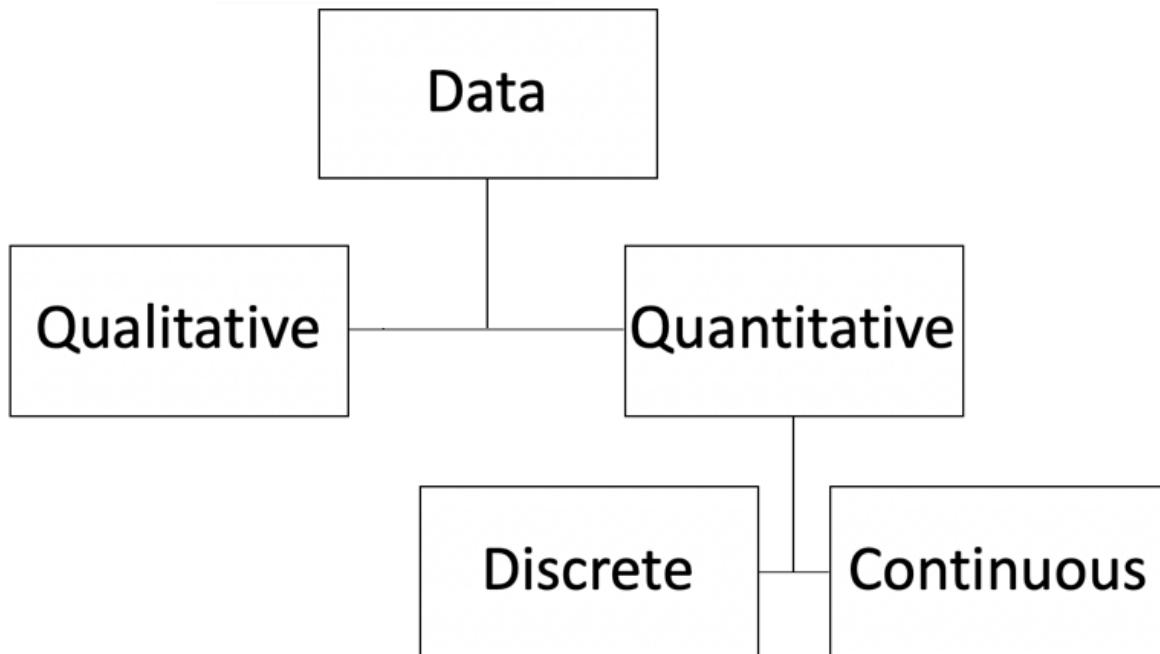
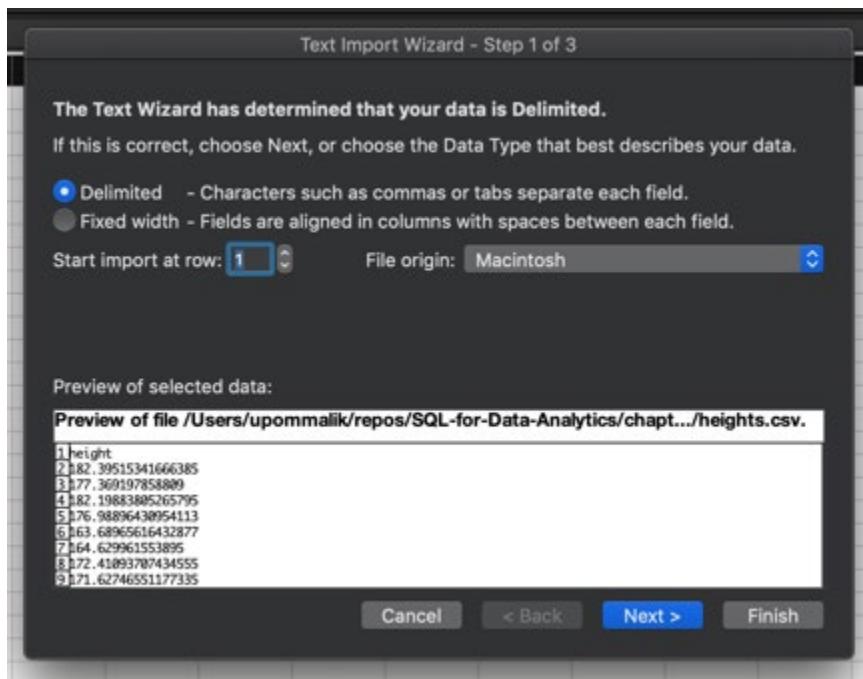
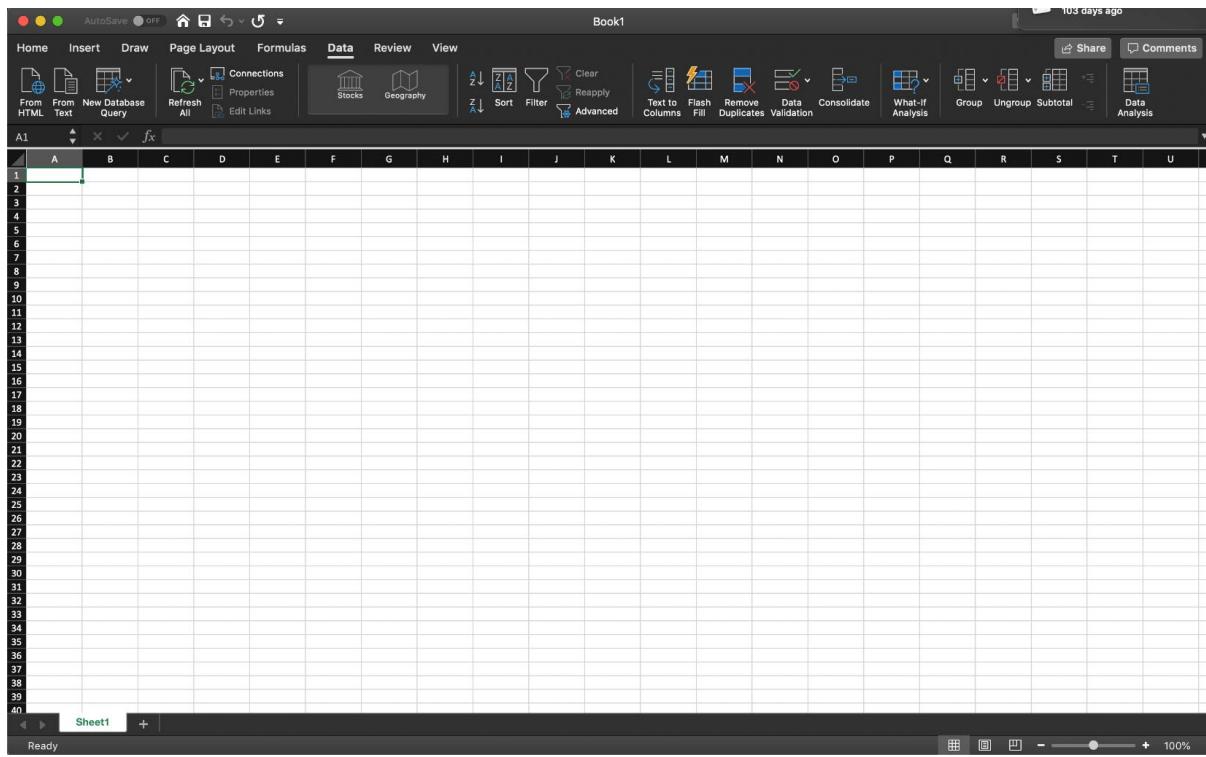


Chapter 1:



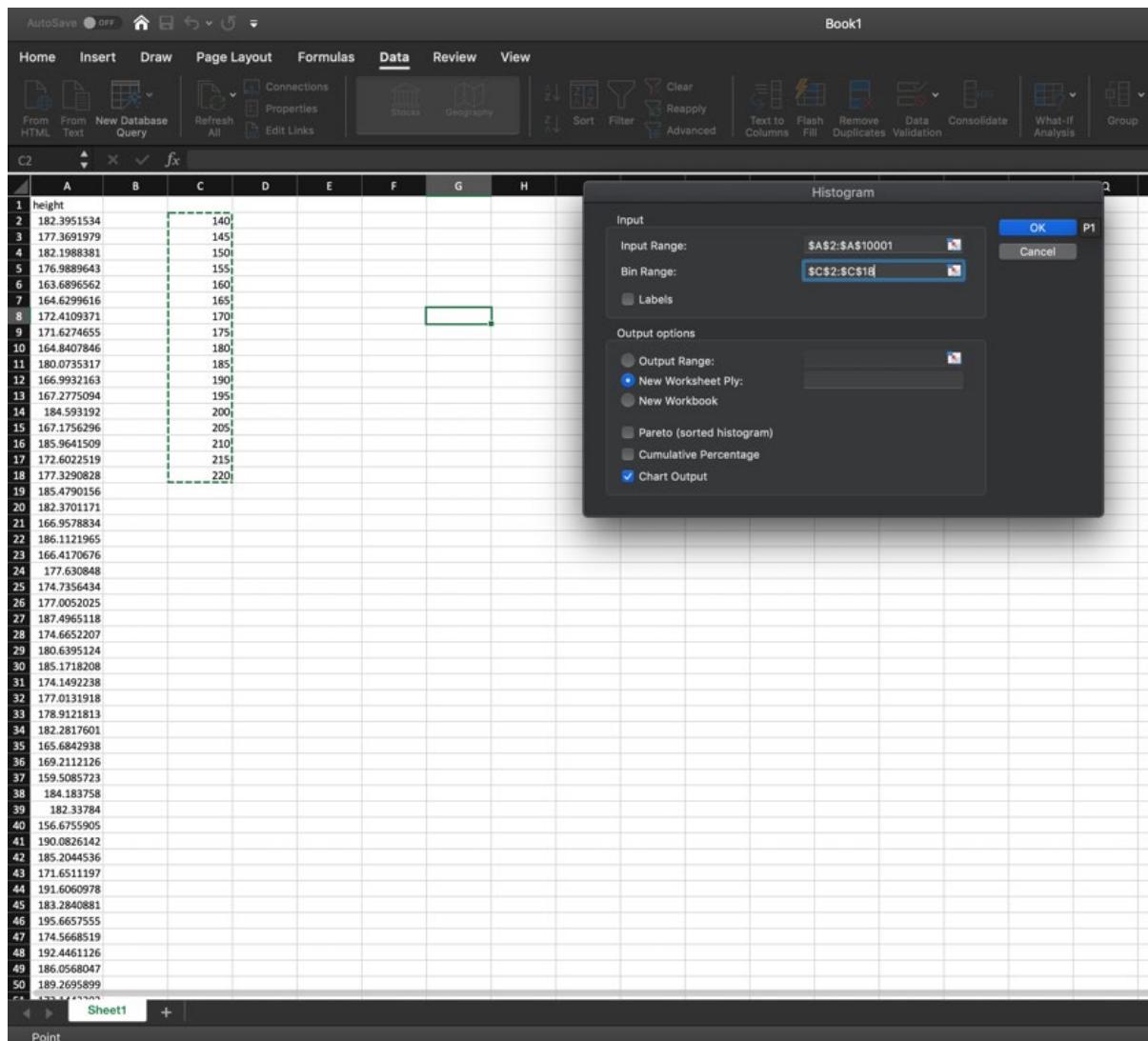
| Year of Birth | Country of Birth | Height (cm) | Eye Color | Number of Doctor Visits in the Year 2018 |
|---------------|------------------|-------------|-----------|--|
| 1977          | Egypt            | 182         | Blue      | 1  |
| 1988          | China            | 196         | Hazel     | 2  |
| 1986          | USA              | 180         | Brown     | 2  |
| 1990          | USA              | 166         | Brown     | 1  |
| 1975          | India            | 181         | Green     | 3  |
| 1951          | Germany          | 184         | Brown     | 1  |
| 2000          | Australia        | 174         | Gray      | 5  |
| 1995          | India            | 183         | Brown     | 1  |
| 1992          | China            | 187         | Brown     | 2  |
| 1987          | USA              | 169         | Blue      | 2  |

| Date   | Make     | Sales Amount (Thousands of \$) |
|--------|----------|--------------------------------|
| 2/1/18 | Ford     | 12                             |
| 2/2/18 | Honda    | 15                             |
| 2/2/18 | Mazda    | 19                             |
| 2/3/18 | Ford     | 20                             |
| 2/4/18 | Toyota   | 10                             |
| 2/4/18 | Toyota   | 10                             |
| 2/4/18 | Mercedes | 30                             |
| 2/5/18 | Ford     | 11                             |
| 2/6/18 | Chevy    | 12.5                           |
| 2/6/18 | Chevy    | 19                             |

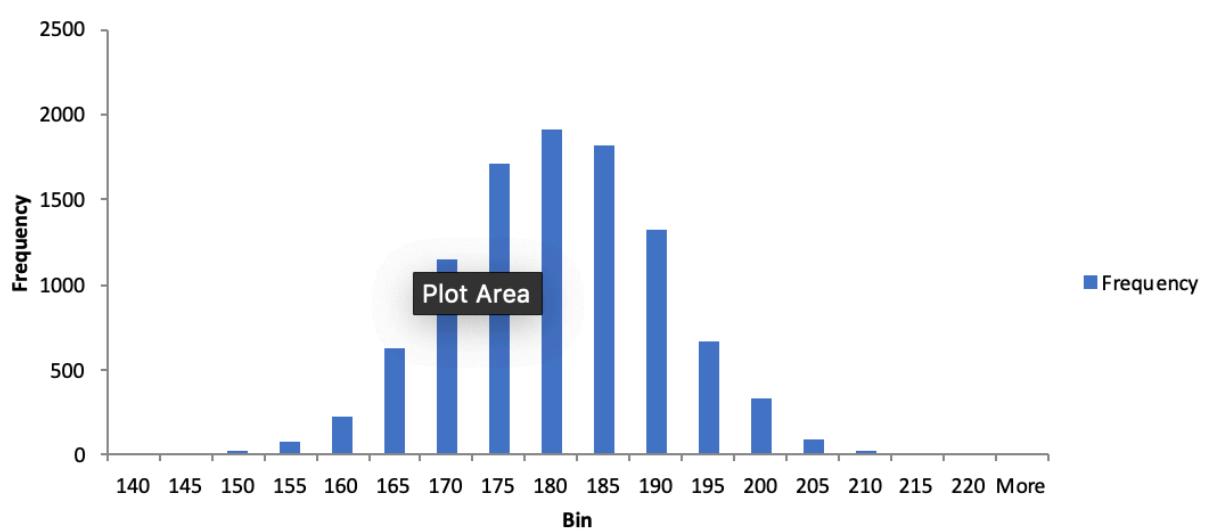


A screenshot of the Microsoft Access application interface. The ribbon menu at the top includes Home, Insert, Draw, Page Layout, and File. Under the Home tab, there are buttons for From HTML, From Text, New Database, Query, Refresh All, Properties, and Edit Links. The main area shows a table with four columns: A, B, C, and D. Column A contains numerical values from 1 to 42, representing heights. Column B contains corresponding values for each row. The table is currently selected, and the status bar at the bottom indicates "Ready".

|    | A           | B   | C | D |
|----|-------------|-----|---|---|
| 1  | height      |     |   |   |
| 2  | 182.3951534 | 140 |   |   |
| 3  | 177.3691979 | 145 |   |   |
| 4  | 182.1988381 | 150 |   |   |
| 5  | 176.9889643 | 155 |   |   |
| 6  | 163.6896562 | 160 |   |   |
| 7  | 164.5299616 | 165 |   |   |
| 8  | 172.4109371 | 170 |   |   |
| 9  | 171.6274655 | 175 |   |   |
| 10 | 164.8407846 | 180 |   |   |
| 11 | 180.075317  | 185 |   |   |
| 12 | 166.9332163 | 190 |   |   |
| 13 | 167.2775094 | 195 |   |   |
| 14 | 184.593392  | 200 |   |   |
| 15 | 167.1756296 | 205 |   |   |
| 16 | 185.9641509 | 210 |   |   |
| 17 | 172.6022519 | 215 |   |   |
| 18 | 177.3290828 | 220 |   |   |
| 19 | 185.4790156 |     |   |   |
| 20 | 182.3701171 |     |   |   |
| 21 | 166.9578834 |     |   |   |
| 22 | 186.1121965 |     |   |   |
| 23 | 166.4170676 |     |   |   |
| 24 | 177.630848  |     |   |   |
| 25 | 174.7356434 |     |   |   |
| 26 | 177.0052025 |     |   |   |
| 27 | 187.4965118 |     |   |   |
| 28 | 174.6655207 |     |   |   |
| 29 | 180.6395124 |     |   |   |
| 30 | 185.1718208 |     |   |   |
| 31 | 174.1492238 |     |   |   |
| 32 | 177.0131918 |     |   |   |
| 33 | 178.9121813 |     |   |   |
| 34 | 182.2817601 |     |   |   |
| 35 | 165.6842938 |     |   |   |
| 36 | 169.2112126 |     |   |   |
| 37 | 159.5085723 |     |   |   |
| 38 | 184.183758  |     |   |   |
| 39 | 182.33784   |     |   |   |
| 40 | 156.6755905 |     |   |   |
| 41 | 190.0826142 |     |   |   |
| 42 | 185.204532  |     |   |   |



## Heights



| N   | Common Name |
|-----|-------------|
| 3   | Terciles    |
| 4   | Quartiles   |
| 5   | Quintiles   |
| 10  | Deciles     |
| 20  | Ventiles    |
| 100 | Percentiles |

$$i = \left[ \frac{k}{n} (d - 1) \right] + 1$$

| Home Insert         |       |
|---------------------|-------|
|                     |       |
| From                | From  |
| HTML                | Text  |
| New D...            | Qu... |
| A1                  | ▲ ×   |
| A                   |       |
| 1 Add-on Sales (\$) |       |
| 2 0                 |       |
| 3 0                 |       |
| 4 1500              |       |
| 5 1700              |       |
| 6 2000              |       |
| 7 2300              |       |
| 8 3300              |       |
| 9 4700              |       |
| 10 5000             |       |
| 11 8200             |       |
| 12 9000             |       |
| 13                  |       |

$$i = \left[ \frac{k}{n} (d - 1) \right] + 1$$

$$i = \left[ \frac{1}{4} (11 - 1) \right] + 1$$

$$i = \frac{10}{4} + 1$$

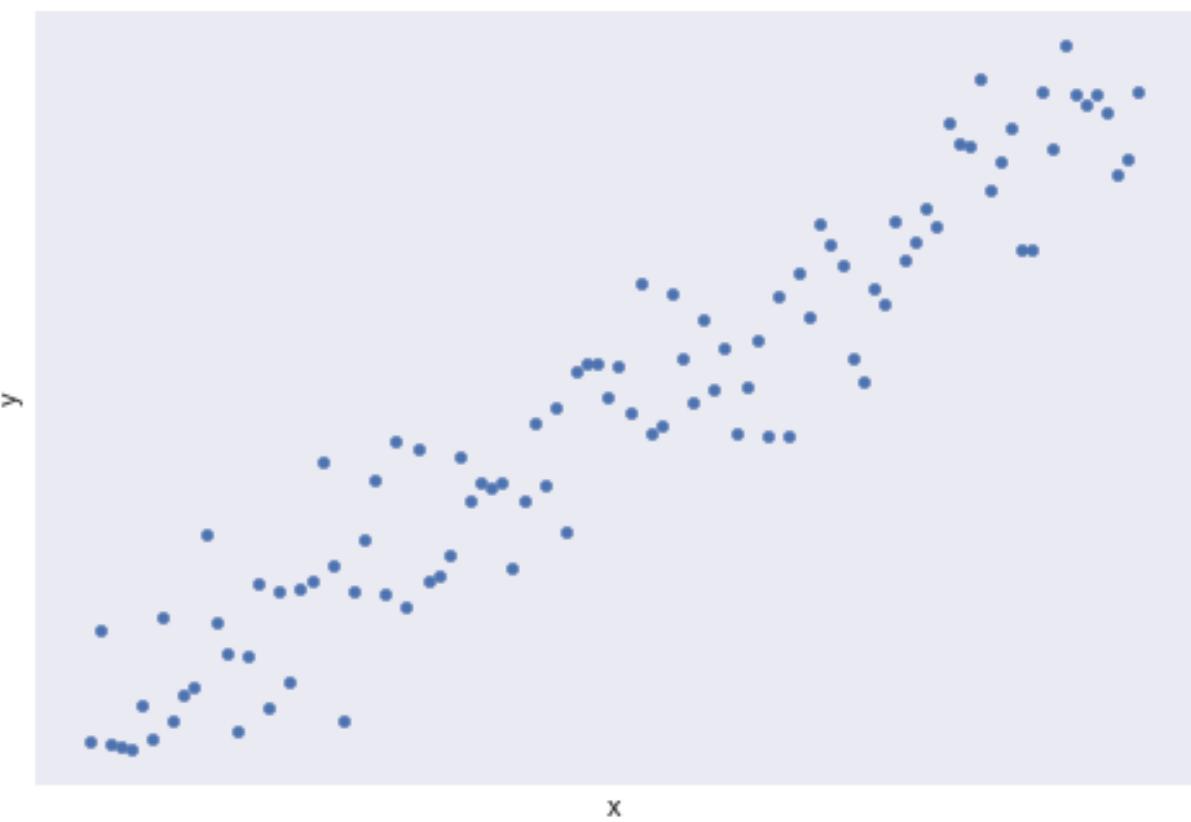
$$i = \frac{10}{4} + 1$$

$$i = 2.5 + 1 = 3.5$$

| Home                |           | Insert         |
|---------------------|-----------|----------------|
|                     |           |                |
|                     |           |                |
| From HTML           | From Text | New Data Query |
| A1                  | ▲ ▼       | X              |
|                     | A         |                |
| 1 Add-on Sales (\$) |           |                |
| 2 0                 |           |                |
| 3 0                 |           |                |
| 4 1500              |           |                |
| 5 1700              |           |                |
| 6 2000              |           |                |
| 7 2300              |           |                |
| 8 3300              |           |                |
| 9 4700              |           |                |
| 10 5000             |           |                |
| 11 8200             |           |                |
| 12 9000             |           |                |
| 13                  |           |                |

A)  $\sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n}}$     B)  $\sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n-1}}$

| Add-on Sales (\$) | Difference with Mean | Difference with Mean Squared |
|-------------------|----------------------|------------------------------|
| 5000              | 1572.727273          | 2473471.074                  |
| 1700              | -1727.272727         | 2983471.074                  |
| 8200              | 4772.727273          | 22778925.62                  |
| 1500              | -1927.272727         | 3714380.165                  |
| 3300              | -127.2727273         | 16198.34711                  |
| 9000              | 5572.727273          | 31055289.26                  |
| 2000              | -1427.272727         | 2037107.438                  |
| 0                 | -3427.272727         | 11746198.35                  |
| 0                 | -3427.272727         | 11746198.35                  |
| 2300              | -1127.272727         | 1270743.802                  |
| 4700              | 1272.727273          | 1619834.711                  |



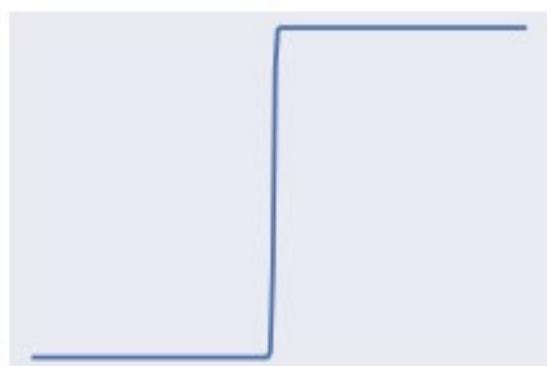
a) quadratic



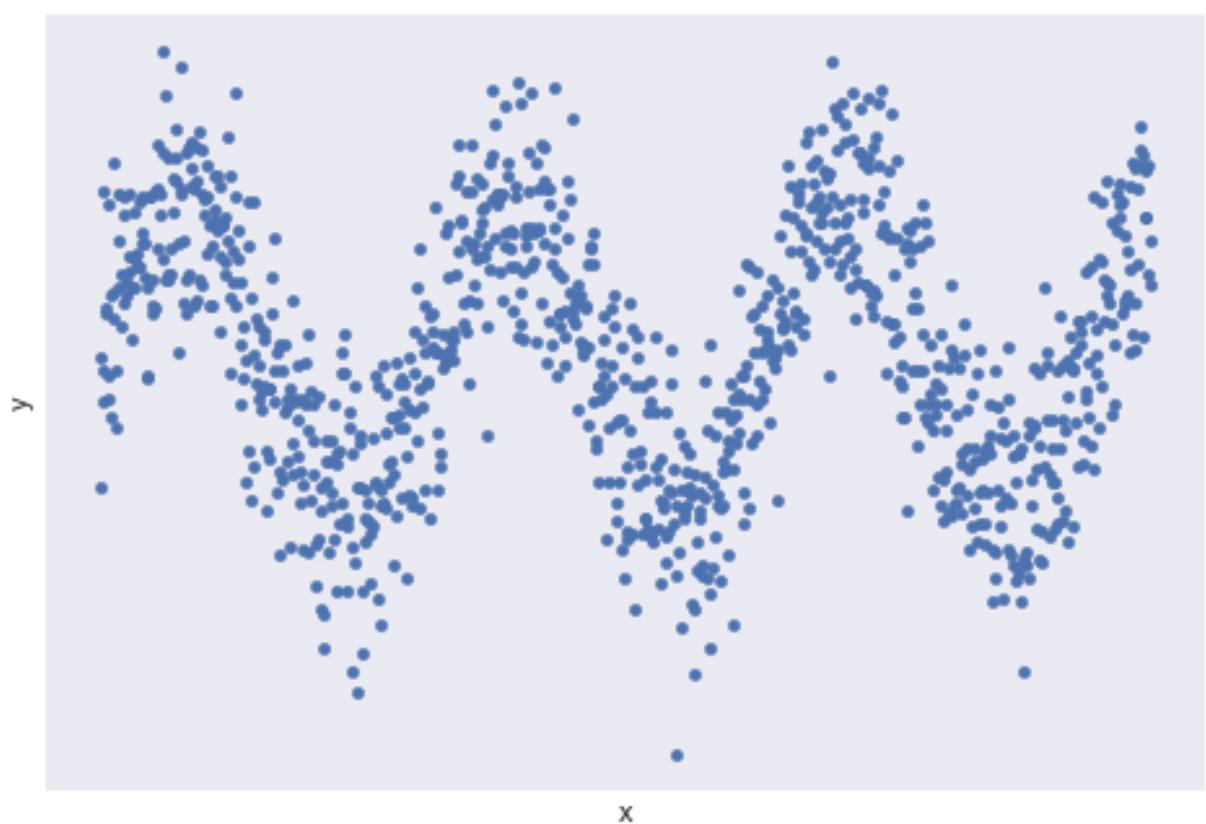
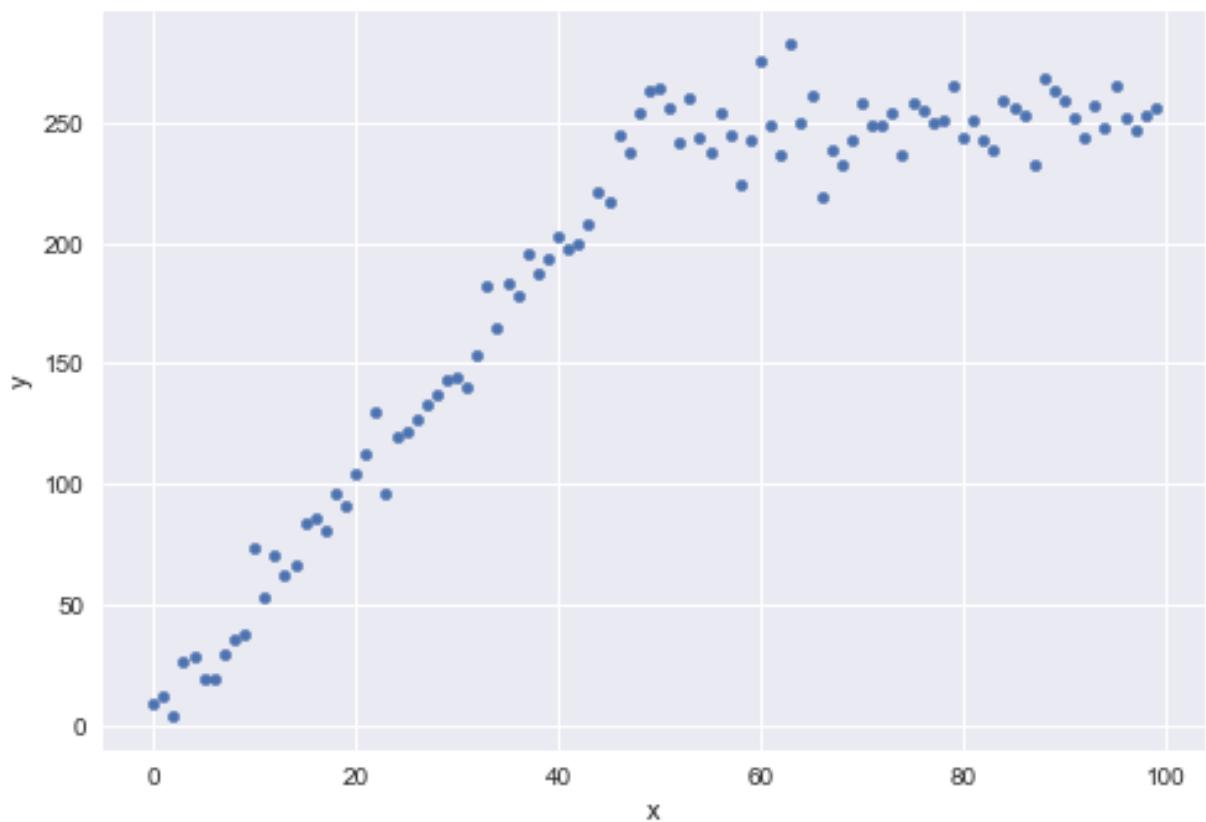
b) power

