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Batch: A1 Roll No.: 16010120015

Experiment / assignment / tutorial No. 5

Grade: AA / AB / BB / BC / CC / CD /DD

Title: Implementation of Database in SQL -DDL

Objective: Define/modify database definitions with proper constraints

Expected Outcome of Experiment:

CO 2: Convert entity-relationship diagrams into relational tables, populate a relational database and formulate SQL queries on the data Use SQL for creation and query the database.

CO 3: Define and apply integrity constraints and improve database design using normalization techniques.

Books/ Journals/ Websites referred:

1. Sharaman Shah,"*Oracle for Professional*", SPD.
2. Dr. P.S. Deshpande, SQL and PL/SQL for Oracle 10g.Black book, Dreamtech Press
3. Korth, Slberchatz, Sudarshan: "Database Systems Concept", 5th Edition , McGraw Hill
4. Peter Rob and Carlos Coronel,"Database Systems Design, Implementation and Management", Thompson Learning, 5th Edition

Pre Lab/ Prior Concepts:

Resources used: Postgresql

Theory: The set of relations in a database must be specifies to the system by means of a data definition language (DDL). The SQL DDL allows specification of not only a set of relations but also specific information about the relation including,

1. The schema for each relation
2. The domain of values associated with each attribute
3. The integrity constraints
4. The set of indices to be maintained for each relation
5. The security and authorization information for each relation
6. The physical storage structure of each relation on disk

Syntax Create Table:

create table employee(ssn,fname varchar(10), mname varchar(10), lname varchar(10),

desg varchar(20), gender varchar(5), addr varchar(20), bdate datetime, sal float,primary

key(ssn));

create table manages(ssn int, dept_code int, start_dt datetime, foreign key(ssn)

create table manages(ssn int, dept_code int, start_dt datetime, foreign key(ssn)

references employee, foreign key(dept_code) refrences department, key(ssn,dept_code)) on delete set null;primary

Data Constraints

Busines managers of the organization determine the a set of rules that must be applied before the data is stored in the database. The application of such rules on raw data ensures **data integrity**.

Eg:- An employee belonging to Sales department cannot have salary higher than Rs. 1000.

An employee has an unique identification number.

Applying Data Constraints

Oracle permits data constraints to be attached to table columns using SQL syntax.

Constraints can be attached to table columns using

Alter table

Unique Constraint

Unique Constraint- At column level Syntax

<ColumnName><Datatype>(<size>)

UNIQUE Unique Constraint- At table level

CREATE TABLE<TableName>(

<ColumnName><Datatype>(<size>)

<ColumnName><Datatype>(<size>)

<Columnname><Datatype>(<size>)

UNIQUE(<ColumnName1>,<ColumnName2>);

Implementation Details (Problem Statement, Query and Screenshots of Results):

Problem Statement:

Considering a Defence Services database for the Army Services .

This database is modeled as the entity set for Service , Soldier , Resources and Department .

IN Army Service which attributes Name, Service-number, room-number, and Place

Resources has the name of the equipments and the products for the soldier .

Alternatively, one or more additional entity sets could be defined, along with relationship sets to replace some of the attributes of the Resources entity set, as

- Resources with attributes Name, department, and Items
- Items which attributes I-Number, Q-Number I-Name.

Each department has unique name and a particular Soldiers who manages the department.

Start date of the organization is recorded. Department have several locations.

- A department controls a number of Weapons . Weapons have a unique Name, Number and a location to Store In Them .
- Soldier name, ssno, address, salary, and birth date are recorded. An Soldier is assigned to department, but may work for Resources (not necessarily controlled by Single Entity).
- Soldier's DEPENDENT are tracked for health purposes (Full Name, birthdate, Relation).

