COURSE NAME: DBMS
COURSE CODE:23AD2102A

Topic: **INTRODUCTION TO SQL, DATA DEFINITION LANGUAGE (DDL)**

Session - 7

AIM OF THE SESSION

To familiarize students with the basic concept of SQL languages and Create table command in detail.

INSTRUCTIONAL OBJECTIVES

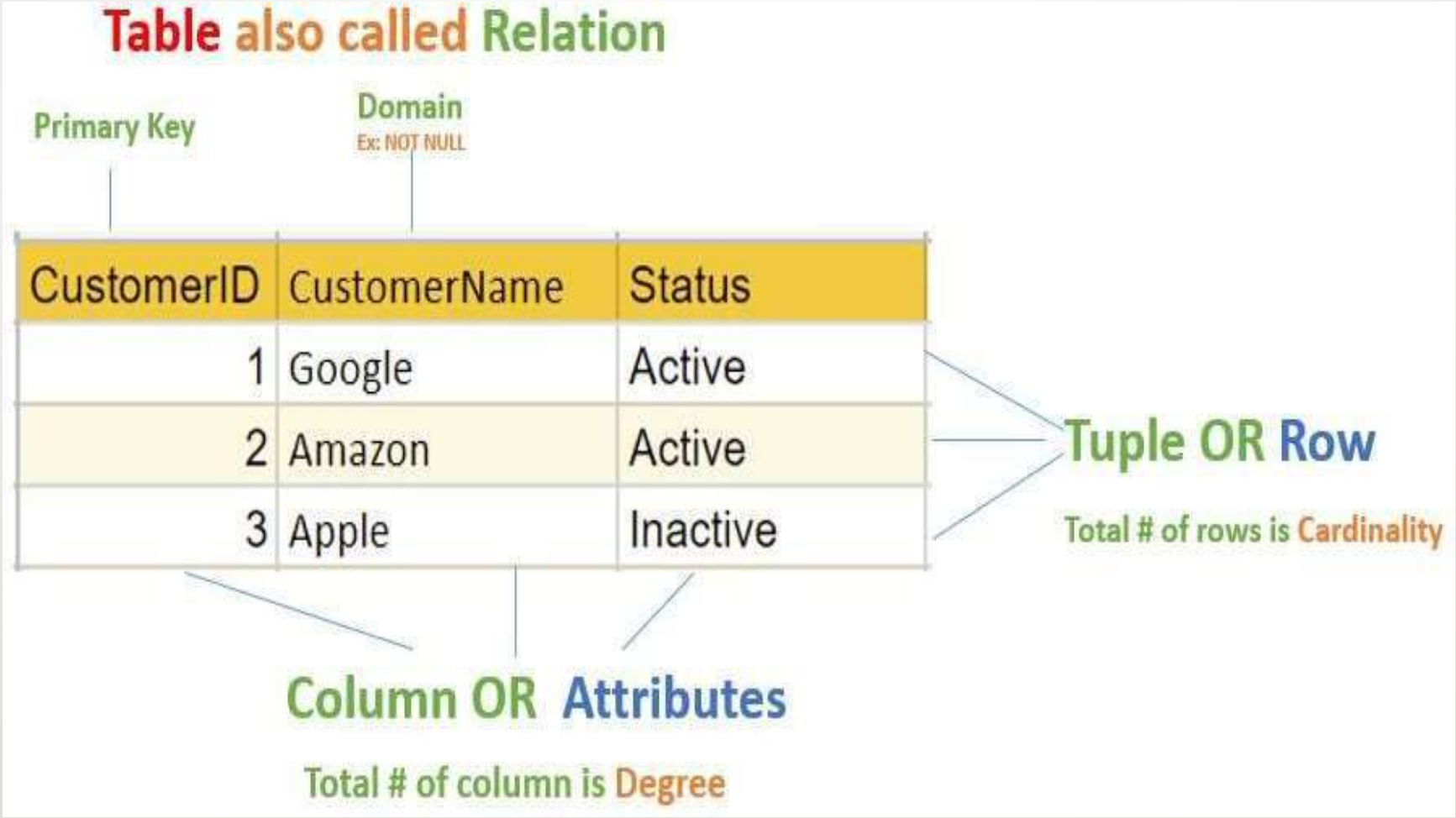
This Session is designed to:

1. Discuss the types of SQL languages.
2. Various command under different types of SQL Languages.
3. Introduction of Create table command with its syntax and examples.

