SE Computer (B)	Roll number : 8942
Experiment no. : 3	Date of Implementation : 26/02/2021
Aim : To implement data manipulation language (DML) commands	
Tool Used : PostgreSQL/MYSQL	
Related Course outcome: Students should be able to Write queries in SQL to retrieve any type of information from a data base.	

Rubrics for assessment of Experiment:

Indicator	Poor	Average	Good
Timeliness Maintains Experiment deadline (3)	Experiment not done (0)	One or More than One week late (1-2)	Maintains deadline (3)
Completeness and neatness Complete all parts of Experiment(3)	N/A	< 80% complete (1-2)	100% complete (3)
Originality Extent of plagiarism(2)	Copied it from someone else(0)	At least try to implement but could not succeed (1)	Implemented (2)
Knowledge In depth knowledge of the Experiment(2)	Unable to answer any questions(0)	Unable to answer few questions (1)	Able to answer all questions (2)

Assessment Marks :

Timeliness	
Completeness and neatness	
Originality	
Knowledge	
Total	

Total :   **(Out of 10)**

Teacher's Sign :	
EXPERIMENT 3	DDL and DML Commands
Aim	To implement DDL and DML – Data Definition (DDL) and Data manipulation language command (DML)
Tools	PostgreSQL/MYSql
Theory	Data Definition Language-1) Create 2) Alter 3) Drop 4) Rename 5) Truncate • **CREATE** – is used to create the database or its objects (like table, index, function, views, store procedure and triggers). • **DROP** – is used to delete objects from the database. • **ALTER**-is used to alter the structure of the database. • **TRUNCATE**–is used to remove all records from a table, including all spaces allocated for the records are removed. • **COMMENT** –is used to add comments to the data dictionary. • **RENAME** –is used to rename an object existing in the database.

1) **CREATE table**

create table "tablename"

    ("column1" "data type",

    "column2" "data type",

    "column3" "data type",

    ...

    "columnN" "data type");

2) **DROP object object_name**

Examples:

DROP TABLE table_name;

table_name: Name of the table to be deleted.

DROP DATABASE database_name;

database_name: Name of the database to be deleted.

3) **TRUNCATE**

   TRUNCATE statement is a Data Definition Language (DDL) operation that is used to mark the extents of a table for deallocation (empty for reuse). The result of this operation quickly removes all data from a table, typically bypassing a number of integrity enforcing mechanisms. It was officially introduced in the standard.

The TRUNCATE TABLE mytable statement is logically (though not physically) equivalent to the DELETE FROM mytable statement (without a WHERE clause).
Syntax:
TRUNCATE TABLE table_name;
table_name: Name of the table to be truncated.
DATABASE name - student_data
- **cannot** be rolled back, so it must be used wisely.

DROP vs TRUNCATE
- Truncate is normally ultra-fast and its ideal for deleting data from a temporary table.
- Truncate preserves the structure of the table for future use, unlike drop table where the table is deleted with its full structure.

Table or Database deletion using DROP statement
- To delete the whole database
  DROP DATABASE student_data;

After running the above query whole database will be deleted.
- To truncate Student_details table from student_data database.
  TRUNCATE TABLE Student_details;

After running the above query Student_details table will be truncated, i.e, the data will be deleted but the structure will remain in the memory for further operations.

4) ALTER
alter command is used for altering the table structure, such as,
- to add a column to existing table
- to rename any existing column
- to change data type of any column or to modify its size.
- to drop a column from the table.

ALTER TABLE table_name
ADD (column_name datatype);

Procedure	**B) Data Manipulation Language**
	A Data Manipulation Language enables programmers and users of the database to retrieve insert, delete and update data in a database. e.g. INSERT, UPDATE, DELETE, SELECT.
	INSERT:
	INSERT statement adds one or more records to any single table in a relational database.
	INSERT INTO tablename VALUES (expr1,expr2……..);
	UPDATE:
	UPDATE statement that changes the data of one or more records in a table. Either all the rows can be updated, or a subset may be chosen using a condition.
	UPDATE table_name SET column_name = value [, column_name = value ...] [WHERE condition]
	DELETE:
	DELETE statement removes one or more records from a table. A subset may be defined for deletion using a condition, otherwise all records are removed.
	DELETE FROM tablename WHERE condition
	SELECT:
	The SELECT statement is used to select data from a database. The data returned is stored in a result table, called the result-set. SELECT statement in its simplest form is given as,
	SELECT Column_name1, Column_name2,…. From table_name Where condition;
	SELECT * from Tbale_name; Would sepect all the columns from a specified table.

