -- Inserting records into Department table  
2 INSERT INTO Department (DEPTNO, DNAME, LOCATION) VALUES  
3 (1, 'HR', 'New York'),  
4 (2, 'IT', 'San Fran'),  
5 (3, 'Finance', 'Chicago'),  
6 (4, 'Marketing', 'LA'),  
7 (5, 'Ops', 'Seattle');  
8  
9 -- Inserting records into Employee table  
10 INSERT INTO Employee (EMPNO, ENAME, JOB, MGR, HIREDATE, GENDER, SAL, COMM, DEPTNO) VALUES  
11 ('E001', 'John', 'Manager', NULL, '2022-01-01', 'M', 50000.00, 2000.00, 1),  
12 ('E002', 'Jane', 'Developer', 'E001', '2022-02-15', 'F', 45000.00, 1500.00, 2),  
13 ('E003', 'Bob', 'Analyst', 'E001', '2022-03-10', 'M', 40000.00, 1000.00, 2),  
14 ('E004', 'Alice', 'Assistant', 'E002', '2022-04-20', 'F', 35000.00, 800.00, 3),  
15 ('E005', 'Mike', 'Clerk', 'E003', '2022-05-05', 'M', 30000.00, 500.00, 3);  
16
```


\

empno	ename	job	mgr	hiredate	gender	sal	comm	deptno
E001	John	Manager	NULL	2022-01-0...	M	50000.00	2000.00	1
E002	Jane	Developer	E001	2022-02-1...	F	45000.00	1500.00	2
E003	Bob	Analyst	E001	2022-03-1...	M	40000.00	1000.00	2
E004	Alice	Assistant	E002	2022-04-2...	F	35000.00	800.00	3
E005	Mike	Clerk	E003	2022-05-0...	M	30000.00	500.00	3

deptno	dname	location
1	HR	New York
2	IT	San Fran
3	Finance	Chicago
4	Marketing	LA
5	Ops	Seattle

4. Add table level constraint such that commission cannot be greater than 30% of salary after the table has been created. Assign the constraint name COMM_30_SAL.
5. Add new constraint with the name DEPT_CHK_LOCATION to DEPT table such that LOCATION can be any one of the following cities MUMBAI, PUNE, BENGALURU, LONDON, SAN FRANCISCO only.
6. Remove the UNIQUE constraint from the LOCATION column.

Q.4)

```
1 -- Adding table-level constraint to Employee table
2 ALTER TABLE Employee
3 ADD CONSTRAINT COMM_30_SAL CHECK (COMM <= SAL * 0.3);
4 SELECT*FROM employee
```

empno	ename	job	mgr	hiredate	gender	sal	comm	deptno
E001	John	Manager	NULL	2022-01-0...	M	50000.00	2000.00	1
E002	Jane	Developer	E001	2022-02-1...	F	45000.00	1500.00	2
E003	Bob	Analyst	E001	2022-03-1...	M	40000.00	1000.00	2
E004	Alice	Assistant	E002	2022-04-2...	F	35000.00	800.00	3
E005	Mike	Clerk	E003	2022-05-0...	M	30000.00	500.00	3

Q.5)

```
1 -- Adding CHECK constraint to Department table for LOCATION
2 ALTER TABLE Department
3 ADD CONSTRAINT DEPT_CHK_LOCATION CHECK (LOCATION IN ('MUMBAI', 'PUNE', 'BENGALURU', 'LONDON', 'SAN FRANCISCO'));
```

History

Syntax | History

PostgreSQL

```
-- Adding CHECK constraint to Department
ALTER TABLE Department
ADD CONSTRAINT DE
...
```

Help: db error: ERROR: check constraint "dept_chk_location" of relation "department" is violated by some row

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Q.6)

```
1 -- Adding CHECK constraint to Department table for LOCATION
2 ALTER TABLE Department
3 DROP CONSTRAINT LOCATION;
```

History

Syntax | History

PostgreSQL