LEARNING OUTCOMES

At the end of this session, you should be able to understand the basic commands of SQL and learn how to write queries with SQL commands.

TABLE



KEY

A DBMS Key is an attribute or set of attributes which helps us to identify a row (tuple) in a relation(table). It allows us to find the relation between two tables.

There are different types of keys:

1. Super Key
2. Unique Key
3. Primary Key
4. Candidate Key
5. Alternate Key
6. Foreign Key

SUPER KEY CANDIDATE KEY & NON-PRIME ATTRIBUTE

- **Super Key**: A super key is a set of one or more attributes(columns), which can uniquely identify a row in a table.
- **Candidate Key**: A super key with no redundant attribute is known as candidate key.
- **Non-prime Attribute:** An attribute that is not part of any candidate key is known as non-prime attribute.

Emp_Id	Emp_Number	Emp_Name
E01	2264	Steve
E02	2278	John
E03	2288	Martin
E04	2297	Robert

Super Key:

1. {Emp_Id}
2. {Emp_Number}
3. {Emp_Id} {Emp_Number}
4. {Emp_Number} {Emp_Name}
5. {Emp_Id} {Emp_Name}
6. {Emp_Id} {Emp_Number} {Emp_Name}

Candidate Key:

1. {Emp_Id}
2. {Emp_Number}

Non-prime attribute

{Emp_Name}

UNIQUE KEY & PRIMARY KEY

- A **Unique key** uniquely identifies each record in the database. This provides uniqueness for the column or set of columns and it can accept only one null value. Unique key is a subset of super key.
- A **primary key** is a combination of fields which uniquely specify a row. This is a special kind of unique key, and it has implicit NOT NULL constraint. It means, Primary key values cannot be NULL.
  - A Primary key constraint has automatic unique constraint defined on it. But not, in the case of Unique Key.
  - Primary Key can be chosen from Candidate key.
  - There can be many unique constraint defined per table, but only one primary key constraint defined per table.

ALTERNATE KEY FOREIGN KEY

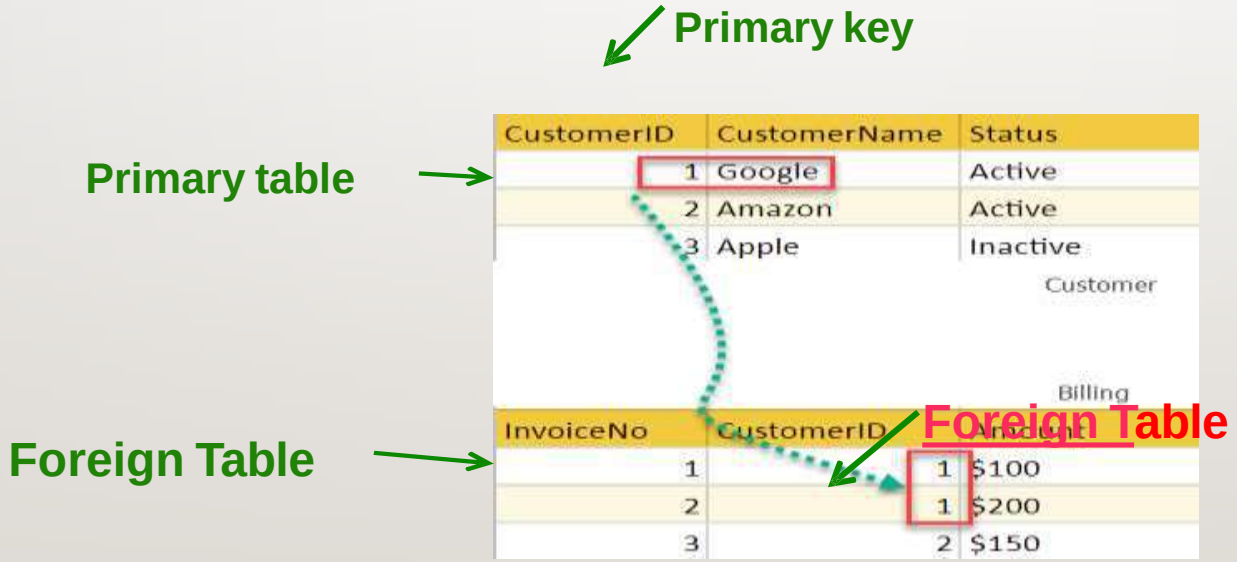
A candidate key, that is not a primary key is called an **Alternate key.**

A non key attribute(or a group of non-key attributes) whose values are derived from primary key of some other table is known as **Foreign key** in its current table.