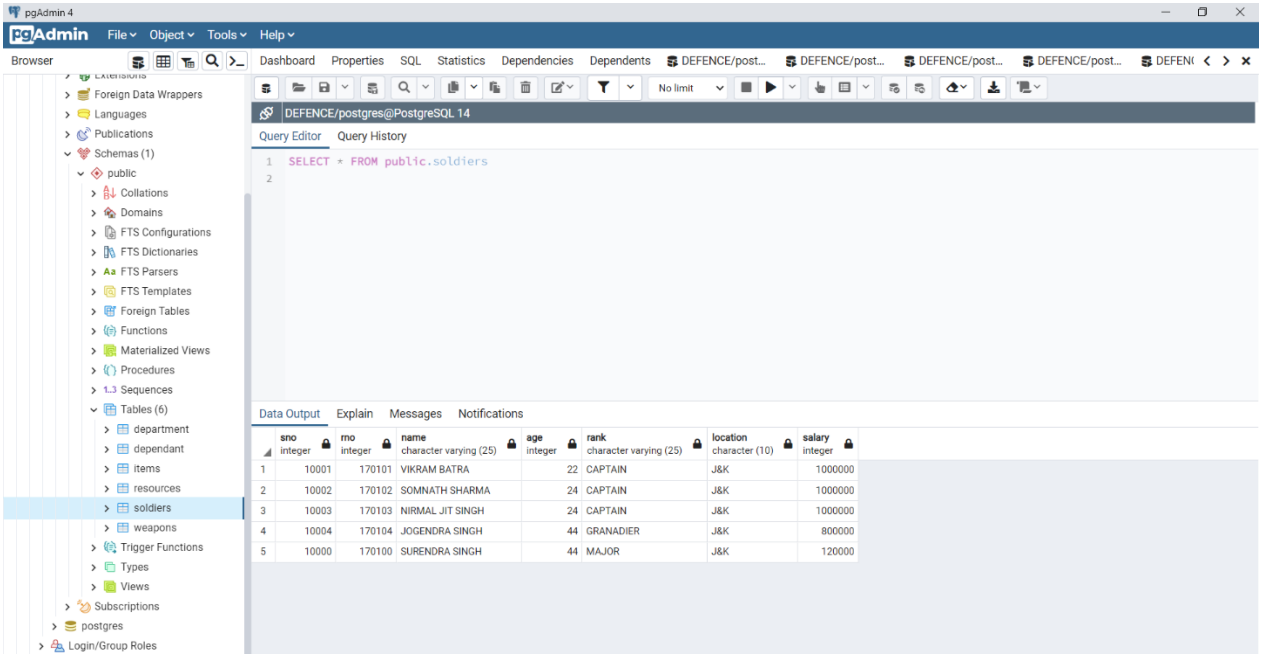
QUERY:

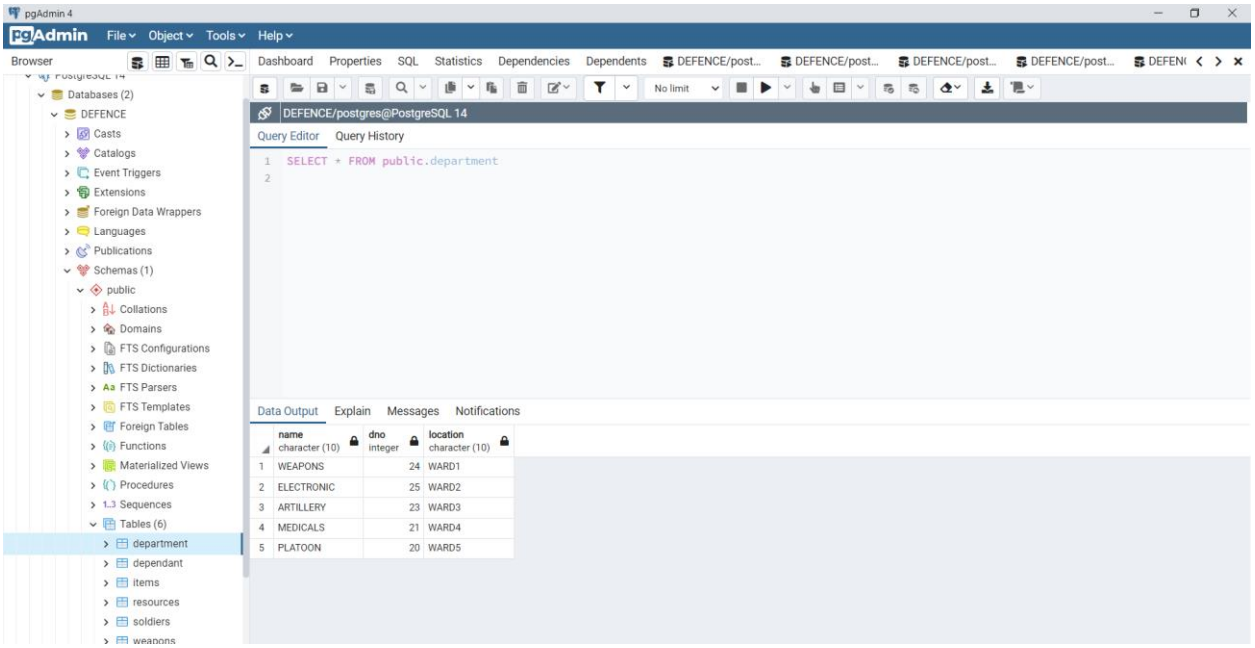
```
CREATE TABLE SOLDIERS (SNO INT,RNO INT, NAME varchar (25) ,AGE INT, RANK
varchar(25) , LOCATION CHAR(10) , SALARY INT )

INSERT INTO SOLDIERS
(SNO, RNO, NAME, AGE, RANK, location, SALARY)
Values
('10001', '170101', 'VIKRAM BATRA','22', 'CAPTAIN', 'J&K', '1000000' )

INSERT INTO SOLDIERS
(SNO, RNO, NAME, AGE, RANK, location, SALARY)
Values
('10002', '170102', 'SOMNATH SHARMA ','24', 'CAPTAIN', 'J&K', '1000000' )

INSERT INTO SOLDIERS
(SNO, RNO, NAME, AGE, RANK, location, SALARY)
Values
('10003', '170103', 'NIRMAL JIT SINGH ','24', 'CAPTAIN', 'J&K', '1000000' )

INSERT INTO SOLDIERS
(SNO, RNO, NAME, AGE, RANK, location, SALARY)
Values
('10004', '170104', 'JOGENDRA SINGH','44', 'GRANADIER', 'J&K', '80000' )

INSERT INTO SOLDIERS
(SNO, RNO, NAME, AGE, RANK, location, SALARY)
Values
('10000', '170100', 'SURENDRA SINGH','44', 'MAJOR', 'J&K', '1200000' )


CREATE TABLE DEPARTMENT ( NAME CHAR(10), DNO INT , LOCATION CHAR (10) )
INSERT INTO DEPARTMENT
( NAME, DNO,location)
Values
('WEAPONS ','24', 'WARD1' )

INSERT INTO DEPARTMENT
( NAME, DNO,location)
Values
('ELECTRONIC ','25', 'WARD2' )

INSERT INTO DEPARTMENT
( NAME, DNO,location)
```

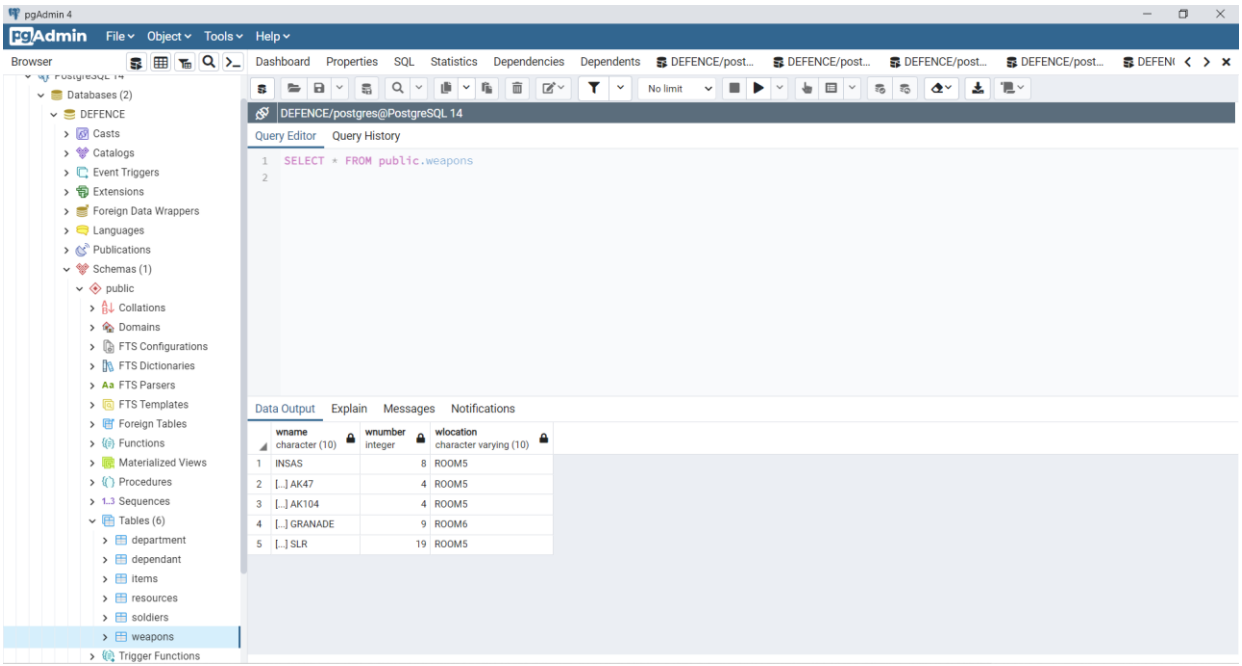
```
Values
('ARTILLERY','23', 'WARD3' )

INSERT INTO DEPARTMENT
( NAME, DNO,location)
Values
('MEDICALS ','21', 'WARD4' )

INSERT INTO DEPARTMENT
( NAME, DNO,location)
Values
('PLATOON ','20', 'WARD5' )


CREATE TABLE RESOURCES ( RNAME CHAR (10), RNUM INT, RDEPRM CHAR (10))

INSERT INTO RESOURCES
( RNAME, RNUM,RDEPRM)
Values
('Personnel ','201', 'D501' )
INSERT INTO RESOURCES
( RNAME, RNUM,RDEPRM)
Values
(' Facilities','200', 'D500' )
INSERT INTO RESOURCES
( RNAME, RNUM,RDEPRM)
Values
(' Defencomp','202', 'D502' )
INSERT INTO RESOURCES
( RNAME, RNUM,RDEPRM)
Values
('Supplies ','203', 'D503' )
INSERT INTO RESOURCES
( RNAME, RNUM,RDEPRM)
Values
(' Equipment','204', 'D504' )


CREATE TABLE WEAPONS (WNAME CHAR (10), WNUMBER INT,WLOCATION VARCHAR(10)
)
INSERT INTO WEAPONS
( WNAME, WNUMBER,WLOCATION)
Values
(' AK47','04', 'ROOM5' )
```