```
-- Adding CHECK constraint to Department
ALTER TABLE Department
DROP CONSTRAINT L
...
```

Help: db error: ERROR: constraint "location" of relation "department" does not exist

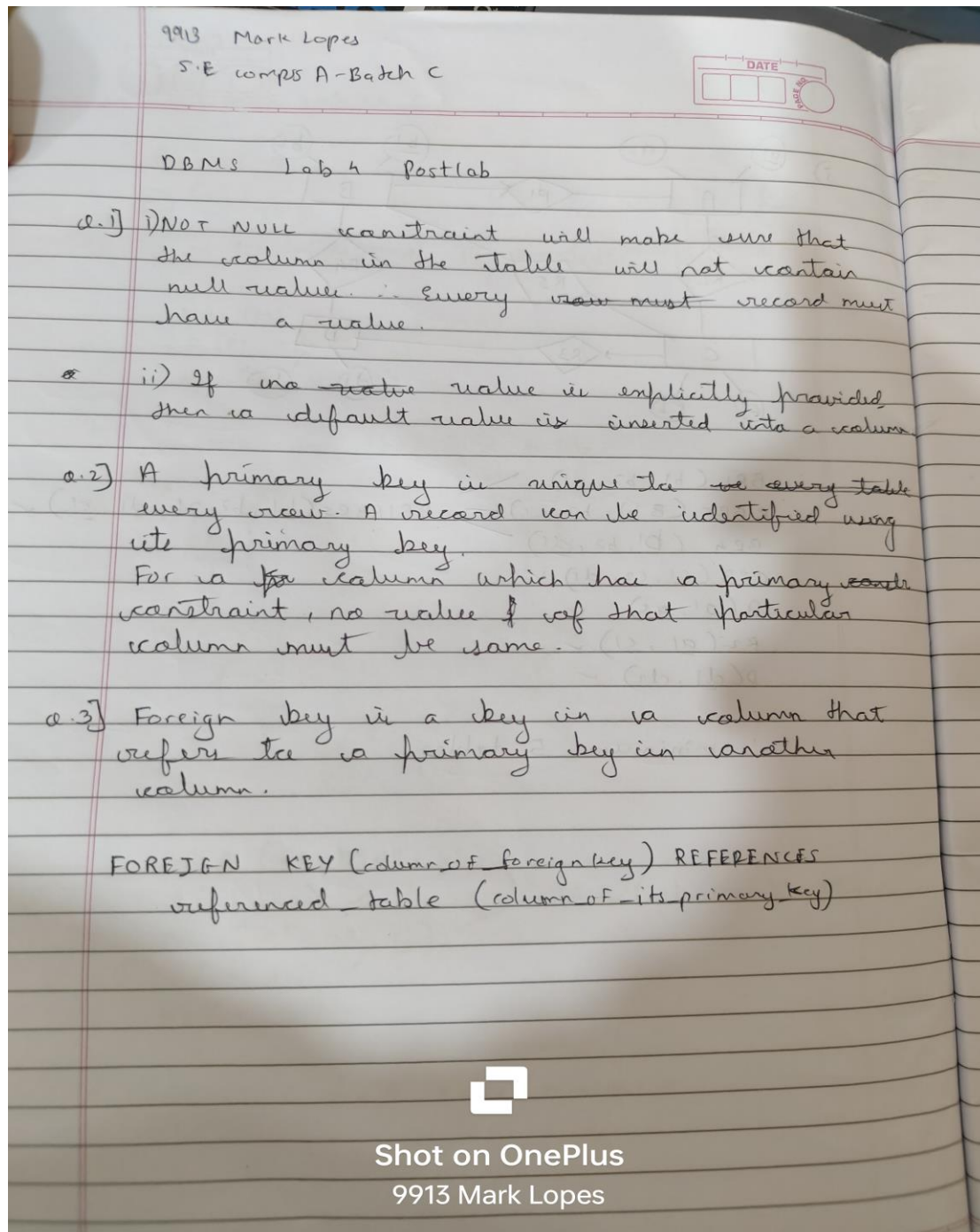
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Conclusion:

Thus using the schema diagram from the previous experiment, the tables were created using CREATE DDL statement with the primary key and foreign key constraint. Other constraints like Check, Unique and Not Null were added to the appropriate column by using ALTER DDL statement.

Post Lab Assignment:

- 1) What is NOT NULL constraint? What is DEFAULT constraint?
- 2) What is primary key? What is PRIMARY KEY constraint?
- 3) What is foreign key? How do you define a foreign key in your table?



Signature of Faculty	Date of Completion:

