Chapter 2: SQL Basics

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What are the all kinds of Data Types in PostgreSQL?

Datatypes	Description	Example
SMALLINT	Stores small-range integer values (-32,768 to 32,767)	32767
INTEGER	Standard integer type (-2^31 to 2^31-1)	2147483647
BIGINT	Large-range integer (-2^63 to 2^63-1)	9223372036854775807
DECIMAL(p,s)	Exact numeric type with fixed precision and scale	DECIMAL(10,2) = 12345.67
NUMERIC(p,s)	Same as DECIMAL, used for financial calculations	NUMERIC(8,3) = 123.456
REAL	Floating point number (4 bytes)	3.14
DOUBLE PRECISION	Floating point number (8 bytes)	2.718281828
SERIAL	Auto-incrementing integer (4 bytes)	1, 2, 3, ...
BIGSERIAL	Auto-incrementing integer (8 bytes)	1, 2, 3, ...
CHAR(n)	Fixed-length character string	ABC'
VARCHAR(n)	Variable-length character string	Hello, World!'
TEXT	Unlimited length character string	Lorem ipsum dolor sit amet'
BOOLEAN	Stores TRUE or FALSE	TRUE or FALSE
DATE	Stores a calendar date	2024-02-07'
TIME	Stores time without time zone	14:30:00'
TIMESTAMP	Stores date and time	2024-02-07 14:30:00'
TIMESTAMPTZ	Stores date and time with time zone	2024-02-07 14:30:00+05:30'
INTERVAL	Stores a time interval	2 years 3 months'
BYTEA	Stores binary data	E'\\xDEADBEEF'
UUID	Stores a universally unique identifier	550e8400-e29b-41d4-a716-446655440000'
JSON	Stores JSON data	{"name": "John", "age": 30}'
JSONB	Stores binary JSON data (faster queries)	{"name": "Alice", "city": "NY"}'
ARRAY	Stores an array of elements	{1,2,3,4,5}'
HSTORE	Stores key-value pairs	"name"=>"John", "age"=>"30"'
CIDR	Stores network address (IP)	192.168.1.0/24'
INET	Stores an IP address	192.168.1.1'

MACADDR	Stores a MAC address	08:00:2b:01:02:03'
TSVECTOR	Full-text search vector	'"hello':1 'world':2"
TSQUERY	Full-text search query	hello & world'
XML	Stores XML data	<note><to>Tove</to></note>'
POINT	Stores a geometric point	(1.5, 2.5)'
LINE	Stores a geometric line	{(1,2), (3,4)}'
LSEG	Stores a line segment	[(1,2), (3,4)]'
BOX	Stores a rectangular box	((1,2), (3,4))'
PATH	Stores a geometric path	((1,2), (3,4), (5,6))'
POLYGON	Stores a polygon shape	((1,2), (3,4), (5,6), (1,2))'
CIRCLE	Stores a circle	<(3,3),5>'

Creating Databases and Tables, CRUD Operations: CREATE, READ, UPDATE, DELETE

Simple creation of table:

```
create table postgress_learning (
username varchar (50),
age int,
email varchar (100),
gender CHAR (1),
salary DECIMAL (5,2),
id int,
Primary key(id)
);
```

Inserting into table:

```
INSERT INTO postgress_learning (username, age, email, gender, salary, id) VALUES
('Sanskar', 23, 'sanskardebnath2019@example.com', 'M', 500.00, 1),
('Tripti', 20, 'tripti.m@example.com', 'F', 650.50, 2),
('Rahul', 32, 'rahul.kapoor@example.com', 'M', 800.75, 3),
('Priya', 24, 'priya.singh@example.com', 'F', 450.25, 4),
('Anika', 29, 'anika.roy@example.com', 'F', 700.00, 5),
('Avinash', 24, 'Avinash@example.com', 'M', 900.00, 6);
```

Reading from the table

- select * from postgress_learning;

	username character varying(50)	age integer	email character varying(100)	gender character(1)	salary numeric(5,2)	id integer
1	Sanskar	23	sanskardebnath2019@	M	500.00	1
2	Tripti	20	tripti.m@example.co	F	650.50	2
3	Rahul	32	rahul.kapoor@exampl	M	800.75	3
4	Priya	24	priya.singh@example	F	450.25	4
5	Anika	29	anika.roy@example.c	F	700.00	5
6	Avinash	24	Avinash@example.com	M	900.00	6

- **select username, age from postgress_learning;**

	username character varying(50)	age integer
1	Sanskar	23
2	Tripti	20
3	Rahul	32
4	Priya	24
5	Anika	29
6	Avinash	24

- **select username as Uname, age as difference from postgress_learning;**

Update query

--update postgress_learning set username = 'SDN' where id = 1;

select * from postgress_learning where id =1;

	username character varying(50)	age integer	email character varying(100)	gender character(1)	salary numeric(5,2)	id integer
1	SDN	23	sanskardebnath2019@	M	500.00	1

Extra: Use returning * after the where condition in update query to see what is updated;

update postgress_learning set username = 'SANSKAR DEBNATH' where id = 1
returning *;

Data Output | Explain | Messages | History

	username character varying(50)	age integer	email character varying(100)	gender character(1)	salary numeric(5,2)	id integer
1	SANSKAR DEBNATH	23	sanskardebnath2019@	M	500.00	1

Updating multiple rows with update query:

update postgress_learning set age = age + 5 where gender = 'M' returning *;

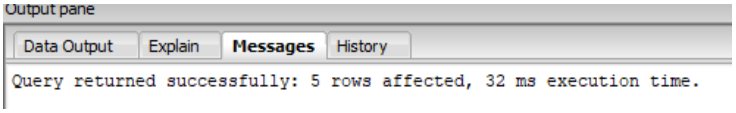
Delete query:

Delete from postgress_learning where id = 1;

Data Output | Explain | Messages | History

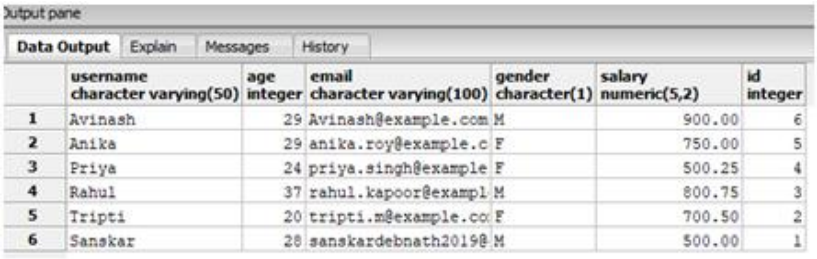
	username character varying(50)	age integer	email character varying(100)	gender character(1)	salary numeric(5,2)	id integer
1	Tripti	20	tripti.m@example.co	F	650.50	2
2	Rahul	32	rahul.kapoor@exampl	M	800.75	3
3	Priya	24	priya.singh@example	F	450.25	4
4	Anika	29	anika.roy@example.c	F	700.00	5
5	Avinash	24	Avinash@example.com	M	900.00	6

Caution : Don't use Delete query without the where condition, else it will remove all the data (Rows)
As I execute it without where clause then this happened with me.



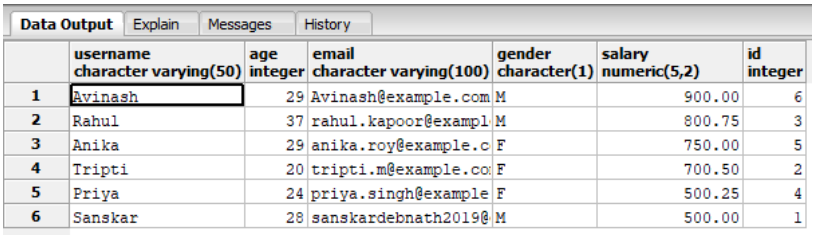
Basic Queries: ORDER BY, LIMIT

- select * from postgress_learning order by id DESC;



	username character varying(50)	age integer	email character varying(100)	gender character(1)	salary numeric(5,2)	id integer
1	Avinash	29	Avinash@example.com	M	900.00	6
2	Anika	29	anika.roy@example.c	F	750.00	5
3	Priya	24	priya.singh@example	F	500.25	4
4	Rahul	37	rahul.kapoor@exampl	M	800.75	3
5	Tripti	20	tripti.m@example.co	F	700.50	2
6	Sanskar	28	sanskardebnath2019@	M	500.00	1

- select * from postgress_learning order by salary DESC, id ASC;



	username character varying(50)	age integer	email character varying(100)	gender character(1)	salary numeric(5,2)	id integer
1	Avinash	29	Avinash@example.com	M	900.00	6
2	Rahul	37	rahul.kapoor@exampl	M	800.75	3
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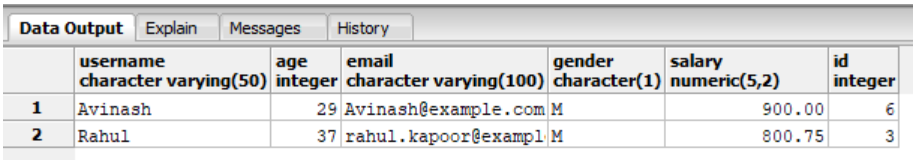
4	Tripti	20	tripti.m@example.co	F	700.50	2
5	Priya	24	priya.singh@example	F	500.25	4
6	Sanskar	28	sanskardebnath2019@	M	500.00	1

select * from postgress_learning order by salary DESC, id ASC LIMIT(2);

--it will display only two records out of all.



	username character varying(50)	age integer	email character varying(100)	gender character(1)	salary numeric(5,2)	id integer
1	Avinash	29	Avinash@example.com	M	900.00	6
2	Rahul	37	rahul.kapoor@exampl	M	800.75	3