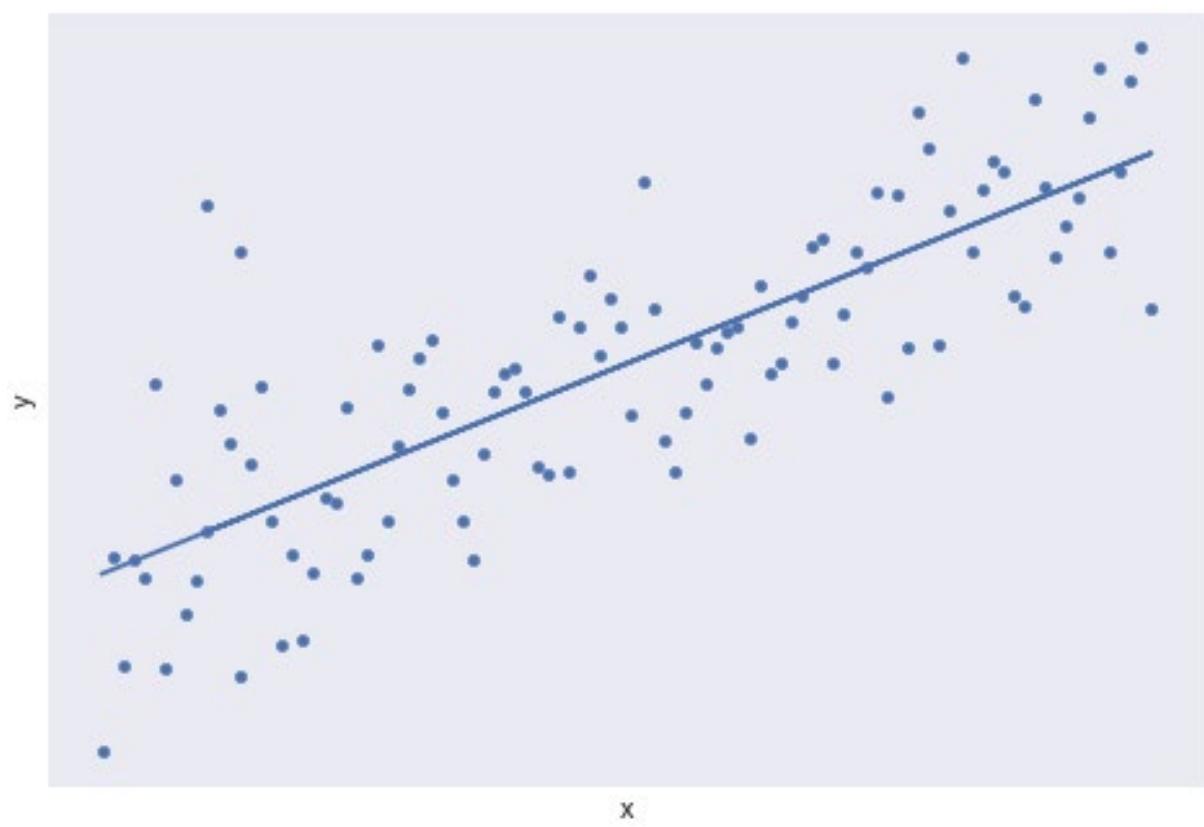
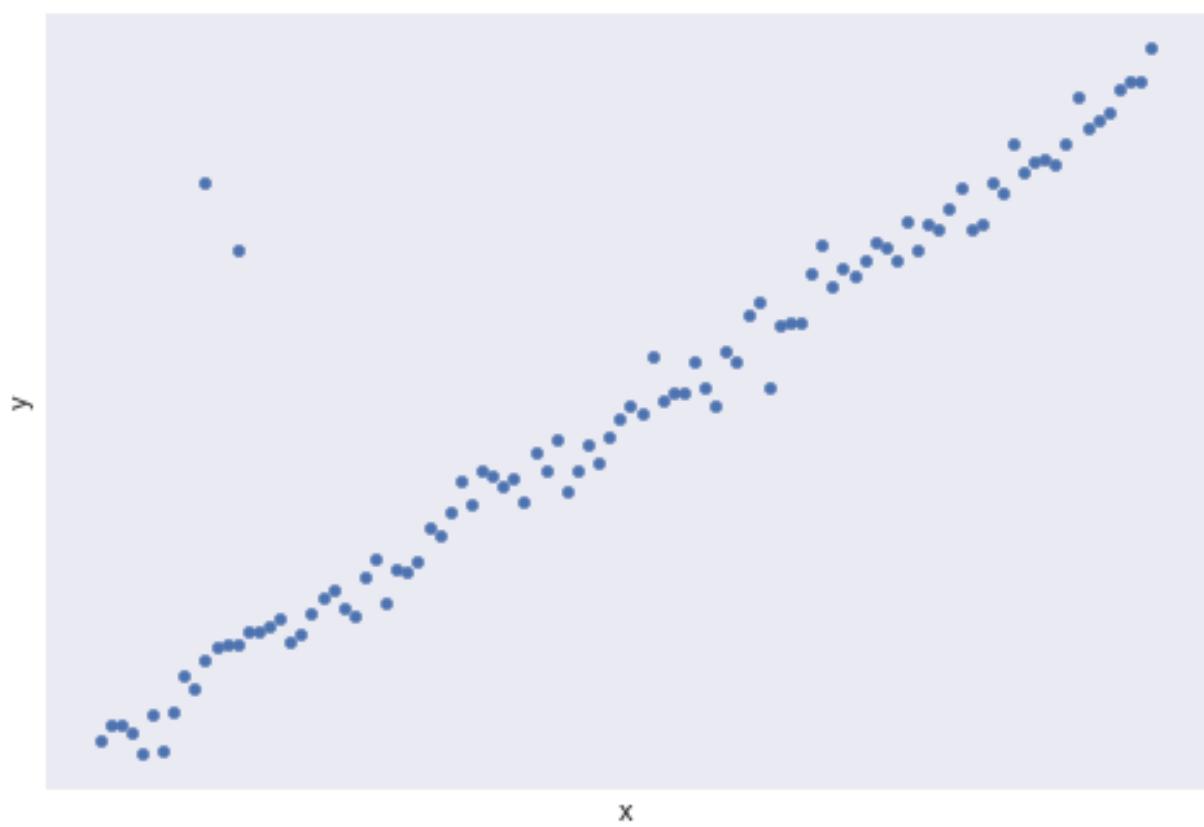


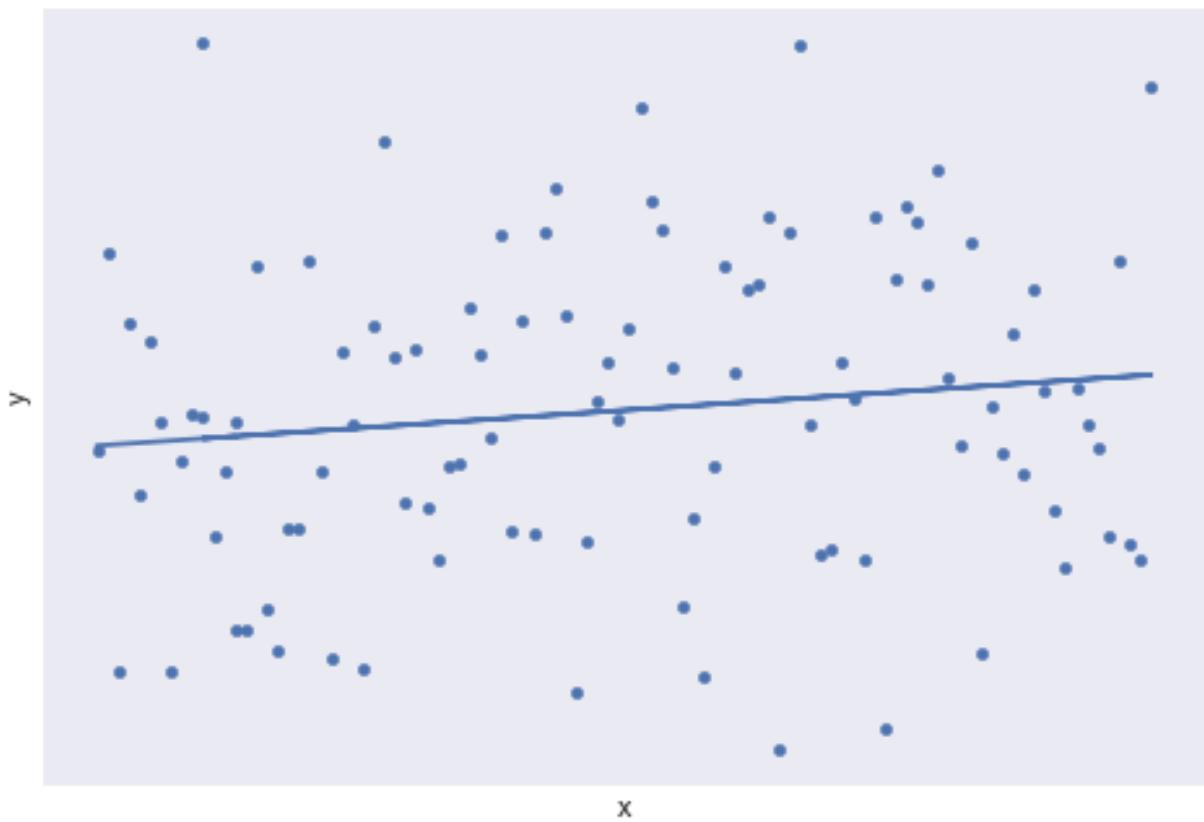
c) inverse



d) logistic



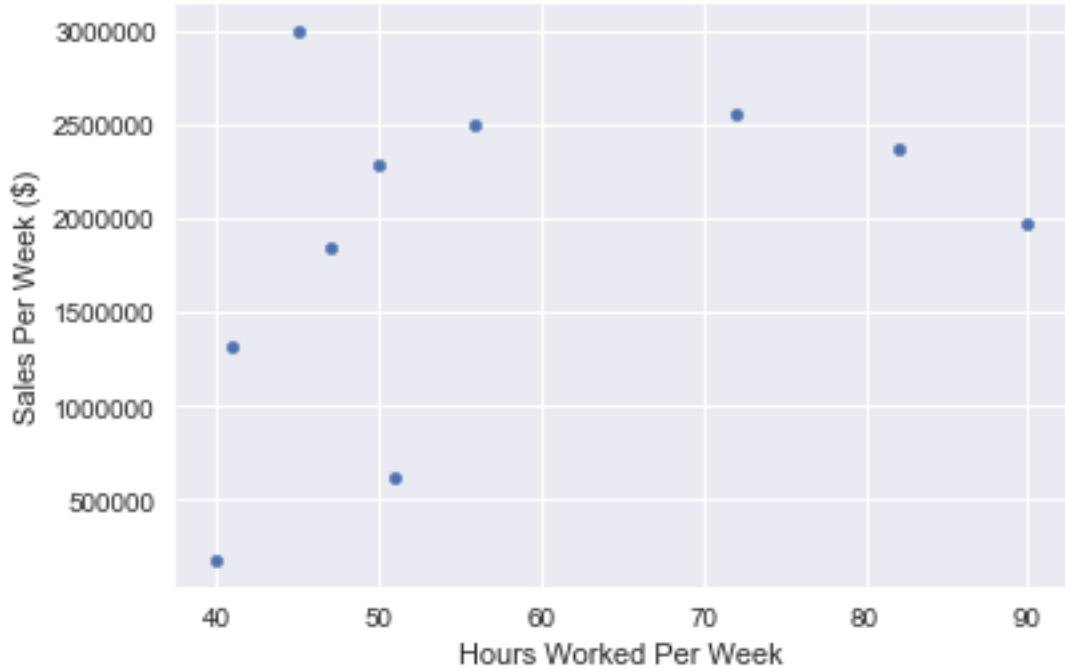




$$r = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^n (x_i - \bar{x})^2} \sqrt{\sum_{i=1}^n (y_i - \bar{y})^2}}$$

#### Hours Worked Per Week   Sales Per Week (\$)

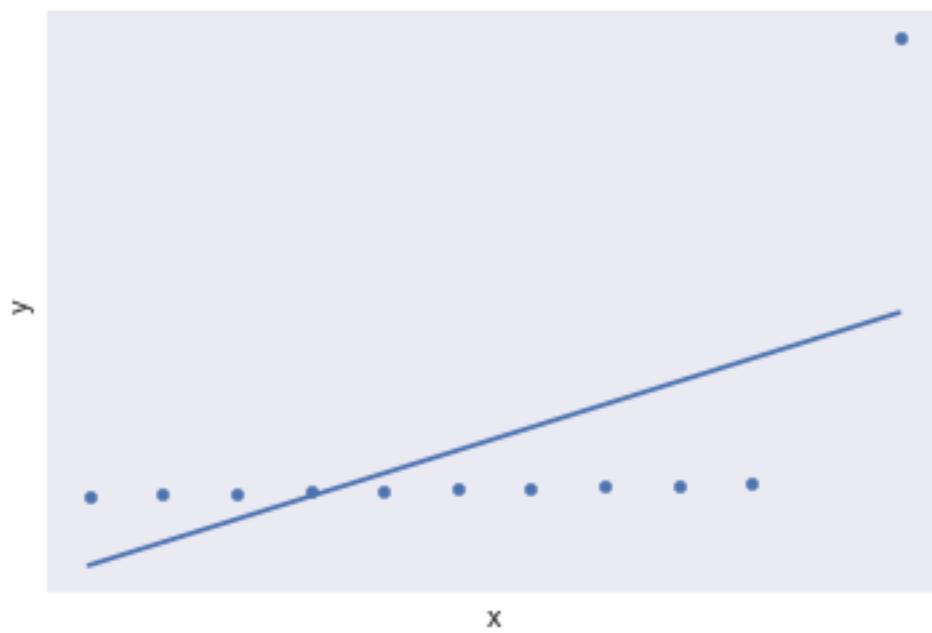
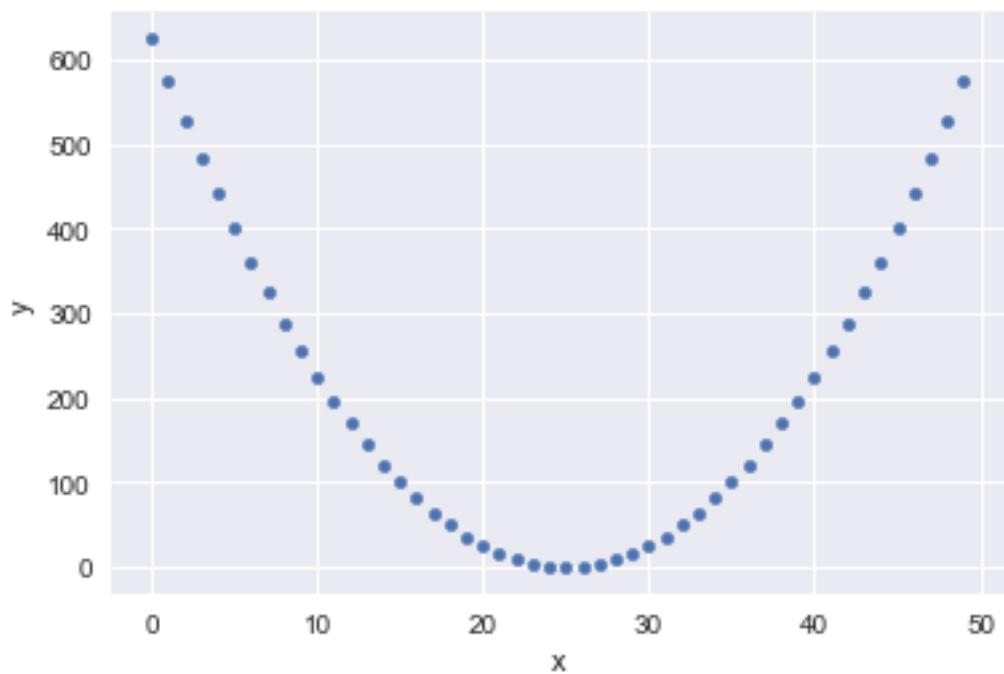
|    |              |
|----|--------------|
| 40 | 179,480.58   |
| 56 | 2,495,037.73 |
| 50 | 2,285,369.51 |
| 82 | 2,367,896.33 |
| 41 | 1,309,745.16 |
| 51 | 623,013.69   |
| 45 | 2,989,943.37 |
| 90 | 1,970,316.24 |
| 47 | 1,845,840.39 |
| 72 | 2,553,231.33 |

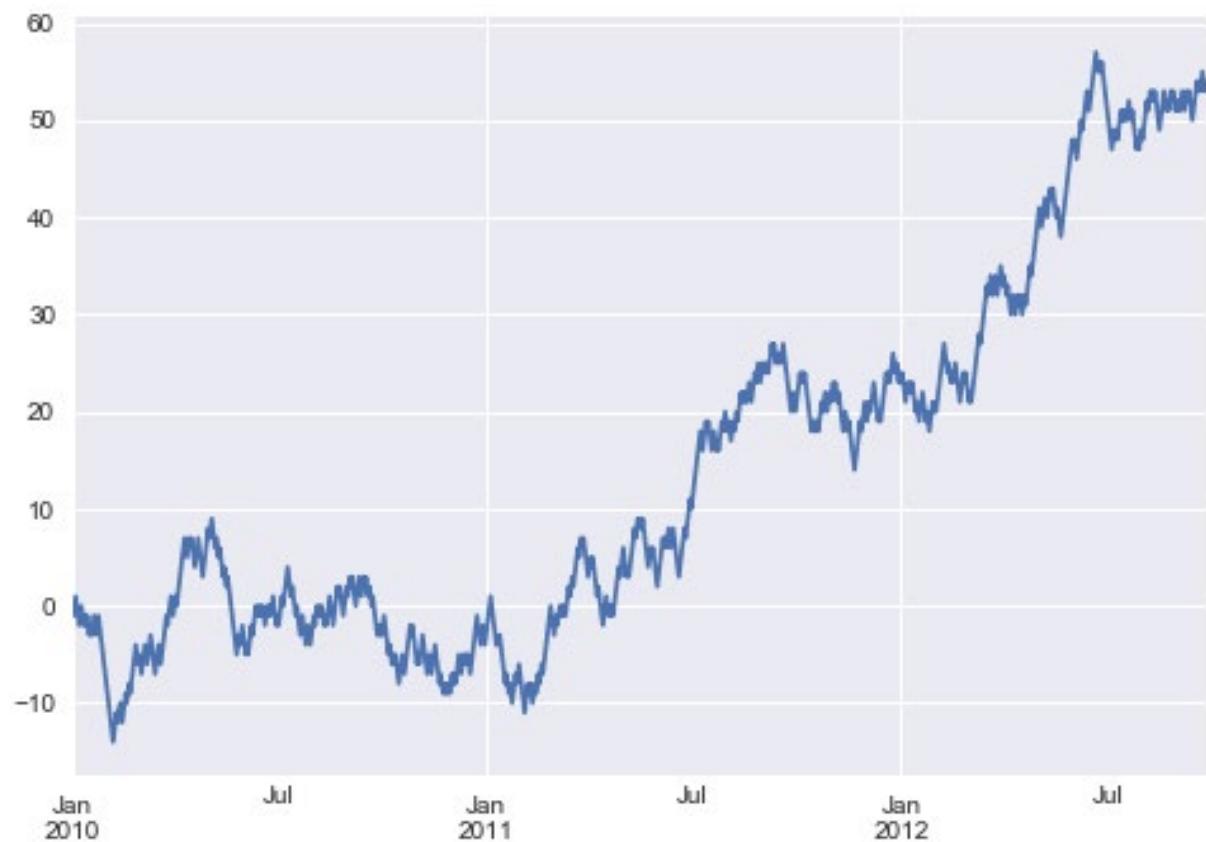


| Hours Worked Per Week | Sales Per Week (\$) | x-mean(x) | (x-mean(x))^2 | y-mean(y)     | (y-mean(y))^2        | [x-mean(x)][y-mean(y)] |
|-----------------------|---------------------|-----------|---------------|---------------|----------------------|------------------------|
| 40                    | 179,480.58          | -17.40    | 302.76        | -1,682,506.85 | 2,830,829,303,631.31 | 29,275,619.21          |
| 56                    | 2,495,037.73        | -1.40     | 1.96          | 633,050.29    | 400,752,674,381.30   | -886,270.41            |
| 50                    | 2,285,369.51        | -7.40     | 54.76         | 423,382.07    | 179,252,379,435.48   | -3,133,027.34          |
| 82                    | 2,367,896.33        | 24.60     | 605.16        | 505,908.90    | 255,943,812,657.79   | 12,445,358.88          |
| 41                    | 1,309,745.16        | -16.40    | 268.96        | -552,242.27   | 304,971,527,314.18   | 9,056,773.27           |
| 51                    | 623,013.69          | -6.40     | 40.96         | -1,238,973.75 | 1,535,055,945,620.25 | 7,929,431.98           |
| 45                    | 2,989,943.37        | -12.40    | 153.76        | 1,127,955.94  | 1,272,284,593,638.99 | -13,986,653.61         |
| 90                    | 1,970,316.24        | 32.60     | 1,062.76      | 108,328.81    | 11,735,131,115.82    | 3,531,519.21           |
| 47                    | 1,845,840.39        | -10.40    | 108.16        | -16,147.04    | 260,726,862.48       | 167,929.20             |
| 72                    | 2,553,231.33        | 14.60     | 213.16        | 691,243.90    | 477,818,127,736.76   | 10,092,160.92          |

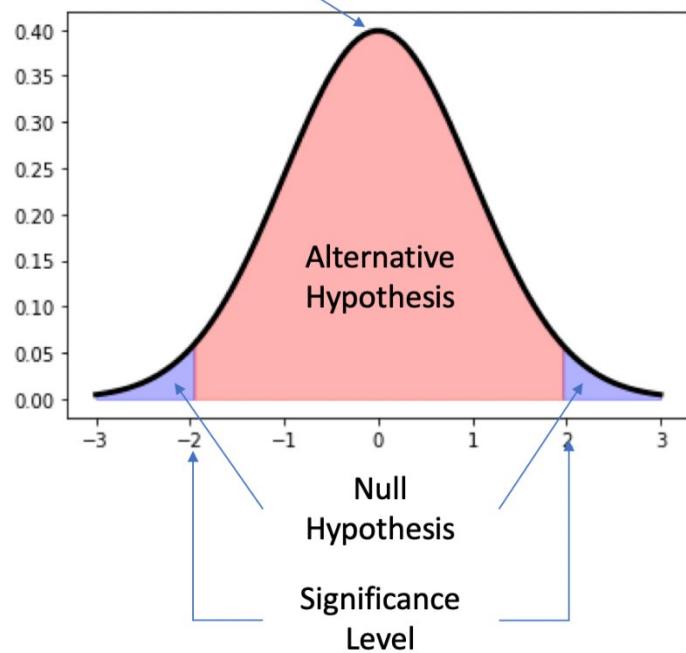
$$r = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^n (x_i - \bar{x})^2} \sqrt{\sum_{i=1}^n (y_i - \bar{y})^2}} = \frac{54492841.32}{(53.03) * (2696090.54)} \approx 0.38$$

| Value of Correlation | Interpretation                   |
|----------------------|----------------------------------|
| -1.0 <= r <= -0.7    | Very Strong Negative Correlation |
| -0.7 <= r <= -0.4    | Strong Negative Correlation      |
| -0.4 < r < -0.2      | Moderate Negative Correlation    |
| -0.2 < r < 0.2       | Weak to Non-Existent Correlation |
| 0.2 < r < 0.4        | Moderate Positive Correlation    |
| 0.4 < r < 0.7        | Strong Positive Correlation      |
| 0.7 < r < 1.0        | Very Strong Positive Correlation |





Test Statistic



Chapter 2:

| Name             | Storage Size | Description                     | Range  |
|------------------|--------------|---------------------------------|--|
| smallint         | 2 bytes      | Small-range integer             | -32768 to +32767   |
| integer          | 4 bytes      | Typical choice for integer      | -2147483648 to +2147483647   |
| bigint           | 8 bytes      | Large-range integer             | -9223372036854775808 to +9223372036854775807   |
| decimal          | variable     | User-specified precision, exact | Up to 131072 digits before the decimal point; up to 16383 digits after the decimal point |
| numeric          | variable     | User-specified precision, exact | Up to 131072 digits before the decimal point; up to 16383 digits after the decimal point |
| real             | 4 bytes      | Variable precision, inexact     | 6 decimal digits precision   |
| double precision | 8 bytes      | Variable precision, inexact     | 15 decimal digits precision  |
| smallserial      | 2 bytes      | Small autoincrementing integer  | 1 to 32767   |
| serial           | 4 bytes      | Autoincrementing integer        | 1 to 2147483647  |
| bigserial        | 8 bytes      | Large autoincrementing integer  | 1 to 9223372036854775807   |

| Name                             | Description                |
|----------------------------------|----------------------------|
| character varying(n), varchar(n) | Variable length with limit |
| character(n), char(n)            | Fixed length, blank padded |
| text                             | Variable unlimited length  |

| Boolean Value | Accepted Values         |
|---------------|-------------------------|
| True          | t, true, y, yes, on, 1  |
| False         | f, false, n, no, off, 0 |

| Name                       | Size     | Description                        |
|----------------------------|----------|------------------------------------|
| Timestamp without timezone | 8 bytes  | both date and time (no time zone)  |
| Timestamp with timezone    | 8 bytes  | both date and time, with time zone |
| date                       | 4 bytes  | date (no time of day)              |
| Time without timezone      | 8 bytes  | time of day (no date)              |
| Time with timezone         | 12 bytes | times of day only, with time zone  |
| interval                   | 16 bytes | time interval                      |

| product_id<br>bigint | model<br>text | year<br>bigint | product_type<br>text | base_msrp<br>numeric | production_start_date<br>timestamp without time zone | production_end_date<br>timestamp without time zone |
|----------------------|---------------|----------------|----------------------|----------------------|--|--|
| 12                   | Lemon ...     | 2019           | scooter              | 349.99               | 2019-02-04 00:00:00                                  | [null]   |
| 11                   | Model ...     | 2019           | automobile           | 95000.00             | 2019-02-04 00:00:00                                  | [null]   |
| 8                    | Bat Limi...   | 2017           | scooter              | 699.99               | 2017-02-15 00:00:00                                  | [null]   |
| 9                    | Model E...    | 2017           | automobile           | 35000.00             | 2017-02-15 00:00:00                                  | [null]   |
| 10                   | Model ...     | 2017           | automobile           | 85750.00             | 2017-02-15 00:00:00                                  | [null]   |
| 7                    | Bat           | 2016           | scooter              | 599.99               | 2016-10-10 00:00:00                                  | [null]   |
| 6                    | Model S...    | 2015           | automobile           | 65500.00             | 2015-04-15 00:00:00                                  | 2018-10-01 00:00:00                                |
| 5                    | Blade         | 2014           | scooter              | 699.99               | 2014-06-23 00:00:00                                  | 2015-01-27 00:00:00                                |
| 4                    | Model ...     | 2014           | automobile           | 115000.00            | 2014-06-23 00:00:00                                  | 2018-12-28 00:00:00                                |
| 3                    | Lemon         | 2013           | scooter              | 499.99               | 2013-05-01 00:00:00                                  | 2018-12-28 00:00:00                                |
| 2                    | Lemon ...     | 2011           | scooter              | 799.99               | 2011-01-03 00:00:00                                  | 2011-03-30 00:00:00                                |

▼  salespeople

▼  Columns (10)

-  salesperson\_id
-  dealership\_id
-  title
-  first\_name
-  last\_name
-  suffix
-  username
-  gender
-  hire\_date
-  termination\_date

| username |               |
|----------|---------------|
|          | text          |
| 1        | nlie2l        |
| 2        | adufaire3r    |
| 3        | bgrimoldby4q  |
| 4        | jmedgewick... |
| 5        | bhain3y       |
| 6        | kclyburn54    |
| 7        | adobbing4g    |
| 8        | skinner1h     |
| 9        | alimon7j      |

| customer_id | title  | first_name | last_name   | suffix | email       | gender | ip_address      | phone      | street_address       | city    | state | postal_code | latitude         | longitude        | date_added                  |
|-------------|--------|------------|-------------|--------|-------------|--------|-----------------|------------|----------------------|---------|-------|-------------|------------------|------------------|-----------------------------|
|             | text   | text       | text        | text   | text        | text   | text            | text       | text                 | text    | text  | text        | double precision | double precision | timestamp without time zone |
| 2625        | [null] | Binky      | Dawtrey     | [null] | bdawtr...   | M      | 15.75.236.78    | 804-990... | 0353 Iowa Road       | Rich... | VA    | 23208       | 37.5593          | -77.4471         | 2010-03-15 00:00:00         |
| 6173        | [null] | Danila     | Gristwood   | [null] | dgrist...   | F      | 254.239.58.1... | 832-157... | 79865 Hagan Terr...  | Katy    | TX    | 77493       | 29.8678          | -95.8298         | 2010-03-15 00:00:00         |
| 13390       | [null] | Danika     | Lough       | [null] | dlough...   | F      | 188.19.7.207    | 212-769... | 38463 Forest Dal...  | New ... | NY    | 10019       | 40.7651          | -73.9858         | 2010-03-15 00:00:00         |
| 7486        | [null] | Ciro       | FERENCOWICZ | [null] | cferen...   | M      | 8.151.167.184   | 786-458... | 61 Village Crossing  | Miami   | FL    | 33111       | 25.5584          | -80.4582         | 2010-03-15 00:00:00         |
| 17099       | [null] | Pearla     | Halksworth  | [null] | phalks...   | F      | 114.138.82.24   | 541-198... | 130 Marcy Crossi...  | Euge... | OR    | 97405       | 44.0185          | -123.0998        | 2010-03-15 00:00:00         |
| 18685       | [null] | Ingram     | Crossman    | [null] | icross...   | M      | 207.145.1.202   | 503-352... | 86 Michigan Junc...  | Salem   | OR    | 97306       | 44.8685          | -123.0438        | 2010-03-15 00:00:00         |
| 30046       | [null] | Nanete     | Hassur      | [null] | nhassu...   | F      | 232.115.170...  | 209-364... | 13961 Steensland...  | Stoc... | CA    | 95205       | 37.9625          | -121.2624        | 2010-03-15 00:00:00         |
| 35683       | [null] | Betteanne  | Rulf        | [null] | brulfrj6... | F      | 52.208.248.90   | 503-396... | 1 Cordelia Crossing  | Salem   | OR    | 97306       | 44.8685          | -123.0438        | 2010-03-15 00:00:00         |
| 22640       | [null] | Shana      | Nugent      | [null] | snuge...    | F      | 207.239.127...  | 202-378... | 96725 Cordelia La... | Was...  | DC    | 20010       | 38.9327          | -77.0322         | 2010-03-16 00:00:00         |
| 34189       | [null] | Devlin     | Barhems     | [null] | dbarhe...   | M      | 180.175.21.2... | 240-895... | 0 Park Meadow St...  | Rock... | MD    | 20851       | 39.0763          | -77.1234         | 2010-03-16 00:00:00         |
| 46277       | Mr     | Salomon    | Rillatt     | [null] | srillatt... | M      | 33.205.88.187   | 504-700... | 5799 Thackeray C...  | New ... | LA    | 70179       | 30.033           | -89.8826         | 2010-03-16 00:00:00         |

|  | key<br>integer | name<br>text | founding_year<br>integer | capital<br>text |
|--|----------------|--------------|--------------------------|-----------------|
|  |                |              |                          |                 |

| product_id | model     | year | product_type | base_msrp | production_start_date | production_end_date |
|------------|-----------|------|--------------|-----------|-----------------------|---------------------|
| 11         | Model Chi | 2019 | automobile   | 104500    | 2019-02-04 00:00:00   | NULL                |

**ERROR: relation "state\_populations" does not exist**  
**LINE 1: select \* from state\_populations;**  
<sup>^</sup>

| customer_id | title  | first_name | last_name | suffix | email      | gender | ip_address      | phone      | street_address       | city    | state | postal_code | latitude         | longitude        | date_added                  | event           |
|-------------|--------|------------|-----------|--------|------------|--------|-----------------|------------|----------------------|---------|-------|-------------|------------------|------------------|-----------------------------|-----------------|
|             | text   | text       | text      | text   | text       | text   | text            | text       | text                 | text    | text  | text        | double precision | double precision | timestamp without time zone | text            |
| 52          | [null] | Giusto     | Backe     | [null] | gbacke...  | M      | 26.56.68.189    | 212-959... | 6 Onsgard Terrace    | New ... | NY    | 10131       | 40.7808          | -73.9772         | 2010-07-06 00:00:00         | thank-you party |
| 406         | [null] | Rozina     | Jean      | [null] | jealb9...  | F      | 50.235.32.29    | 917-610... | 64653 Homewood...    | New ... | NY    | 10105       | 40.7628          | -73.9785         | 2010-09-15 00:00:00         | thank-you party |
| 456         | Rev    | Cybille    | Noke      | [null] | cnokec...  | F      | 5.31.139.106    | 212-306... | 88 Sycamore Park...  | New ... | NY    | 10260       | 40.7808          | -73.9772         | 2017-01-21 00:00:00         | thank-you party |
| 472         | [null] | Rawley     | Yegorov   | [null] | reigor...  | M      | 183.199.243...  | 212-560... | 872 Old Shore Par... | New ... | NY    | 10034       | 40.8662          | -73.9221         | 2014-11-24 00:00:00         | thank-you party |
| 496         | [null] | Layton     | Spolton   | [null] | ispolt0... | M      | 108.112.8.165   | 646-900... | 7 Old Gate Drive     | New ... | NY    | 10024       | 40.7864          | -73.9764         | 2010-12-20 00:00:00         | thank-you party |
| 1028        | [null] | Issy       | Andrieux  | [null] | landrie... | F      | 199.50.5.37     | 212-206... | 33337 Dahlie Way     | New ... | NY    | 10115       | 40.8111          | -73.9642         | 2017-11-27 00:00:00         | thank-you party |
| 1037        | [null] | Magdalene  | Veryard   | [null] | mverya...  | F      | 93.201.129.2... | [null]     | 41028 Katie Junct... | New ... | NY    | 10039       | 40.8265          | -73.9383         | 2014-03-04 00:00:00         | thank-you party |
| 1063        | [null] | Juliet     | Beadles   | [null] | jbeadle... | F      | 47.96.88.226    | 212-645... | 34984 Goodland ...   | New ... | NY    | 10120       | 40.7506          | -73.9894         | 2014-08-17 00:00:00         | thank-you party |
| 1211        | [null] | Gwyneth    | McCobb    | [null] | gmcco...   | F      | 38.182.151.2... | [null]     | 4 Jana Park          | New ... | NY    | 10160       | 40.7808          | -73.9772         | 2014-01-08 00:00:00         | thank-you party |
| 1262        | [null] | Conrado    | Escoffier | [null] | cescoff... | M      | 23.120.12.44    | 646-523... | 2 Atwood Court       | New ... | NY    | 10060       | 40.7808          | -73.9772         | 2015-02-17 00:00:00         | thank-you party |

### Chapter 3:

|                          | dealership_id<br>bigint | street_address<br>text | city<br>text       | state<br>text     | postal_code<br>text | latitude<br>double precision | longitude<br>double precision | date_opened<br>timestamp without time zone | date_closed<br>timestamp without time zone      |
|--------------------------|-------------------------|------------------------|--------------------|-------------------|---------------------|------------------------------|-------------------------------|--|---|
| 1                        | 2                       | 808 South Hobart...    | Los ...            | CA                | 90005               | 34.057754                    | -118.305423                   | 2014-06-01 00:00:00                        | [null]  |
| 2                        | 5                       | 2210 Bunker Hill ...   | San ...            | CA                | 94402               | 37.524487                    | -122.343609                   | 2014-06-01 00:00:00                        | [null]  |
| salesperson_id<br>bigint | dealership_id<br>bigint | title<br>text          | first_name<br>text | last_name<br>text | suffix<br>text      | username<br>text             | gender<br>text                | hire_date<br>timestamp without time zone   | termination_date<br>timestamp without time zone |
| 23                       | 2                       | [null]                 | Beauregard         | Peschke           | [null]              | bpeschkem                    | Male                          | 2018-09-12 00:00:00                        | [null]  |
| 51                       | 5                       | [null]                 | Lanette            | Gerriessen        | [null]              | lgerriessen1e                | Female                        | 2018-06-24 00:00:00                        | [null]  |
| 57                       | 5                       | [null]                 | Spense             | Pithcock          | [null]              | spithcock1k                  | Male                          | 2017-12-15 00:00:00                        | [null]  |
| 61                       | 5                       | [null]                 | Ludvig             | Baynam            | [null]              | lbaynam1o                    | Male                          | 2016-08-25 00:00:00                        | [null]  |
| 62                       | 2                       | [null]                 | Carroll            | Pudan             | [null]              | cpudan1p                     | Female                        | 2016-05-17 00:00:00                        | [null]  |
| 63                       | 2                       | [null]                 | Adrienne           | Otham             | [null]              | aotham1q                     | Female                        | 2014-12-20 00:00:00                        | [null]  |
| 71                       | 2                       | [null]                 | Georgianna         | Bastian           | [null]              | gbastian1y                   | Female                        | 2018-12-23 00:00:00                        | [null]  |
| 75                       | 2                       | [null]                 | Saundra            | Shoebottom        | [null]              | sshoebotto...                | Female                        | 2018-03-18 00:00:00                        | [null]  |
| 108                      | 2                       | [null]                 | Hale               | Brigshaw          | [null]              | hbrigshaw2z                  | Male                          | 2015-07-30 00:00:00                        | [null]  |

Inner Join

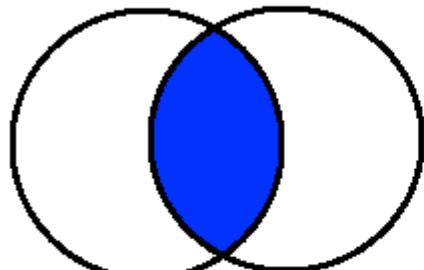


Table A      Table B

Left Outer Join

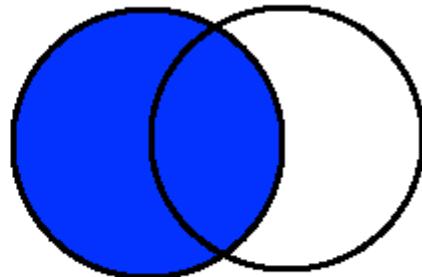


Table A      Table B

Right Outer Join

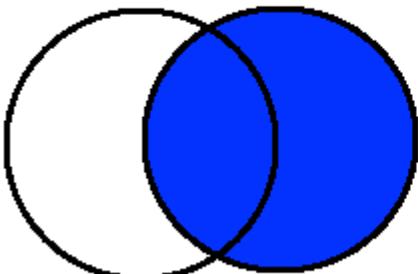


Table A      Table B

Full Outer Join

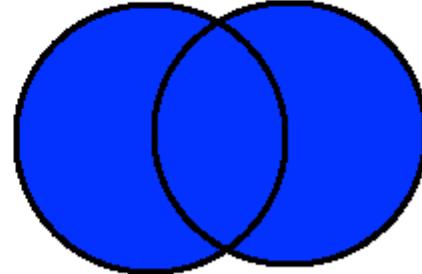


Table A      Table B

| salesperson_id<br>bigint | dealership_id<br>bigint | title<br>text | first_name<br>text | last_name<br>text | suffix<br>text | username<br>text | gender<br>text | hire_date<br>timestamp without time zone | termination_date<br>timestamp without time zone | dealership_id<br>bigint | street_address<br>text | city<br>text | state<br>text | postal_code<br>text |
|--------------------------|-------------------------|---------------|--------------------|-------------------|----------------|------------------|----------------|--|---|-------------------------|------------------------|--------------|---------------|---------------------|
| 1                        | 17                      | [null]        | Electra            | Elleyne           | [null]         | ealleyne0        | Female         | 2017-05-31 00:00:00                      | [null]  | 17                      | 2120 Walnut Street     | Phila...     | PA            | 19092               |
| 2                        | 6                       | [null]        | Montague           | Alcoran           | [null]         | malcoran1        | Male           | 2018-12-31 00:00:00                      | [null]  | 6                       | 7315 California A...   | Seatt...     | WA            | 98136               |
| 3                        | 17                      | [null]        | Ethy               | Sloss             | IV             | esloss2          | Female         | 2016-08-10 00:00:00                      | [null]  | 17                      | 2120 Walnut Street     | Phila...     | PA            | 19092               |
| 4                        | 10                      | [null]        | Nester             | Dugood            | [null]         | ndugood3         | Male           | 2017-06-03 00:00:00                      | [null]  | 10                      | 7425 Wilson Aven...    | Chic...      | IL            | 60706               |
| 5                        | 17                      | [null]        | Cornall            | Swanger           | [null]         | cswanger4        | Male           | 2018-05-17 00:00:00                      | [null]  | 17                      | 2120 Walnut Street     | Phila...     | PA            | 19092               |
| 6                        | 8                       | [null]        | Ellary             | Nend              | [null]         | enend5           | Male           | 2016-05-07 00:00:00                      | [null]  | 8                       | 5938 Comforth Ro...    | Portl...     | OR            | 97218               |
| 7                        | 1                       | [null]        | Granville          | Fidell            | [null]         | gfidell6         | Male           | 2017-06-17 00:00:00                      | [null]  | 1                       | 52 Hillside Terrace    | Millb...     | NJ            | 07039               |
| 8                        | 18                      | [null]        | Lanie              | Tisun             | [null]         | htisun7          | Male           | 2017-12-12 00:00:00                      | [null]  | 18                      | 1447 Hardesty Av...    | Kans...      | MO            | 64195               |
| 9                        | 14                      | [null]        | Lamar              | Treleven          | [null]         | ltreleven8       | Male           | 2018-05-08 00:00:00                      | [null]  | 14                      | 800 North Mays S...    | Roun...      | TX            | 78664               |

| salesperson_id<br>bigint | dealership_id<br>bigint | title<br>text | first_name<br>text | last_name<br>text | suffix<br>text | username<br>text | gender<br>text | hire_date<br>timestamp without time zone | termination_date<br>timestamp without time zone | dealership_id<br>bigint | street_address<br>text | city<br>text         |         |
|--------------------------|-------------------------|---------------|--------------------|-------------------|----------------|------------------|----------------|--|---|-------------------------|------------------------|----------------------|---------|
| 1                        | 23                      | 2             | [null]             | Beauregard        | Peschke        | [null]           | bpeschke       | Male                                     | 2018-09-12 00:00:00                             | [null]                  | 2                      | 808 South Hobart...  | Los ... |
| 2                        | 51                      | 5             | [null]             | Lanette           | Gerriesen      | [null]           | lgerriesen1e   | Female                                   | 2018-06-24 00:00:00                             | [null]                  | 5                      | 2210 Bunker Hill ... | San ... |
| 3                        | 57                      | 5             | [null]             | Spense            | Pithcock       | [null]           | spithcock1k    | Male                                     | 2017-12-15 00:00:00                             | [null]                  | 5                      | 2210 Bunker Hill ... | San ... |
| 4                        | 61                      | 5             | [null]             | Ludvig            | Baynam         | [null]           | lbaynam1o      | Male                                     | 2016-08-25 00:00:00                             | [null]                  | 5                      | 2210 Bunker Hill ... | San ... |
| 5                        | 62                      | 2             | [null]             | Carroll           | Pudan          | [null]           | cpudan1p       | Female                                   | 2016-05-17 00:00:00                             | [null]                  | 2                      | 808 South Hobart...  | Los ... |
| 6                        | 63                      | 2             | [null]             | Adriiane          | Otham          | [null]           | aotham1q       | Female                                   | 2014-12-20 00:00:00                             | [null]                  | 2                      | 808 South Hobart...  | Los ... |
| 7                        | 71                      | 2             | [null]             | Georgianna        | Bastian        | [null]           | gbastian1y     | Female                                   | 2018-12-23 00:00:00                             | [null]                  | 2                      | 808 South Hobart...  | Los ... |
| 8                        | 75                      | 2             | [null]             | Saundra           | Shoebottom     | [null]           | sshoebottom... | Female                                   | 2018-03-18 00:00:00                             | [null]                  | 2                      | 808 South Hobart...  | Los ... |
| 9                        | 108                     | 2             | [null]             | Hale              | Brigshaw       | [null]           | hbrigshaw2z    | Male                                     | 2015-07-30 00:00:00                             | [null]                  | 2                      | 808 South Hobart...  | Los ... |

| customer_id<br>bigint | title<br>text | first_name<br>text | last_name<br>text | suffix<br>text | email<br>text | gender<br>text | ip_address<br>text | phone<br>text      | street_address<br>text | city<br>text | state<br>text | postal_code<br>text | latitude<br>double precision | longitude<br>double precision | date_added<br>timestamp without time zone | email_id<br>bigint |
|-----------------------|---------------|--------------------|-------------------|----------------|---------------|----------------|--------------------|--------------------|------------------------|--------------|---------------|---------------------|------------------------------|-------------------------------|---|--------------------|
| 1 [null]              | Arlena        | Riveles            | [null]            | arivele...     | F             | 98.36.172.246  | [null]             | [null]             | [null]                 | [null]       | [null]        | [null]              | [null]                       | [null]                        | 2017-04-23 00:00:00                       | 282584             |
| 1 [null]              | Arlena        | Riveles            | [null]            | arivele...     | F             | 98.36.172.246  | [null]             | [null]             | [null]                 | [null]       | [null]        | [null]              | [null]                       | [null]                        | 2017-04-23 00:00:00                       | 370722             |
| 1 [null]              | Arlena        | Riveles            | [null]            | arivele...     | F             | 98.36.172.246  | [null]             | [null]             | [null]                 | [null]       | [null]        | [null]              | [null]                       | [null]                        | 2017-04-23 00:00:00                       | 323983             |
| 2 Dr                  | Ode           | Stovin             | [null]            | ostovin...     | M             | 16.97.59.186   | 314-534...         | 2573 Fordem Par... | Saint...               | MO           | 63116         |                     | 38.5814                      | -90.2625                      | 2014-10-02 00:00:00                       | 323984             |
| 2 Dr                  | Ode           | Stovin             | [null]            | ostovin...     | M             | 16.97.59.186   | 314-534...         | 2573 Fordem Par... | Saint...               | MO           | 63116         |                     | 38.5814                      | -90.2625                      | 2014-10-02 00:00:00                       | 245816             |
| 2 Dr                  | Ode           | Stovin             | [null]            | ostovin...     | M             | 16.97.59.186   | 314-534...         | 2573 Fordem Par... | Saint...               | MO           | 63116         |                     | 38.5814                      | -90.2625                      | 2014-10-02 00:00:00                       | 144183             |
| 2 Dr                  | Ode           | Stovin             | [null]            | ostovin...     | M             | 16.97.59.186   | 314-534...         | 2573 Fordem Par... | Saint...               | MO           | 63116         |                     | 38.5814                      | -90.2625                      | 2014-10-02 00:00:00                       | 370723             |
| 2 Dr                  | Ode           | Stovin             | [null]            | ostovin...     | M             | 16.97.59.186   | 314-534...         | 2573 Fordem Par... | Saint...               | MO           | 63116         |                     | 38.5814                      | -90.2625                      | 2014-10-02 00:00:00                       | 282585             |
| 2 Dr                  | Ode           | Stovin             | [null]            | ostovin...     | M             | 16.97.59.186   | 314-534...         | 2573 Fordem Par... | Saint...               | MO           | 63116         |                     | 38.5814                      | -90.2625                      | 2014-10-02 00:00:00                       | 117146             |
| 2 Dr                  | Ode           | Stovin             | [null]            | ostovin...     | M             | 16.97.59.186   | 314-534...         | 2573 Fordem Par... | Saint...               | MO           | 63116         |                     | 38.5814                      | -90.2625                      | 2014-10-02 00:00:00                       | 209804             |
| 2 Dr                  | Ode           | Stovin             | [null]            | ostovin...     | M             | 16.97.59.186   | 314-534...         | 2573 Fordem Par... | Saint...               | MO           | 63116         |                     | 38.5814                      | -90.2625                      | 2014-10-02 00:00:00                       | 174737             |
| 2 Dr                  | Ode           | Stovin             | [null]            | ostovin...     | M             | 16.97.59.186   | 314-534...         | 2573 Fordem Par... | Saint...               | MO           | 63116         |                     | 38.5814                      | -90.2625                      | 2014-10-02 00:00:00                       | 91913              |
| 3 [null]              | Braden        | Jordan             | [null]            | bjorda...      | M             | 192.86.248.59  | [null]             | 5651 Kennedy Park  | Pens...                | FL           | 32590         |                     | 30.6143                      | -87.2758                      | 2018-10-27 00:00:00                       | 323985             |

| customer_id<br>bigint | title<br>text | first_name<br>text | last_name<br>text | suffix<br>text | email<br>text | gender<br>text | ip_address<br>text | phone<br>text        | street_address<br>text | city<br>text | state<br>text | postal_code<br>text | latitude<br>double precision | longitude<br>double precision | date_added<br>timestamp without time zone | email_id<br>bigint | customer_id<br>bigint | customer_id<br>text | email_subje... |
|-----------------------|---------------|--------------------|-------------------|----------------|---------------|----------------|--------------------|----------------------|------------------------|--------------|---------------|---------------------|------------------------------|-------------------------------|---|--------------------|-----------------------|---------------------|----------------|
| 27 [null]             | Anson         | Fellibrand         | [null]            | afelibr...     | M             | 64.80.85.50    | 203-107...         | 65 Shelley Road      | New ...                | CT           | 06505         | 41.3057             | -72.7799                     | 2019-04-07 00:00:00           | [null]                                    | [null]             | [null]                | [null]              |                |
| 32 [null]             | Hamnet        | Purselowe          | [null]            | hpurse...      | M             | 225.215.209... | 239-462...         | 5 Johnson Way        | Napl...                | FL           | 34102         | 26.134              | -81.7956                     | 2019-02-07 00:00:00           | [null]                                    | [null]             | [null]                | [null]              |                |
| 70 [null]             | Caty          | Woolveridge        | [null]            | cwoolv...      | F             | 104.21.118.34  | 757-238...         | [null]               | [null]                 | [null]       | [null]        | [null]              | [null]                       | 2019-04-09 00:00:00           | [null]                                    | [null]             | [null]                | [null]              |                |
| 77 [null]             | Donald        | Lattey             | [null]            | dlattey...     | M             | 5.31.114.103   | 304-575...         | 48889 Laurel Pass    | Charl...               | WV           | 25326         | 38.2968             | -81.5547                     | 2019-05-25 00:00:00           | [null]                                    | [null]             | [null]                | [null]              |                |
| 112 [null]            | Harcourt      | Cripps             | [null]            | hcripp...      | M             | 219.20.188...  | 951-922...         | 9 Hoard Place        | San ...                | CA           | 92410         | 34.1069             | -117.2979                    | 2019-02-21 00:00:00           | [null]                                    | [null]             | [null]                | [null]              |                |
| 113 [null]            | Giffy         | Bennington         | Jr                | ghenni...      | M             | 181.117.182... | 202-767...         | 7861 Michigan Po...  | Was...                 | DC           | 20231         | 38.8933             | -77.0146                     | 2019-02-13 00:00:00           | [null]                                    | [null]             | [null]                | [null]              |                |
| 125 [null]            | Bernard       | Jirka              | [null]            | bjirka3...     | M             | 124.68.237.8   | [null]             | 112 Lunder Hill      | Pitts...               | PA           | 15215         | 40.5048             | -79.9138                     | 2019-02-17 00:00:00           | [null]                                    | [null]             | [null]                | [null]              |                |
| 192 [null]            | Selina        | Hearl              | [null]            | shearl...      | F             | 174.136.106... | 585-208...         | 842 Moulton Court    | Roch...                | NY           | 14646         | 43.286              | -77.6843                     | 2019-04-09 00:00:00           | [null]                                    | [null]             | [null]                | [null]              |                |
| 199 [null]            | Mercy         | Martschik          | [null]            | mmart...       | F             | 63.73.23.98    | 352-750...         | 66667 Stone Corn...  | Broo...                | FL           | 34405         | 28.5059             | -82.4226                     | 2019-04-01 00:00:00           | [null]                                    | [null]             | [null]                | [null]              |                |
| 212 [null]            | Norma         | Goldis             | [null]            | ngoldi...      | F             | 90.182.242.61  | 215-737...         | 4865 Sauthoff Cir... | Phila...               | PA           | 19125         | 39.9788             | -75.1262                     | 2019-03-26 00:00:00           | [null]                                    | [null]             | [null]                | [null]              |                |

| product_id<br>bigint | model<br>text | product_id<br>bigint | model<br>text   |
|----------------------|---------------|----------------------|-----------------|
| 1                    | Lemon         |                      | 1 Lemon         |
| 1                    | Lemon         |                      | 2 Lemon Li...   |
| 1                    | Lemon         |                      | 3 Lemon         |
| 1                    | Lemon         |                      | 4 Model Chi     |
| 1                    | Lemon         |                      | 5 Blade         |
| 1                    | Lemon         |                      | 6 Model Sig...  |
| 1                    | Lemon         |                      | 7 Bat           |
| 1                    | Lemon         |                      | 8 Bat Limite... |
| 1                    | Lemon         |                      | 9 Model Ep...   |
| 1                    | Lemon         |                      | 10 Model Ga...  |
| 1                    | Lemon         |                      | 11 Model Chi    |
| 1                    | Lemon         |                      | 12 Lemon Ze...  |
| 2                    | Lemon ...     |                      | 1 Lemon         |

| customer_id<br>bigint | first_name<br>text | last_name<br>text | phone<br>text |
|-----------------------|--------------------|-------------------|---------------|
| 35824                 | Wyatan             | Dickie            | 405-786...    |
| 13206                 | Stace              | Tuison            | 810-769...    |
| 2958                  | Kirstyn            | Draysay           | 208-534...    |
| 32636                 | Kile               | Fishlee           | 937-207...    |
| 26730                 | Raina              | Titterell         | 304-871...    |
| 23832                 | Harrietta          | Leverette         | 803-298...    |
| 35844                 | Maura              | Clyne             | 904-169...    |
| 43229                 | Field              | Lopes             | 757-409...    |
| 6038                  | Carey              | Swadling          | 727-426...    |

| street_address<br>text | city<br>text | state<br>text | postal_code<br>text |
|------------------------|--------------|---------------|---------------------|
| 00003 Continenta...    | Suff...      | VA            | 23436               |
| 00003 Sullivan Ro...   | Des ...      | IA            | 50981               |
| 00006 Birchwood ...    | Lake...      | FL            | 33805               |
| 00006 Roth Plaza       | Fort ...     | AR            | 72916               |
| 00006 Vidon Place      | Dallas       | TX            | 75358               |
| 00027 Judy Place       | Hou...       | TX            | 77293               |
| 00031 Redwing D...     | Minn...      | MN            | 55446               |
| 0003 Novick Trail      | Mont...      | VT            | 05609               |
| 0004 Northport Al...   | Boise        | ID            | 83705               |
| 0004 Superior Alley    | New ...      | NJ            | 08922               |
| 0005 Eagle Crest ...   | Ralei...     | NC            | 27626               |

| first_name | last_name  | guest_type |
|------------|------------|------------|
| Euell      | MacWhirter | Customer   |
| Martainn   | Tordoff    | Customer   |
| Truman     | Cutmore    | Customer   |
| Asher      | Drogan     | Customer   |
| Kelley     | Christley  | Customer   |
| Megan      | McCourtie  | Customer   |
| Free       | Errol      | Customer   |
| Dick       | Steward    | Customer   |
| Bing       | Connal     | Customer   |
| Rea        | Arnason    | Customer   |
| Powell     | Sendley    | Customer   |
| Alastair   | Blacklawe  | Customer   |
| Ada        | Beeze      | Customer   |
| Orran      | Worrall    | Customer   |
| Hyman      | Gabbius    | Customer   |
| Brandise   | Yude       | Customer   |
| Barron     | Dawney     | Customer   |
| Bob        | Adamolli   | Customer   |
| Carroll    | Pudan      | Employee   |
| Abbott     | Poupard    | Customer   |

| customer_id | title  | first_name   | last_name   | suffix | email      | gender | ip_address      | phone      | street_address      | city     | state  | postal_code | latitude | longitude | date_added          | customer_type     |
|-------------|--------|--------------|-------------|--------|------------|--------|-----------------|------------|---------------------|----------|--------|-------------|----------|-----------|---------------------|-------------------|
|             |        |              |             |        |            |        |                 |            |                     |          |        |             |          |           |                     |                   |
| 1           | [null] | Arena        | Riveles     | [null] | arivela... | F      | 98.36.172.246   | [null]     | [null]              | [null]   | [null] | [null]      | [null]   | [null]    | 2017-04-23 00:00:00 | Standard Customer |
| 2           | Dr     | Ode          | Stovin      | [null] | ostovin... | M      | 16.97.59.186    | 314-534... | 2573 Fordem Par...  | Saint... | MO     | 63116       | 38.5814  | -90.2625  | 2014-10-02 00:00:00 | Standard Customer |
| 3           | [null] | Braden       | Jordan      | [null] | bjorda...  | M      | 192.86.248.59   | [null]     | 5651 Kennedy Park   | Pens...  | FL     | 32590       | 30.6143  | -87.2758  | 2018-10-27 00:00:00 | Standard Customer |
| 4           | [null] | Jessika      | Nussen      | [null] | jnusse...  | F      | 159.165.138...  | 615-824... | 224 Village Circle  | Nash...  | TN     | 37215       | 36.0986  | -86.8219  | 2017-09-03 00:00:00 | Standard Customer |
| 5           | [null] | Lonnie       | Rembaud     | [null] | lremba...  | F      | 18.131.58.65    | 786-499... | 38 Lindbergh Way    | Miami    | FL     | 33124       | 25.5584  | -80.4582  | 2014-03-06 00:00:00 | Premium Customer  |
| 6           | [null] | Cortie       | Locksley    | [null] | clocksl... | M      | 140.194.59.82   | [null]     | 6537 Delladonna ... | Miami    | FL     | 33158       | 25.6364  | -80.3187  | 2013-03-31 00:00:00 | Standard Customer |
| 7           | [null] | Wood         | Kenham      | [null] | wkenn...   | M      | 191.190.135...  | 407-552... | 001 Onegard Park    | Orla...  | FL     | 32891       | 28.5663  | -81.2608  | 2011-08-25 00:00:00 | Standard Customer |
| 8           | [null] | Rutger       | Humblestone | [null] | rhumb...   | M      | 77.10.235.191   | 203-551... | 21376 Esker Center  | New ...  | CT     | 06510       | 41.3087  | -72.9271  | 2013-12-15 00:00:00 | Standard Customer |
| 9           | [null] | Melantha     | Tibb        | [null] | mtibb8...  | F      | 155.176.37.1... | 913-590... | 05915 Havey Hill    | Sha...   | KS     | 66225       | 38.8999  | -94.832   | 2016-02-11 00:00:00 | Standard Customer |
| 10          | Ms     | Barbara-anne | Gowlett     | Jr     | bgowle...  | F      | 67.110.62.119   | 915-714... | 9 Kim Point         | El Pa... | TX     | 79940       | 31.6948  | -106.3    | 2012-06-28 00:00:00 | Standard Customer |

| <b>customer_id</b> | <b>region</b> |
|--------------------|---------------|
| bigint             | text          |
| 1                  | Other         |
| 2                  | Other         |
| 3                  | Southe...     |
| 4                  | Southe...     |
| 5                  | Southe...     |
| 6                  | Southe...     |
| 7                  | Southe...     |
| 8                  | New En...     |
| 9                  | Other         |
| 10                 | Other         |

| <b>first_name</b> | <b>last_name</b> | <b>phone</b> |
|-------------------|------------------|--------------|
| text              | text             | text         |
| Aaren             | Norrey           | NO PHONE     |
| Aaren             | Sadat            | 504-559-3464 |
| Aaren             | Whelpdale        | 607-761-2568 |
| Aaren             | Lamlin           | 414-937-4628 |
| Aaren             | Deeman           | NO PHONE     |
| Aarika            | Guerin           | 501-121-5841 |
| Aarika            | Danaher          | 904-175-3112 |
| Aarika            | Chadwell         | 915-856-7492 |
| Aarika            | Emmanuel         | NO PHONE     |
| Aarika            | Mawhinney        | 205-355-4381 |

| <b>product_id</b> | <b>model</b>  | <b>year</b> | <b>product_type</b> | <b>base_msrp</b> | <b>production_start_date</b> | <b>production_end_date</b>  |
|-------------------|---------------|-------------|---------------------|------------------|------------------------------|-----------------------------|
| bigint            | text          | bigint      | text                | numeric          | timestamp without time zone  | timestamp without time zone |
| 1                 | 1 Lemon       | 2010        | scooter             | 399.99           | 2010-03-03 00:00:00          | 2012-06-08 00:00:00         |
| 2                 | 2 Lemon ...   | 2011        | scooter             | 600.00           | 2011-01-03 00:00:00          | 2011-03-30 00:00:00         |
| 3                 | 3 Lemon       | 2013        | scooter             | 499.99           | 2013-05-01 00:00:00          | 2018-12-28 00:00:00         |
| 4                 | 5 Blade       | 2014        | scooter             | 600.00           | 2014-06-23 00:00:00          | 2015-01-27 00:00:00         |
| 5                 | 7 Bat         | 2016        | scooter             | 599.99           | 2016-10-10 00:00:00          | [null]                      |
| 6                 | 8 Bat Limi... | 2017        | scooter             | 600.00           | 2017-02-15 00:00:00          | [null]                      |
| 7                 | 12 Lemon ...  | 2019        | scooter             | 349.99           | 2019-02-04 00:00:00          | [null]                      |

| year   |
|--------|
| bigint |
| 2010   |
| 2011   |
| 2013   |
| 2014   |
| 2015   |
| 2016   |
| 2017   |
| 2019   |

| year   | product_type |
|--------|--------------|
| bigint | text         |
| 2010   | scooter      |
| 2011   | scooter      |
| 2013   | scooter      |
| 2014   | automobile   |
| 2014   | scooter      |
| 2015   | automobile   |
| 2016   | scooter      |
| 2017   | automobile   |
| 2017   | scooter      |
| 2019   | automobile   |
| 2019   | scooter      |

| salesperson_id<br>bigint | dealership_id<br>bigint | title<br>text | first_name<br>text | last_name<br>text | suffix<br>text | username<br>text | gender<br>text | hire_date<br>timestamp without time zone | termination_date<br>timestamp without time zone |
|--------------------------|-------------------------|---------------|--------------------|-------------------|----------------|------------------|----------------|--|---|
| 189                      | 17                      | [null]        | Abby               | Drewery           | [null]         | adrewery58       | Male           | 2015-09-01 00:00:00                      | [null]  |
| 137                      | 4                       | [null]        | Abie               | Brydell           | [null]         | abrydell3s       | Male           | 2016-11-04 00:00:00                      | [null]  |
| 27                       | 4                       | [null]        | Ad                 | Loding            | [null]         | alodingq         | Male           | 2017-06-27 00:00:00                      | [null]  |
| 63                       | 2                       | [null]        | Adrianne           | Otham             | [null]         | aotham1q         | Female         | 2014-12-20 00:00:00                      | [null]  |
| 272                      | 7                       | [null]        | Afton              | Limon             | [null]         | alinmon7j        | Female         | 2014-09-01 00:00:00                      | [null]  |
| 35                       | 17                      | [null]        | Agnella            | Linke             | [null]         | alinkey          | Female         | 2018-10-23 00:00:00                      | [null]  |
| 161                      | 18                      | [null]        | Aile               | Dobbing           | [null]         | adobbbing4g      | Female         | 2014-08-14 00:00:00                      | 2016-10-03 00:00:00                             |
| 136                      | 3                       | [null]        | Alanna             | Dufaire           | [null]         | adufaire3r       | Female         | 2014-06-27 00:00:00                      | [null]  |
| 147                      | 6                       | [null]        | Alaric             | Serrick           | [null]         | asterrick42      | Male           | 2014-06-17 00:00:00                      | [null]  |
| 221                      | 19                      | [null]        | Alberik            | Polglase          | [null]         | apolglase64      | Male           | 2015-11-19 00:00:00                      | [null]  |
| 139                      | 18                      | [null]        | Alexina            | Coatsworth        | [null]         | acoatswort...    | Female         | 2015-07-27 00:00:00                      | [null]  |
| 100                      | 18                      | [null]        | Alie               | Bellfield         | [null]         | abellfield2r     | Female         | 2017-12-11 00:00:00                      | [null]  |
| 287                      | 7                       | [null]        | Allayne            | Billingham        | [null]         | abiltingham7y    | Male           | 2014-08-06 00:00:00                      | [null]  |

| customer_id<br>bigint | title<br>text | first_name<br>text | last_name<br>text | suffix<br>text | email<br>text | gender<br>text | ip_address<br>text | phone<br>text | street_address<br>text | city<br>text | state<br>text | postal_code<br>text | latitude<br>double precision | longitude<br>double precision | date_added<br>timestamp without time zone |
|-----------------------|---------------|--------------------|-------------------|----------------|---------------|----------------|--------------------|---------------|------------------------|--------------|---------------|---------------------|------------------------------|-------------------------------|---|
| 1                     | [null]        | Arlena             | Riveles           | [null]         | arivele...    | F              | 98.36.172.246      | [null]        | [null]                 | [null]       | [null]        | [null]              | [null]                       | [null]                        | 2017-04-23 00:00:00                       |
| 4                     | [null]        | Jessika            | Nussen            | [null]         | jnusse...     | F              | 159.165.138...     | 615-824...    | 224 Village Circle     | Nash...      | TN            | 37215               | 36.0986                      | -86.8219                      | 2017-09-03 00:00:00                       |
| 5                     | [null]        | Lonn               | Rembaud           | [null]         | lremba...     | F              | 18.131.58.65       | 786-499...    | 38 Lindbergh Way       | Miami        | FL            | 33124               | 25.5584                      | -80.4582                      | 2014-03-06 00:00:00                       |
| 6                     | [null]        | Cortie             | Locksley          | [null]         | clocksl...    | M              | 140.194.59.82      | [null]        | 6537 Delladonna ...    | Miami        | FL            | 33158               | 25.6364                      | -80.3187                      | 2013-03-31 00:00:00                       |
| 7                     | [null]        | Wood               | Kennham           | [null]         | wkenn...      | M              | 191.190.135...     | 407-552...    | 001 Onsgard Park       | Orla...      | FL            | 32891               | 28.5663                      | -81.2608                      | 2011-08-25 00:00:00                       |
| 7                     | [null]        | Wood               | Kennham           | [null]         | wkenn...      | M              | 191.190.135...     | 407-552...    | 001 Onsgard Park       | Orla...      | FL            | 32891               | 28.5663                      | -81.2608                      | 2011-08-25 00:00:00                       |
| 7                     | [null]        | Wood               | Kennham           | [null]         | wkenn...      | M              | 191.190.135...     | 407-552...    | 001 Onsgard Park       | Orla...      | FL            | 32891               | 28.5663                      | -81.2608                      | 2011-08-25 00:00:00                       |
| 11                    | Mrs           | Urbano             | Middlehurst       | [null]         | umiddl...     | M              | 185.118.6.23       | 918-339...    | 5203 7th Trail         | Tulsa        | OK            | 74156               | 36.3024                      | -95.9605                      | 2011-10-22 00:00:00                       |
| 12                    | Mr            | Tyne               | Duggan            | [null]         | tdugga...     | F              | 13.29.231.228      | [null]        | [null]                 | [null]       | [null]        | [null]              | [null]                       | [null]                        | 2017-10-25 00:00:00                       |

## Chapter 4:

|              |
|--------------|
| <b>count</b> |
| bigint       |

50000

|              |
|--------------|
| <b>count</b> |
| bigint       |

51

| Function                         | Explanation   |
|----------------------------------|---|
| COUNT(columnX)                   | Counts the number of rows in columnX that have a non-NULL value.  |
| COUNT(*)                         | Counts the number of rows in the output table.  |
| MIN(columnX)                     | Returns the minimum value in columnX. For text columns, it returns the value that would appear first alphabetically.      |
| MAX(columnX)                     | Returns the maximum value in columnX.   |
| SUM(columnX)                     | Returns the sum of all values in columnX.   |
| AVG(columnX)                     | Returns the average of all values in columnX.   |
| STDDEV(columnX)                  | Returns the sample standard deviation of all values in columnX.   |
| VAR(columnX)                     | Returns the sample variance of all values in columnX.   |
| REGR_SLOPE(columnX, columnY)     | Returns the slope of a linear regression for columnX as the response variable, and columnY as the predictor variable.     |
| REGR_INTERCEPT(columnX, columnY) | Returns the intercept of a linear regression for columnX as the response variable, and columnY as the predictor variable. |
| CORR(columnX, columnY)           | Calculates the Pearson correlation between columnX and columnY in the data.   |

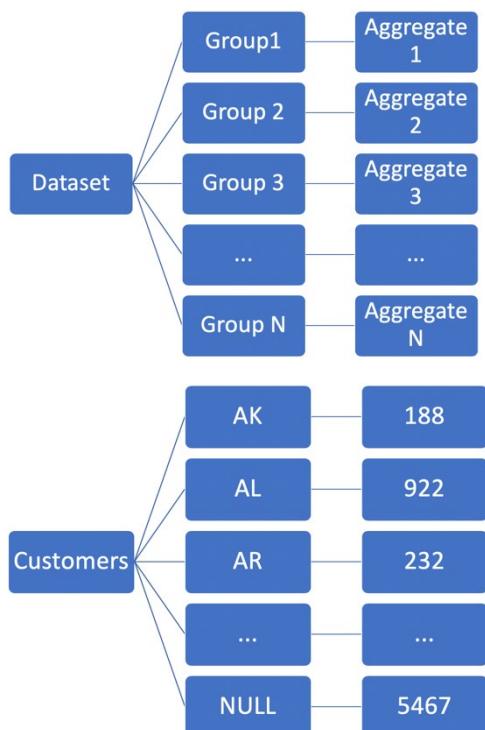
|              |
|--------------|
| <b>count</b> |
| bigint       |

5038

**avg\_base\_msrp**  
double precision

33358.3275

| min<br>numeric | max<br>numeric | avg<br>numeric     | stddev<br>numeric |
|----------------|----------------|--------------------|-------------------|
| 349.99         | 115000.00      | 33358.327500000000 | 44484.40866379    |



| state<br>text | count<br>bigint |
|---------------|-----------------|
| KS            | 619             |
| [null]        | 5467            |
| CA            | 5038            |
| NH            | 77              |
| OR            | 386             |
| ND            | 93              |
| TX            | 4865            |
| NV            | 643             |
| KY            | 598             |

| state<br>text | count<br>bigint |
|---------------|-----------------|
| AK            | 188             |
| AL            | 922             |
| AR            | 232             |
| AZ            | 931             |
| CA            | 5038            |
| CO            | 1042            |
| CT            | 576             |
| DC            | 1447            |
| DE            | 149             |

| state<br>text | count<br>bigint |
|---------------|-----------------|
| VT            | 16              |
| WY            | 23              |
| ME            | 25              |
| RI            | 47              |
| NH            | 77              |
| ND            | 93              |
| MT            | 122             |
| SD            | 124             |
| DE            | 149             |

| state<br>text | count<br>bigint |
|---------------|-----------------|
| AK            | 87              |
| AL            | 489             |
| AR            | 120             |
| AZ            | 415             |
| CA            | 2572            |
| CO            | 526             |
| CT            | 301             |
| DC            | 713             |
| DE            | 74              |

| state<br>text | gender<br>text | count<br>bigint |
|---------------|----------------|-----------------|
| AK            | F              | 101             |
| AK            | M              | 87              |
| AL            | F              | 433             |
| AL            | M              | 489             |
| AR            | F              | 112             |
| AR            | M              | 120             |
| AZ            | F              | 516             |
| AZ            | M              | 415             |
| CA            | F              | 2466            |

| product_type<br>text | min<br>numeric | max<br>numeric | avg<br>numeric       | stddev<br>numeric |
|----------------------|----------------|----------------|----------------------|-------------------|
| automobile           | 35000.00       | 115000.00      | 79250.000000000000   | 30477.45068079    |
| scooter              | 349.99         | 799.99         | 578.5614285714285714 | 167.971085947212  |

| state<br>text | gender<br>text | count<br>bigint |
|---------------|----------------|-----------------|
| AK            | F              | 101             |
| AK            | M              | 87              |
| AK            | [null]         | 188             |
| AL            | F              | 433             |
| AL            | M              | 489             |
| AL            | [null]         | 922             |
| AR            | F              | 112             |
| AR            | M              | 120             |
| AR            | [null]         | 232             |

| Function                  | Explanation  |
|---------------------------|--|
| mode()                    | Returns the value that appears most often. In the case of a tie, returns the first value in order.                             |
| Percentile_cont(fraction) | Returns a value corresponding to the specified fraction in the ordering, interpolating between adjacent input items if needed. |
| Percentile_disc(fraction) | Returns the first input value whose position in the ordering equals or exceeds the specified fraction.                         |

|                  |
|------------------|
| median           |
| double precision |
| 749.99           |

ERROR: aggregate functions are not allowed in WHERE

LINE 3: WHERE COUNT(\*)>=1000

  ^

SQL state: 42803

Character: 45

| state<br>text | count<br>bigint |
|---------------|-----------------|
| CA            | 5038            |
| CO            | 1042            |
| DC            | 1447            |
| FL            | 3748            |
| GA            | 1251            |
| IL            | 1094            |
| NC            | 1070            |
| NY            | 2395            |
| OH            | 1656            |

|  |
|--|
| <b>missing_state</b><br>double precision |
| 0.10934                                  |

|                             |
|-----------------------------|
| <b>equal_ids</b><br>boolean |
| true                        |

| channel<br>text | product_id<br>bigint | avg_sales_amount<br>double precision |
|-----------------|----------------------|--------------------------------------|
| dealership      | 3                    | 477.253737607644                     |
| dealership      | 4                    | 109822.274881517                     |
| dealership      | 5                    | 664.330132075472                     |
| dealership      | 6                    | 62563.3763837638                     |
| dealership      | 7                    | 573.744146637002                     |
| dealership      | 8                    | 668.850500463391                     |
| dealership      | 9                    | 33402.6845637584                     |
| dealership      | 10                   | 81270.1121794872                     |
| dealership      | 11                   | 91589.7435897436                     |

Chapter 5:

| <b>date_added</b><br>timestamp without time zone | <b>count</b><br>bigint |
|--|------------------------|
| 2010-03-15 00:00:00                              | 11                     |
| 2010-03-16 00:00:00                              | 13                     |
| 2010-03-17 00:00:00                              | 12                     |
| 2010-03-18 00:00:00                              | 19                     |
| 2010-03-19 00:00:00                              | 23                     |
| 2010-03-20 00:00:00                              | 16                     |
| 2010-03-21 00:00:00                              | 20                     |
| 2010-03-22 00:00:00                              | 14                     |
| 2010-03-23 00:00:00                              | 11                     |
| 2010-03-24 00:00:00                              | 21                     |
| 2010-03-25 00:00:00                              | 15                     |

| <b>customer_id</b><br>bigint | <b>title</b><br>text | <b>first_name</b><br>text | <b>last_name</b><br>text | <b>gender</b><br>text | <b>total_customers</b><br>bigint |
|------------------------------|----------------------|---------------------------|--------------------------|-----------------------|----------------------------------|
| 1                            | [null]               | Arlena                    | Riveles                  | F                     | 50000                            |
| 2                            | Dr                   | Ode                       | Stovin                   | M                     | 50000                            |
| 3                            | [null]               | Braden                    | Jordan                   | M                     | 50000                            |
| 4                            | [null]               | Jessika                   | Nussen                   | F                     | 50000                            |
| 5                            | [null]               | Lonnie                    | Rembaud                  | F                     | 50000                            |
| 6                            | [null]               | Cortie                    | Locksley                 | M                     | 50000                            |
| 7                            | [null]               | Wood                      | Kennham                  | M                     | 50000                            |
| 8                            | [null]               | Rutger                    | Humblestone              | M                     | 50000                            |
| 9                            | [null]               | Melantha                  | Tibb                     | F                     | 50000                            |
| 10                           | Ms                   | Barbara-anne              | Gowlett                  | F                     | 50000                            |
| 11                           | Mrs                  | Urbano                    | Middlehurst              | M                     | 50000                            |

| customer_id<br>bigint | title<br>text | first_name<br>text | last_name<br>text | gender<br>text | total_customers<br>bigint |
|-----------------------|---------------|--------------------|-------------------|----------------|---------------------------|
| 1                     | [null]        | Arlena             | Riveles           | F              | 25044                     |
| 2                     | Dr            | Ode                | Stovin            | M              | 24956                     |
| 3                     | [null]        | Braden             | Jordan            | M              | 24956                     |
| 4                     | [null]        | Jessika            | Nussen            | F              | 25044                     |
| 5                     | [null]        | Lonnie             | Rembaud           | F              | 25044                     |
| 6                     | [null]        | Cortie             | Locksley          | M              | 24956                     |
| 7                     | [null]        | Wood               | Kennham           | M              | 24956                     |
| 8                     | [null]        | Rutger             | Humblestone       | M              | 24956                     |
| 9                     | [null]        | Melantha           | Tibb              | F              | 25044                     |
| 10                    | Ms            | Barbara-anne       | Gowlett           | F              | 25044                     |
| 11                    | Mrs           | Urbano             | Middlehurst       | M              | 24956                     |

| customer_id<br>bigint | title<br>text | first_name<br>text | last_name<br>text | gender<br>text | total_customers<br>bigint |
|-----------------------|---------------|--------------------|-------------------|----------------|---------------------------|
| 1                     | [null]        | Arlena             | Riveles           | F              | 1                         |
| 2                     | Dr            | Ode                | Stovin            | M              | 2                         |
| 3                     | [null]        | Braden             | Jordan            | M              | 3                         |
| 4                     | [null]        | Jessika            | Nussen            | F              | 4                         |
| 5                     | [null]        | Lonnie             | Rembaud           | F              | 5                         |
| 6                     | [null]        | Cortie             | Locksley          | M              | 6                         |
| 7                     | [null]        | Wood               | Kennham           | M              | 7                         |
| 8                     | [null]        | Rutger             | Humblestone       | M              | 8                         |
| 9                     | [null]        | Melantha           | Tibb              | F              | 9                         |
| 10                    | Ms            | Barbara-anne       | Gowlett           | F              | 10                        |
| 11                    | Mrs           | Urbano             | Middlehurst       | M              | 11                        |

