

SQL Cheat Sheet

```
In [1]: # !pip install ipython-sql
# !pip install psycopg2 # PostgreSQL
# !pip install mysql # MySQL
```

```
In [2]: SQL_CONN = 'postgresql://wing@localhost/wing'

%config SqlMagic.displaycon=False
%load_ext sql
%sql {SQL_CONN}
```

1. Tables: CREATE, ALTER, DROP

```
In [3]: %%sql
DROP TYPE IF EXISTS t_grade;
CREATE TYPE t_grade AS ENUM('A', 'B', 'C', 'D');
```

Done.

Done.

```
Out[3]: []
```

```
In [4]: %%sql
CREATE TABLE advisors (
    id SERIAL PRIMARY KEY,
    name VARCHAR(255) NOT NULL
);

CREATE TABLE students (
    id SERIAL PRIMARY KEY,
    advisorId INT NOT NULL,
    name VARCHAR(255) UNIQUE NOT NULL,
    age INT NOT NULL,
    height DECIMAL(8,2),
    gpa REAL,
    grade t_grade DEFAULT 'D',
    created TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
    FOREIGN KEY(advisorId) REFERENCES advisors(id)
);
```

Done.

Done.

```
Out[4]: []
```

```
In [5]: %%sql
ALTER TABLE advisors
ADD telephone VARCHAR(255);

ALTER TABLE advisors
DROP COLUMN telephone;
```

Done.

Done.

Out[5]: []

```
In [6]: %%sql
DROP TABLE students;
DROP TABLE IF EXISTS advisors;
```

Done.
Done.

Out[6]: []

2. Views: CREATE VIEW ... AS ...

```
In [7]: %%sql
CREATE VIEW cust_names AS
SELECT firstName, lastName FROM customers WHERE state='OR';

SELECT * FROM cust_names;
```

Done.
2 rows affected.

Out[7]: **firstname** **lastname**

jane	doe
john	doe

```
In [8]: %%sql
DROP VIEW cust_names;
```

Done.

Out[8]: []

3. Records: INSERT, UPDATE, DELETE

3.1 INSERT INTO ...

```
In [9]: %%sql
INSERT INTO customers (firstName, lastName, age) VALUES ('jack', 'daniels', 99)
```

1 rows affected.

Out[9]: []

```
In [10]: %%sql
INSERT INTO customers (firstName, lastName, age) SELECT firstName, lastName, age
```

1 rows affected.

Out[10]: []

3.2 UPDATE ... SET

```
In [11]: %%sql
UPDATE customers SET
```

```
age=age-1,
email='jack@daniels.net',
state='CA'
WHERE lastname='daniels' AND age=99;
```

1 rows affected.

Out[11]: []

3.3 DELETE FROM ...

```
In [12]: %%sql
DELETE FROM customers
WHERE firstName='jack' AND age=98;
```

2 rows affected.

Out[12]: []

SELECT ... (AS ...) FROM ... (AS ...) WHERE ... GROUP BY ... HAVING ... ORDER BY ... (DESC)
LIMIT ... OFFSET ...

4. SELECT ... AS ... FROM

```
In [13]: %%sql
SELECT CONCAT(firstName, ' ', lastName) AS name, age + 1 AS "age + 1" FROM cust
```

4 rows affected.

Out[13]:

name	age + 1
jane doe	19
john doe	20
jack daniels	23
jane austen	23

4.1 DISTINCT

```
In [14]: %%sql
SELECT DISTINCT state FROM customers;
```

3 rows affected.

Out[14]: state

None

OR

WA

```
In [15]: %%sql
SELECT DISTINCT lastName, state FROM customers;
```

3 rows affected.

Out[15]: **lastname state**

austen None

daniels WA

doe OR

5. WHERE ... IS / NOT / AND / OR / IN / LIKE / BETWEEN

In [16]: `%%sql
SELECT * FROM customers WHERE firstName='john' AND lastName='doe' OR lastName='doe'`
2 rows affected.

Out[16]: **id firstname lastname age email state**

2 john doe 19 john@doe.com OR

4 jack daniels 22 None WA

In [17]: `%%sql
SELECT * FROM customers where age=(SELECT MIN(age) AS max_age FROM customers);`
1 rows affected.

Out[17]: **id firstname lastname age email state**

1 jane doe 18 jane@doe.com OR

In [18]: `%%sql
SELECT * FROM customers WHERE age>=20;`
2 rows affected.

Out[18]: **id firstname lastname age email state**

4 jack daniels 22 None WA

5 jane austen 22 None None

In [19]: `%%sql
SELECT * FROM customers WHERE age BETWEEN 17 AND 19`
2 rows affected.

Out[19]: **id firstname lastname age email state**

1 jane doe 18 jane@doe.com OR

2 john doe 19 john@doe.com OR

In [20]: `%%sql
SELECT * FROM customers WHERE firstName LIKE 'jan%';`
2 rows affected.