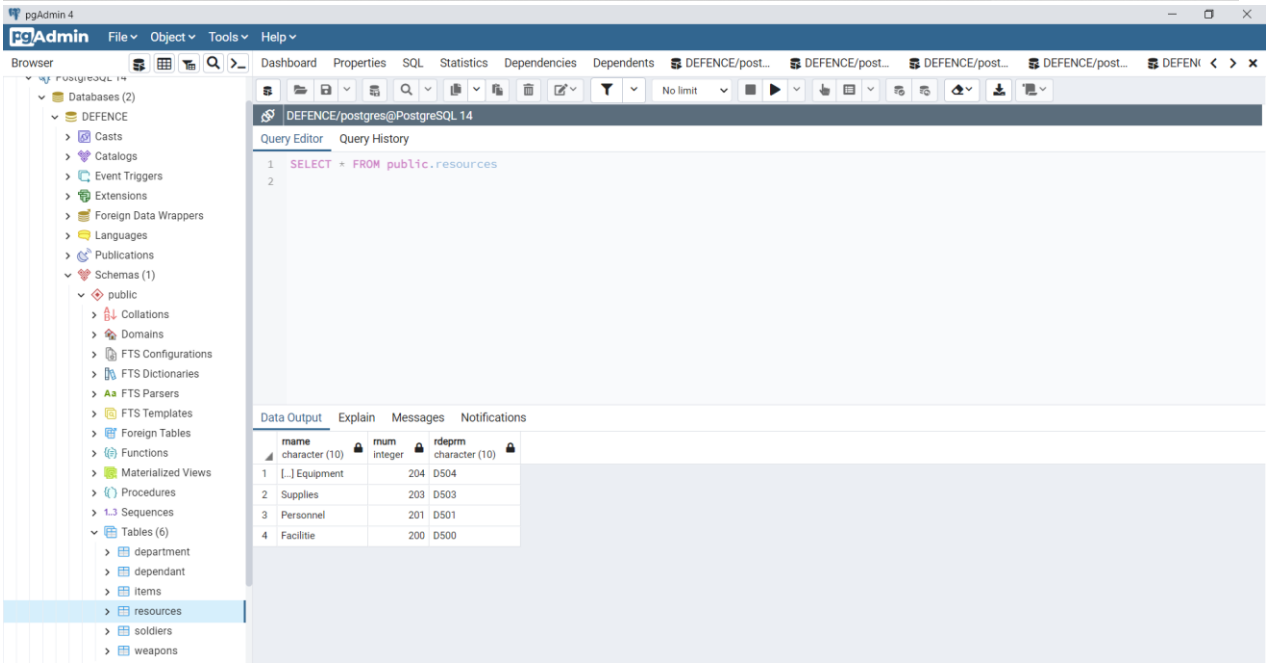
```
INSERT INTO WEAPONS
( WNAME, WNUMBER,WLOCATION)
Values
(' AK104','04', 'ROOM5' )

INSERT INTO WEAPONS
( WNAME, WNUMBER,WLOCATION)
Values
(' GRANADE','09', 'ROOM6' )

INSERT INTO WEAPONS
( WNAME, WNUMBER,WLOCATION)
Values
(' SLR','19', 'ROOM5' )

INSERT INTO WEAPONS
( WNAME, WNUMBER,WLOCATION)
Values
('INSAS','08', 'ROOM5' )


CREATE TABLE ITEMS ( INAME CHAR(10), IDNO INT , ILOCATION CHAR (10) , IRNUM INT,
IQUATY INT )


CREATE TABLE DEPENDANT (DNAME CHAR (10), DNUMBER INT,DLOCATION CHAR(10) ,
DEBDATE INT, DERELATION CHAR(10))
```

Output:


pgAdmin 4
File Object Tools Help
Browser
Dashboard Properties SQL Statistics Dependencies Dependents
DEFENCE/postgres@PostgreSQL 14
Query Editor Query History
SELECT * FROM public.soldiers
Data Output Explain Messages Notifications
sno rno name age rank location salary
1 10001 170101 VIKRAM BATRA 22 CAPTAIN J&K 1000000
2 10002 170102 SOMNATH SHARMA 24 CAPTAIN J&K 1000000
3 10003 170103 NIRMAL JIT SINGH 24 CAPTAIN J&K 1000000
4 10004 170104 JOGENDRA SINGH 44 GRANADIER J&K 800000
5 10000 170100 SURENDRA SINGH 44 MAJOR J&K 120000


pgAdmin 4
File Object Tools Help
Browser
Dashboard Properties SQL Statistics Dependencies Dependents
DEFENCE/postgres@PostgreSQL 14
Query Editor Query History
SELECT * FROM public.department
Data Output Explain Messages Notifications
name dno location
1 WEAPONS 24 WARD1
2 ELECTRONIC 25 WARD2
3 ARTILLERY 23 WARD3
4 MEDICALS 21 WARD4
5 PLATOON 20 WARD5





Conclusion:

We've learned all about the basics of SQL. With SQL,

- we can store and find our stored data. SQL has many variations
- How to create and open a database file and table
- How to Insert into database

This gives us the foundational tools of understanding how to build and manipulate databases.

