SQL IN 45 MINUTES

UCSD DSC 96, Fall 2019

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Actually mostly stolen from MODE.


ESS
KEW
ELL
SE-
QUEL
SKEWL

WHY SQL?

- It's semantically easy to understand and learn.
- Because it can be used to access large amounts of data directly where it's stored, analysts don't have to copy data into other applications.
- Compared to spreadsheet tools, data analysis done in SQL is easy to audit and replicate.

SQL is great for performing the types of aggregations that you might normally do with dataframes—sums, counts, minimums and maximums, etc.—but over much larger datasets.

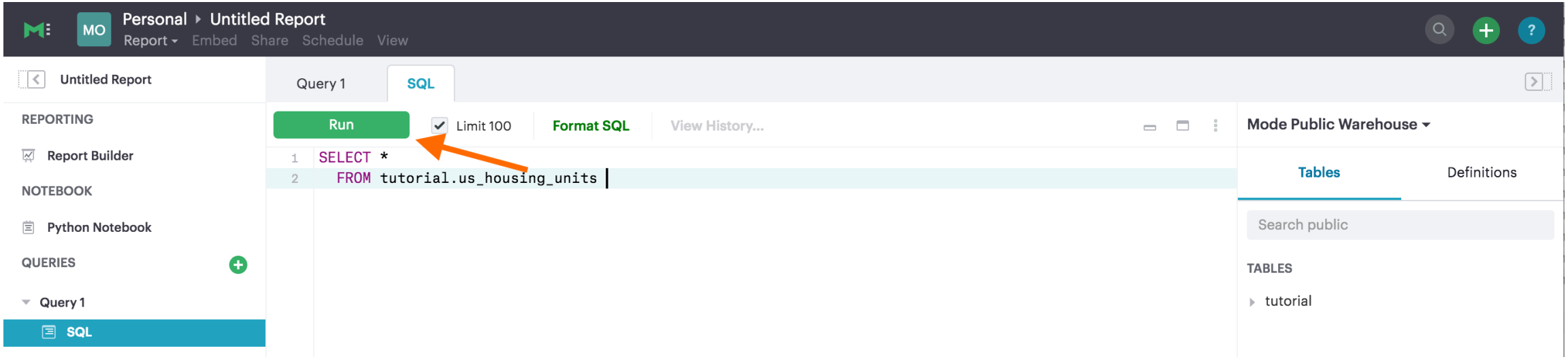
MODE

To follow along:

1. Go to https://mode.com/
2. Create an account
3. Click “new report” (see below)

CENSUS HOUSING UNITS

```
SELECT * FROM tutorial.us_housing_units
```



YOU CAN RUN A QUERY BY PRESSING ⌘ + RETURN ON A MAC OR CTRL + RETURN ON A PC

SELECT AND FROM

```
SELECT year,
     month,
     west
   FROM tutorial.us_housing_units
```

WHAT ACTUALLY HAPPENS WHEN YOU RUN A QUERY?

- Query is sent to database
- Only results are sent back
- Database is not modified (with SELECT)

FORMATTING

- White space doesn’t matter
- Capitalization doesn’t matter
  - But there are strong conventions for COMMANDS to be all caps.

COLUMN NAMES

```
SELECT west AS "West Region"
  FROM tutorial.us_housing_units
```

```
SELECT west AS West_Region,
       south AS South_Region
  FROM tutorial.us_housing_units
```

LIMIT

```
SELECT *
  FROM tutorial.us_housing_units
 LIMIT 15
```

WHERE

```
SELECT *
  FROM tutorial.us_housing_units
 WHERE month = 1
```

COMPARISON OPERATORS

```
SELECT *
  FROM tutorial.us_housing_units
 WHERE west > 30
```

Equal to	=
Not equal to	<> or !=
Greater than	>
Less than	<
Greater than or equal to	>=
Less than or equal to	<=

ARITHMETIC

```
SELECT year,
       month,
       west,
       south,
       (west + south)/2 AS south_west_avg
  FROM tutorial.us_housing_units
```

BILLBOARD TOP 100

```
SELECT * FROM tutorial.billboard_top_100_year_end
```

EXPLORING THE DATA

```
SELECT *
  FROM tutorial.billboard_top_100_year_end
 ORDER BY year DESC, year_rank
```

LIKE

```
SELECT *
  FROM tutorial.billboard_top_100_year_end
 WHERE "group" LIKE 'Snoop%'
```

- % is wildcard (_ for one char)
- LIKE is case sensitive
- Double quotes on group because that is a function in SQL!
- To ignore case when you’re matching values, you can use the ILIKE command

IN

```
SELECT *
  FROM tutorial.billboard_top_100_year_end
 WHERE year_rank IN (1, 2, 3)
```

```
SELECT *
  FROM tutorial.billboard_top_100_year_end
 WHERE artist IN ('Taylor Swift', 'Usher', 'Ludacris')
```

BETWEEN

```
SELECT *
  FROM tutorial.billboard_top_100_year_end
 WHERE year_rank BETWEEN 5 AND 10
```

```
SELECT *
  FROM tutorial.billboard_top_100_year_end
 WHERE year_rank >= 5 AND year_rank <= 10
```

NULL

```
SELECT *
  FROM tutorial.billboard_top_100_year_end
 WHERE artist IS NULL
```

- WHERE artist = NULL will not work—you can't perform arithmetic on null values.

AND

OR

NOT

ORDER BY

```
SELECT *
  FROM tutorial.billboard_top_100_year_end
 WHERE year = 2013
 ORDER BY year_rank DESC
```

APPLE STOCK PRICES

```
SELECT * FROM tutorial.aapl_historical_stock_price
```

COUNT

```
SELECT COUNT(*)
  FROM tutorial.aapl_historical_stock_price
```

- Non-distinct count
- Does not count nulls

SUM, MIN, MAX, AVG

```
SELECT SUM(volume)
  FROM tutorial.aapl_historical_stock_price
```

```
SELECT MIN(volume) AS min_volume,
       MAX(volume) AS max_volume
  FROM tutorial.aapl_historical_stock_price
```

GROUP BY

```
SELECT year,
       COUNT(*) AS count
  FROM tutorial.aapl_historical_stock_price
 GROUP BY year
```

```
SELECT year,
       month,
       COUNT(*) AS count
  FROM tutorial.aapl_historical_stock_price
 GROUP BY year, month
```

HAVING

```
SELECT year,
       month,
       MAX(high) AS month_high
  FROM tutorial.aapl_historical_stock_price
 GROUP BY year, month
HAVING MAX(high) > 400
 ORDER BY year, month
```

QUERY CLAUSE ORDER

1. SELECT
2. FROM
3. WHERE
4. GROUP BY
5. HAVING
6. ORDER BY

DISTINCT

```
SELECT DISTINCT month
  FROM tutorial.aapl_historical_stock_price
```

```
SELECT COUNT(DISTINCT month) AS unique_months
  FROM tutorial.aapl_historical_stock_price
```

Can be SLOOOOOW

CRUNCHBASE

```
SELECT * FROM benn.college_football_players
```

JOINS

```
SELECT companies.permalink AS companies_permalink,
       companies.name AS companies_name,
       acquisitions.company_permalink AS
acquisitions_permalink,
       acquisitions.acquired_at AS acquired_date
  FROM tutorial.crunchbase_companies companies
  JOIN tutorial.crunchbase_acquisitions acquisitions
    ON companies.permalink = acquisitions.company_permalink
```

JOIN AS VENN DIAGRAM
VS
JOIN AS INNER PRODUCT

Confused about joins? Click here.

MORE JOINS

- Inner, outer, left, right
- Joins using WHERE or ON
- FULL OUTER JOIN
- UNION
- Joins with comparison operators
- Joins on Multiple Keys
- Self joins

ADVANCED SQL TOPICS

- Data Types
- Date Format
- Data Wrangling with SQL
- Writing Subqueries in SQL
- Window Functions
- Performance Tuning SQL Queries

link