Out[20]: **id firstname lastname age email state**

1 jane doe 18 jane@doe.com OR

5 jane austen 22 None None

```
In [21]: %%sql
SELECT * FROM customers WHERE firstName NOT LIKE 'ja__';
```

1 rows affected.

```
Out[21]: id  firstname  lastname  age      email  state
2      john      doe      19  john@doe.com  OR
```

```
In [22]: %%sql
SELECT * FROM customers WHERE lastName IN ('austen', 'daniels');
```

2 rows affected.

```
Out[22]: id  firstname  lastname  age  email  state
4      jack      daniels   22  None   WA
5      jane      austen   22  None   None
```

```
In [23]: %%sql
SELECT * FROM customers WHERE email IS NULL /* "= NULL" wouldn't work! */;
```

2 rows affected.

```
Out[23]: id  firstname  lastname  age  email  state
4      jack      daniels   22  None   WA
5      jane      austen   22  None   None
```

6. GROUP BY ... HAVING

Aggregate Functions

```
In [24]: %%sql
SELECT MIN /*MAX,AVG,SUM*/ (age) FROM customers;
```

1 rows affected.

```
Out[24]: min
18
```

```
In [25]: %%sql
SELECT COUNT(*) FROM customers WHERE age>20;
```

1 rows affected.

```
Out[25]: count
2
```

```
In [26]: %%sql
SELECT COUNT(state) AS "#States", COUNT(*) AS "#Custs" FROM customers;
```

1 rows affected.

```
Out[26]: #States  #Custs
3         4
```

```
In [27]: %%sql
SELECT COUNT(lastName), COUNT(DISTINCT lastName) FROM customers;
```

1 rows affected.

```
Out[27]: count count_1
         4         3
```

SELECT ... AggFn() GROUP BY ... HAVING AggFn() ...

```
In [28]: %%sql
SELECT lastName, COUNT(*), MAX(age) FROM customers GROUP BY lastName;
```

3 rows affected.

```
Out[28]: lastname count max
         austen      1    22
         daniels     1    22
         doe         2    19
```

```
In [29]: %%sql
SELECT lastName, MAX(age) FROM customers WHERE age<20 GROUP BY lastName;
```

1 rows affected.

```
Out[29]: lastname max
         doe      19
```

```
In [30]: %%sql
SELECT lastName, COUNT(*) FROM customers GROUP BY lastName HAVING COUNT(*)>1;
```

1 rows affected.

```
Out[30]: lastname count
         doe         2
```

7. ORDER BY ... DESC

```
In [31]: %%sql
SELECT * FROM customers ORDER BY lastname DESC, firstname;
```

4 rows affected.

```
Out[31]: id  firstname lastname age      email  state
         1      jane      doe   18  jane@doe.com  OR
         2      john      doe   19  john@doe.com  OR
         4      jack    daniels  22      None    WA
         5      jane    austen  22      None    None
```

8. LIMIT ... OFFSET

```
In [32]: %%sql
SELECT * FROM customers;
```

4 rows affected.

```
Out[32]:
```

id	firstname	lastname	age	email	state
1	jane	doe	18	jane@doe.com	OR
2	john	doe	19	john@doe.com	OR
4	jack	daniels	22	None	WA
5	jane	austen	22	None	None

```
In [33]: %%sql
SELECT * FROM customers LIMIT 2 OFFSET 2;
```

2 rows affected.

```
Out[33]:
```

id	firstname	lastname	age	email	state
4	jack	daniels	22	None	WA
5	jane	austen	22	None	None

9. JOIN ... ON

```
In [34]: %%sql
SELECT * FROM customers
```

4 rows affected.

```
Out[34]:
```

id	firstname	lastname	age	email	state
1	jane	doe	18	jane@doe.com	OR
2	john	doe	19	john@doe.com	OR
4	jack	daniels	22	None	WA
5	jane	austen	22	None	None

```
In [35]: %%sql
SELECT * FROM products
```

3 rows affected.

```
Out[35]:
```

id	name	price
1	xbox	299.95
2	ps5	399.00
3	ps6	None

```
In [36]: %%sql
SELECT * FROM orders
```

3 rows affected.

```
Out[36]:
```

id	custid	prodid	qty	date
1	1	2	1	2020-01-01 00:00:00
2	2	1	1	2020-01-02 00:00:00
3	4	1	2	2020-02-03 00:00:00

9.1 JOIN (Inner/Default)

```
In [37]: %%sql
SELECT customers.id, customers.state, states.name
FROM customers
JOIN states ON customers.state=states.state;
```

2 rows affected.

```
Out[37]:
```

id	state	name
2	OR	Oregon
1	OR	Oregon

```
In [38]: %%sql
SELECT customers.firstName, customers.lastName, products.name AS "Product Name"
FROM customers
JOIN orders ON customers.id=orders.custId
JOIN products ON orders.prodId=products.id;
```

3 rows affected.

```
Out[38]:
```

firstname	lastname	Product Name	qty
jane	doe	ps5	1
john	doe	xbox	1
jack	daniels	xbox	2

```
In [39]: %%sql
SELECT c.firstName, c.lastName, p.name, p.price, o.qty
FROM orders AS o
JOIN customers AS c ON o.custid=c.id
JOIN products AS p ON o.prodid=p.id
```

3 rows affected.

```
Out[39]:
```

firstname	lastname	name	price	qty
jane	doe	ps5	399.00	1
john	doe	xbox	299.95	1
jack	daniels	xbox	299.95	2

```
In [40]: %%sql
SELECT c.firstName, c.lastName, o.id
FROM customers AS c
JOIN orders AS o ON c.id=o.custId;
```

3 rows affected.