Post Lab Questions:

1. **Which command is used for removing a table and all its data from the database:**

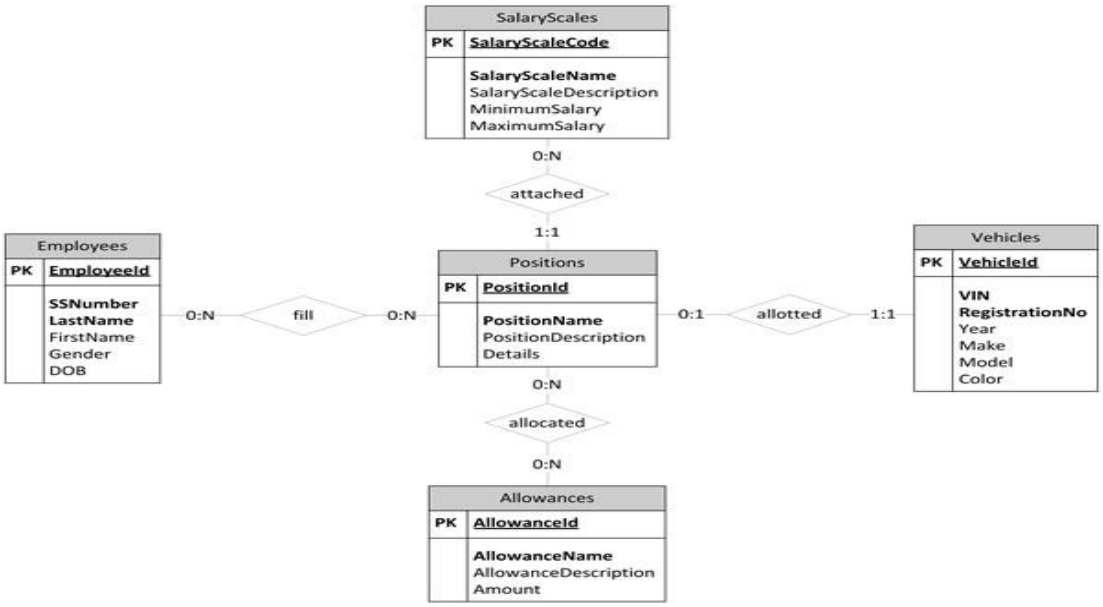
   A. DROP Command
   B. TRUNCATE Command
   C. Both Commands

Answer: (A)

2. **For the given ER model, using DDL command: Write syntax to create CREATE Tables with all possible integrity constraints**

Problem Statement:

A small accounting firm wants a simple HR application that will help it to keep track of its employees, their positions, allowances, salary scales, and which company vehicles their employees drive. The application must keep track of all the positions at the firm, the employees filling these positions, the allowances for these positions, the salary scales for these positions, and the company vehicles assigned to these positions.



Answer:

CREATE TABLE EMPLOYEES(SSNUMBER INT, LASTNAME CHAR(10),FIRSTNAME CHAR(10),GENDER CHAR,DOB INT)

CREATE TABLE SALARYSCALES(SALARYSCALENAME CHAR(10),SALARYSCALEDESCRIPTION CHAR(100), MINIMUMSALARY INT,MAXIMUMSALARY INT)

CREATE TABLE POSITIONS (POSITIONNAME CHAR(20), POSITIONDESCRIPTION CHAR(100), DETAILS CHAR(500))

CREATE TABLE VEHICLES(VIN INT,REGISTRATIONNO INT, YEAR INT, MAKE CHAR(50),MODEL CHAR(50), COLOR CHAR(10))

CREATE TABLE ALLOWANCES(ALLOWANCENAME CHAR(10), ALLOWANCEDESCRIPTION CHAR(100), AMOUNT INT)