Task1: 1. Create following tables:

Table name : client_master

Column Name	Data type	Size	Constraint
client_no	varchar	6	PRIMARY KEY
Name	varchar	20	NOT NULL
Address	varchar	30	
City	varchar	15	
Pincode	numeric	8	
State	varchar	15	
Bal_due	numeric	10,2	

Table name: Product_master

Column Name	Data type	Size	Constraint
product_no	Varchar	6	PRIMARY KEY
description	Varchar	15	NOT NULL
Profit_percent	Numeric	4,2	
Unit_measure	Varchar	10	
Qty_on_hand	Numeric	8	
Reorder_level	Numeric	8	
Sell_price	Numeric	8,2	
Cost_price	Numeric	8,2	

2. Insert 5-6 records in each table.

3. Find out the names of all clients

4. Retrieve the entire contents of the client_master table.

5. Retrieve the list of names and cities of all the clients

6. List the various products available from the product_master table

7. List all the clients who are located in mumbai.

8. Change the city of client_no C001 to mumbai

9. Change the bal_due of client_no C005 to Rs. 1000

10. Change the cost price of 'hard disk' to Rs. 3000

	11. Delete all the products from product_master where the qty_on_hand is less than 100
	12. Delete from client_master where the column state holds the value 'Tamil Nadu'
Post Lab Questions:	1. Explain difference between Alter and update command in SQL with a suitable example.
	2. Explain different types of keys with suitable examples.
	3. Perform delete and truncate in lab and Differentiate delete and truncate

1.] Create database company

Query:
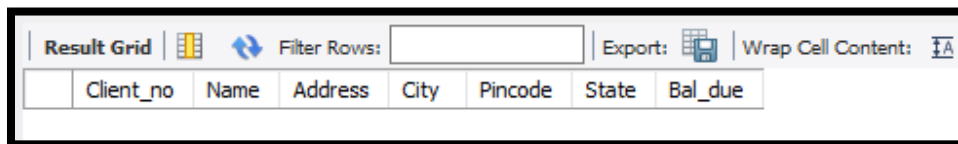
create database company;

Create table client_master

Query:

create table client_master(
Client_no varchar(6),
Name varchar(20),
Address varchar(30),
City varchar(15),
Pincode numeric(8),
State varchar(15),
Bal_due numeric(10,2));

Screenshot:
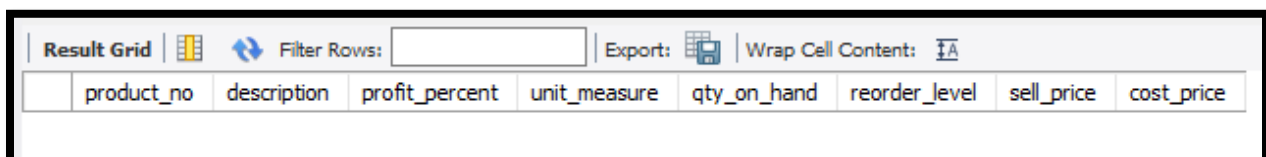
Result Grid	Filter Rows:		Export:	Wrap Cell Content:
Client_no	Name	Address	City	Pincode	State	Bal_due

Create table product_master

Query:

create table Product_master(
product_no varchar(6),
description varchar(15),
profit_percent numeric(4,2),
unit_measure varchar(10),
qty_on_hand numeric(8),
reorder_level numeric(8),
sell_price numeric(8,2),
cost_price numeric(8,2));

Screenshot:

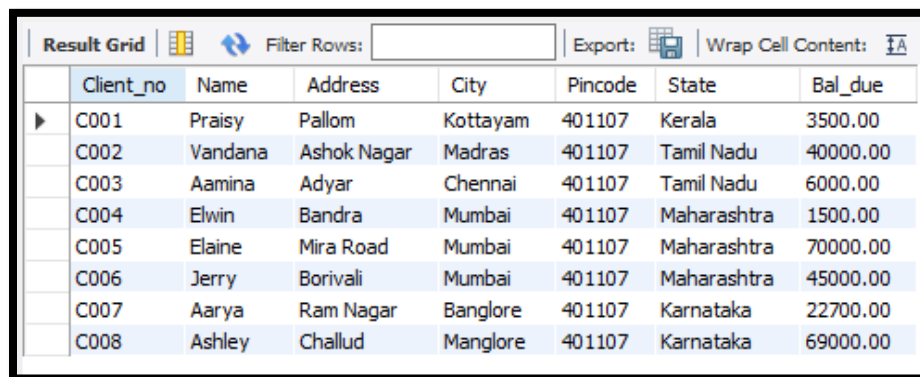| Result Grid	Filter Rows:		Export:	Wrap Cell Content:
product_no	description	profit_percent	unit_measure	qty_on_hand	reorder_level	sell_price	cost_price

Gini Chacko 8942

2. Insert 5-6 records in each table.

- ### In client_master table

Query:

Insert into client_master value('C001', 'Praisy', 'Pallom', 'Kottayam', 401107, 'Kerala', 3500);
Insert into client_master value('C002', 'Vandana', 'Ashok Nagar', 'Madras', 401107, 'Tamil Nadu', 40000);
Insert into client_master value('C003', 'Aamina', 'Adyar', 'Chennai', 401107, 'Tamil Nadu', 6000);
Insert into client_master value('C004', 'Elwin', 'Bandra', 'Mumbai', 401107, 'Maharashtra', 1500);
Insert into client_master value('C005', 'Elaine', 'Mira Road', 'Mumbai', 401107, 'Maharashtra', 70000);
Insert into client_master value('C006', 'Jerry', 'Borivali', 'Mumbai', 401107, 'Maharashtra', 45000);
Insert into client_master value('C007', 'Aarya', 'Ram Nagar', 'Banglore', 401107, 'Karnataka', 22700);
Insert into client_master value('C008', 'Ashley', 'Challud', 'Manglore', 401107, 'Karnataka', 69000);

Screenshot:

Client_no	Name	Address	City	Pincode	State	Bal_due
C001	Praisy	Pallom	Kottayam	401107	Kerala	3500.00
C002	Vandana	Ashok Nagar	Madras	401107	Tamil Nadu	40000.00
C003	Aamina	Adyar	Chennai	401107	Tamil Nadu	6000.00
C004	Elwin	Bandra	Mumbai	401107	Maharashtra	1500.00
C005	Elaine	Mira Road	Mumbai	401107	Maharashtra	70000.00
C006	Jerry	Borivali	Mumbai	401107	Maharashtra	45000.00
C007	Aarya	Ram Nagar	Banglore	401107	Karnataka	22700.00
C008	Ashley	Challud	Manglore	401107	Karnataka	69000.00

- ### In product_master table

Query:

Insert into product_master value('P001', 'Monitor', '10', 'inches',300, 30, 40000, 10000);
Insert into product_master value('P002', 'Mouse', '20', 'grams',700, 60, 1500, 700);
Insert into product_master value('P003', 'Keyboard', '15', 'inches',1000, 50, 2500, 1500);
Insert into product_master value('P004', 'Hard disk', '50', 'grams',950, 45, 5000, 2500);
Insert into product_master value('P005', 'Aluminium wire', '30', 'metre',110, 30, 110, 50);
Insert into product_master value('P006', 'Copper wire', '20', 'metre',80, 55, 150, 90);

Screenshot:

product_no	description	profit_percent	unit_measure	qty_on_hand	reorder_level	sell_price	cost_price
P001	Monitor	10.00	inches	300	30	40000.00	10000.00
P002	Mouse	20.00	grams	700	60	1500.00	700.00
P003	Keyboard	15.00	inches	1000	50	2500.00	1500.00
P004	Hard disk	50.00	grams	950	45	5000.00	2500.00
P005	Aluminium wire	30.00	metre	110	30	110.00	50.00
P006	Copper wire	20.00	metre	80	55	150.00	90.00

3. Find out the names of all clients

Query:

     select Name

     from client_master;

Screenshot:

Name
Praisy
Vandana
Aamina
Elwin
Elaine
Jerry
Aarya
Ashley

4. Retrieve the entire contents of the client_master table.

Query:

     SELECT * FROM client_master;

Screenshot:

Client_no	Name	Address	City	Pincode	State	Bal_due
C001	Praisy	Pallom	Kottayam	401107	Kerala	3500.00
C002	Vandana	Ashok Nagar	Madras	401107	Tamil Nadu	40000.00
C003	Aamina	Adyar	Chennai	401107	Tamil Nadu	6000.00
C004	Elwin	Bandra	Mumbai	401107	Maharashtra	1500.00
C005	Elaine	Mira Road	Mumbai	401107	Maharashtra	70000.00
C006	Jerry	Borivali	Mumbai	401107	Maharashtra	45000.00
C007	Aarya	Ram Nagar	Banglore	401107	Karnataka	22700.00
C008	Ashley	Challud	Manglore	401107	Karnataka	69000.00

5. Retrieve the list of names and cities of all the clients
Query:

      select Name, City

      from client_master;

Screenshot:

Name	City
Praisy	Kottayam
Vandana	Madras
Aamina	Chennai
Elwin	Mumbai
Elaine	Mumbai
Jerry	Mumbai
Aarya	Banglore
Ashley	Manglore

6. List the various products available from the product_master table
Query:

      select distinct description

      from product_master;

Screenshot:
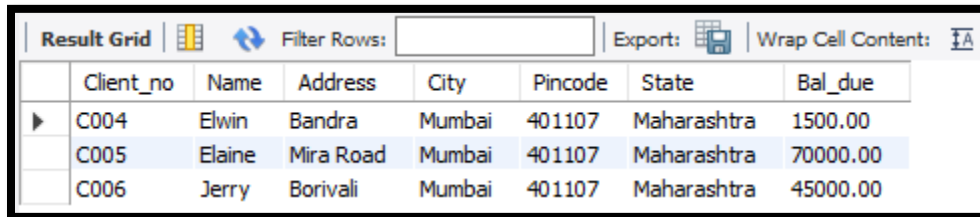
description
Monitor
Mouse
Keyboard
Hard disk
Aluminium wire
Copper wire

7. List all the clients who are located in mumbai.
Query:

select * from client_master where City like "Mumbai";

Screenshot:
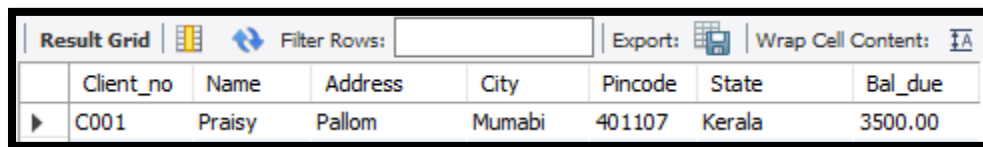
	Client_no	Name	Address	City	Pincode	State	Bal_due
▶	C004	Elwin	Bandra	Mumbai	401107	Maharashtra	1500.00
	C005	Elaine	Mira Road	Mumbai	401107	Maharashtra	70000.00
	C006	Jerry	Borivali	Mumbai	401107	Maharashtra	45000.00

8. Change the city of client_no C001 to Mumbai
Query:

update client_master SET City = "Mumabi" WHERE Client_no = 'C001';

Screenshot:
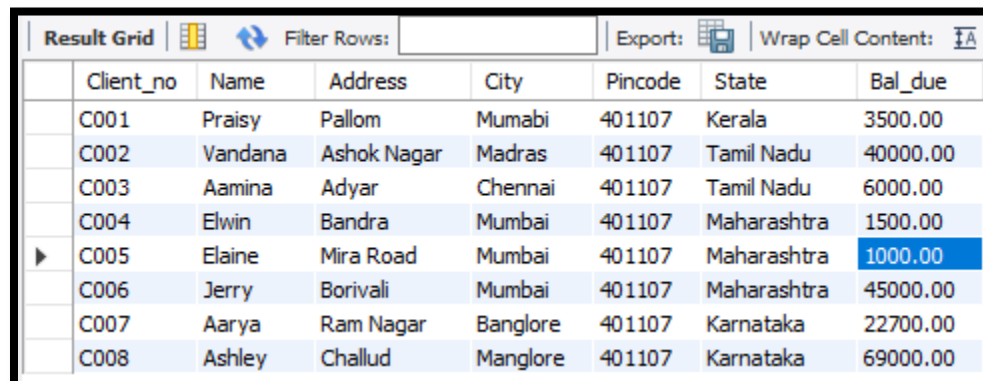
	Client_no	Name	Address	City	Pincode	State	Bal_due
▶	C001	Praisy	Pallom	Mumabi	401107	Kerala	3500.00

9. Change the bal_due of client_no C005 to Rs. 1000
Query:

update client_master SET Bal_due = 1000 WHERE Client_no = 'C005';

Screenshot:
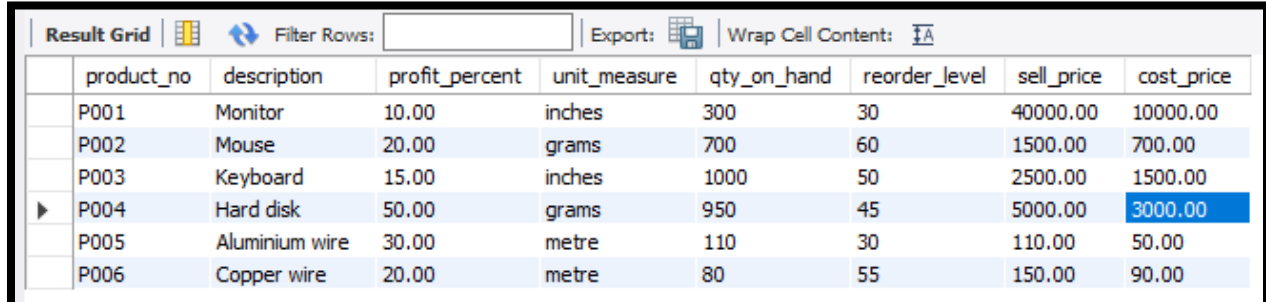
	Client_no	Name	Address	City	Pincode	State	Bal_due
	C001	Praisy	Pallom	Mumabi	401107	Kerala	3500.00
	C002	Vandana	Ashok Nagar	Madras	401107	Tamil Nadu	40000.00
	C003	Aamina	Adyar	Chennai	401107	Tamil Nadu	6000.00
	C004	Elwin	Bandra	Mumbai	401107	Maharashtra	1500.00
▶	C005	Elaine	Mira Road	Mumbai	401107	Maharashtra	1000.00
	C006	Jerry	Borivali	Mumbai	401107	Maharashtra	45000.00
	C007	Aarya	Ram Nagar	Banglore	401107	Karnataka	22700.00
	C008	Ashley	Challud	Manglore	401107	Karnataka	69000.00

Gini Chacko 8942

10. Change the cost price of 'hard disk' to Rs. 3000

Query:

update product_master SET cost_price = 3000 WHERE description = 'Hard disk';

Screenshot:

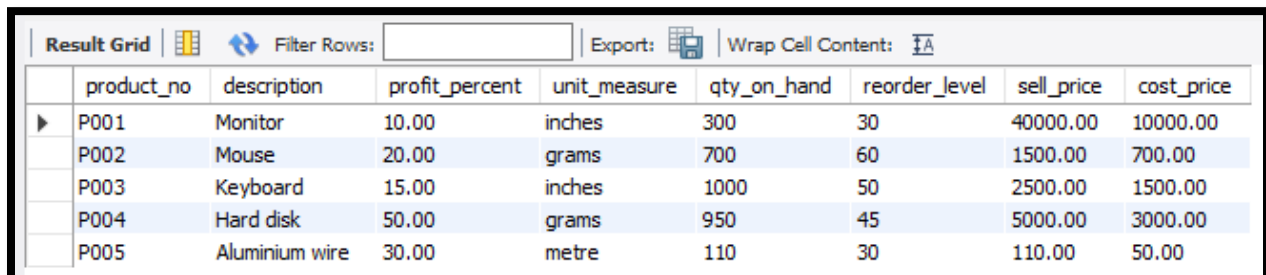| product_no	description	profit_percent	unit_measure	qty_on_hand	reorder_level	sell_price	cost_price
P001	Monitor	10.00	inches	300	30	40000.00	10000.00
P002	Mouse	20.00	grams	700	60	1500.00	700.00
P003	Keyboard	15.00	inches	1000	50	2500.00	1500.00
P004	Hard disk	50.00	grams	950	45	5000.00	3000.00
P005	Aluminium wire	30.00	metre	110	30	110.00	50.00
P006	Copper wire	20.00	metre	80	55	150.00	90.00

11. Delete all the products from product_master where the qty_on_hand is less than 100

Query:

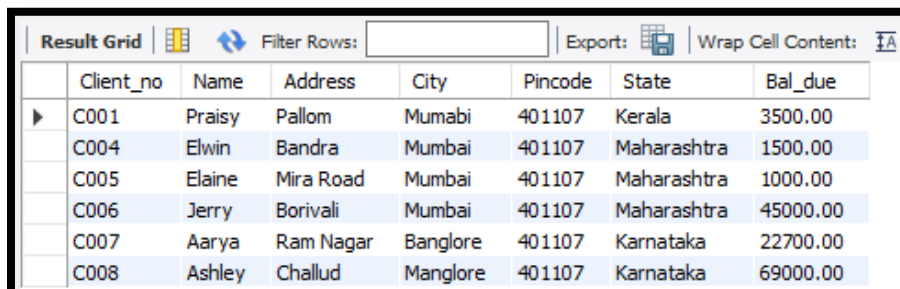delete from product_master where qty_on_hand < 100;

Screenshot:

product_no	description	profit_percent	unit_measure	qty_on_hand	reorder_level	sell_price	cost_price
P001	Monitor	10.00	inches	300	30	40000.00	10000.00
P002	Mouse	20.00	grams	700	60	1500.00	700.00
P003	Keyboard	15.00	inches	1000	50	2500.00	1500.00
P004	Hard disk	50.00	grams	950	45	5000.00	3000.00
P005	Aluminium wire	30.00	metre	110	30	110.00	50.00

12. Delete from client_master where the column state holds the value 'Tamil Nadu'

Query:

delete from client_master where State = 'Tamil Nadu';

Screenshot:

Client_no	Name	Address	City	Pincode	State	Bal_due
C001	Praisy	Pallom	Mumabi	401107	Kerala	3500.00
C004	Elwin	Bandra	Mumbai	401107	Maharashtra	1500.00
C005	Elaine	Mira Road	Mumbai	401107	Maharashtra	1000.00
C006	Jerry	Borivali	Mumbai	401107	Maharashtra	45000.00
C007	Aarya	Ram Nagar	Banglore	401107	Karnataka	22700.00
C008	Ashley	Challud	Manglore	401107	Karnataka	69000.00

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POSTLAB QUESTIONS:

1.] Explain difference between Alter and update command in SQL with a suitable example.

ANS: 1. ALTER COMMAND:

ALTER SQL command is a DDL (Data Definition Language) statement. ALTER is used to update the structure of the table in the database (like add, delete, modify the attributes of the tables in the database).

Syntax:

// add a column to the existing table

ALTER TABLE tableName

ADD columnName columnDefinition;

2. UPDATE COMMAND:

UPDATE SQL command is a DML (Data manipulation Language) statement. It is used to manipulate the data of any existing column. But can't change the tables definition.

Syntax:

// table name that has to update

UPDATE tableName

// which columns have to update

SET column1 = value1, column2 = value2,.....,

columnN = valueN.

// which row you have to update

WHERE condition

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ALTER COMMAND	UPDATE COMMAND
1) ALTER command is Data Definition Language.	1) UPDATE command is a Data Manipulation Language.
2) Alter command will perform the action on structure level and not on the data level.	2) Update command will perform on the data level.
3) ALTER command is used to add, delete, modify the attributes of the relations (tables) in the database.	3) UPDATE command is used to update existing records in a database.
4) ALTER command by default initializes values of all the tuple as NULL	4) UPDATE command sets specified values in the command to the tuples.
5) This command make changes with table structure	5) This command makes changes with data inside the table.
6) Example: Table structure Table Name, SP, functions, etc.	6) Example: change data in the table in rows or in column etc.

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2.] Explain different types of keys with suitable examples.

ANS:
- keys play an important role in the relational database. It is used to uniquely identify any record or row of data from the table. It is also used to establish and identify relationships between tables.

  Types of key:
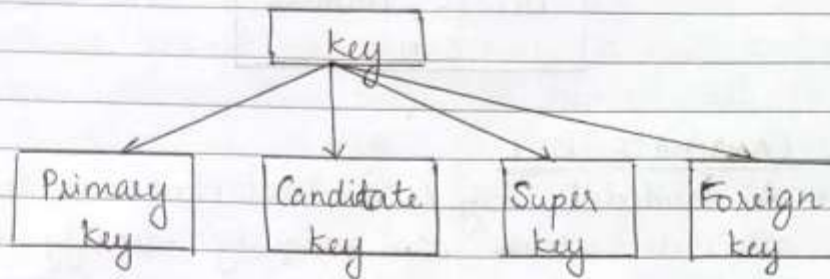
1. PRIMARY KEY
- It is the first key which is used to identify one and only one instance of an entity uniquely. An entity can contain multiple keys as we saw in PERSON table. The key which is most suitable from those lists become a primary key.
- In the EMPLOYEE table, ID can be primary key since it is unique for each employee. In the EMPLOYEE table, we can even select License_Number and Passport_Number as primary key since they are also unique.
- For each entity, selection of the primary key is based on requirement and developers.

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Example:

```
┌─────────────────────────┐
│ EMPLOYEE                │
│ Employee _ ID ──────────┼──→ Primary key
│ Employee _ Name         │
│ Employee _ Address      │
│ Passport _ Number       │
│ License _ Number        │
│         SSN             │
└─────────────────────────┘
```

2. CANDIDATE KEY

- A candidate key is an attribute or set of an attribute which can uniquely identify a tuple.
- The remaining attributes except for primary key are considered as a candidate key. The candidate keys are as strong as the primary key.
  Example: In the EMPLOYEE table, id is best suited for the primary key. Rest of the attributes like SSN, Passport_Number, and License_Number, etc are considered as a candidate key.

```
┌─────────────────────────┐
│ EMPLOYEE                │
├─────────────────────────┤
│ Employee _ ID           │
│ Employee _ Name         │
│ Employee _ Address      │
│ Passport _ Number   ┐   │
│ License _ Number    ├── Candidate key
│         SSN         ┘   │
└─────────────────────────┘
```

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3. SUPER KEY

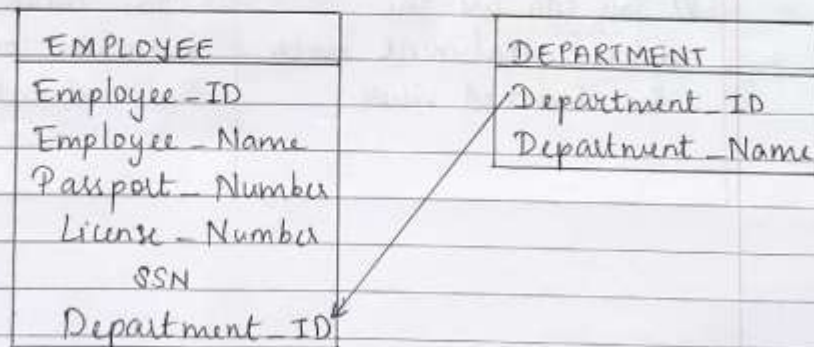Super key is set of an attribute which can uniquely identify a tuple. Super key is a superset of a candidate key.

Example: In the above EMPLOYEE table, for (Employee_ID, Employee_Name) the name of two employees can be the same, but their Employee_ID can't be the same. Hence, this combination can also be a key.

The super key would be Employee_ID, (Employee_ID, Employee_Name) etc.

4. FOREIGN KEY

- Foreign keys are the column of the table which is used to point to the primary key of another table. We add the primary key of the DEPARTMENT table, Department_Id as a new attribute in the EMPLOYEE table.

- Now in EMPLOYEE table, Department_Id is the foreign key, and both the tables are related.

EXAMPLE

EMPLOYEE
Employee_ID
Employee_Name
Passport_Number
License_Number
SSN
Department_ID

DEPARTMENT
Department_ID
Department_Name

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3.] Perform delete and truncate in lab and Differentiate delete & Truncate

ANS:

DELETE	TURNCATE
1) Delete comand is useful to delete all or specific rows from a table specified using a where.	1) The truncate command removes all rows of a table. We cannot use a where clause in this.
2) It is a DML command.	2) It is a DDL command.
3) SQL Delete command places lock on each row requires deleting from table.	3) SQL Truncate command places a table and page lock to remove all records.
4) Delete commands logs entry for each deleted row in the transaction log.	4) The truncate command does not log entries for each deleted row in the transaction log.
5) Delete command is slower than the turncate command.	5) It is faster than the delete command.
6) It retains the identity and does not reset it to the seed value.	6) Truncate command reset the identity to its seed value.
7) It requires more transaction log space than the truncate command.	7) It requires less transaction log space than the truncate command.
8) You can use the delete statement with the indexed views.	8) You cannot use the truncate command with the indexed views.

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