- Foreign key is used to represent the relationship between two tables.
- Foreign key of a table is a primary key of some other table.

PRIMARY TABLE & FOREIGN TABLE

- The table in which foreign key attribute exists, is called a **Foreign Table or Detail table.**
- The table that defines the primary key, which is the foreign key of the detail table or Foreign table refers to, is called **Primary table or Master table.**



SQL
Structured Query Language

- **SQL** is a language which is used to create & operate database.
- **SQL** is the basic language used for all the databases.
- **SQL** can be used by both casual users as well as skilled programmer.

There are minor syntax changes amongst different databases, but the basic **SQL** syntax remains largely the same.

- According to ANSI (American National Standards Institute), **SQL** is the standard language to operate a relational database management system.
- **SQL** is used in the accessing, updating, and manipulation of data in a database. Its design allows for the management of data in an RDBMS, such as MYSQL and PostgreSQL.

PROCESSING CAPABILITIES OF SQL

1. DATA DEFINITION LANGUAGE(DDL)

The SQL DDL provides commands for defining relation schemas, deleting relations, creating indexes and modifying relation schemas**.**

2.INTERACTIVE DATA MANIPULATION LANGUAGE(DML)

The SQL DML includes a query language based on both relational algebra and the tuple relational calculus. It includes the commands to insert, delete and modify tuples in the data base.

PROCESSING CAPABILITIES OF SQL

3. Embedded SQL

It is a method of combining the computing power of a programming language and the database manipulation capabilities of SQL.

4.**View Definition**

The SQL DDL also includes commands for defining views.(Views are the virtual tables that does not really exist in its own but is derived from one or more base table(s)).

5.Authorization

The SQL DDL also includes commands for specifying access rights to relation and views.

PROCESSING CAPABILITIES OF SQL

6.Integrity

The SQL provides limited forms of integrity checking. Future products and standards of SQL are likely to include enhanced features for integrity checking.

7.Transaction Control

SQL includes commands for specifying the beginning and ending of transactions along with the commands to have a control over transaction processing.

Data Definition Language

- Data Definition Language actually consists of the SQL commands that can be used to define the database structure or schema.
- It simply deals with descriptions of the database schema and is used to create and modify the structure of database objects in the database.
- DDL is a set of SQL commands used to create, modify, and delete database structures but not data.
- These commands are normally not used by a general user, who should be accessing the database via an application.

DATA DEFINITION LANGUAGE (Cont..)

List of DDL commands

- CREATE: This command is used to create the new database or its objects.
- ALTER: This is used to alter the structure of the database.
- DROP: This command is used to delete objects from the database.
- TRUNCATE: This is used to remove all records from a table, including all spaces allocated for the records are removed.
- RENAME: This is used to rename an object existing in the database.

1) **CREATE TABLE command:** This DDL command allows us to create the new table.

```
CREATE TABLE [IF NOT EXISTS] <table_name> ( <column1> <data_type(length)>
[column_contraint], <column2> <data_type(length)> [column_contraint], ...
<columnN> <data_type(length)> [column_contraint], [table_constraints] );
```

In the above syntax,

- After CREATE TABLE we can specify optional IF NOT EXISTS clause, which will create a table only if it does not exist. If a table already exists, Postgres will only give a warning instead of an error and skip creating a new table.
- The table_name is the unique name of a table which you want to create.
- In the bracket, specify the list of column names along with their data types. Specify the optional [column_constraint] such as NOT NULL, Check, Unique, Primary Key, Foreign Key etc.

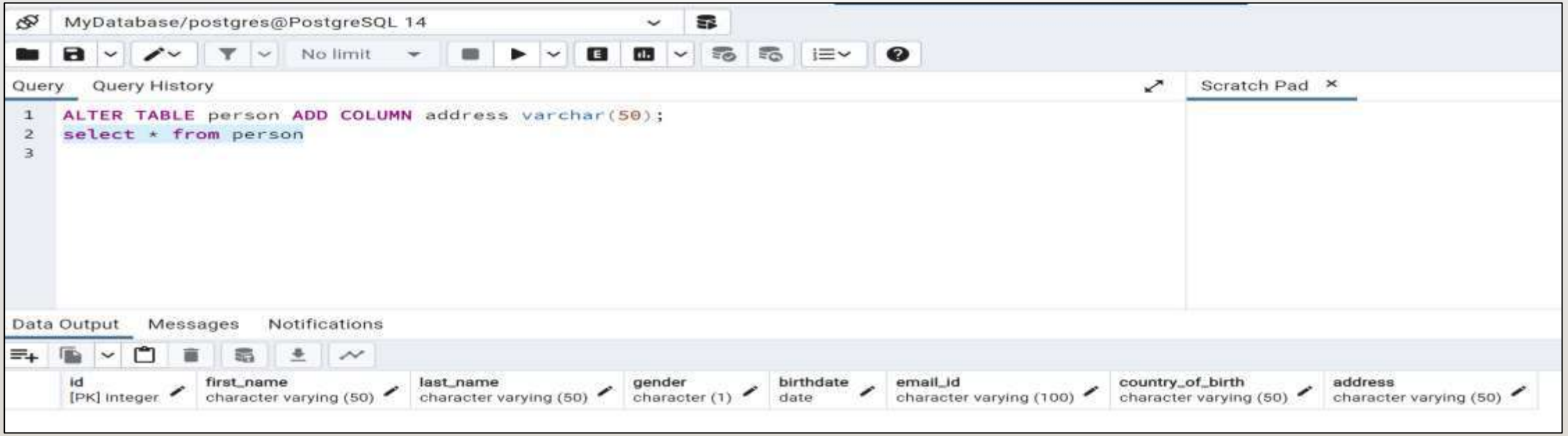
DATA DEFINITION LANGUAGE (Cont..)

```
CREATE TABLE IF NOT EXISTS person ( Id INT PRIMARY KEY, first_name VARCHAR(50) NOT NULL, last_name VARCHAR(50) NOT NULL, gender CHAR(1), birthdate DATE, email_id VARCHAR(100) UNIQUE, country_of_birth VARCHAR(50) );
```

2) ALTER TABLE command: This DDL command allows to alter the structure of the database. The commands are:

A) ADD COLUMN: It is used to add a new column in the table. For example, to add a column address of type varchar to an existing table:

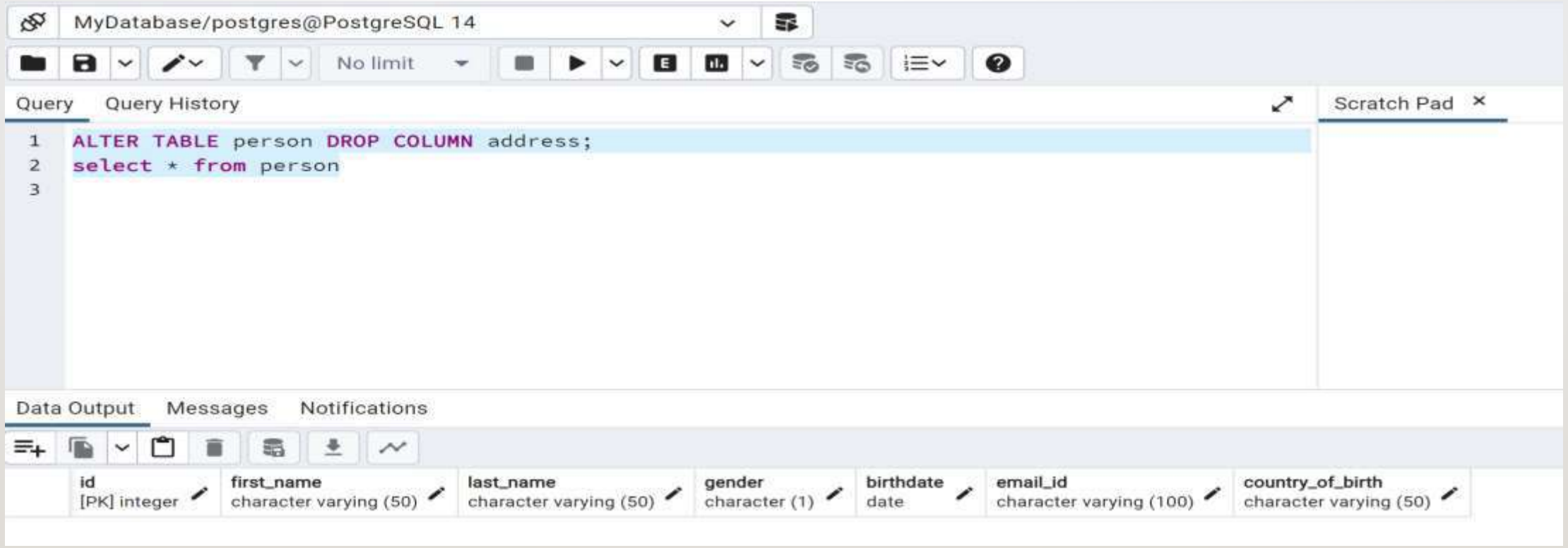
```
ALTER TABLE person ADD COLUMN address varchar(50);
```



DATA DEFINITION LANGUAGE (Cont..)

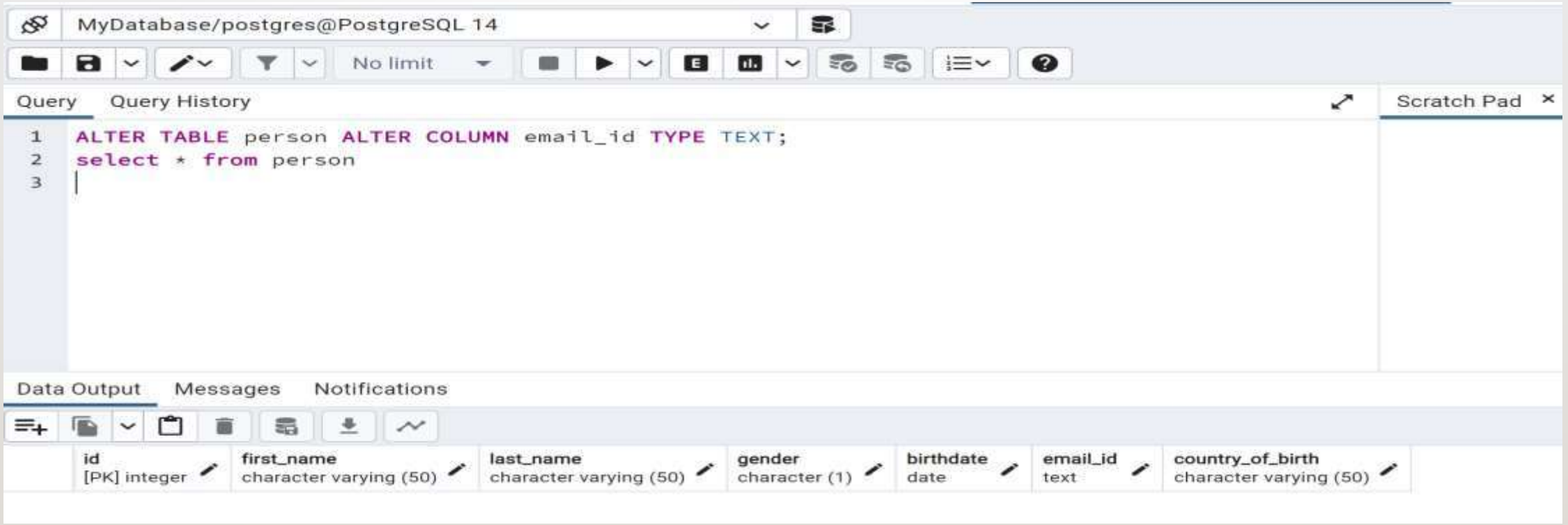
B) DROP COLUMN: It is used to drop an existing column from the table.

```
ALTER TABLE person DROP COLUMN address;
```



C) ALTER COLUMN: It is used to alter the existing column. To change the datatype of email from VARCHAR to TEXT.

```
ALTER TABLE person ALTER COLUMN email_id TYPE TEXT;
```



DATA DEFINITION LANGUAGE (Cont..)

To add a NOT NULL constraint to a column:

```
ALTER TABLE person ALTER COLUMN gender SET NOT NULL;
```

To remove a NOT NULL constraint from a column:

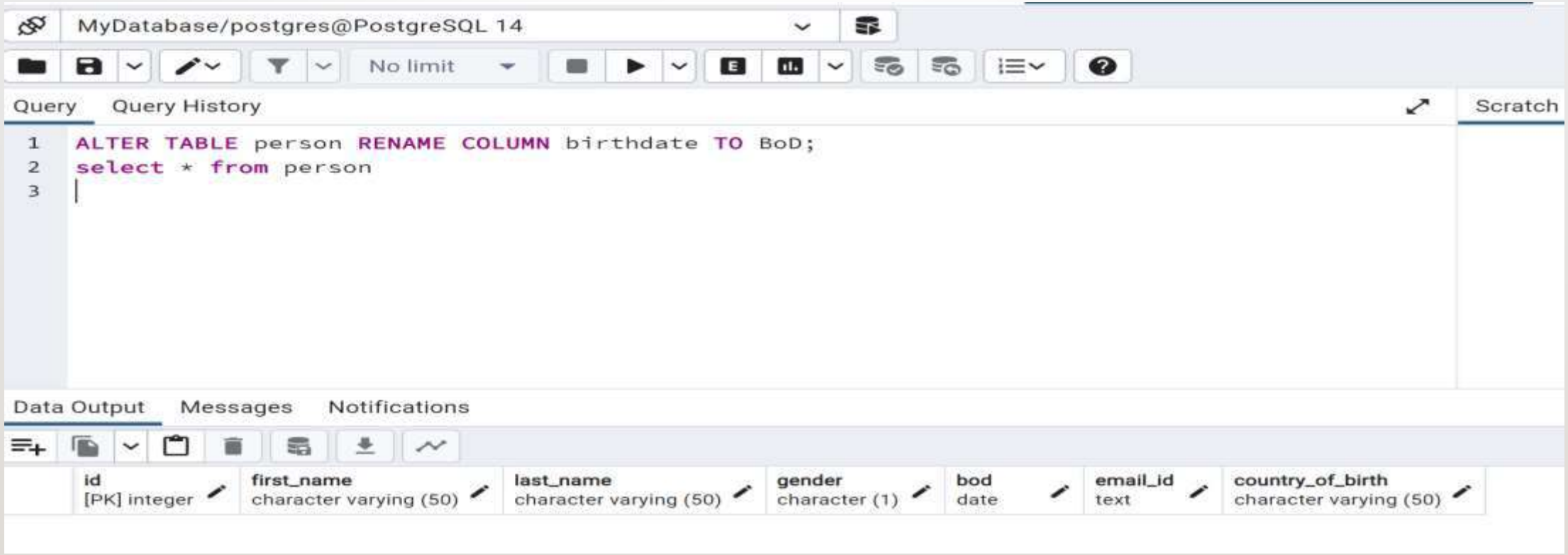
```
ALTER TABLE person ALTER COLUMN gender DROP NOT NULL;
```

To add a PRIMARY KEY constraint to a table:

```
ALTER TABLE person ADD PRIMARY KEY (id);
```

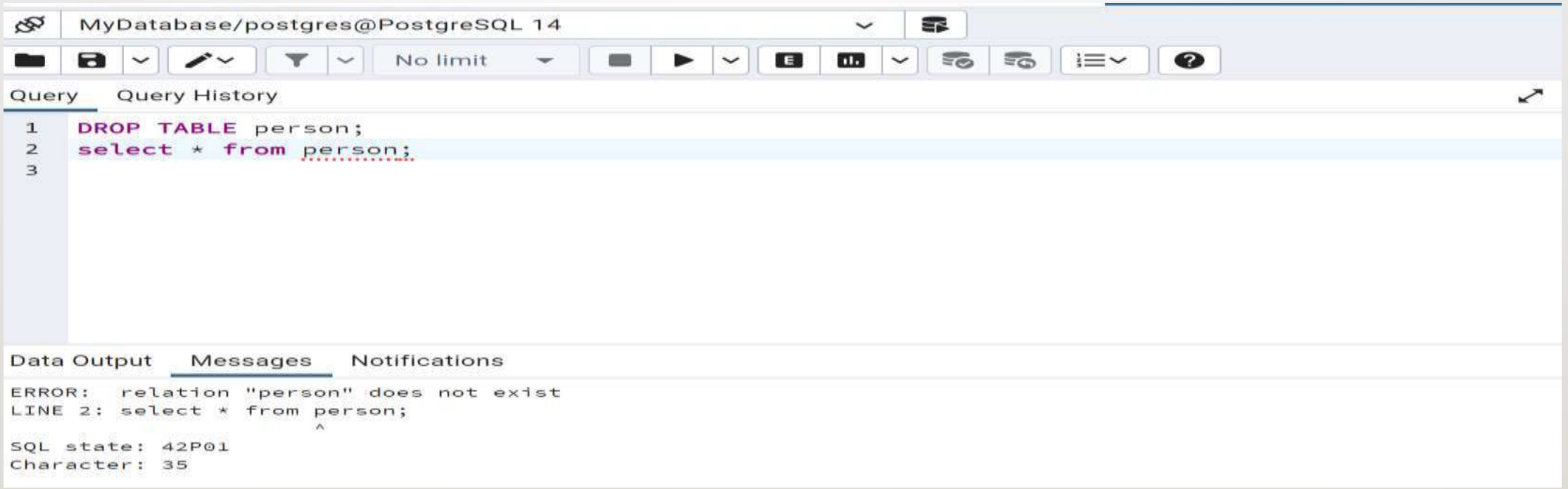
D) RENAME COLUMN: It is used to change the name of a column.

```
ALTER TABLE person RENAME COLUMN birthdate TO BoD;
```



3) DROP command: This DDL command allows us to delete the database objects. With the help of the "DROP" command we can drop (delete) the whole structure in one go.

```
DROP TABLE person;
```



4) TRUNCATE command: It is used to delete all the data from the table. With the help of the "TRUNCATE" command, we can't delete the single row as here WHERE clause is not used.

Syntax of TRUNCATE TABLE command: **TRUNCATE TABLE** table_name;

5) ALTER TABLE RENAME command: This DDL command allows the users to change the name of the existing table. For example, To rename from person to employee, use the following ALTER TABLE statement:

```
ALTER TABLE person RENAME TO employee;
```

SUMMARY

1. In this section, we discussed the various types of SQL languages and commands of these languages that are used to work on the database nd the data stored in the databases.

2. We also discussed the CREATE TABLE command in detail with its syntax and examples for creating the tables.

SELF-ASSESSMENT QUESTIONS

1. Commands that comes under DDL is/are –

(a) CREATE
(b) DROP
(c) TRUCATE
(d) ALLOF THE ABOVE

2. Command that comes under DML is/are –

(a) ROLLBACK
(b) GRANT
(c) UPDATE
(d) ALL OF THE ABOVE

SELF-ASSESSMENT QUESTIONS

3. Command that comes under DCL is/are -

(a) GRANT
(b) REVOKE
(c) BOTH (a) AND (b)
(d) NONE OF THE ABOVE

4. Following the completion of a transaction, it must be executed to save all the operations performed in the transaction. Here we are talking about which command?

(a) REVOKE
(b) COMMIT
(c) ROLLBACK
(d) SAVE

TERMINAL QUESTIONS

1. Describe various types of SQL Languages.

2. List out the commands of Data Definition Language with examples.

3. Analyze the DDL commands in PostgreSQL.

4. Summarize the create table command with its syntax and examples.

REFERENCES FOR FURTHER LEARNING OF THE SESSION

Reference Books:

1. Database System Concepts, Sixth Edition, Abraham Silberschatz, Yale University Henry, F. Korth Lehigh University, S. Sudarshan Indian Institute of Technology, Bombay.

2. An Introduction to Database Systems by Bipin C. Desai

3. Fundamentals of Database Systems, 7th Edition, RamezElmasri, University of Texas at Arlington, Shamkant B. Navathe, University of Texasat Arlington.

Sites and Web links:

1. https://www.geeksforgeeks.org/postgresql-create-table/

2. https://www.tutorialsteacher.com/postgresql

THANK YOU

Team – DBMS