Out[40]: **firstname lastname id**

jane	doe	1
john	doe	2
jack	daniels	3

9.2 LEFT JOIN (Outer)

```
In [41]: %%sql
SELECT customers.id, customers.state, states.name
FROM customers
LEFT JOIN states ON customers.state=states.state;
```

4 rows affected.

Out[41]: **id state name**

2	OR	Oregon
1	OR	Oregon
5	None	None
4	WA	None

9.3 RIGHT JOIN (Outer)

```
In [42]: %%sql
SELECT customers.id, customers.state, states.name
FROM customers
RIGHT JOIN states ON customers.state=states.state;
```

3 rows affected.

Out[42]: **id state name**

2	OR	Oregon
1	OR	Oregon
None	None	California

10. Strings

```
In [43]: %%sql
SELECT 'a' || 'bc', CONCAT('a', 'bc');
```

1 rows affected.

Out[43]: **?column? concat**

abc	abc
-----	-----

```
In [44]: %%sql
SELECT name, LENGTH(name) AS len FROM products ORDER BY len, name;
```

3 rows affected.

Out[44]:

name	len
ps5	3
ps6	3
xbox	4

ps5	3
ps6	3
xbox	4

In [45]:

```
%%sql
SELECT LOWER /*UPPER*/ ('aBc');
```

1 rows affected.

Out[45]:

lower
abc

abc

In [46]:

```
%%sql
SELECT SUBSTR('2022-02-14', 9, 2) AS day, SUBSTR('abc', 2);
```

1 rows affected.

Out[46]:

day	substr
14	bc

14	bc
----	----

In [47]:

```
%%sql
SELECT TRIM /*LTRIM,RTRIM*/ ('-abc-', '-');
```

1 rows affected.

Out[47]:

btrim
abc

abc

In [48]:

```
%%sql
SELECT 'ab'='aB'
```

1 rows affected.

Out[48]:

?column?
False

False

11. Numbers

In [49]:

```
%%sql
SELECT 1 / 2 AS "1/2", 1 % 2 AS "1%2";
```

1 rows affected.

Out[49]:

1/2	1%2
0	1

0	1
---	---

In [50]:

```
%%sql
SELECT ROUND(1.51);
```

1 rows affected.

Out[50]: round

2

12. Transactions

```
In [ ]: %%sql /* SQLite */
BEGIN TRANSACTION;
INSERT INTO orders (custId, prodId, qty) VALUES (1, 1, 99);
DELETE FROM orders WHERE qty=99;
END TRANSACTION;
SELECT * from orders;
```

```
In [ ]: %%sql /* SQLite */
BEGIN TRANSACTION;
INSERT INTO orders (custId, prodId, qty) VALUES (1, 1, 99);
ROLLBACK;
SELECT * from orders;
```

13. Triggers

```
In [ ]: %%sql /* SQLite */
CREATE TRIGGER my_trigger AFTER INSERT ON products
BEGIN
    UPDATE products SET price=0.95*price WHERE id=NEW.id;
END;
```

14. Procedures

```
In [51]: %%sql
CREATE PROCEDURE insert_delete(first_name VARCHAR, last_name VARCHAR, age INT)
BEGIN ATOMIC
INSERT INTO customers (firstName, lastName, age) VALUES
(first_name, last_name, age);
DELETE FROM customers
WHERE firstName=first_name AND lastName=last_name;
END;
```

Done.

Out[51]: []

```
In [52]: %%sql
CALL insert_delete('joe', 'shmoe', 2);
DROP PROCEDURE insert_delete;
```

Done.

Done.

Out[52]: []

15. Subselects

In [53]: `%%sql
SELECT * FROM orders WHERE prodId IN (SELECT id FROM products WHERE price>300);`

1 rows affected.

Out[53]:

id	custid	prodid	qty	date
1	1	2	1	2020-01-01 00:00:00

In [54]: `%%sql
SELECT firstName, lastName, ss.qty, products.name
FROM (SELECT custId, prodId, qty FROM orders WHERE qty>1) AS ss
JOIN customers ON ss.custId=customers.id
JOIN products ON ss.prodId=products.id;`

1 rows affected.

Out[54]:

firstname	lastname	qty	name
jack	daniels	2	xbox

In []: