PostgreSQL Instructions

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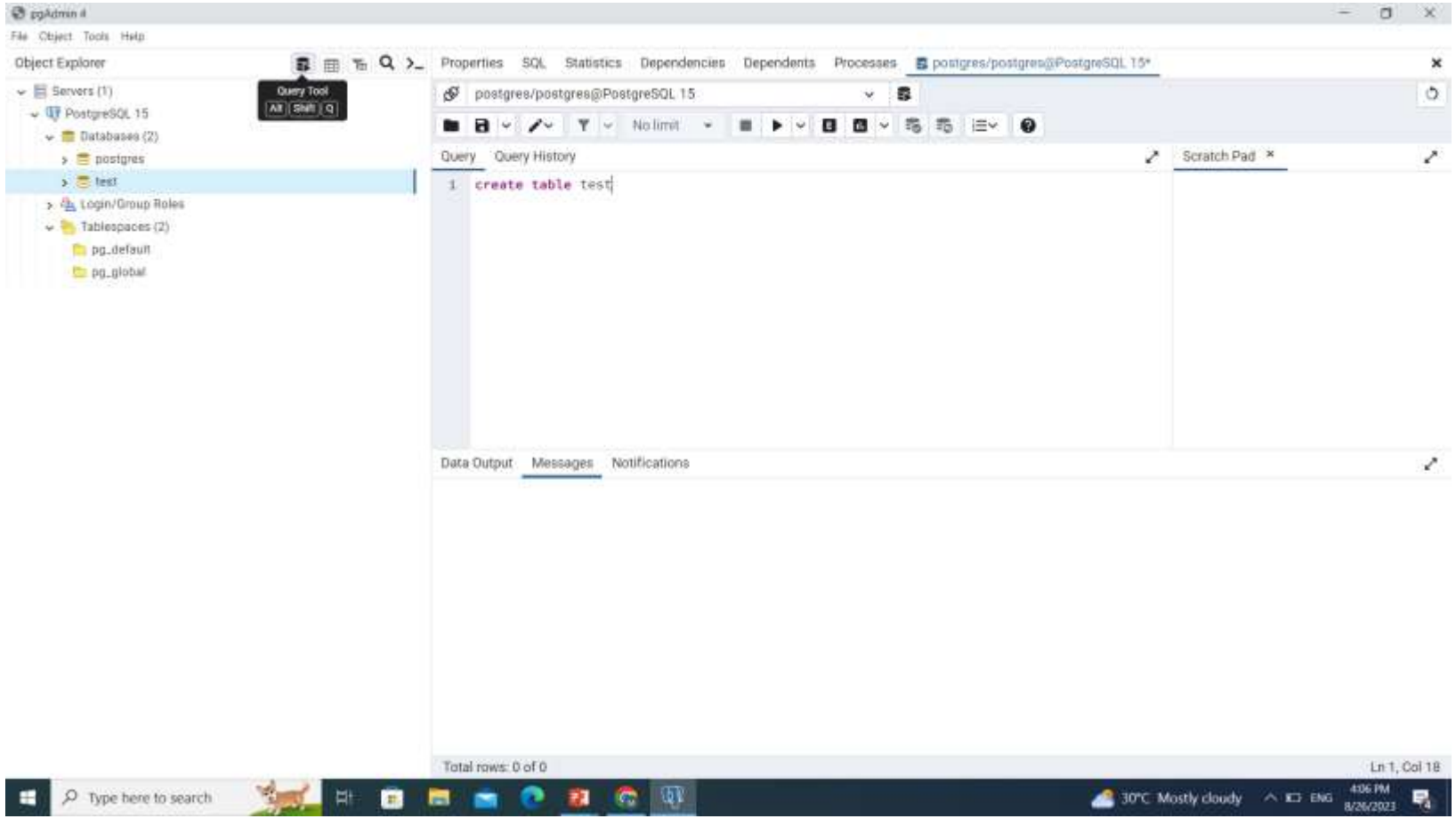
Open pgadmin 4



Open Query tool from the top left icon. Create database by the following query create database databasename.
Click on the new database created and open its query tool

What is SQL Queries?

- Almost all relational database management systems use SQL (Structured Query Language) for data manipulation and retrieval. SQL is the standard language for relational database systems. SQL is a non-procedural language.
- Structured Query Language(SQL) is use to perform certain operations on the existing database and also we can use this language to create a database. It uses certain commands like Create, Drop, Insert, etc. to carry out the required tasks.

SQL Commands

- DDL – Data Definition Language
- DQL – Data Query Language
- DML – Data Manipulation Language
- DCL – Data Control Language

DDL

DDL or Data Definition Language actually consists of the SQL commands that can be used to define the database structure.

List of DDL commands:

- CREATE: This command is used to create the database or its objects (like table, index, function, views, store procedure, and triggers).
- DROP: This command is used to delete objects from the database.
- ALTER: This is used to alter the structure of the database.
- TRUNCATE: This is used to remove all records from a table, including all spaces allocated for the records are removed.
- COMMENT: This is used to add comments to the data dictionary.
- RENAME: This is used to rename an object existing in the database.

Data Query Language

- DQL statements are used for performing queries on the data within schema objects
- SELECT**:** It is used to retrieve data from the database.

Data Manipulation language

The SQL commands that deals with the manipulation of data present in the database belong to DML or Data Manipulation Language and this includes most of the SQL statements. It is the component of the SQL statement that controls access to data and to the database.

List of DML commands:

- INSERT : It is used to insert data into a table.
- UPDATE: It is used to update existing data within a table.
- DELETE : It is used to delete records from a database table.

Data Control Language

DCL includes commands such as GRANT and REVOKE which mainly deal with the rights, permissions, and other controls of the database system.

List of DCL commands:

- GRANT: This command gives users access privileges to the database.
- REVOKE: This command withdraws the user’s access privileges given by using the GRANT command.

Table

- A Table is a collection of rows and columns. Data in relational model is stored in tables.
- Before a table is created the following factors of a table are to be finalized.
  - What data table is supposed to store.
  - The name of the table. It should depict the content of the table.
  - What are the columns that table should contains
  - The name, data type and maximum length of each column of the table.
  - What are the rules to be implemented to main data integrity of the table.

Data types

- Varchar(len)
- Varchar2(len)
- Int
- CHAR(len)
  - Fixed length character data. If len is given then it can store up to len number of characters. Default width is 1
- Decimal(total length of the digits including both side of decimal, length of digit after decimal)
- Number(total length of the digits including both side of decimal, length of digit after decimal)

Table creation

```
SQL> create table COURSES
  2  (  ccode          varchar2(5),
  3     name           varchar2(30),
  4     duration       number(3),
  5     fee            number(5),
  6     prerequisite varchar2(100)
  7  );
```

Inserting rows into a table

```
insert into courses
    values('ora','Oracle database',25,4500,'Knowledge of Windows');
```

Inserting a row with selected columns

```
insert into courses(ccode,name)
     values ('odba','Oracle Database Administration');
```

Select Statements

```
select  * from courses;

CCODE NAME                 DURATION       FEE PREREQUISITE
----- -------------------- --------- --------- -------------------------
ora   Oracle database              25      4500 Windows
vbnet VB.NET                       30      5500 Windows and programming
c     C programming                20      3500 Computer Awareness
asp   ASP.NET                      25      5000 Internet and programming
java  Java Language                25      4500 C language
xml   XML Programming              15      4000 HTML,Scripting, ASP/JSP
```

```
select name,fee from courses;

NAME                          FEE
-------------------- ----------
Oracle database             4500
VB.NET                      5500
C programming               3500
ASP.NET                     5000
Java Language               4500
XML Programming             4000
```

```
select name,fee, fee * 0.15 from courses;

NAME                          FEE  FEE*0.15
-------------------- ---------- ---------
Oracle database             4500       675
VB.NET                      5500       825
C programming               3500       525
ASP.NET                     5000       750
Java Language               4500       675
XML Programming             4000       600
```

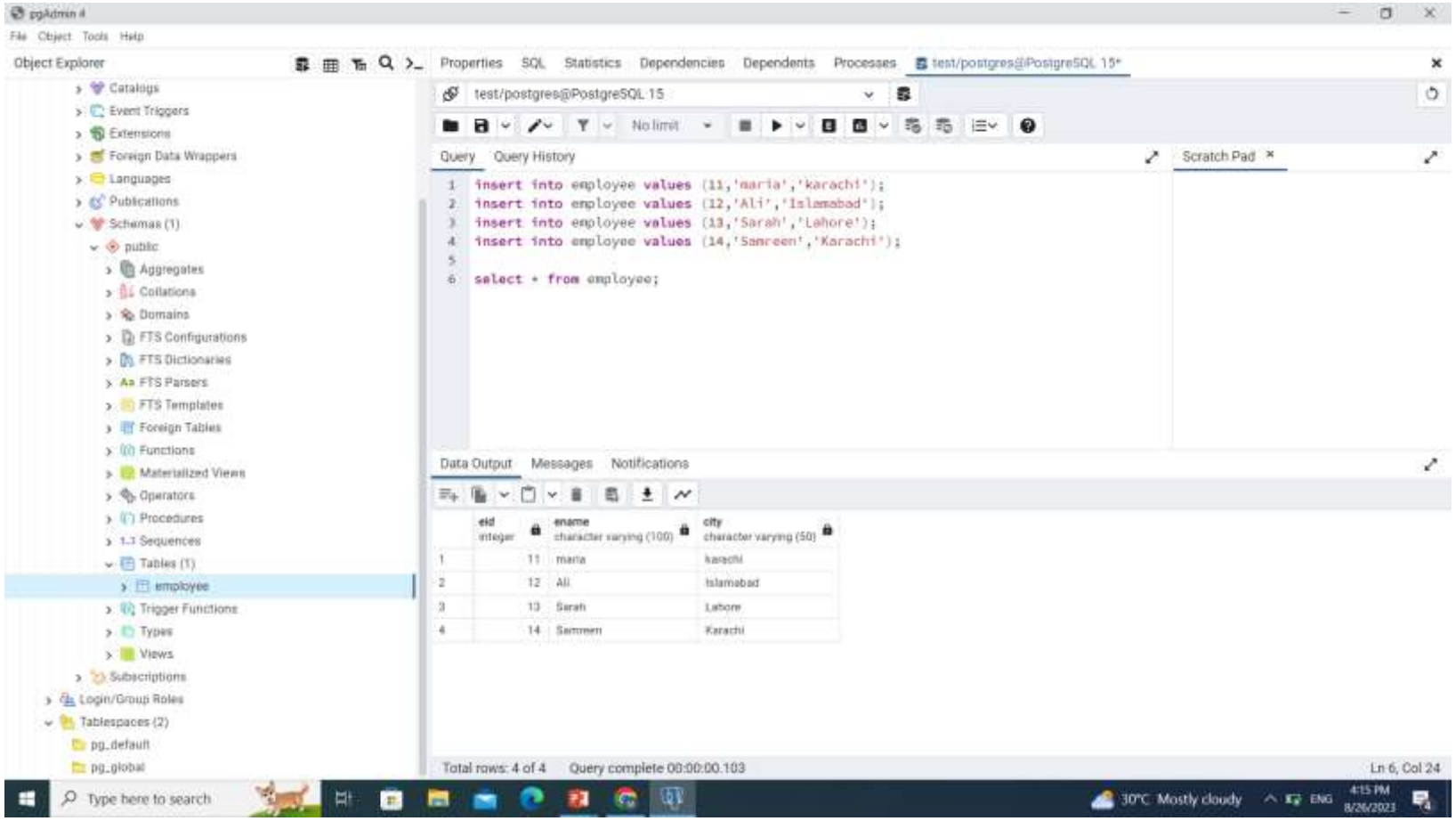
```
select name, fee, fee * 0.15 DISCOUNT from courses

NAME                          FEE  DISCOUNT
-------------------- ---------- ---------
Oracle database             4500       675
VB.NET                      5500       825
C programming               3500       525
ASP.NET                     5000       750
Java Language               4500       675
XML Programming             4000       600
```

Task 1:
Lets create a sample table as shown

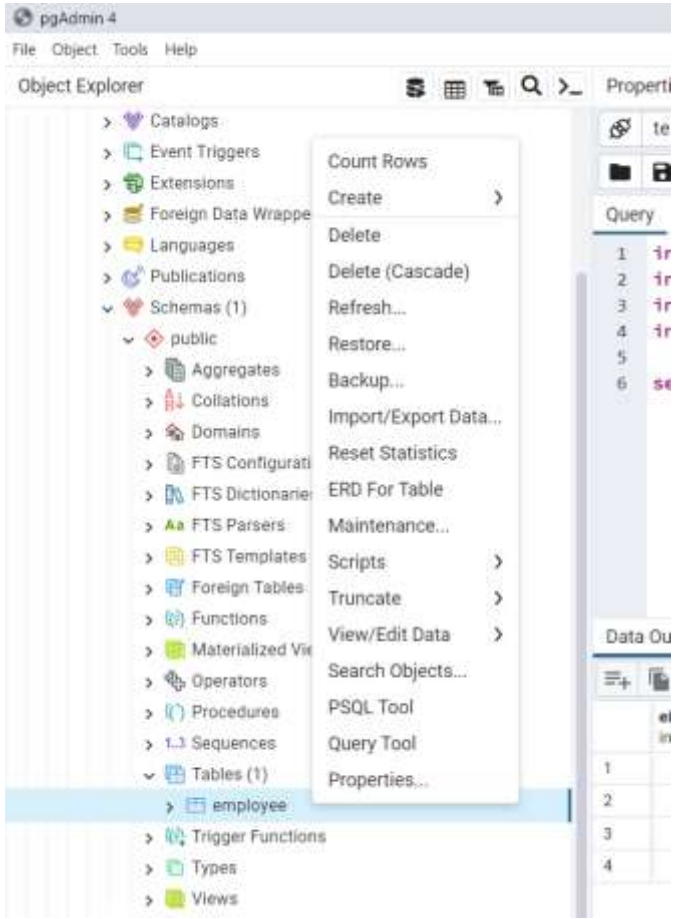
Table Name: employee

EID	Ename	City
11	Maria	Karachi
12	Ali	Islamabad
13	Sarah	Lahore
14	Samreen	Karachi

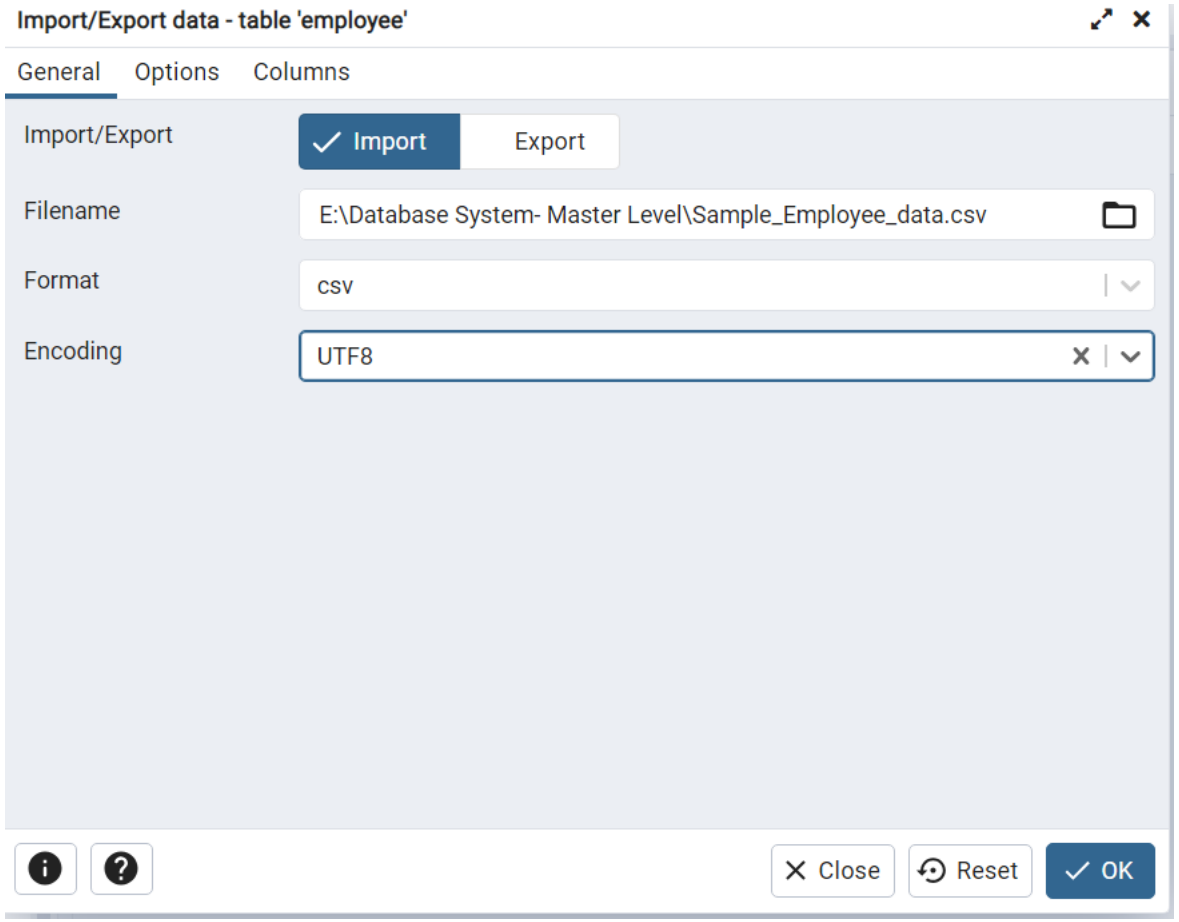
Insert and Display Data

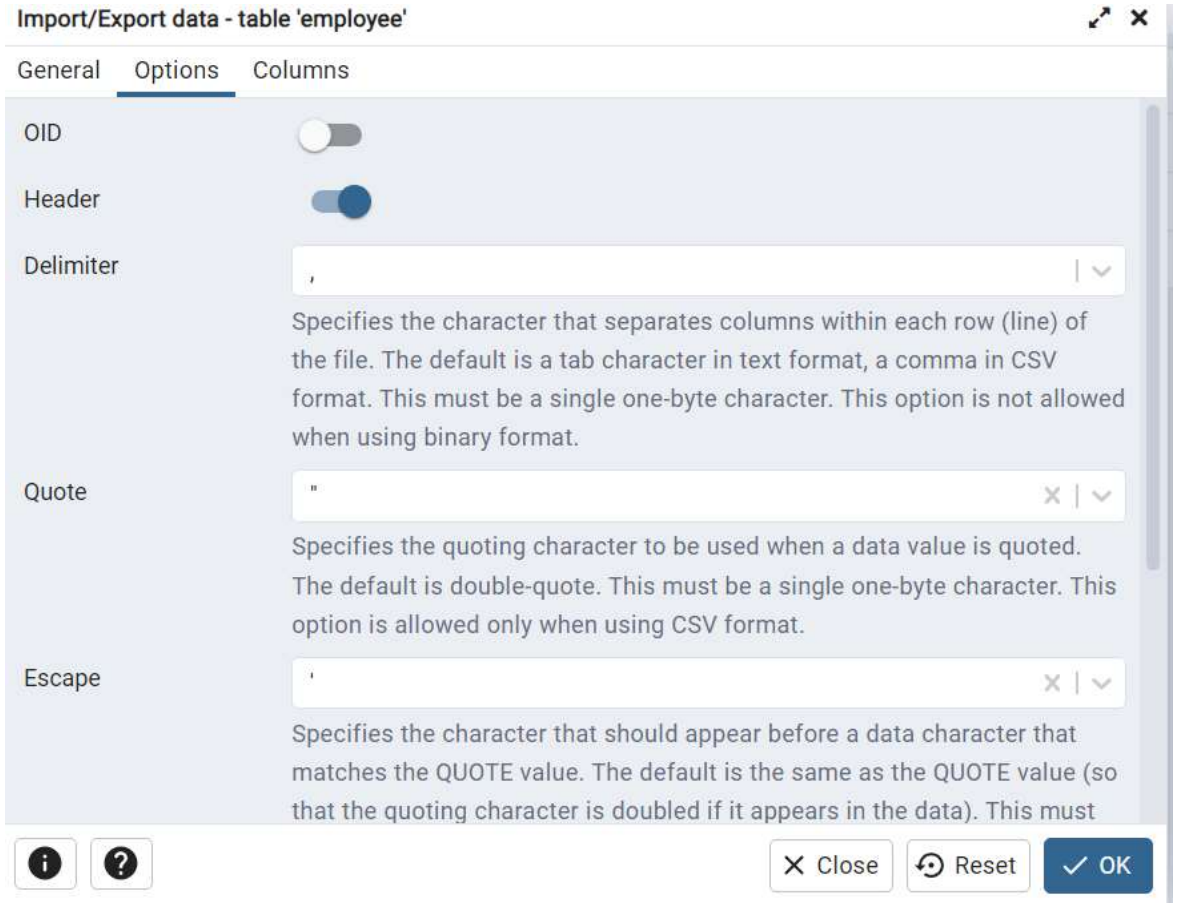


Import employee file



Import


Import/Export data - table 'employee'
General
Options
Columns
Import/Export
Import
Export
Filename
E:\Database System- Master Level\Sample_Employee_data.csv
Format
csv
Encoding
UTF8
Close
Reset
OK


Import/Export data - table 'employee'
General
Options
Columns
OID
Header
Delimiter
,
Specifies the character that separates columns within each row (line) of the file. The default is a tab character in text format, a comma in CSV format. This must be a single one-byte character. This option is not allowed when using binary format.
Quote
"
Specifies the quoting character to be used when a data value is quoted. The default is double-quote. This must be a single one-byte character. This option is allowed only when using CSV format.
Escape
'
Specifies the character that should appear before a data character that matches the QUOTE value. The default is the same as the QUOTE value (so that the quoting character is doubled if it appears in the data). This must
Close
Reset
OK

Display Data

```
6  select * from employee;
```

Data Output | Messages | Notifications

	eid integer	ename character varying (100)	city character varying (50)
1	11	maria	karachi
2	12	Ali	Islamabad
3	13	Sarah	Lahore
4	14	Samreen	Karachi
5	15	Aleshia	St. Stephens Ward
6	16	Evan	Abbey Ward
7	17	France	East Southbourne and Tuckton...
8	18	Ulysses	Hawerby cum Beesby
9	19	Tyisha	Greets Green and Lyng Ward

Task

- Now you have to import sales data (csv file provided). The PostgreSQL doesn’t create table itself from the file unlike oracle so you have to identify the fields of the table from the header of csv file. Create table and import similarly.

Query | Query History

```
1  create table sales(region varchar(100), country varchar(50), item_type varchar(100), sales_channel varchar(50),
2                     order_pirority char, order_date date, order_id int,  ship_date Date, units_sold int,
3                     unit_price decimal,unit_cost decimal,total_revenue decimal,total_cost decimal );
4
5  select * from sales;
```

Data Output | Messages | Notifications

	region character varying (100)	country character varying (50)	item_type character varying (100)	sales_channel character varying (50)	order_pirority character	order_date date	order_id integer	sl d
1	Australia and Oceania	Tuvalu	Baby Food	Offline	H	2010-05-28	669165933	2
2	Central America and the Caribbean	Grenada	Cereal	Online	C	2012-08-22	963881480	2
3	Europe	Russia	Office Supplies	Offline	L	2014-05-02	341417157	2
4	Sub-Saharan Africa	Sao Tome and Principe	Fruits	Online	C	2014-06-20	514321792	2
5	Sub-Saharan Africa	Rwanda	Office Supplies	Offline	L	2013-02-01	115456712	2
6	Australia and Oceania	Solomon Islands	Baby Food	Online	C	2015-02-04	547995746	2
7	Sub-Saharan Africa	Angola	Household	Offline	M	2011-04-23	135425221	2
8	Sub-Saharan Africa	Burkina Faso	Vegetables	Online	H	2012-07-17	871543967	2

Total rows: 100 of 100 | Query complete 00:00:00.089 | Ln 5, Col 21

Select particular Column

```
7  select item_type, unit_price from sales;
```

Data Output | Messages | Notifications

	item_type character varying (100)	unit_price numeric
1	Baby Food	255.28
2	Cereal	205.7
3	Office Supplies	651.21
4	Fruits	9.33
5	Office Supplies	651.21
6	Baby Food	255.28
7	Household	668.27
8	Vegetables	154.06
9	Personal Care	81.73

Selecting Distinct Value

```
7  select distinct item_type from sales;
```

Data Output | Messages | Notifications

	item_type character varying (100)
1	Fruits
2	Beverages
3	Vegetables
4	Baby Food
5	Clothes
6	Cereal
7	Cosmetics
8	Meat
9	Household

Total rows: 12 of 12 Query complete 00:00:00.088

ORDERBY Clause to sorting in ascending order

```
select * from sales order by units_sold;
```

a Output | Messages | Notifications

region character varying (100)	country character varying (50)	item_type character varying (100)	sales_channel character varying (50)	order_pirority character	order_date date	order_id integer	sl
Asia	Kyrgyzstan	Vegetables	Online	H	2011-06-24	814711606	2
Europe	Slovakia	Vegetables	Online	H	2012-10-06	759224212	2
Europe	Switzerland	Personal Care	Online	M	2010-12-23	617667090	2
Europe	United Kingdom	Household	Online	L	2012-01-05	955357205	2
Middle East and North Africa	Kuwait	Fruits	Online	M	2012-04-30	513417565	2
Middle East and North Africa	Libya	Fruits	Online	L	2015-08-14	816200339	2
Australia and Oceania	Australia	Cereal	Offline	H	2013-06-09	450563752	2
Sub-Saharan Africa	Mali	Clothes	Online	M	2011-07-26	512878119	2

Sorting in descending order

```
5  select * from sales order by units_sold desc;
```

Data Output | Messages | Notifications

	region character varying (100)	country character varying (50)	item_type character varying (100)	sales_channel character varying (50)	order_pirority character	order_date date	order_id integer	sl
1	Australia and Oceania	Tuvalu	Baby Food	Offline	H	2010-05-28	669165933	2
2	Australia and Oceania	Fiji	Clothes	Offline	C	2010-06-30	647876489	2
3	Middle East and North Africa	Pakistan	Cosmetics	Offline	L	2013-07-05	231145322	2
4	Australia and Oceania	Samoa	Cosmetics	Online	H	2013-07-20	670854651	2
5	Sub-Saharan Africa	Lesotho	Fruits	Online	L	2013-08-18	918419539	2
6	Australia and Oceania	Australia	Beverages	Offline	H	2014-07-07	240470397	2
7	Australia and Oceania	Federated States of Micronesia	Beverages	Online	C	2014-10-28	217221009	2
8	Central America and the Caribbean	Honduras	Household	Offline	H	2017-02-08	522840487	2

Multiple sorting

```
5  select * from sales order by region,country;
```

Data Output | Messages | Notifications

region character varying (100)	country character varying (50)	item_type character varying (100)	sales_channel character varying (50)	order_pirority character	order_date date	order_id integer	sl
Asia	Bangladesh	Clothes	Online	L	2017-01-13	187310731	2
Asia	Brunei	Office Supplies	Online	L	2012-04-01	320009267	2
Asia	Kyrgyzstan	Vegetables	Online	H	2011-06-24	814711606	2
Asia	Laos	Vegetables	Offline	C	2011-09-15	789176547	2
Asia	Malaysia	Fruits	Offline	L	2011-11-11	810711038	2
Asia	Mongolia	Personal Care	Offline	C	2014-02-19	832401311	2
Asia	Myanmar	Household	Offline	H	2015-01-16	177713572	2
Asia	Myanmar	Clothes	Online	H	2015-11-14	223359620	2

Where Clause

```
5  select * from sales where region='Europe';
```

Data Output | Messages | Notifications

	region character varying (100)	country character varying (50)	item_type character varying (100)	sales_channel character varying (50)	order_pirority character	order_date date	order_id integer	ship_date date	units integ
1	Europe	Russia	Office Supplies	Offline	L	2014-05-02	341417157	2014-05-08	
2	Europe	Bulgaria	Clothes	Online	M	2012-04-23	972292029	2012-06-03	
3	Europe	Norway	Baby Food	Online	L	2014-05-14	819028031	2014-06-28	
4	Europe	Portugal	Baby Food	Online	H	2015-07-31	860673511	2015-09-03	
5	Europe	Moldova	Personal Care	Online	L	2016-05-07	740147912	2016-05-10	
6	Europe	France	Cosmetics	Online	H	2017-05-22	898523128	2017-06-05	
7	Europe	Norway	Beverages	Offline	C	2014-07-18	435608613	2014-07-30	
8	Europe	Switzerland	Cosmetics	Offline	M	2012-09-17	249693334	2012-10-20	

Operators

Operator	Meaning
=	Equal to
!= or <>	Not equal to
>=	Greater than or equal to
<=	Less than or equal to
>	Greater than
<	Less than
AND	Logical ANDing
OR	Logical Oring
NOT	Negates result of condition.

Or clause

```
select * from sales where region='Europe' or region='Asia';
```

Output | Messages | Notifications

region character varying (100)	country character varying (50)	item_type character varying (100)	sales_channel character varying (50)	order_pirority character	order_date date	order_id integer	ship_date date	u ir
Europe	Russia	Office Supplies	Offline	L	2014-05-02	341417157	2014-05-08	
Asia	Kyrgyzstan	Vegetables	Online	H	2011-06-24	814711606	2011-07-12	
Asia	Bangladesh	Clothes	Online	L	2017-01-13	187310731	2017-03-01	
Asia	Mongolia	Personal Care	Offline	C	2014-02-19	832401311	2014-02-23	
Europe	Bulgaria	Clothes	Online	M	2012-04-23	972292029	2012-06-03	
Asia	Sri Lanka	Cosmetics	Offline	M	2016-11-19	419123971	2016-12-18	
Asia	Turkmenistan	Household	Offline	L	2010-12-30	441619336	2011-01-20	
Europe	Norway	Baby Food	Online	L	2014-05-14	819028031	2014-06-28	

And Clause

```
select * from sales where region='Europe' and units_sold>5000;
```

a Output | Messages | Notifications

region character varying (100)	country character varying (50)	item_type character varying (100)	sales_channel character varying (50)	order_pirority character	order_date date	order_id integer	ship_date date
Europe	Norway	Baby Food	Online	L	2014-05-14	819028031	2014-06-28
Europe	Moldova	Personal Care	Online	L	2016-05-07	740147912	2016-05-10
Europe	Norway	Beverages	Offline	C	2014-07-18	435608613	2014-07-30
Europe	Switzerland	Cosmetics	Offline	M	2012-09-17	249693334	2012-10-20
Europe	Iceland	Cosmetics	Online	C	2016-12-31	331438481	2016-12-31
Europe	Macedonia	Clothes	Offline	C	2014-10-14	787399423	2014-11-14
Europe	Lithuania	Office Supplies	Offline	H	2010-10-24	166460740	2010-11-17
Europe	Monaco	Baby Food	Offline	H	2012-05-29	688288152	2012-06-02

Between

```
5  select * from sales where units_sold between 5000 and 10000;
```

Data Output | Messages | Notifications

	region character varying (100)	country character varying (50)	item_type character varying (100)	sales_channel character varying (50)	order_pirority character	order_date date	order_id integer	sl
1	Australia and Oceania	Tuvalu	Baby Food	Offline	H	2010-05-28	669165933	2
2	Sub-Saharan Africa	Sao Tome and Principe	Fruits	Online	C	2014-06-20	514321792	2
3	Sub-Saharan Africa	Rwanda	Office Supplies	Offline	L	2013-02-01	115456712	2
4	Sub-Saharan Africa	Burkina Faso	Vegetables	Online	H	2012-07-17	871543967	2
5	Sub-Saharan Africa	Republic of the Congo	Personal Care	Offline	M	2015-07-14	770463311	2
6	Sub-Saharan Africa	Senegal	Cereal	Online	H	2014-04-18	616607081	2
7	Asia	Bangladesh	Clothes	Online	L	2017-01-13	187310731	2
8	Central America and the Caribbean	Honduras	Household	Offline	H	2017-02-08	522840487	2

IN Operator

- IN Operator Compares a single value with a list of values. If the value is matching with any of the values given in the list then condition is taken as true.
- The following command will retrieve all courses where duration is either 20 or 30 days:

```
select  name
from  courses
where   duration  in  (20,30);

NAME
--------------------
VB.NET
C  programming
```

Select name from courses where duration = 20 or duration = 30

Manipulating Data

- UPDATE command is used to modify existing data in the rows. The following is the syntax of UPDATE command.

```
UPDATE table SET column = {expression | subquery}
                [, column = {expression | subquery}] ...
[WHERE condition];
```

Update Command

- The following command will change course fee of ASP to 6000.

```
Update courses set fee = 6000
Where ccode = 'asp';
```

- It is also possible to change more than one column at a time as follows:

```
update  courses  set  fee = 6000, duration=30
where  ccdoe = 'asp';
```

Deleting rows using DELETE command

```
DELETE   FROM    table
     [WHERE  condition;]
```

If WHERE clause is not given then all rows of the table will be deleted.

The following command will delete row where CCODE is "c".

```
Delete from  courses
Where ccode = 'c';
```

Data Definition Queries

- Modifying Existing Columns:
  - ALTER TABLE *table_name* ADD *column_name datatype*;
    - ALTER TABLE Customers ADD Email varchar(255);
  - ALTER TABLE *table_name* DROP COLUMN *column_name*;
    - ALTER TABLE Customers DROP COLUMN Email;
  - Increase size of column:
    - Alter table course modify (coursename varchar(50));
- Deleting table:
  - Drop table tablename;

Do it yourself- write select queries for the following

- Display all the column of the sales table with highest priority (order_priority=H) from sales table
- Display country, item_type, order_date, profit from sales table sort by the latest order.
- Display distinct region from sales table.
- Display all the data sales table where units sold were between 5000 and 10000
- Display order id and profit (give column name for profit) for each order from sales table
- Display all details from sale table sorted by profit.
- Display employee name and city from employee table they live in sorted alphabetically.
- Update the order priority to ‘h’ for order number 341417157