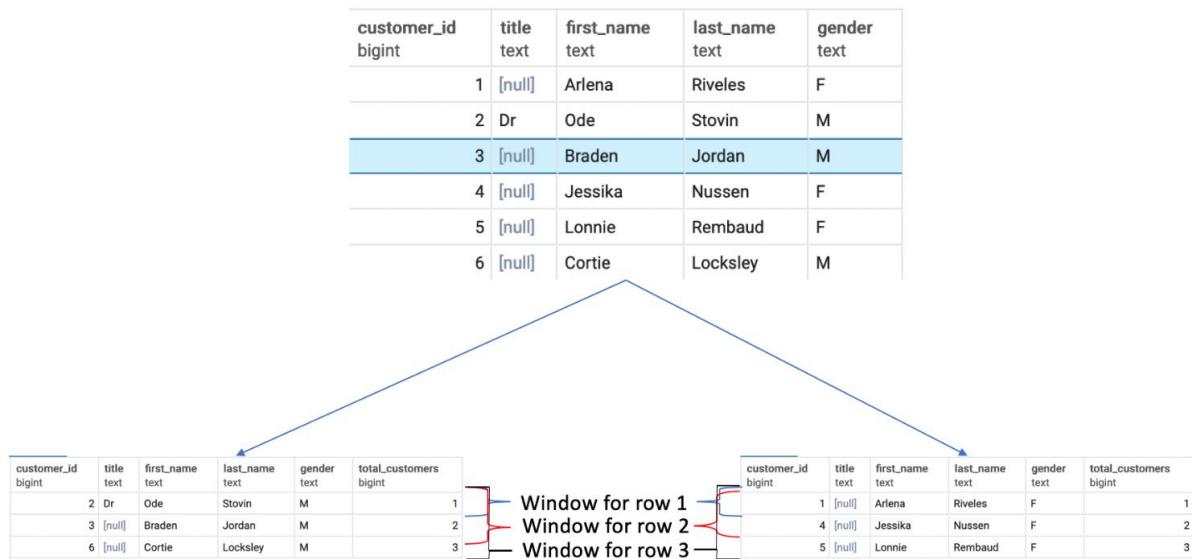
| customer_id<br>bigint | title<br>text | first_name<br>text | last_name<br>text | gender<br>text | total_customers<br>bigint |
|-----------------------|---------------|--------------------|-------------------|----------------|---------------------------|
| 1                     | [null]        | Arlena             | Riveles           | F              |                           |
| 2                     | Dr            | Ode                | Stovin            | M              |                           |
| 3                     | [null]        | Braden             | Jordan            | M              |                           |

1 Window for row 1

2 Window for row 2

3 Window for row 3

| customer_id<br>bigint | title<br>text | first_name<br>text | last_name<br>text | gender<br>text | total_customers<br>bigint |
|-----------------------|---------------|--------------------|-------------------|----------------|---------------------------|
| 1                     | [null]        | Arlena             | Riveles           | F              | 1                         |
| 2                     | Dr            | Ode                | Stovin            | M              | 1                         |
| 3                     | [null]        | Braden             | Jordan            | M              | 2                         |
| 4                     | [null]        | Jessika            | Nussen            | F              | 2                         |
| 5                     | [null]        | Lonnie             | Rembaud           | F              | 3                         |
| 6                     | [null]        | Cortie             | Locksley          | M              | 3                         |
| 7                     | [null]        | Wood               | Kennham           | M              | 4                         |
| 8                     | [null]        | Rutger             | Humblestone       | M              | 5                         |
| 9                     | [null]        | Melantha           | Tibb              | F              | 4                         |
| 10                    | Ms            | Barbara-anne       | Gowlett           | F              | 5                         |
| 11                    | Mrs           | Urbano             | Middlehurst       | M              | 6                         |



| customer_id<br>bigint | street_address<br>text  | date_added<br>date | total_customers_filled_street<br>bigint |
|-----------------------|-------------------------|--------------------|---|
| 2625                  | 0353 Iowa Road          | 2010-03-15         | 10                                      |
| 17099                 | 130 Marcy Crossing      | 2010-03-15         | 10                                      |
| 18685                 | 86 Michigan Junction    | 2010-03-15         | 10                                      |
| 35683                 | 1 Cordelia Crossing     | 2010-03-15         | 10                                      |
| 6173                  | 79865 Hagan Terrace     | 2010-03-15         | 10                                      |
| 12484                 | [null]                  | 2010-03-15         | 10                                      |
| 13390                 | 38463 Forest Dale Way   | 2010-03-15         | 10                                      |
| 7486                  | 61 Village Crossing     | 2010-03-15         | 10                                      |
| 30046                 | 13961 Steensland Trail  | 2010-03-15         | 10                                      |
| 30555                 | 294 Quincy Hill         | 2010-03-15         | 10                                      |
| 48307                 | 8487 Warbler Plaza      | 2010-03-15         | 10                                      |
| 48229                 | 943 Cody Trail          | 2010-03-16         | 22                                      |
| 42776                 | 6010 Carey Drive        | 2010-03-16         | 22                                      |
| 46277                 | 5799 Thackeray Crossing | 2010-03-16         | 22                                      |
| 34189                 | 0 Park Meadow Street    | 2010-03-16         | 22                                      |
| 8571                  | 39223 Lunder Street     | 2010-03-16         | 22                                      |
| 17626                 | 086 East Hill           | 2010-03-16         | 22                                      |
| 17832                 | 62 Delladonna Road      | 2010-03-16         | 22                                      |

| customer_id<br>bigint | title<br>text | first_name<br>text | last_name<br>text | gender<br>text | total_customers<br>bigint | total_customers_title<br>bigint |
|-----------------------|---------------|--------------------|-------------------|----------------|---------------------------|---------------------------------|
| 1                     | [null]        | Arlena             | Riveles           | F              | 1                         | 0                               |
| 2                     | Dr            | Ode                | Stovin            | M              | 1                         | 1                               |
| 3                     | [null]        | Braden             | Jordan            | M              | 2                         | 1                               |
| 4                     | [null]        | Jessika            | Nussen            | F              | 2                         | 0                               |
| 5                     | [null]        | Lonnie             | Rembaud           | F              | 3                         | 0                               |
| 6                     | [null]        | Cortie             | Locksley          | M              | 3                         | 1                               |
| 7                     | [null]        | Wood               | Kennham           | M              | 4                         | 1                               |
| 8                     | [null]        | Rutger             | Humblestone       | M              | 5                         | 1                               |
| 9                     | [null]        | Melantha           | Tibb              | F              | 4                         | 0                               |
| 10                    | Ms            | Barbara-anne       | Gowlett           | F              | 5                         | 1                               |
| 11                    | Mrs           | Urbano             | Middlehurst       | M              | 6                         | 2                               |
| 12                    | Mr            | Tyne               | Duggan            | F              | 6                         | 2                               |
| 13                    | [null]        | Gannon             | Braker            | M              | 7                         | 2                               |
| 14                    | [null]        | Derry              | Lyburn            | M              | 8                         | 2                               |
| 15                    | [null]        | Nichols            | Espinay           | M              | 9                         | 2                               |

| Function                       | Explanation   |
|--------------------------------|---|
| ROW_NUMBER()                   | Gives the current row number within a partition   |
| RANK()                         | Gives a ranking within the partition based on ORDER BY, creating gaps when there are ties (for example, if row 1 and row 2 are both tied for 1, then row 3 will get the ranking 3)    |
| DENSE_RANK()                   | Gives a ranking within the partition based on ORDER BY, creating no gaps when there are ties (for example, if row 1 and row 2 are both tied for 1, then row 3 will get the ranking 2) |
| NTILE( <i>num_buckets</i> )    | Assigns an n-tile within a partition based on ORDER BY, where n is determined by the <i>num_buckets</i> integer   |
| LAG( <i>column1, offset</i> )  | Returns the value of <i>column 1</i> that is integer <i>offset</i> rows before the current row based on ORDER BY  |
| LEAD( <i>column1, offset</i> ) | Returns the value of <i>column 1</i> that is integer <i>offset</i> rows after the current row based on ORDER BY   |

| salesperson_id<br>bigint | dealership_id<br>bigint | title<br>text | first_name<br>text | last_name<br>text | suffix<br>text | username<br>text | gender<br>text | hire_date<br>timestamp without time zone | termination_date<br>timestamp without time zone | rank<br>bigint |
|--------------------------|-------------------------|---------------|--------------------|-------------------|----------------|------------------|----------------|--|---|----------------|
| 65                       | 1                       | [null]        | Dukie              | Oxteby            | [null]         | doxteby1s        | Male           | 2015-01-24 00:00:00                      | [null]  | 1              |
| 74                       | 1                       | [null]        | Marcos             | Spong             | [null]         | mspong21         | Male           | 2015-03-18 00:00:00                      | [null]  | 2              |
| 60                       | 1                       | [null]        | Eveleen            | Mace              | [null]         | emace1n          | Female         | 2015-07-15 00:00:00                      | [null]  | 3              |
| 87                       | 1                       | [null]        | Quent              | Wogden            | [null]         | qwogden2e        | Male           | 2015-08-17 00:00:00                      | [null]  | 4              |
| 98                       | 1                       | [null]        | Englebert          | Lorraine          | [null]         | elorraine2p      | Male           | 2016-01-23 00:00:00                      | [null]  | 5              |
| 31                       | 1                       | [null]        | Lelia              | Sheriff           | [null]         | lsheriffu        | Female         | 2016-06-18 00:00:00                      | [null]  | 6              |
| 168                      | 1                       | [null]        | Sheff              | McCoughan         | [null]         | smccougha...     | Male           | 2016-07-22 00:00:00                      | [null]  | 7              |
| 49                       | 1                       | [null]        | Nadia              | Rennick           | [null]         | nrennick1c       | Female         | 2016-07-24 00:00:00                      | [null]  | 8              |
| 10                       | 1                       | [null]        | Jereme             | Onele             | [null]         | jonele9          | Male           | 2016-08-15 00:00:00                      | [null]  | 9              |
| 7                        | 1                       | [null]        | Granville          | Fidell            | [null]         | gfidell6         | Male           | 2017-06-17 00:00:00                      | [null]  | 10             |
| 155                      | 1                       | [null]        | Ira                | Meere             | [null]         | imeere4a         | Male           | 2017-09-11 00:00:00                      | [null]  | 11             |
| 297                      | 1                       | [null]        | Shay               | Nafziger          | Sr             | snafziger88      | Male           | 2017-12-03 00:00:00                      | [null]  | 12             |
| 183                      | 1                       | [null]        | Eleen              | McAndie           | [null]         | emcandie52       | Female         | 2018-07-08 00:00:00                      | [null]  | 13             |
| 170                      | 1                       | [null]        | Giselbert          | Schule            | [null]         | gschule4p        | Male           | 2018-08-01 00:00:00                      | [null]  | 14             |
| 162                      | 1                       | [null]        | Cristine           | Gibbens           | [null]         | cgibbens4h       | Female         | 2018-10-07 00:00:00                      | [null]  | 15             |
| 258                      | 1                       | [null]        | Dorie              | Dosedale          | [null]         | ddosedale75      | Male           | 2018-10-15 00:00:00                      | [null]  | 16             |
| 92                       | 1                       | Rev           | Sandye             | Duny              | [null]         | sduny2j          | Female         | 2019-01-03 00:00:00                      | [null]  | 17             |
| 39                       | 1                       | [null]        | Massimiliano       | McSpirron         | [null]         | mmcspirron...    | Male           | 2019-02-12 00:00:00                      | [null]  | 18             |

| <b>sales_transaction_date</b><br>date | <b>sales_moving_average_7</b><br>double precision |
|---------------------------------------|---|
| 2010-03-10                            | [null]  |
| 2010-03-12                            | [null]  |
| 2010-03-15                            | [null]  |
| 2010-03-17                            | [null]  |
| 2010-03-18                            | [null]  |
| 2010-03-19                            | [null]  |
| 2010-03-21                            | 394.275857142857                                  |
| 2010-03-23                            | 394.990125  |
| 2010-03-24                            | 399.99  |
| 2010-03-25                            | 399.99  |
| 2010-03-29                            | 449.98875   |
| 2010-04-01                            | 544.986375  |
| 2010-04-02                            | 594.985125  |
| 2010-04-03                            | 594.985125  |
| 2010-04-04                            | 589.98525   |
| 2010-04-05                            | 589.98525   |
| 2010-04-06                            | 639.984   |
| 2010-04-07                            | 689.98275   |

| <b>sales_transaction_date</b><br>date | <b>total_sales</b><br>double precision | <b>max_sales_30</b><br>double precision |
|---------------------------------------|--|---|
| 2019-01-01                            | 87694.844                              | 316464.847                              |
| 2019-01-02                            | 76149.854                              | 316464.847                              |
| 2019-01-03                            | 161269.809                             | 316464.847                              |
| 2019-01-04                            | 193209.912                             | 316464.847                              |
| 2019-01-05                            | 49469.77                               | 316464.847                              |
| 2019-01-06                            | 96319.835                              | 316464.847                              |
| 2019-01-07                            | 42239.837                              | 316464.847                              |
| 2019-01-08                            | 101729.748                             | 316464.847                              |
| 2019-01-09                            | 118634.902                             | 316464.847                              |
| 2019-01-10                            | 100089.78                              | 316464.847                              |
| 2019-01-11                            | 183209.871                             | 283849.84                               |

| <b>dealership_id</b><br>double precision | <b>total_sales_amount</b><br>double precision | <b>ntile</b><br>integer |
|--|---|-------------------------|
| 13                                       | 538079.414                                    | 1                       |
| 9  | 618263.995                                    | 1                       |
| 8  | 671619.251                                    | 2                       |
| 4  | 905158.609                                    | 2                       |
| 17                                       | 907058.842                                    | 3                       |
| 20                                       | 949849.053                                    | 3                       |
| 12                                       | 1086033.376                                   | 4                       |
| 15                                       | 1197118.234                                   | 4                       |
| 6  | 1316253.465                                   | 5                       |
| 14                                       | 1551108.481                                   | 5                       |
| 3  | 1622872.801                                   | 6                       |
| 16                                       | 1981062.341                                   | 6                       |

## Chapter 6:

```
customer_id,title,first_name,last_name,suffix,email,gender,ip_address,phone,street_address,city,state,postal_code,latitude,longitude,date_added
1,,Arlena,Riveles,,ariveles@stumbleupon.com,F,98.36.172.246,,,,,,2017-04-23 00:00:00
2,Dr,Ode,Stovin,,ostovin1@npr.org,M,16.97.59.186,314-534-4361,2573 Fordem Parkway,Saint Louis,MO,63116,38.5814,-90.2625,2014-10-02 00:00:00
3,,Bradon,Jordan,,bjordan2@geocities.com,M,192.86.248.59.,5651 Kennedy Park,Pensacola,FL,32590,30.6143,-87.2758,2018-10-27 00:00:00
4,,Jessika,Nussen,,jnussen3@salon.com,F,159.165.138.166,615-824-2506,224 Village Circle,Nashville,TN,37215,36.0986,-86.8219,2017-09-03 00:00:00
5,,Lonnrie,Rembaud,,lrembaud4@discovery.com,F,18.131.58.65,786-499-3431,38 Lindbergh Way,Miami,FL,33124,25.5584,-80.4582,2014-03-06 00:00:00
```

**COPY 5**

**Time: 22.208 ms**

```
customer_id,title,first_name,last_name,suffix,email,gender,ip_address,phone,street_address,city,state,postal_code,latitude,longitude,date_added
1,,Arlena,Riveles,,ariveles@stumbleupon.com,F,98.36.172.246,,,,,,2017-04-23 00:00:00
2,Dr,Ode,Stovin,,ostovin1@npr.org,M,16.97.59.186,314-534-4361,2573 Fordem Parkway,Saint Louis,MO,63116,38.5814,-90.2625,2014-10-02 00:00:00
3,,Bradon,Jordan,,bjordan2@geocities.com,M,192.86.248.59.,5651 Kennedy Park,Pensacola,FL,32590,30.6143,-87.2758,2018-10-27 00:00:00
4,,Jessika,Nussen,,jnussen3@salon.com,F,159.165.138.166,615-824-2506,224 Village Circle,Nashville,TN,37215,36.0986,-86.8219,2017-09-03 00:00:00
5,,Lonnrie,Rembaud,,lrembaud4@discovery.com,F,18.131.58.65,786-499-3431,38 Lindbergh Way,Miami,FL,33124,25.5584,-80.4582,2014-03-06 00:00:00
[sql] #
```

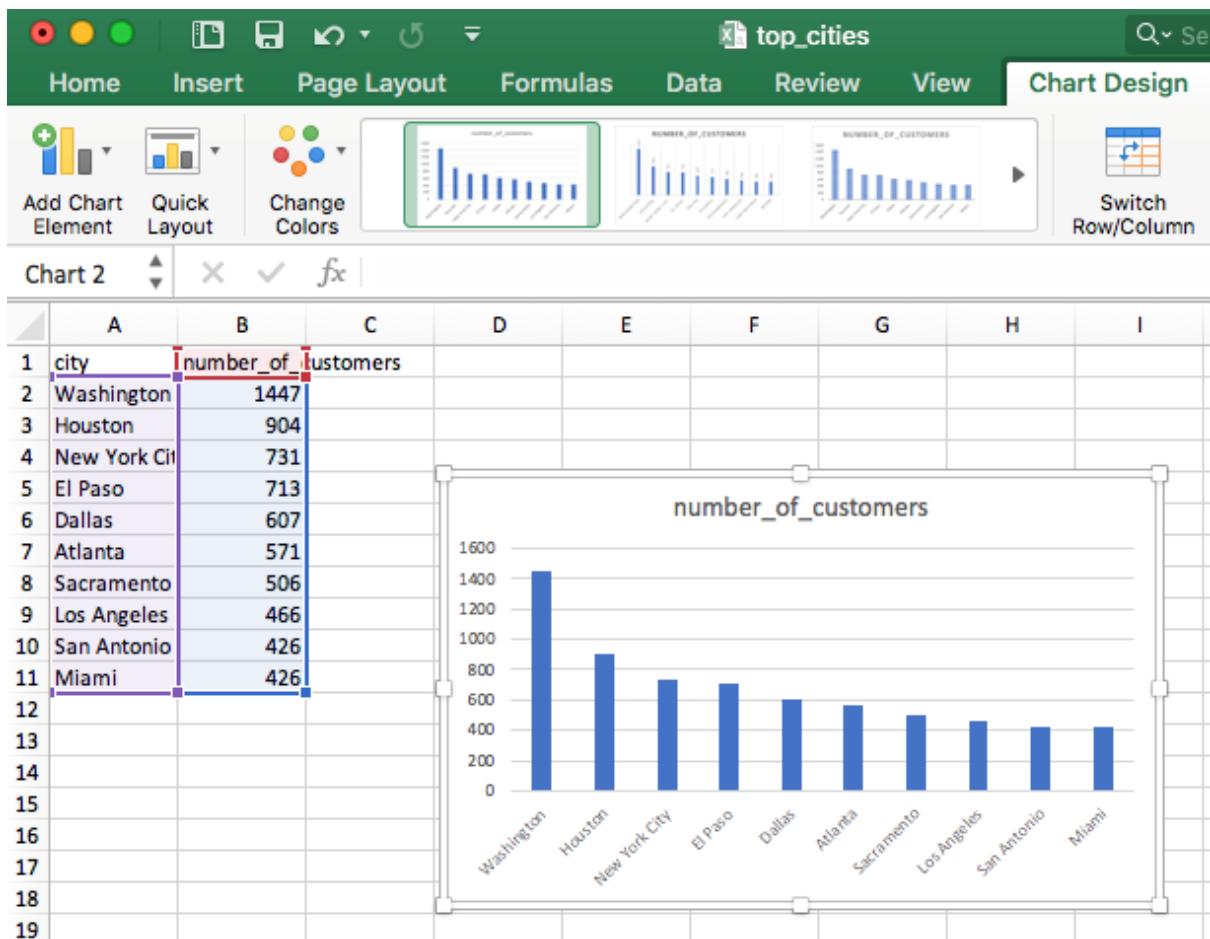
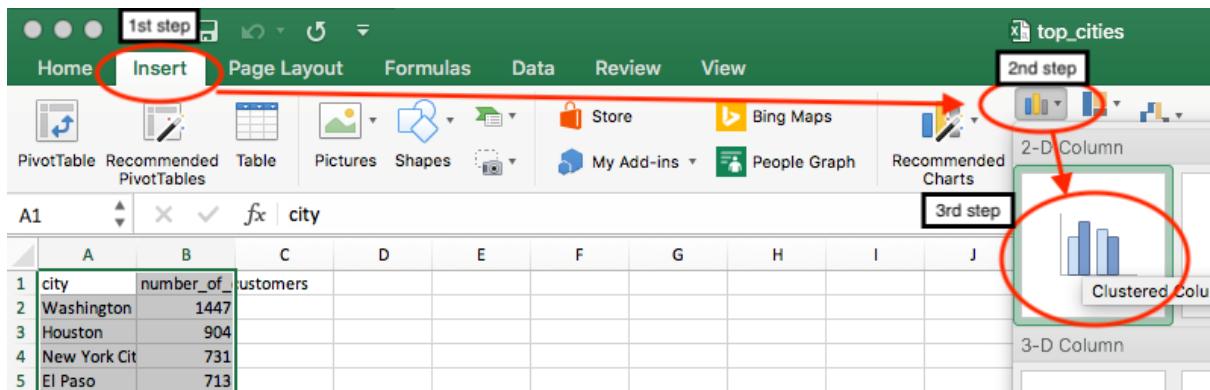
| city          | number_of_customers |
|---------------|---------------------|
| Washington    | 1447                |
| Houston       | 904                 |
| New York City | 731                 |
| El Paso       | 713                 |
| Dallas        | 607                 |
| Atlanta       | 571                 |
| Sacramento    | 506                 |
| Los Angeles   | 466                 |
| San Antonio   | 426                 |
| Miami         | 426                 |

A screenshot of Microsoft Excel showing a table of city names and their corresponding number of customers. The table is located on a sheet titled 'K22'. The columns are labeled 'A', 'B', and 'C'. The data starts at row 1 and includes the following entries:

|    | A            | B                   | C |
|----|--------------|---------------------|---|
| 1  | city         | number_of_customers |   |
| 2  | Washington   | 1447                |   |
| 3  | Houston      | 904                 |   |
| 4  | New York Cit | 731                 |   |
| 5  | El Paso      | 713                 |   |
| 6  | Dallas       | 607                 |   |
| 7  | Atlanta      | 571                 |   |
| 8  | Sacramento   | 506                 |   |
| 9  | Los Angeles  | 466                 |   |
| 10 | San Antonio  | 426                 |   |
| 11 | Miami        | 426                 |   |
| 12 |              |                     |   |

A screenshot of Microsoft Excel showing the same table of city names and customer counts. In this view, rows 1 through 11 are selected, indicated by a green border around the cells in columns A, B, and C. The data is identical to the first table.

|    | A            | B                   | C |
|----|--------------|---------------------|---|
| 1  | city         | number_of_customers |   |
| 2  | Washington   | 1447                |   |
| 3  | Houston      | 904                 |   |
| 4  | New York Cit | 731                 |   |
| 5  | El Paso      | 713                 |   |
| 6  | Dallas       | 607                 |   |
| 7  | Atlanta      | 571                 |   |
| 8  | Sacramento   | 506                 |   |
| 9  | Los Angeles  | 466                 |   |
| 10 | San Antonio  | 426                 |   |
| 11 | Miami        | 426                 |   |
| 12 |              |                     |   |



ion details.

English locale

butors.

d

n publications.

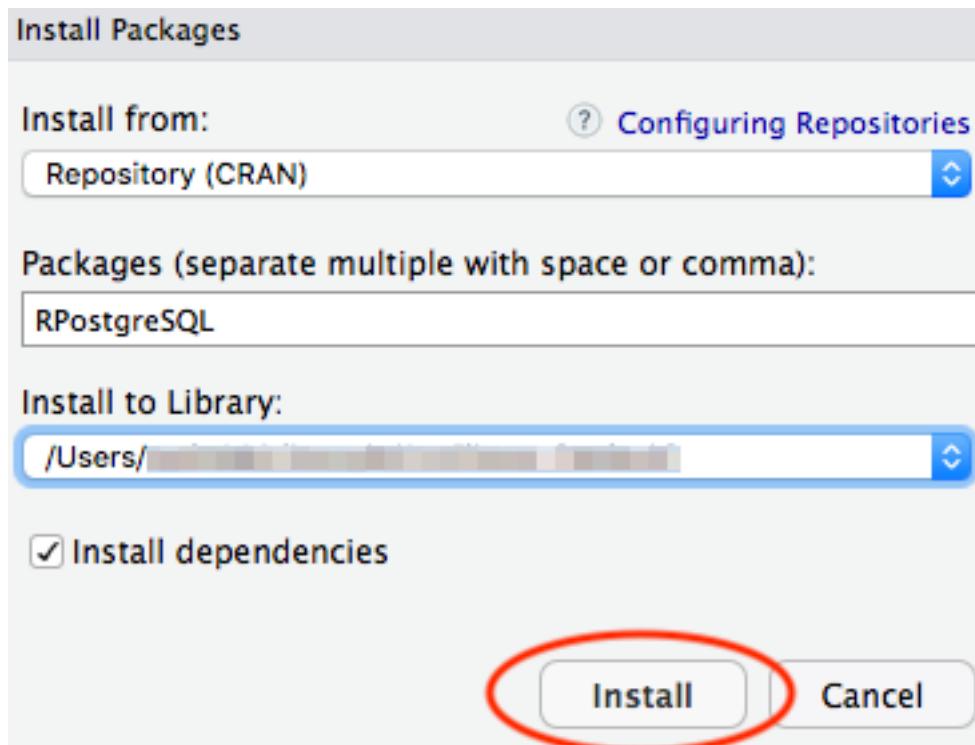
-line help, or  
to help.

Files Plots Packages Help Viewer

Install Update

| Name  | Description  | Version |
|-------|--|---------|
| boot  | Bootstrap Functions (Originally by Angelo Canty for S) | 1.3-20  |
| class | Functions for Classification                           | 7.3-15  |

**System Library**



RStudio

Console Terminal ×

```
~ / 
Type 'q()' to quit R.

> library(RPostgreSQL)
Loading required package: DBI
> con <- dbConnect(PostgreSQL(), host="REDACTED", user="REDACTED", dbname="REDACTED", port=5432)
> result <- dbGetQuery(con, "select * from customers limit 10;")
> result
```

|    | id             | title        | first_name             | last_name      | suffix       | email                       | gender |
|----|----------------|--------------|------------------------|----------------|--------------|-----------------------------|--------|
| 1  | 1              | <NA>         | Worthington            | Hansmann       | <NA>         | whansmann@bbc.co.uk         | Male   |
| 2  | 2              | <NA>         | Ariela                 | Gallear        | <NA>         | agallear1@goodreads.com     | Female |
| 3  | 3              | Ms           | Garrott                | Belleny        | <NA>         | gbelleny2@sciencedirect.com | Male   |
| 4  | 4              | <NA>         | Melodie                | Heinel         | <NA>         | mheinel3@de.vu              | Female |
| 5  | 5              | <NA>         | Bessie                 | Hallsworth     | <NA>         | bhallsworth4@i2i.jp         | Female |
| 6  | 6              | <NA>         | Marius                 | Barkworth      | <NA>         | mbarkworth5@shop-pro.jp     | Male   |
| 7  | 7              | <NA>         | Caleb                  | Verbrugge      | <NA>         | cverbrugge6@lycos.com       | Male   |
| 8  | 8              | <NA>         | Cherry                 | Easen          | <NA>         | ceasen@reuters.com          | Female |
| 9  | 9              | <NA>         | Mindy                  | Ordemann       | <NA>         | mordemann8@gmpg.org         | Female |
| 10 | 10             | <NA>         | Ilene                  | Knaggs         | <NA>         | iknaggs9@google.com.au      | Female |
|    |                | ip_address   | phone                  | street_address | state_abbrev |                             |        |
| 1  | 193.39.147.224 | 714-908-1090 | 50 Ronald Regan Circle |                | CA           |                             |        |
| 2  | 27.189.22.136  | <NA>         | 79 Atwood Parkway      |                | IN           |                             |        |

Environment History Connections

Import Dataset

Global Environment

Data

|        |         |
|--------|---------|
| con    | Formal  |
| result | 10 obs. |

Files Plots Packages Help

Install Update

Name Description

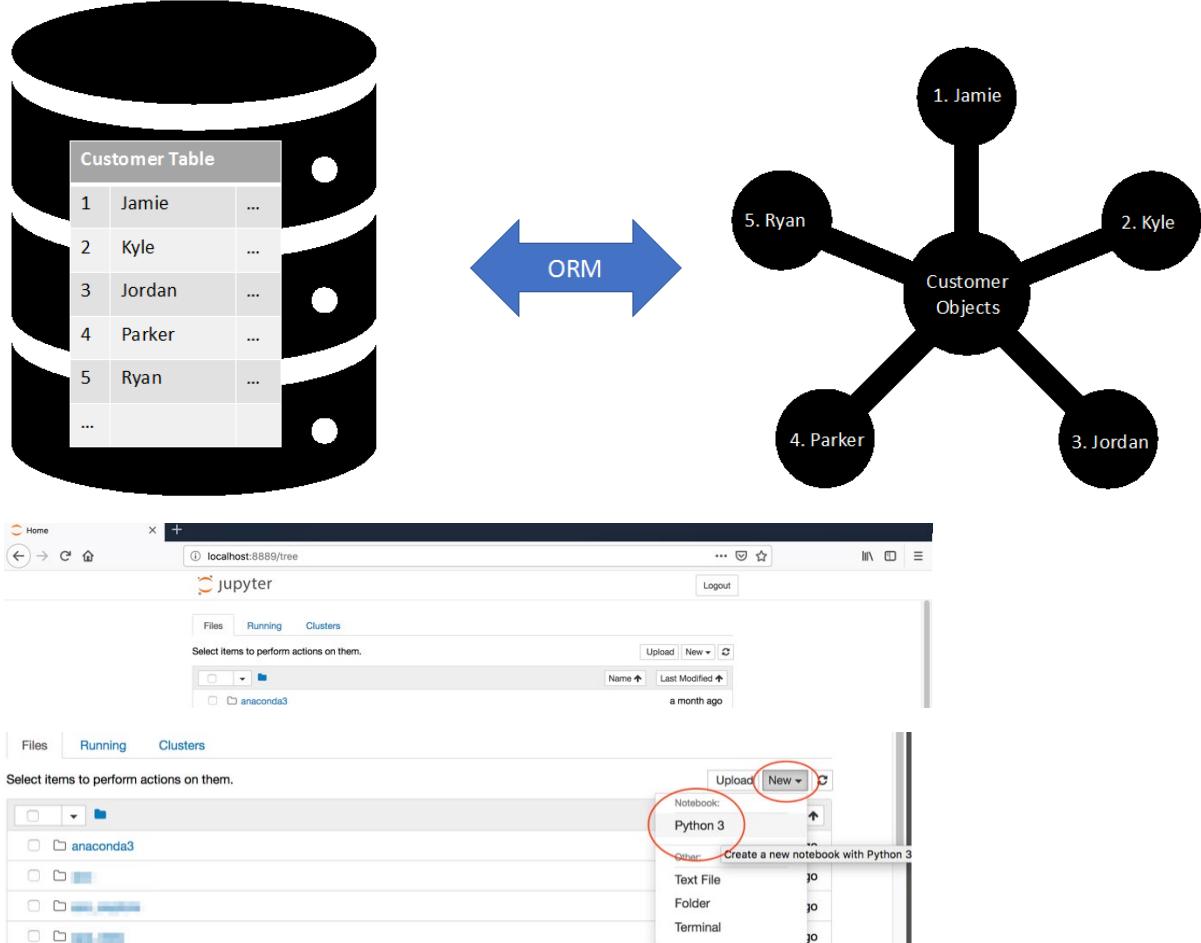
User Library

|   |             |
|---|-------------|
| <input checked="" type="checkbox"/> DBI         | R Database  |
| <input checked="" type="checkbox"/> RPostgreSQL | R Interface |

terminal — python

```
[bash:~$ python
Python 3.6.3 |Anaconda custom (64-bit)| (default, Oct  6 2017, 12:04:38)
[GCC 4.2.1 Compatible Clang 4.0.1 (tags/RELEASE_401/final)] on darwin
Type "help", "copyright", "credits" or "license" for more information.
>>> ]
```

```
[1, None, 'Arlena', 'Riveles', None, 'ariveles@stumbleupon.com', 'F', '98.36.172.246', None, None, None, None, None, None, None, None, datetime.datetime(2017, 4, 23, 0, 0)), (2, 'Dr', 'Ode', 'Stovin', None, 'ostovin1@npr.org', 'M', '16.97.59.186', '314-534-4361', '2573 Fordem Parkway', 'Saint Louis', 'MO', '63116', 38.5814, -90.2625, datetime.datetime(2014, 10, 2, 0, 0)), (3, None, 'Braden', 'Jordan', None, 'bjordan2@geocities.com', 'M', '192.86.248.59', None, '5651 Kennedy Park', 'Pensacola', 'FL', '32590', 30.6143, -87.2758, datetime.datetime(2018, 10, 27, 0, 0)), (4, None, 'Jessika', 'Nussen', None, 'jnussen3@salon.com', 'F', '159.165.138.166', '615-824-2506', '224 Village Circle', 'Nashville', 'TN', '37215', 36.0986, -86.8219, datetime.datetime(2017, 9, 3, 0, 0)), (5, None, 'Lonnie', 'Rembaud', None, 'lrembaud4@discovery.com', 'F', '18.131.58.65', '786-499-3431', '38 Lindbergh Way', 'Miami', 'FL', '33124', 25.5584, -80.4582, datetime.datetime(2014, 3, 6, 0, 0))]
```



```
In [1]: from sqlalchemy import create_engine  
        import pandas
```

In [ ]:

```
Out[4]: [(1, None, 'Arlena', 'Riveles', None, 'ariveles0@stumbleupon.com', 'F', '98.36.172.246', None, datetime.datetime(2017, 4, 23, 0, 0)),  
         (2, 'Dr', 'Ode', 'Stovin', None, 'ostovin1@npr.org', 'M', '16.97.59.186', '314-534-4361', '2573 Fordem Parkway', 'Saint Louis', 'MO', '63116', 38.5814, -90.2625, datetime.datetime(2014, 10, 2, 0, 0))]
```

```

In [1]: from sqlalchemy import create_engine
import pandas as pd
%matplotlib inline

In [2]: cnxn_string = ("postgresql+psycopg2://{}:{}@{}:{}/{}"
                     .format(username, pswd, host, port, database))
print(cnxn_string)
postgresql+psycopg2://{}:{}@{}:{}/{}

In [3]: engine = create_engine(cnxn_string.format(
    username="{}",
    pswd="{}",
    host="{}",
    port=5432,
    database="{}"))

In [4]: engine.execute("SELECT * FROM customers LIMIT 2").fetchall()
Out[4]: [(1, None, 'Arlena', 'Riveles', None, 'ariveles@stumbleupon.com', 'F', '98.36.172.246', None, None, None, None, None, None, None, None, datetime.datetime(2017, 4, 23, 0, 0)),
          (2, 'Dr', 'Ode', 'Stovin', None, 'ostovini@npr.org', 'M', '16.97.59.186', '314-534-4361', '2573 Fordem Parkway', 'Saint Louis', 'MO', '63116', 38.5814, -90.2625, datetime.datetime(2014, 10, 2, 0, 0))]

In [5]: customers_data = pd.read_sql_table('customers', engine)

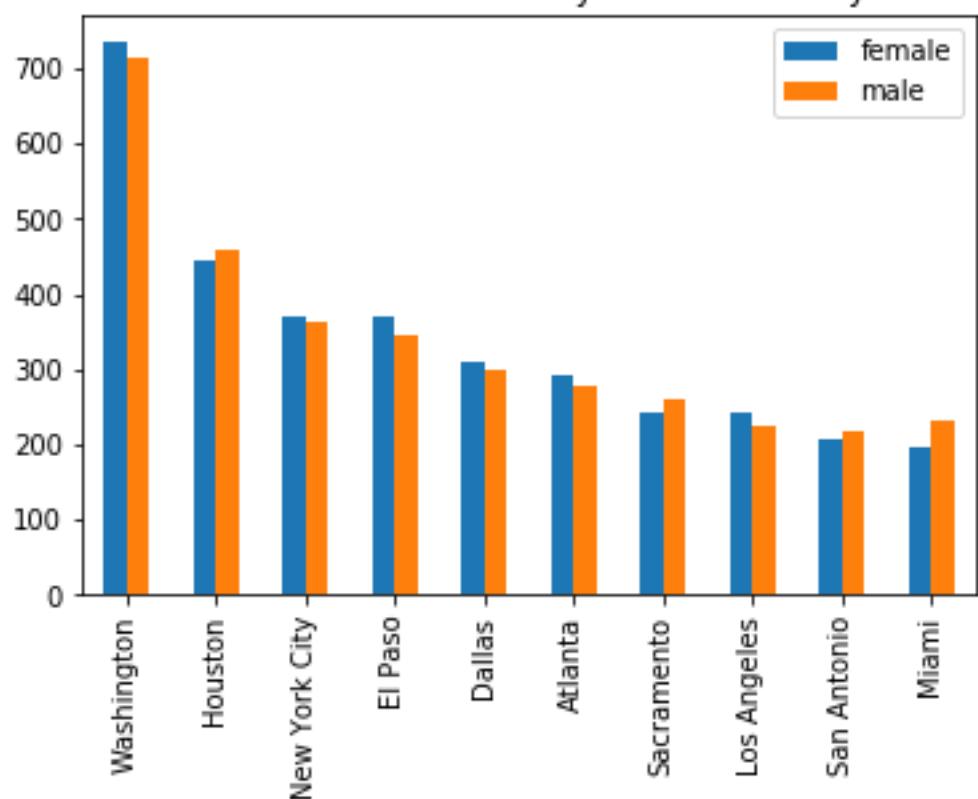
In [ ]:

```

**Out[7]:**

|   | city          | number_of_customers | female | male |
|---|---------------|---------------------|--------|------|
| 0 | Washington    | 1447                | 734    | 713  |
| 1 | Houston       | 904                 | 446    | 458  |
| 2 | New York City | 731                 | 369    | 362  |
| 3 | El Paso       | 713                 | 369    | 344  |
| 4 | Dallas        | 607                 | 309    | 298  |
| 5 | Atlanta       | 571                 | 292    | 279  |
| 6 | Sacramento    | 506                 | 244    | 262  |
| 7 | Los Angeles   | 466                 | 241    | 225  |
| 8 | San Antonio   | 426                 | 207    | 219  |
| 9 | Miami         | 426                 | 195    | 231  |

Number of Customers by Gender and City

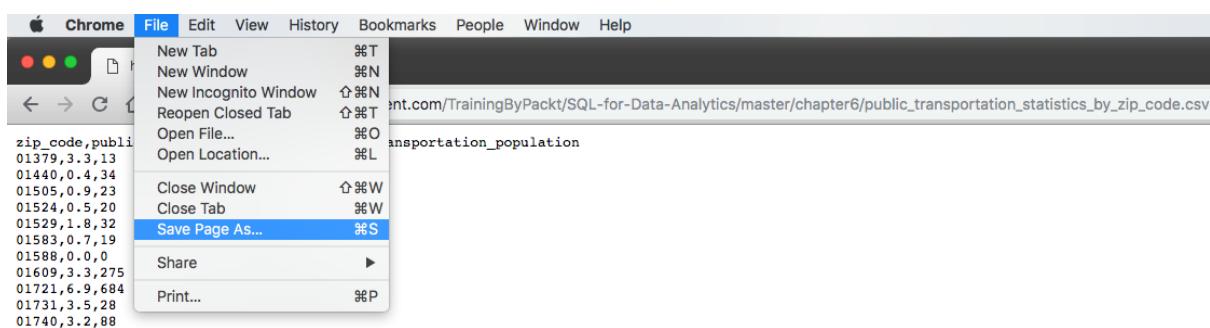


| city          | number_of_customers | female | male |
|---------------|---------------------|--------|------|
| Washington    | 1447                | 734    | 713  |
| Houston       | 904                 | 446    | 458  |
| New York City | 731                 | 369    | 362  |
| El Paso       | 713                 | 369    | 344  |
| Dallas        | 607                 | 309    | 298  |
| Atlanta       | 571                 | 292    | 279  |
| Sacramento    | 506                 | 244    | 262  |
| Los Angeles   | 466                 | 241    | 225  |
| San Antonio   | 426                 | 207    | 219  |
| Miami         | 426                 | 195    | 231  |

(10 rows)

Out[13]:

|   | city          | number_of_customers | female | male |
|---|---------------|---------------------|--------|------|
| 0 | Washington    | 1447                | 734    | 713  |
| 1 | Houston       | 904                 | 446    | 458  |
| 2 | New York City | 731                 | 369    | 362  |
| 3 | El Paso       | 713                 | 369    | 344  |



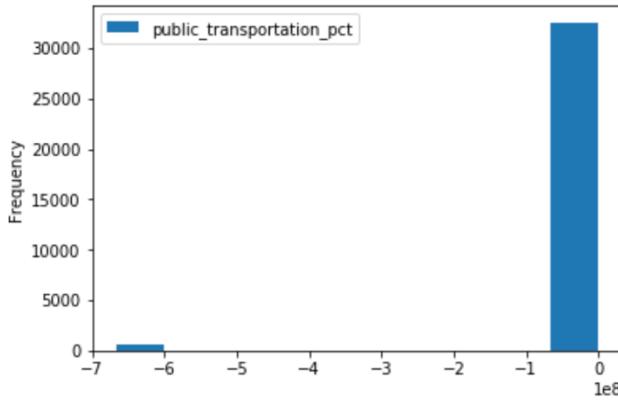
Out[11]:

|   | zip_code | public_transportation_pct | public_transportation_population |
|---|----------|---------------------------|----------------------------------|
| 0 | 01379    | 3.3                       | 13                               |
| 1 | 01440    | 0.4                       | 34                               |
| 2 | 01505    | 0.9                       | 23                               |
| 3 | 01524    | 0.5                       | 20                               |
| 4 | 01529    | 1.8                       | 32                               |

| max_pct  | min_pct                |
|----------|------------------------|
| 100      | -666666666             |
| <hr/>    |                        |
| f        | 0.71703932151117964534 |
| t        | 0.80502739284563325814 |
| (2 rows) |                        |

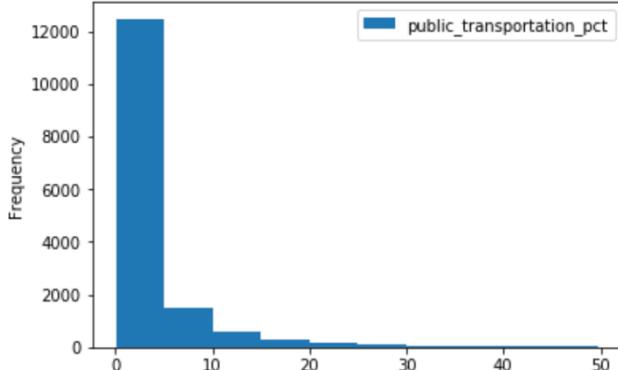
```
In [7]: data.plot.hist(y='public_transportation_pct')

Out[7]: <matplotlib.axes._subplots.AxesSubplot at 0x11b508080>
```



```
In [13]: data = pd.read_sql_query("""
    SELECT *
    FROM public_transportation_by_zip
    WHERE public_transportation_pct > 0
    AND public_transportation_pct < 50""", engine)
data.plot.hist(y='public_transportation_pct')|
```

```
Out[13]: <matplotlib.axes._subplots.AxesSubplot at 0x1193ef160>
```



```
In [4]: import csv
from io import StringIO

def psql_insert_copy(table, conn, keys, data_iter):
    # gets a DBAPI connection that can provide a cursor
    dbapi_conn = conn.connection
    with dbapi_conn.cursor() as cur:
        s_buf = StringIO()
        writer = csv.writer(s_buf)
        writer.writerows(data_iter)
        s_buf.seek(0)

        columns = ', '.join('"{}"'.format(k) for k in keys)
        if table.schema:
            table_name = '{}.{}'.format(table.schema, table.name)
        else:
            table_name = table.name

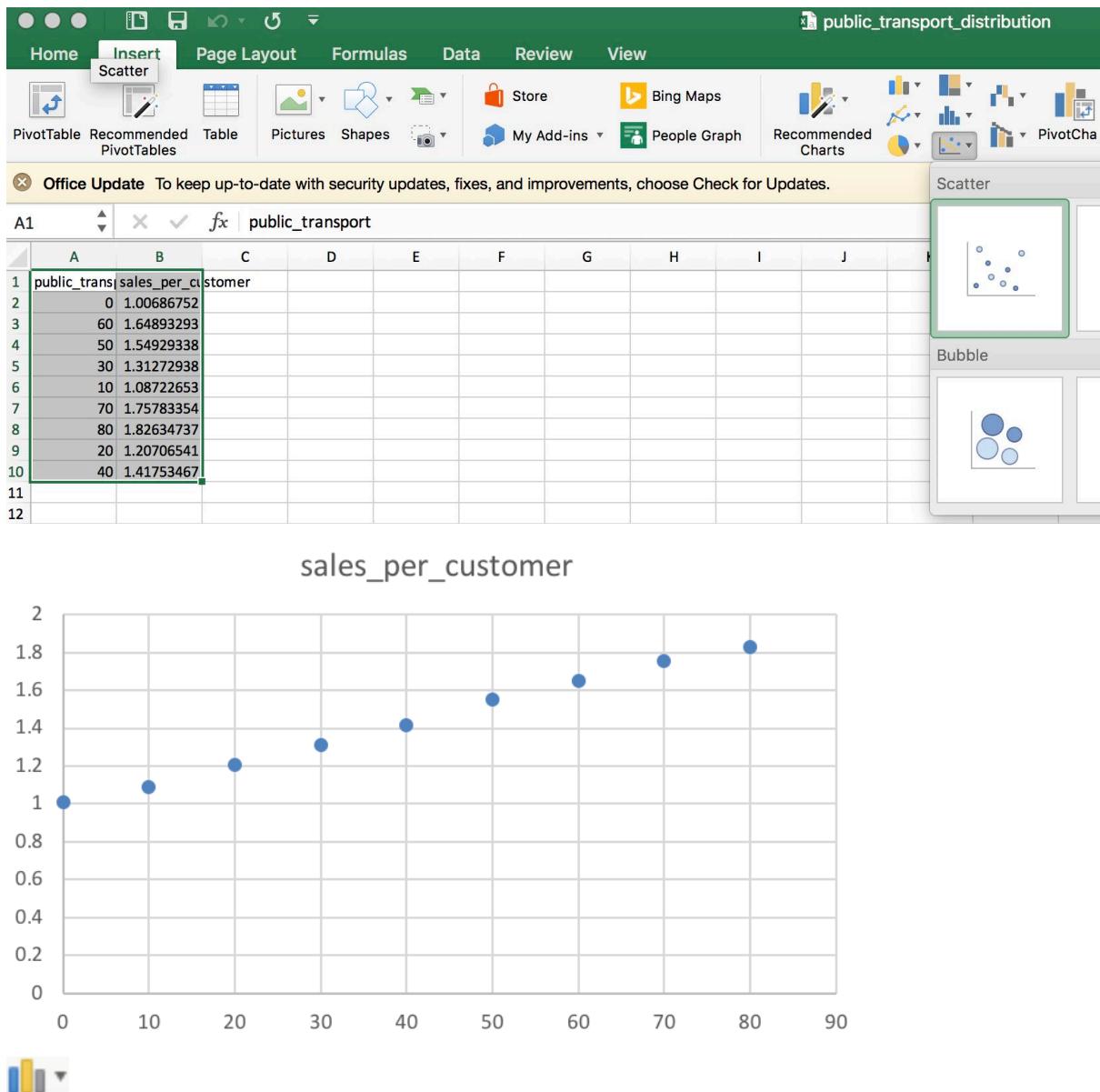
        sql = 'COPY {} ({}) FROM STDIN WITH CSV'.format(
            table_name, columns)
        cur.copy_expert(sql=sql, file=s_buf)

%time data.to_sql('public_transportation_by_zip', engine, method=psql_insert_copy, if_exists='replace')
CPU times: user 102 ms, sys: 21.1 ms, total: 123 ms
Wall time: 1.2 s
```

With COPY: ~1 Second

```
In [5]: %time data.to_sql('public_transportation_by_zip', engine, if_exists='replace')
CPU times: user 4.58 s, sys: 4.16 s, total: 8.75 s
Wall time: 9min 15s
```

Without COPY: ~9 minutes



Chapter 7:

DateStyle

ISO, MDY

(1 row)

| month_date          |  | number_of_sales |
|---------------------|--|-----------------|
| 2018-01-01 00:00:00 |  | 504             |
| 2018-02-01 00:00:00 |  | 487             |
| 2018-03-01 00:00:00 |  | 624             |
| 2018-04-01 00:00:00 |  | 755             |
| 2018-05-01 00:00:00 |  | 945             |
| 2018-06-01 00:00:00 |  | 993             |
| 2018-07-01 00:00:00 |  | 1119            |
| 2018-08-01 00:00:00 |  | 1046            |
| 2018-09-01 00:00:00 |  | 867             |
| 2018-10-01 00:00:00 |  | 780             |
| 2018-11-01 00:00:00 |  | 801             |
| 2018-12-01 00:00:00 |  | 596             |

(12 rows)

| month_date          |  | number_of_new_customers |
|---------------------|--|-------------------------|
| 2018-01-01 00:00:00 |  | 430                     |
| 2018-02-01 00:00:00 |  | 415                     |
| 2018-03-01 00:00:00 |  | 450                     |
| 2018-04-01 00:00:00 |  | 423                     |
| 2018-05-01 00:00:00 |  | 454                     |
| 2018-06-01 00:00:00 |  | 456                     |
| 2018-07-01 00:00:00 |  | 478                     |
| 2018-08-01 00:00:00 |  | 448                     |
| 2018-09-01 00:00:00 |  | 440                     |
| 2018-10-01 00:00:00 |  | 464                     |
| 2018-11-01 00:00:00 |  | 460                     |
| 2018-12-01 00:00:00 |  | 473                     |

(12 rows)

| latitude | longitude |
|----------|-----------|
| NULL     | NULL      |
| 38.5814  | -90.2625  |
| 30.6143  | -87.2758  |
| 36.0986  | -86.8219  |
| 25.5584  | -80.4582  |
| 25.6364  | -80.3187  |
| 28.5663  | -81.2608  |
| 41.3087  | -72.9271  |
| 38.8999  | -94.832   |
| 31.6948  | -106.3    |

(10 rows)

| point              |
|--------------------|
| NULL               |
| (-90.2625,38.5814) |
| (-87.2758,30.6143) |
| (-86.8219,36.0986) |
| (-80.4582,25.5584) |
| (-80.3187,25.6364) |
| (-81.2608,28.5663) |
| (-72.9271,41.3087) |
| (-94.832,38.8999)  |
| (-106.3,31.6948)   |

(10 rows)

| distance_in_miles |
|-------------------|
| 88.1949338379752  |

(1 row)

| avg_dist         | median_dist      |
|------------------|------------------|
| 146.778266080342 | 91.2395829323349 |

(1 row)

| product_type | models   |
|--------------|--|
| automobile   | {"Model Chi","Model Epsilon","Model Gamma","Model Sigma"}                      |
| scooter      | {Bat,"Bat Limited Edition",Blade,Lemon,"Lemon Limited Edition","Lemon Zester"} |

(2 rows)

```
example_ids
-----
123
456
789
(3 rows)
```

```
string_to_array
-----
{hello,there,how,are,you?}
(1 row)
```

```
example_purchased_products
-----
Lemon, Bat Limited Edition
(1 row)
```

| Desired Operation                         | Postgres Function Example   | Example Output |
|---|---|----------------|
| Concatenate two arrays                    | array_cat(ARRAY[1, 2], ARRAY[3, 4])<br>or<br>ARRAY[1, 2]    ARRAY[3, 4] | {1, 2, 3, 4}   |
| Append a value to an array                | array_append(ARRAY[1, 2], 3)<br>or<br>ARRAY[1, 2]    3                  | {1, 2, 3}      |
| Check if a value is contained in an array | 3 = ANY(ARRAY[1, 2])  | f              |
| Check if two arrays overlap               | ARRAY[1, 2, 3] && ARRAY[3, 4]   | t              |
| Check if an array contains another array  | ARRAY[1, 2, 3] @> ARRAY[2, 1]   | t              |

```
row_to_json
-----
{"customer_id":1, +  
 "title":null, +  
 "first_name":"Arlena", +  
 "last_name":"Riveles", +  
 "suffix":null, +  
 "email":"ariveles0@stumbleupon.com",+  
 "gender":"F", +  
 "ip_address":"98.36.172.246", +  
 "phone":null, +  
 "street_address":null, +  
 "city":null, +  
 "state":null, +  
 "postal_code":null, +  
 "latitude":null, +  
 "longitude":null, +  
 "date_added":"2017-04-23T00:00:00"}  
(1 row)
```

```
jsonb_pretty
-----
{ +  
   "email": "ihughillj@nationalgeographic.com",+  
   "phone": null, +  
   "sales": [ +  
     ], +  
   "last_name": "Hughill", +  
   "date_added": "2012-08-08T00:00:00", +  
   "first_name": "Itch", +  
   "customer_id": 20 +  
 }  
(1 row)
```

| keys        |  | values                             |
|-------------|--|------------------------------------|
| email       |  | "ihughillj@nationalgeographic.com" |
| phone       |  | null                               |
| sales       |  | []                                 |
| last_name   |  | "Hughill"                          |
| date_added  |  | "2012-08-08T00:00:00"              |
| first_name  |  | "Itch"                             |
| customer_id |  | 20                                 |

(7 rows)

```
{"email": "nespinaye@51.la", "phone": "818-658-6748", "sales": [{"product_id": 5, "product_name": "Blade", "sales_amount": 559.992, "sales_transaction_date": "2014-07-19T06:33:44"}], "last_name": "Espinay", "date_added": "2014-07-05T00:00:00", "first_name": "Nichols", "customer_id": 15}
```

```
jsonb_pretty
-----
{
    "email": "nespinaye@51.la",
    "phone": "818-658-6748",
    "sales": [
        {
            "product_id": 5,
            "product_name": "Blade",
            "sales_amount": 559.992,
            "sales_transaction_date": "2014-07-19T06:33:44"
        }
    ],
    "last_name": "Espinay",
    "date_added": "2014-07-05T00:00:00",
    "first_name": "Nichols",
    "customer_id": 15
}
(1 row)
```

| rating | feedback  |
|--------|---|
| 9      | I highly recommend the lemon scooter. It's so fast  |
| 10     | I really enjoyed the sale - I was able to get the Bat for a 20% discount  |
| 4      | Overall, the experience was ok. I don't think that the customer service rep was really understanding the issue. |
| 9      | The model epsilon has been a fantastic ride - one of the best cars I have ever driven.                          |
| 9      | I've been riding the scooter around town. It's been good in urban areas.  |

(5 rows)

| word      | rating |
|-----------|--------|
| I         | 9      |
| highly    | 9      |
| recommend | 9      |
| the       | 9      |
| lemon     | 9      |
| scooter.  | 9      |
| It's      | 9      |
| so        | 9      |
| fast      | 9      |
| I         | 10     |

(10 rows)

| token     |  | rating |
|-----------|--|--------|
| NULL      |  | 9      |
| high      |  | 9      |
| recommend |  | 9      |
| NULL      |  | 9      |
| lemon     |  | 9      |
| scooter   |  | 9      |
| NULL      |  | 9      |
| NULL      |  | 9      |
| NULL      |  | 9      |
| fast      |  | 9      |

(10 rows)

| word       |  | avg_rating         |
|------------|--|--------------------|
| pop        |  | 2.0000000000000000 |
| batteri    |  | 2.333333333333333  |
| servic     |  | 2.333333333333333  |
| custom     |  | 2.333333333333333  |
| issu       |  | 2.500000000000000  |
| long       |  | 2.666666666666667  |
| ship       |  | 2.666666666666667  |
| email      |  | 3.500000000000000  |
| help       |  | 4.000000000000000  |
| one        |  | 4.333333333333333  |
| littl      |  | 4.666666666666667  |
| hook       |  | 5.000000000000000  |
| get        |  | 5.000000000000000  |
| work       |  | 5.000000000000000  |
| NULL       |  | 5.1872659176029963 |
| realli     |  | 5.500000000000000  |
| scooter    |  | 5.9090909090909091 |
| ride       |  | 6.750000000000000  |
| model      |  | 7.333333333333333  |
| lemon      |  | 7.666666666666667  |
| great      |  | 7.750000000000000  |
| fast       |  | 8.000000000000000  |
| dealership |  | 9.000000000000000  |
| sale       |  | 9.500000000000000  |
| discount   |  | 9.666666666666667  |

(25 rows)

| rating | feedback   |
|--------|--|
| 1      | I On my second trip one of the tires popped. I would have really expected it to get repaired under the warranty. |
| 3      | I was riding to work and one my wheels popped! It was going to cost \$200 to fix it - what a scam!               |
| 2      | I popped a wheel, and can't seem to fix it.  |

(3 rows)

| feedback   |  | tsvectorized_feedback                                  |
|--|--|--|
| I highly recommend the lemon scooter. It's so fast |  | 'fast':10 'high':2 'lemon':5 'recommend':3 'scooter':6 |

| plainto_tsquery     |
|---------------------|
| 'lemon' & 'scooter' |
| (1 row)             |

| rating | feedback   |
|--------|--|
| 9      | I highly recommend the lemon scooter. It's so fast                             |
| 8      | The lemon scooter has been incredible! I love it!                              |
| 6      | The lemon scooter was a little too fast for me. I will be returning this item. |

(3 rows)

| rating | feedback   |  | searchable  |
|--------|--|--|---|
| 9      | I highly recommend the lemon scooter. It's so fast |  | '9':11 'fast':10 'high':2 'lemon':5 'recommend':3 'scooter':6 |

(1 row)

| rating | feedback   |
|--------|--|
| 8      | I really appreciated having a dealership so close to me - it made the transaction much easier! |
| 9      | The sales people at the dealership were so nice and helpful!                                   |
| 10     | The millburn dealership is the best! Those folks are great!                                    |

(3 rows)

| query                                    |  | count |
|--|--|-------|
| 'lemon' & 'model' & 'sigma'              |  | 340   |
| 'lemon' & 'model' & 'chi'                |  | 331   |
| 'bat' & 'model' & 'epsilon'              |  | 241   |
| 'bat' & 'model' & 'sigma'                |  | 226   |
| 'bat' & 'model' & 'chi'                  |  | 221   |
| 'lemon' & 'model' & 'epsilon'            |  | 217   |
| 'bat' & 'model' & 'gamma'                |  | 153   |
| 'lemon' & 'model' & 'gamma'              |  | 133   |
| 'lemon' & 'zester' & 'model' & 'chi'     |  | 28    |
| 'lemon' & 'zester' & 'model' & 'epsilon' |  | 22    |
| 'blade' & 'model' & 'chi'                |  | 21    |
| 'lemon' & 'zester' & 'model' & 'sigma'   |  | 17    |
| 'blade' & 'model' & 'sigma'              |  | 12    |
| 'lemon' & 'zester' & 'model' & 'gamma'   |  | 11    |
| 'blade' & 'model' & 'epsilon'            |  | 4     |
| 'blade' & 'model' & 'gamma'              |  | 4     |

(16 rows)

Chapter 8:

Type "help" for help.

sqlda=#

## QUERY PLAN

```
Seq Scan on emails  (cost=0.00..9606.58  rows=418158  width=79)
(1 row)
```

## QUERY PLAN

Seq Scan on emails (cost=0.00..9606.58 rows=418158 width=79)  
(1 row)

## QUERY PLAN

```
Seq Scan on emails  (cost=0.00..9606.58 rows=418158 width=79)
(1 row)
```

## QUERY PLAN

```
Seq Scan on emails  (cost=0.00.. 9606.58 rows=418158 width=79)
(1 row)
```

## QUERY PLAN

```
Seq Scan on emails  (cost=0.00..9606.58  rows=418158 width=79)
(1 row)
```

## QUERY PLAN

```
Seq Scan on emails  (cost=0.00..9606.58  rows=418158 width=79)
(1 row)
```

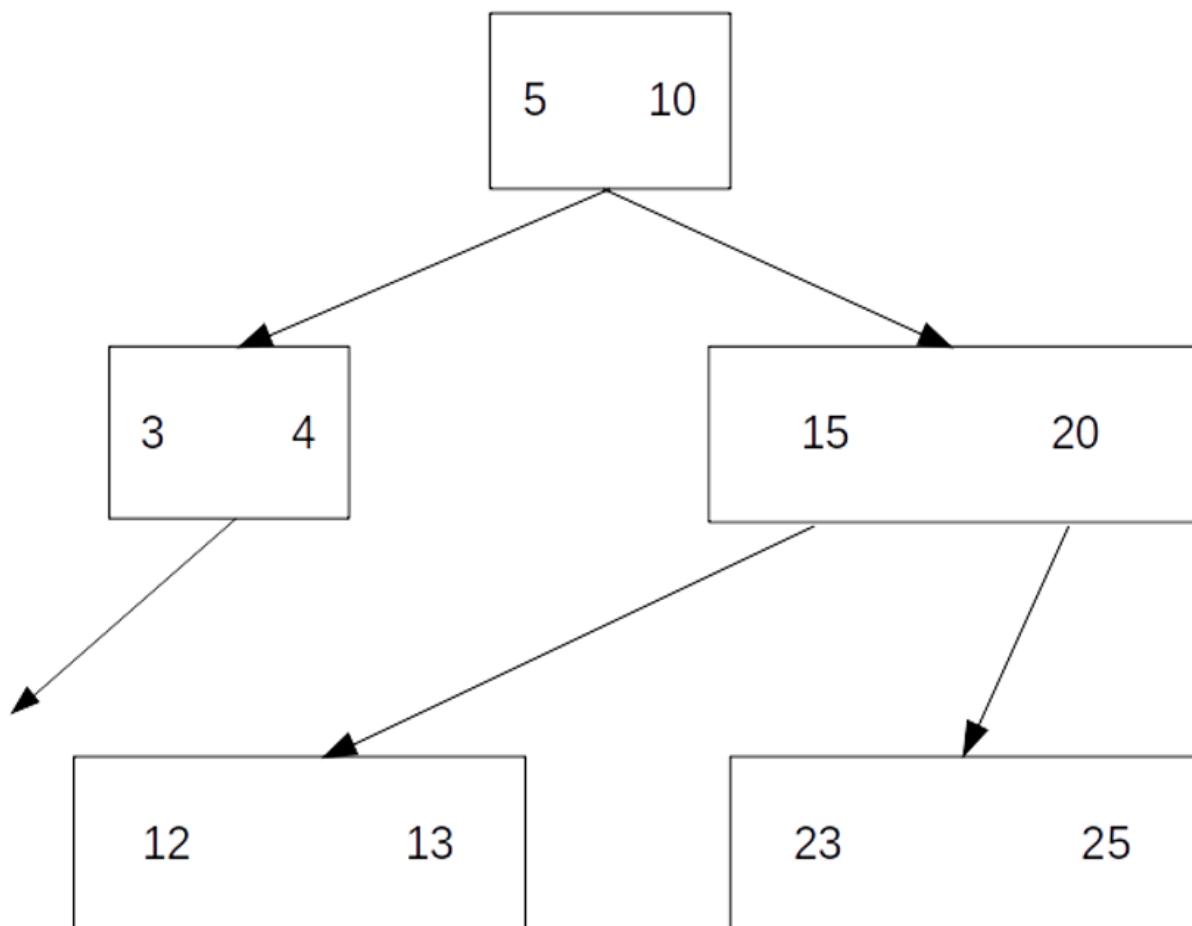
## QUERY PLAN

```
Limit  (cost=0.00..0.11 rows=5 width=79)
      -> Seq Scan on emails  (cost=0.00..9606.58 rows=418158 width=79)
(2 rows)
```

```
Gather  (cost=1000.00..9051.49 rows=130 width=79)
  Workers Planned: 2
    -> Parallel Seq Scan on emails  (cost=0.00..8038.49 rows=54 width=79)
        Filter: ((clicked_date >= '2011-01-01 00:00:00'::timestamp without time zone) AND
(clicked_date <= '2011-02-01 00:00:00'::timestamp without time zone))
(4 rows)
```

## QUERY PLAN

```
Seq Scan on customers  (cost=0.00..1786.00 rows=26439 width=140)
  Filter: ((latitude > '30'::double precision) AND (latitude < '40'::double precision))
(2 rows)
```



Type "help" for help.

```
sqlda=#
```

## QUERY PLAN

```
Seq Scan on customers  (cost=0.00..1661.00 rows=1 width=140)
  Filter: (state = 'F0'::text)
(2 rows)
```

-----  
 QUERY PLAN

```
HashAggregate  (cost=1661.00..1661.51 rows=51 width=3)
  Group Key: state
  -> Seq Scan on customers  (cost=0.00..1536.00 rows=50000 width=3)
```

-----  
 QUERY PLAN

```
Index Scan using ix_state on customers  (cost=0.29..8.31 rows=1 width=140)
  Index Cond: (state = 'F0'::text)
```

-----  
 QUERY PLAN

```
Seq Scan on customers  (cost=0.00..1661.00 rows=24960 width=140)
  Filter: (gender = 'M'::text)
```

|             |  |                             |  |  |  |  |  |
|-------------|--|-----------------------------|--|--|--|--|--|
| state       |  | text                        |  |  |  |  |  |
| postal_code |  | text                        |  |  |  |  |  |
| latitude    |  | double precision            |  |  |  |  |  |
| longitude   |  | double precision            |  |  |  |  |  |
| date_added  |  | timestamp without time zone |  |  |  |  |  |

Indexes:

```
  "ix_gender" btree (gender)
  "ix_state" btree (state)
```

-----  
 QUERY PLAN

```
Seq Scan on customers  (cost=0.00..1661.00 rows=24960 width=140)
  Filter: (gender = 'M'::text)
```

-----  
 QUERY PLAN

```
Seq Scan on customers  (cost=0.00..1786.00 rows=17788 width=140)
  Filter: ((latitude < '38'::double precision) AND (latitude > '30'::double precision))
(2 rows)
```

-----  
 QUERY PLAN

```
Bitmap Heap Scan on customers  (cost=382.62..1685.44 rows=17788 width=140)
  Recheck Cond: ((latitude < '38'::double precision) AND (latitude > '30'::double precision))
  -> Bitmap Index Scan on ix_latitude  (cost=0.00..378.17 rows=17788 width=0)
    Index Cond: ((latitude < '38'::double precision) AND (latitude > '30'::double precision))
(4 rows)
```

-----  
 QUERY PLAN

```
Bitmap Heap Scan on customers  (cost=382.62..1685.44 rows=17788 width=140) (actual time=4.064..12.818 rows=17896 loops=1)
  Recheck Cond: ((latitude < '38'::double precision) AND (latitude > '30'::double precision))
  Heap Blocks: exact=1036
  -> Bitmap Index Scan on ix_latitude  (cost=0.00..378.17 rows=17788 width=0) (actual time=3.700..3.701 rows=17896 loops=1)
    Index Cond: ((latitude < '38'::double precision) AND (latitude > '30'::double precision))
Planning Time: 0.301 ms
Execution Time: 14.582 ms
(7 rows)
```

-----  
 QUERY PLAN

```
Bitmap Heap Scan on customers  (cost=297.67..1600.49 rows=17788 width=140) (actual time=3.107..12.117 rows=17896 loops=1)
  Recheck Cond: ((latitude < '38'::double precision) AND (latitude > '30'::double precision))
  Heap Blocks: exact=1036
  -> Bitmap Index Scan on ix_latitude_less  (cost=0.00..293.23 rows=17788 width=0) (actual time=2.726..2.727 rows=17896 loops=1)
    Planning Time: 0.681 ms
    Execution Time: 13.905 ms
(6 rows)
```

```

-----  

          QUERY PLAN  

-----  

Bitmap Heap Scan on customers  (cost=5.12..318.44 rows=107 width=140) (actual time=0.146..0.440 rows=102 loops=1)  

  Recheck Cond: (suffix = 'Jr'::text)  

  Heap Blocks: exact=100  

    -> Bitmap Index Scan on ix_jr  (cost=0.00..5.09 rows=107 width=0) (actual time=0.092..0.092 rows=102 loops=1)  

      Index Cond: (suffix = 'Jr'::text)  

Planning Time: 0.411 ms  

Execution Time: 0.511 ms  

(7 rows)

-----  

          QUERY PLAN  

-----  

Seq Scan on customers  (cost=0.00..1661.00 rows=24960 width=140) (actual time=0.024..26.937 rows=24956 loops=1)  

  Filter: (gender = 'M'::text)  

  Rows Removed by Filter: 25044  

Planning Time: 0.107 ms  

Execution Time: 29.905 ms  

(5 rows)

-----  

          QUERY PLAN  

-----  

Seq Scan on customers  (cost=0.00..1661.00 rows=24960 width=140) (actual time=0.028..21.504 rows=24956 loops=1)  

  Filter: (gender = 'M'::text)  

  Rows Removed by Filter: 25044  

Planning Time: 0.444 ms  

Execution Time: 23.955 ms  

(5 rows)

-----  

          QUERY PLAN  

-----  

Seq Scan on customers  (cost=0.00..1661.00 rows=24960 width=140) (actual time=0.020..21.596 rows=24956 loops=1)  

  Filter: (gender = 'M'::text)  

  Rows Removed by Filter: 25044  

Planning Time: 0.521 ms  

Execution Time: 24.105 ms  

(5 rows)

sqla=# EXPLAIN ANALYZE SELECT * FROM customers WHERE gender='M';
-----  

          QUERY PLAN  

-----  

Seq Scan on customers  (cost=0.00..1661.00 rows=24960 width=140) (actual time=0.023..22.629 rows=24956 loops=1)  

  Filter: (gender = 'M'::text)  

  Rows Removed by Filter: 25044  

Planning Time: 0.158 ms  

Execution Time: 25.162 ms  

(5 rows)

sqla=# EXPLAIN ANALYZE SELECT * FROM customers WHERE gender='M';
-----  

          QUERY PLAN  

-----  

Seq Scan on customers  (cost=0.00..1661.00 rows=24960 width=140) (actual time=0.023..21.765 rows=24956 loops=1)  

  Filter: (gender = 'M'::text)  

  Rows Removed by Filter: 25044  

Planning Time: 0.153 ms  

Execution Time: 24.198 ms  

(5 rows)

sqla=# EXPLAIN ANALYZE SELECT * FROM customers WHERE gender='M';
-----  

          QUERY PLAN  

-----  

Seq Scan on customers  (cost=0.00..1661.00 rows=24960 width=140) (actual time=0.023..21.758 rows=24956 loops=1)  

  Filter: (gender = 'M'::text)  

  Rows Removed by Filter: 25044  

Planning Time: 0.158 ms  

Execution Time: 24.277 ms  

(5 rows)

sqla=# EXPLAIN ANALYZE SELECT * FROM customers WHERE gender='M';
-----  

          QUERY PLAN  

-----  

Seq Scan on customers  (cost=0.00..1661.00 rows=24960 width=140) (actual time=0.023..21.967 rows=24956 loops=1)  

  Filter: (gender = 'M'::text)  

  Rows Removed by Filter: 25044  

Planning Time: 0.163 ms  

Execution Time: 24.444 ms  

(5 rows)

```

-----  
QUERY PLAN

```
Seq Scan on customers  (cost=0.00..1661.00 rows=24960 width=140) (actual time=0.020..22.642 rows=24956 loops=1)
  Filter: (gender = 'M'::text)
  Rows Removed by Filter: 25044
Planning Time: 0.300 ms
Execution Time: 25.155 ms
(5 rows)
```

-----  
QUERY PLAN

```
Seq Scan on customers  (cost=0.00..1661.00 rows=1 width=140) (actual time=22.293..22.293 rows=0 loops=1)
  Filter: (state = 'FO'::text)
  Rows Removed by Filter: 50000
Planning Time: 0.188 ms
Execution Time: 22.328 ms
(5 rows)
```

-----  
QUERY PLAN

```
Index Scan using ix_state on customers  (cost=0.29..8.31 rows=1 width=140) (actual time=0.060..0.060 rows=0 loops=1)
  Index Cond: (state = 'FO'::text)
Planning Time: 0.374 ms
Execution Time: 0.103 ms
(4 rows)
```

-----  
QUERY PLAN

```
Index Scan using ix_state on customers  (cost=0.00..8.02 rows=1 width=140) (actual time=0.014..0.014 rows=0 loops=1)
  Index Cond: (state = 'FO'::text)
Planning Time: 0.271 ms
Execution Time: 0.048 ms
(4 rows)
```

-----  
QUERY PLAN

```
Seq Scan on emails  (cost=0.00..10651.98 rows=417309 width=79) (actual time=0.024..121.483 rows=417315 loops=1)
  Filter: (customer_id > 100)
  Rows Removed by Filter: 843
Planning Time: 0.199 ms
Execution Time: 152.656 ms
(5 rows)
```

| Customer ID | First Name | Last Name   | Address      |
|-------------|------------|-------------|--------------|
| 1           | Meat       | Hook        | Melee Island |
| 2           | Captain    | Blondebeard | Puerto Pollo |
| 3           | Griswold   | Goodsoup    | Blood Island |

| Order ID | Customer ID | Product Code | Qty |
|----------|-------------|--------------|-----|
| 1618     | 3           | GROG1        | 12  |
| 1619     | 2           | POULET3      | 3   |

| Customer ID | First Name | Last Name   | Address      | Order ID | Product Code | Qty |
|-------------|------------|-------------|--------------|----------|--------------|-----|
| 2           | Captain    | Blondebeard | Puerto Pollo | 1619     | POULET3      | 3   |
| 3           | Griswold   | Goodsoup    | Blood Island | 1618     | GROG1        | 12  |

| customer_id | first_name | last_name   | address        |
|-------------|------------|-------------|----------------|
| 4           | Guybrush   | Threepwood  | Melee Island   |
| 5           | Murray     | TheSkull    | Plunder island |
| 1           | Meat       | Hook        | Melee Island   |
| 2           | Captain    | Blondebeard | Puerto Pollo   |
| 3           | Griswold   | Goodsoup    | Blood Island   |

(5 rows)

| order_id | customer_id | product_code | qty |
|----------|-------------|--------------|-----|
| 1620     | 4           | MON123       | 1   |
| 1621     | 4           | MON636       | 3   |
| 1622     | 5           | MON666       | 1   |
| 1618     | 3           | GROG1        | 12  |
| 1619     | 2           | POULET3      | 3   |

(5 rows)

| customer_id | first_name | last_name   | address        | order_id | product_code | qty |
|-------------|------------|-------------|----------------|----------|--------------|-----|
| 4           | Guybrush   | Threepwood  | Melee Island   | 1620     | MON123       | 1   |
| 4           | Guybrush   | Threepwood  | Melee Island   | 1621     | MON636       | 3   |
| 5           | Murray     | TheSkull    | Plunder island | 1622     | MON666       | 1   |
| 3           | Griswold   | Goodsoup    | Blood Island   | 1618     | GROG1        | 12  |
| 2           | Captain    | Blondebeard | Puerto Pollo   | 1619     | POULET3      | 3   |

(5 rows)

```
smalljoins=# SELECT customers.*, order_info.order_id, order_info.product_code, order_info.qty INTO join_
results FROM customers INNER JOIN order_info ON customers.customer_id=order_info.customer_id;
```

```
SELECT 5
```

#### QUERY PLAN

```
Hash Join  (cost=24.18..172.89 rows=3560 width=140) (actual time=0.537..0.548 rows=10 loops=1)
  Hash Cond: (order_info.customer_id = customers.customer_id)
    -> Seq Scan on order_info  (cost=0.00..21.30 rows=1130 width=44) (actual time=0.238..0.240 rows=10 loops=1)
    -> Hash  (cost=16.30..16.30 rows=630 width=100) (actual time=0.225..0.226 rows=5 loops=1)
      Buckets: 1024  Batches: 1  Memory Usage: 9kB
        -> Seq Scan on customers  (cost=0.00..16.30 rows=630 width=100) (actual time=0.199..0.202 rows=5 loops=1)
Planning Time: 7.077 ms
Execution Time: 1.533 ms
(8 rows)
```

#### QUERY PLAN

```
Hash Join  (cost=28.62..50.08 rows=315 width=100) (actual time=0.104..0.110 rows=4 loops=1)
  Hash Cond: (customers.customer_id = order_info.customer_id)
    -> Seq Scan on customers  (cost=0.00..16.30 rows=630 width=100) (actual time=0.015..0.017 rows=5 loops=1)
    -> Hash  (cost=26.12..26.12 rows=200 width=4) (actual time=0.057..0.057 rows=4 loops=1)
      Buckets: 1024  Batches: 1  Memory Usage: 9kB
        -> HashAggregate  (cost=24.12..26.12 rows=200 width=4) (actual time=0.026..0.030 rows=4 loops=1)
          Group Key: order_info.customer_id
            -> Seq Scan on order_info  (cost=0.00..21.30 rows=1130 width=4) (actual time=0.008..0.011 rows=5 loops=1)
Planning Time: 0.199 ms
Execution Time: 0.177 ms
(10 rows)
```

| customer_id | first_name | last_name   | address        | order_id | product_code | qty |
|-------------|------------|-------------|----------------|----------|--------------|-----|
| 4           | Guybrush   | Threepwood  | Melee Island   | 1620     | MON123       | 1   |
| 4           | Guybrush   | Threepwood  | Melee Island   | 1621     | MON636       | 3   |
| 5           | Murray     | TheSkull    | Plunder island | 1622     | MON666       | 1   |
| 3           | Griswold   | Goodsoup    | Blood Island   | 1618     | GROG1        | 12  |
| 2           | Captain    | Blondebeard | Puerto Pollo   | 1619     | POULET3      | 3   |
| 1           | Meat       | Hook        | Melee Island   |          |              |     |

(6 rows)

#### QUERY PLAN

```

Hash Right Join (cost=24.18..172.89 rows=3560 width=140) (actual time=0.068..0.089 rows=6 loops=1)
  Hash Cond: (order_info.customer_id = customers.customer_id)
    -> Seq Scan on order_info (cost=0.00..21.30 rows=1130 width=44) (actual time=0.007..0.009 rows=5 loops=1)
    -> Hash (cost=16.30..16.30 rows=630 width=100) (actual time=0.034..0.034 rows=5 loops=1)
      Buckets: 1024 Batches: 1 Memory Usage: 9kB
        -> Seq Scan on customers (cost=0.00..16.30 rows=630 width=100) (actual time=0.020..0.024 rows=5 loops=1)
Planning Time: 0.219 ms
Execution Time: 0.188 ms
(8 rows)

```

| customer_id | first_name | last_name   | address        | order_id | product_code | qty |
|-------------|------------|-------------|----------------|----------|--------------|-----|
| 4           | Guybrush   | Threepwood  | Melee Island   | 1620     | MON123       | 1   |
| 4           | Guybrush   | Threepwood  | Melee Island   | 1621     | MON636       | 3   |
| 5           | Murray     | TheSkull    | Plunder island | 1622     | MON666       | 1   |
| 3           | Griswold   | Goodsoup    | Blood Island   | 1618     | GROG1        | 12  |
| 2           | Captain    | Blondebeard | Puerto Pollo   | 1619     | POULET3      | 3   |

(5 rows)

#### QUERY PLAN

```

Hash Left Join (cost=24.18..172.89 rows=3560 width=140) (actual time=0.066..0.075 rows=5 loops=1)
  Hash Cond: (order_info.customer_id = customers.customer_id)
    -> Seq Scan on order_info (cost=0.00..21.30 rows=1130 width=44) (actual time=0.022..0.024 rows=5 loops=1)
    -> Hash (cost=16.30..16.30 rows=630 width=100) (actual time=0.021..0.022 rows=5 loops=1)
      Buckets: 1024 Batches: 1 Memory Usage: 9kB
        -> Seq Scan on customers (cost=0.00..16.30 rows=630 width=100) (actual time=0.007..0.012 rows=5 loops=1)
Planning Time: 0.220 ms
Execution Time: 0.141 ms
(8 rows)

```

| customer_id | first_name | last_name   | address        | order_id | product_code | qty |
|-------------|------------|-------------|----------------|----------|--------------|-----|
| 4           | Guybrush   | Threepwood  | Melee Island   | 1620     | MON123       | 1   |
| 4           | Guybrush   | Threepwood  | Melee Island   | 1621     | MON636       | 3   |
| 5           | Murray     | TheSkull    | Plunder island | 1622     | MON666       | 1   |
| 3           | Griswold   | Goodsoup    | Blood Island   | 1618     | GROG1        | 12  |
| 2           | Captain    | Blondebeard | Puerto Pollo   | 1619     | POULET3      | 3   |
|             |            |             |                | 1621     | MEL386       | 1   |
| 1           | Meat       | Hook        | Melee Island   |          |              |     |

(7 rows)

#### QUERY PLAN

```

Hash Full Join (cost=24.18..172.89 rows=3560 width=140) (actual time=0.126..0.148 rows=7 loops=1)
  Hash Cond: (order_info.customer_id = customers.customer_id)
    -> Seq Scan on order_info (cost=0.00..21.30 rows=1130 width=44) (actual time=0.009..0.012 rows=6 loops=1)
    -> Hash (cost=16.30..16.30 rows=630 width=100) (actual time=0.064..0.065 rows=5 loops=1)
      Buckets: 1024 Batches: 1 Memory Usage: 9kB
        -> Seq Scan on customers (cost=0.00..16.30 rows=630 width=100) (actual time=0.021..0.026 rows=5 loops=1)
Planning Time: 0.226 ms
Execution Time: 0.232 ms
(8 rows)

```

| customer_id | first_name | last_name   | city |
|-------------|------------|-------------|------|
| 1           | Arlena     | Riveles     |      |
| 12          | Tyne       | Duggan      |      |
| 21          | Pryce      | Geist       |      |
| 24          | Barbi      | Lanegran    |      |
| 30          | Kath       | Rivel       |      |
| 38          | Carter     | Lagneaux    |      |
| 44          | Waldemar   | Paroni      |      |
| 49          | Hannah     | McGlew      |      |
| 56          | Riva       | Cathesyed   |      |
| 63          | Gweneth    | Maior       |      |
| 70          | Caty       | Woolveridge |      |
| 72          | Jodi       | Faulty      |      |

### fixed\_val

```
-----
```

1

(1 row)

### QUERY PLAN

```
Function Scan on fixed_val  (cost=0.25..0.26 rows=1 width=4) (actual time=0.031..0.032 rows=1 loops=1)
Planning Time: 0.060 ms
Execution Time: 0.060 ms
(3 rows)
```

### num\_samples

```
-----
```

37711

(1 row)

### max

```
-----
```

115000

(1 row)

### avg\_sales

```
-----
```

6413.11540412024

(1 row)

```
avg_sales
```

```
7939.33132075954
```

```
(1 row)
```

| List of functions |                 |                  |                     |      |
|-------------------|-----------------|------------------|---------------------|------|
| Schema            | Name            | Result data type | Argument data types | Type |
| public            | avg_sales       | numeric          | channel_type text   | func |
| public            | avg_sales_since | numeric          | since_date date     | func |
| public            | fixed_val       | integer          |                     | func |
| public            | max_sale        | numeric          |                     | func |
| public            | num_samples     | integer          |                     | func |

(5 rows)

```
CREATE OR REPLACE FUNCTION public.num_samples()
RETURNS integer
LANGUAGE plpgsql
AS $function$
DECLARE total integer;
BEGIN
SELECT COUNT(*) INTO total FROM sales;
RETURN total;
END; $function$
```

```
avg_sales_window
```

```
477.686246311006
```

```
(1 row)
```

| List of functions |              |                  |                        |      |
|-------------------|--------------|------------------|------------------------|------|
| Schema            | Name         | Result data type | Argument data types    | Type |
| public            | get_stock    | integer          | text                   | func |
| public            | insert_order | integer          | integer, text, integer | func |
| public            | update_stock | integer          |                        | func |

(3 rows)

| product_code | name                    | stock |
|--------------|-------------------------|-------|
| MON636       | Red Herring             | 99    |
| GROG1        | Grog                    | 65    |
| POULET3      | El Pollo Diablo         | 2     |
| MON123       | Rubber Chicken + Pulley | 7     |
| MON666       | Murray's Arm            | 0     |

(5 rows)

| order_id | customer_id | product_code | qty |
|----------|-------------|--------------|-----|
| 1618     | 3           | GROG1        | 12  |
| 1619     | 2           | POULET3      | 3   |
| 1620     | 4           | MON123       | 1   |
| 1621     | 4           | MON636       | 3   |
| 1622     | 5           | MON666       | 1   |

(5 rows)

insert\_order

-----

1623

(1 row)

| order_id | customer_id | product_code | qty |
|----------|-------------|--------------|-----|
| 1618     | 3           | GROG1        | 12  |
| 1619     | 2           | POULET3      | 3   |
| 1620     | 4           | MON123       | 1   |
| 1621     | 4           | MON636       | 3   |
| 1622     | 5           | MON666       | 1   |
| 1623     | 4           | MON636       | 10  |

(6 rows)

update\_stock

-----

89

(1 row)

| product_code | name                    | stock |
|--------------|-------------------------|-------|
| GROG1        | Grog                    | 65    |
| POULET3      | El Pollo Diablo         | 2     |
| MON123       | Rubber Chicken + Pulley | 7     |
| MON666       | Murray's Arm            | 0     |
| MON636       | Red Herring             | 89    |

(5 rows)

insert\_order

```
-----  
      1624  
(1 row)
```

| order_id | customer_id | product_code | qty |
|----------|-------------|--------------|-----|
| 1618     | 3           | GROG1        | 12  |
| 1619     | 2           | POULET3      | 3   |
| 1620     | 4           | MON123       | 1   |
| 1621     | 4           | MON636       | 3   |
| 1622     | 5           | MON666       | 1   |
| 1623     | 3           | MON636       | 10  |
| 1624     | 4           | MON123       | 2   |

(7 rows)

| product_code | name                    | stock |
|--------------|-------------------------|-------|
| MON666       | Murray's Arm            | 0     |
| GROG1        | Grog                    | 65    |
| POULET3      | El Pollo Diablo         | 2     |
| MON636       | Red Herring             | 89    |
| MON123       | Rubber Chicken + Pulley | 5     |

(5 rows)

| order_id | avg_qty           |
|----------|-------------------|
| 1625     | 4.750000000000000 |
| 1626     | 5.000000000000000 |
| 1627     | 5.300000000000000 |

(3 rows)

```
ben@hillValley:~$ psql sqlda
psql (11.4 (Ubuntu 11.4-0ubuntu0.19.04.1))
Type "help" for help.

sqlda=# 
```

```
sqlda=# SELECT pg_sleep(1000);
```

```
pid | query
-----+
14117 | SELECT pid, query FROM pg_stat_activity WHERE state = 'active';
14131 | SELECT pg_sleep(1000);
(2 rows)
```

```
pg_cancel_backend
-----
t
(1 row)
```

```
ERROR: canceling statement due to user request
sqlda=# 
```

```
sqlda=# SELECT pg_sleep(1000);
FATAL: terminating connection due to administrator command
server closed the connection unexpectedly
    This probably means the server terminated abnormally
        before or while processing the request.
The connection to the server was lost. Attempting reset: Succeeded.
sqlda=# 
```

Chapter 9:

| model                 | base_msrp | production_start_date |
|-----------------------|-----------|-----------------------|
| Lemon                 | 399.99    | 2010-03-03 00:00:00   |
| Lemon Limited Edition | 799.99    | 2011-01-03 00:00:00   |
| Lemon                 | 499.99    | 2013-05-01 00:00:00   |
| Blade                 | 699.99    | 2014-06-23 00:00:00   |
| Bat                   | 599.99    | 2016-10-10 00:00:00   |
| Bat Limited Edition   | 699.99    | 2017-02-15 00:00:00   |
| Lemon Zester          | 349.99    | 2019-02-04 00:00:00   |

(7 rows)

| model                 | product_id |
|-----------------------|------------|
| Lemon                 | 1          |
| Lemon Limited Edition | 2          |
| Lemon                 | 3          |
| Blade                 | 5          |
| Bat                   | 7          |
| Bat Limited Edition   | 8          |
| Lemon Zester          | 12         |

(7 rows)

| model                 | product_id |
|-----------------------|------------|
| Lemon                 | 1          |
| Lemon Limited Edition | 2          |
| Lemon                 | 3          |
| Blade                 | 5          |
| Bat                   | 7          |
| Bat Limited Edition   | 8          |
| Lemon Zester          | 12         |

(7 rows)

| Table "public.sales"   |                             |           |          |         |  |  |
|------------------------|-----------------------------|-----------|----------|---------|--|--|
| Column                 | Type                        | Collation | Nullable | Default |  |  |
| customer_id            | bigint                      |           |          |         |  |  |
| product_id             | bigint                      |           |          |         |  |  |
| sales_transaction_date | timestamp without time zone |           |          |         |  |  |
| sales_amount           | double precision            |           |          |         |  |  |
| channel                | text                        |           |          |         |  |  |
| dealership_id          | double precision            |           |          |         |  |  |

| model    | customer_id | sales_transaction_date | sales_amount | channel  | dealership_id |
|----------|-------------|------------------------|--------------|----------|---------------|
| Lemon    | 41604       | 2012-03-30 22:45:29    | 399.99       | internet |               |
| Lemon    | 41531       | 2010-09-07 22:53:16    | 399.99       | internet |               |
| Lemon    | 41443       | 2011-05-24 02:19:11    | 399.99       | internet |               |
| Lemon    | 41291       | 2010-08-08 14:12:52    | 319.992      | internet |               |
| Lemon    | 41084       | 2012-01-09 03:34:52    | 319.992      | internet |               |
| (5 rows) |             |                        |              |          |               |

| model | customer_id | sales_transaction_date | sales_amount | channel    | dealership_id |
|-------|-------------|------------------------|--------------|------------|---------------|
| Bat   | 4319        | 2016-10-10 00:41:57    | 599.99       | internet   |               |
| Bat   | 40250       | 2016-10-10 02:47:28    | 599.99       | dealership | 4             |
| Bat   | 35497       | 2016-10-10 04:21:08    | 599.99       | dealership | 2             |
| Bat   | 4553        | 2016-10-10 07:42:59    | 599.99       | dealership | 11            |
| Bat   | 11678       | 2016-10-10 09:21:08    | 599.99       | internet   |               |
| Bat   | 45868       | 2016-10-10 10:29:29    | 599.99       | internet   |               |
| Bat   | 24125       | 2016-10-10 18:57:25    | 599.99       | dealership | 1             |
| Bat   | 31307       | 2016-10-10 21:22:38    | 599.99       | internet   |               |
| Bat   | 42213       | 2016-10-10 21:27:36    | 599.99       | internet   |               |
| Bat   | 47790       | 2016-10-11 01:28:58    | 599.99       | dealership | 20            |
| Bat   | 6342        | 2016-10-11 03:04:57    | 599.99       | internet   |               |
| Bat   | 45880       | 2016-10-11 04:09:19    | 599.99       | dealership | 7             |
| Bat   | 43477       | 2016-10-11 05:24:50    | 599.99       | internet   |               |
| Bat   | 6322        | 2016-10-11 08:48:07    | 599.99       | internet   |               |
| Bat   | 46653       | 2016-10-11 15:47:01    | 599.99       | dealership | 6             |
| Bat   | 9045        | 2016-10-12 00:15:20    | 599.99       | dealership | 19            |
| Bat   | 23679       | 2016-10-12 00:17:53    | 539.991      | internet   |               |
| Bat   | 49856       | 2016-10-12 00:26:15    | 599.99       | dealership | 10            |
| Bat   | 45256       | 2016-10-12 02:08:01    | 539.991      | dealership | 7             |
| Bat   | 48809       | 2016-10-12 05:08:43    | 599.99       | internet   |               |
| Bat   | 42625       | 2016-10-12 06:17:55    | 599.99       | internet   |               |
| Bat   | 39653       | 2016-10-12 06:28:25    | 599.99       | dealership | 7             |
| Bat   | 49226       | 2016-10-12 10:26:13    | 539.991      | internet   |               |
| Bat   | 18602       | 2016-10-12 15:09:53    | 599.99       | internet   |               |

count

7328

(1 row)

max

2019-05-31 22:15:30

(1 row)

| model | customer_id | sales_transaction_date | sales_amount | channel    | dealership_id |
|-------|-------------|------------------------|--------------|------------|---------------|
| Bat   | 4553        | 2016-10-10 00:00:00    | 599.99       | dealership | 11            |
| Bat   | 35497       | 2016-10-10 00:00:00    | 599.99       | dealership | 2             |
| Bat   | 40250       | 2016-10-10 00:00:00    | 599.99       | dealership | 4             |
| Bat   | 4319        | 2016-10-10 00:00:00    | 599.99       | internet   |               |
| Bat   | 11678       | 2016-10-10 00:00:00    | 599.99       | internet   |               |

(5 rows)

| sales_transaction_date |  | count |
|------------------------|--|-------|
| 2016-10-10 00:00:00    |  | 9     |
| 2016-10-11 00:00:00    |  | 6     |
| 2016-10-12 00:00:00    |  | 10    |
| 2016-10-13 00:00:00    |  | 10    |
| 2016-10-14 00:00:00    |  | 5     |
| 2016-10-15 00:00:00    |  | 10    |
| 2016-10-16 00:00:00    |  | 14    |
| 2016-10-17 00:00:00    |  | 9     |
| 2016-10-18 00:00:00    |  | 11    |
| 2016-10-19 00:00:00    |  | 12    |
| 2016-10-20 00:00:00    |  | 10    |
| 2016-10-21 00:00:00    |  | 6     |
| 2016-10-22 00:00:00    |  | 2     |
| 2016-10-23 00:00:00    |  | 5     |
| 2016-10-24 00:00:00    |  | 6     |
| 2016-10-25 00:00:00    |  | 9     |
| 2016-10-26 00:00:00    |  | 2     |
| 2016-10-27 00:00:00    |  | 4     |
| 2016-10-28 00:00:00    |  | 7     |
| 2016-10-29 00:00:00    |  | 5     |
| 2016-10-30 00:00:00    |  | 5     |
| 2016-10-31 00:00:00    |  | 3     |

(22 rows)

| <code>sales_transaction_date</code> | <code>count</code> | <code>sum</code> | <code>lag</code> | <code>volume</code>        |
|-------------------------------------|--------------------|------------------|------------------|----------------------------|
| 2016-10-10 00:00:00                 | 9                  | 9                |                  |                            |
| 2016-10-11 00:00:00                 | 6                  | 15               |                  |                            |
| 2016-10-12 00:00:00                 | 10                 | 25               |                  |                            |
| 2016-10-13 00:00:00                 | 10                 | 35               |                  |                            |
| 2016-10-14 00:00:00                 | 5                  | 40               |                  |                            |
| 2016-10-15 00:00:00                 | 10                 | 50               |                  |                            |
| 2016-10-16 00:00:00                 | 14                 | 64               |                  |                            |
| 2016-10-17 00:00:00                 | 9                  | 73               | 9                | 7.111111111111111          |
| 2016-10-18 00:00:00                 | 11                 | 84               | 15               | 4.600000000000000          |
| 2016-10-19 00:00:00                 | 12                 | 96               | 25               | 2.840000000000000          |
| 2016-10-20 00:00:00                 | 10                 | 106              | 35               | 2.0285714285714286         |
| 2016-10-21 00:00:00                 | 6                  | 112              | 40               | 1.800000000000000          |
| 2016-10-22 00:00:00                 | 2                  | 114              | 50               | 1.280000000000000          |
| 2016-10-23 00:00:00                 | 5                  | 119              | 64               | 0.859375000000000          |
| 2016-10-24 00:00:00                 | 6                  | 125              | 73               | 0.71232876712328767123     |
| 2016-10-25 00:00:00                 | 9                  | 134              | 84               | 0.59523809523809523810     |
| 2016-10-26 00:00:00                 | 2                  | 136              | 96               | 0.4166666666666666666667   |
| 2016-10-27 00:00:00                 | 4                  | 140              | 106              | 0.32075471698113207547     |
| 2016-10-28 00:00:00                 | 7                  | 147              | 112              | 0.31250000000000000000000  |
| 2016-10-29 00:00:00                 | 5                  | 152              | 114              | 0.333333333333333333333333 |
| 2016-10-30 00:00:00                 | 5                  | 157              | 119              | 0.31932773109243697479     |
| 2016-10-31 00:00:00                 | 3                  | 160              | 125              | 0.28000000000000000000000  |

(22 rows)

| <code>product_id</code> | <code>model</code>    | <code>year</code> | <code>product_type</code> | <code>base_msrp</code> | <code>production_start_date</code> | <code>production_end_date</code> |
|-------------------------|-----------------------|-------------------|---------------------------|------------------------|------------------------------------|----------------------------------|
| 1                       | Lemon                 | 2010              | scooter                   | 399.99                 | 2010-03-03 00:00:00                | 2012-06-08 00:00:00              |
| 2                       | Lemon Limited Edition | 2011              | scooter                   | 799.99                 | 2011-01-03 00:00:00                | 2011-03-30 00:00:00              |
| 3                       | Lemon                 | 2013              | scooter                   | 499.99                 | 2013-05-01 00:00:00                | 2018-12-28 00:00:00              |
| 4                       | Model Chi             | 2014              | automobile                | 115,000.00             | 2014-06-23 00:00:00                | 2018-12-28 00:00:00              |
| 5                       | Blade                 | 2014              | scooter                   | 699.99                 | 2014-06-23 00:00:00                | 2015-01-27 00:00:00              |
| 6                       | Model Sigma           | 2015              | automobile                | 65,500.00              | 2015-04-15 00:00:00                | 2018-10-01 00:00:00              |
| 7                       | Bat                   | 2016              | scooter                   | 599.99                 | 2016-10-10 00:00:00                |                                  |
| 8                       | Bat Limited Edition   | 2017              | scooter                   | 699.99                 | 2017-02-15 00:00:00                |                                  |
| 9                       | Model Epsilon         | 2017              | automobile                | 35,000.00              | 2017-02-15 00:00:00                |                                  |
| 10                      | Model Gamma           | 2017              | automobile                | 85,750.00              | 2017-02-15 00:00:00                |                                  |
| 11                      | Model Chi             | 2019              | automobile                | 95,000.00              | 2019-02-04 00:00:00                |                                  |
| 12                      | Lemon Zester          | 2019              | scooter                   | 349.99                 | 2019-02-04 00:00:00                |                                  |

(12 rows)

| <code>product_id</code> | <code>model</code>    | <code>year</code> | <code>product_type</code> | <code>base_msrp</code> | <code>production_start_date</code> | <code>production_end_date</code> |
|-------------------------|-----------------------|-------------------|---------------------------|------------------------|------------------------------------|----------------------------------|
| 1                       | Lemon                 | 2010              | scooter                   | 399.99                 | 2010-03-03 00:00:00                | 2012-06-08 00:00:00              |
| 2                       | Lemon Limited Edition | 2011              | scooter                   | 799.99                 | 2011-01-03 00:00:00                | 2011-03-30 00:00:00              |
| 3                       | Lemon                 | 2013              | scooter                   | 499.99                 | 2013-05-01 00:00:00                | 2018-12-28 00:00:00              |
| 5                       | Blade                 | 2014              | scooter                   | 699.99                 | 2014-06-23 00:00:00                | 2015-01-27 00:00:00              |
| 7                       | Bat                   | 2016              | scooter                   | 599.99                 | 2016-10-10 00:00:00                |                                  |
| 8                       | Bat Limited Edition   | 2017              | scooter                   | 699.99                 | 2017-02-15 00:00:00                |                                  |
| 12                      | Lemon Zester          | 2019              | scooter                   | 349.99                 | 2019-02-04 00:00:00                |                                  |

(7 rows)

```
customer_id | product_id | sales_transaction_date | sales_amount | channel | dealership_id
-----+-----+-----+-----+-----+-----+
      1 |       7 | 2017-07-19 08:38:41 |     479.992 | internet |          20
      22 |       7 | 2017-08-14 09:59:02 |     599.99 | dealership |          20
     145 |       7 | 2019-01-20 10:40:11 |     479.992 | internet |          20
     289 |       7 | 2017-05-09 14:20:04 |     539.991 | dealership |          7
     331 |       7 | 2019-05-21 20:03:21 |     539.991 | dealership |          4
(5 rows)
```

```
model | sales_transaction_date
-----+-----
Bat Limited Edition | 2017-02-15 01:49:02
Bat Limited Edition | 2017-02-15 09:42:37
Bat Limited Edition | 2017-02-15 10:48:31
Bat Limited Edition | 2017-02-15 12:22:41
Bat Limited Edition | 2017-02-15 13:51:34
(5 rows)
```

```
count
-----
5803
(1 row)
```

```
max
-----
2019-05-31 15:08:03
(1 row)
```

| model               | sales_transaction_date |
|---------------------|------------------------|
| Bat Limited Edition | 2017-02-15             |

(5 rows)

| sales_transaction_date | count |
|------------------------|-------|
| 2017-02-15             | 6     |
| 2017-02-16             | 2     |
| 2017-02-17             | 1     |
| 2017-02-18             | 4     |
| 2017-02-19             | 5     |
| 2017-02-20             | 6     |
| 2017-02-21             | 5     |
| 2017-02-22             | 4     |
| 2017-02-23             | 6     |
| 2017-02-24             | 2     |
| 2017-02-25             | 2     |
| 2017-02-26             | 2     |
| 2017-02-27             | 4     |
| 2017-02-28             | 4     |
| 2017-03-01             | 5     |
| 2017-03-02             | 1     |

| sales_transaction_date | count | sum |
|------------------------|-------|-----|
| 2017-02-15             | 6     | 6   |
| 2017-02-16             | 2     | 8   |
| 2017-02-17             | 1     | 9   |
| 2017-02-18             | 4     | 13  |
| 2017-02-19             | 5     | 18  |
| 2017-02-20             | 6     | 24  |
| 2017-02-21             | 5     | 29  |
| 2017-02-22             | 4     | 33  |
| 2017-02-23             | 6     | 39  |
| 2017-02-24             | 2     | 41  |
| 2017-02-25             | 2     | 43  |
| 2017-02-26             | 2     | 45  |
| 2017-02-27             | 4     | 49  |
| 2017-02-28             | 4     | 53  |
| 2017-03-01             | 5     | 58  |
| 2017-03-02             | 1     | 59  |
| 2017-03-03             | 3     | 62  |
| 2017-03-04             | 8     | 70  |
| 2017-03-05             | 4     | 74  |
| 2017-03-06             | 7     | 81  |
| 2017-03-07             | 7     | 88  |
| 2017-03-08             | 8     | 96  |

(22 rows)

| <code>sales_transaction_date</code> | <code>count</code> | <code>sum</code> |
|-------------------------------------|--------------------|------------------|
| 2016-10-10 00:00:00                 | 9                  | 9                |
| 2016-10-11 00:00:00                 | 6                  | 15               |
| 2016-10-12 00:00:00                 | 10                 | 25               |
| 2016-10-13 00:00:00                 | 10                 | 35               |
| 2016-10-14 00:00:00                 | 5                  | 40               |
| 2016-10-15 00:00:00                 | 10                 | 50               |
| 2016-10-16 00:00:00                 | 14                 | 64               |
| 2016-10-17 00:00:00                 | 9                  | 73               |
| 2016-10-18 00:00:00                 | 11                 | 84               |
| 2016-10-19 00:00:00                 | 12                 | 96               |
| 2016-10-20 00:00:00                 | 10                 | 106              |
| 2016-10-21 00:00:00                 | 6                  | 112              |
| 2016-10-22 00:00:00                 | 2                  | 114              |
| 2016-10-23 00:00:00                 | 5                  | 119              |
| 2016-10-24 00:00:00                 | 6                  | 125              |
| 2016-10-25 00:00:00                 | 9                  | 134              |
| 2016-10-26 00:00:00                 | 2                  | 136              |
| 2016-10-27 00:00:00                 | 4                  | 140              |
| 2016-10-28 00:00:00                 | 7                  | 147              |
| 2016-10-29 00:00:00                 | 5                  | 152              |
| 2016-10-30 00:00:00                 | 5                  | 157              |
| 2016-10-31 00:00:00                 | 3                  | 160              |

(22 rows)

| sales_transaction_date | count | sum | lag | volume                 |
|------------------------|-------|-----|-----|------------------------|
| 2017-02-15             | 6     | 6   |     |                        |
| 2017-02-16             | 2     | 8   |     |                        |
| 2017-02-17             | 1     | 9   |     |                        |
| 2017-02-18             | 4     | 13  |     |                        |
| 2017-02-19             | 5     | 18  |     |                        |
| 2017-02-20             | 6     | 24  |     |                        |
| 2017-02-21             | 5     | 29  |     |                        |
| 2017-02-22             | 4     | 33  | 6   | 4.500000000000000      |
| 2017-02-23             | 6     | 39  | 8   | 3.875000000000000      |
| 2017-02-24             | 2     | 41  | 9   | 3.5555555555555556     |
| 2017-02-25             | 2     | 43  | 13  | 2.3076923076923077     |
| 2017-02-26             | 2     | 45  | 18  | 1.500000000000000      |
| 2017-02-27             | 4     | 49  | 24  | 1.0416666666666667     |
| 2017-02-28             | 4     | 53  | 29  | 0.82758620689655172414 |
| 2017-03-01             | 5     | 58  | 33  | 0.757575757575757576   |
| 2017-03-02             | 1     | 59  | 39  | 0.51282051282051282051 |
| 2017-03-03             | 3     | 62  | 41  | 0.51219512195121951220 |
| 2017-03-04             | 8     | 70  | 43  | 0.62790697674418604651 |
| 2017-03-05             | 4     | 74  | 45  | 0.64444444444444444444 |
| 2017-03-06             | 7     | 81  | 49  | 0.65306122448979591837 |
| 2017-03-07             | 7     | 88  | 53  | 0.66037735849056603774 |
| 2017-03-08             | 8     | 96  | 58  | 0.65517241379310344828 |

(22 rows)

| product_id | model                 | year | product_type | base_msrp | production_start_date | production_end_date |
|------------|-----------------------|------|--------------|-----------|-----------------------|---------------------|
| 12         | Lemon Zester          | 2019 | scooter      | 349.99    | 2019-02-04 00:00:00   |                     |
| 1          | Lemon                 | 2010 | scooter      | 399.99    | 2010-03-03 00:00:00   | 2012-06-08 00:00:00 |
| 3          | Lemon                 | 2013 | scooter      | 499.99    | 2013-05-01 00:00:00   | 2018-12-28 00:00:00 |
| 7          | Bat                   | 2016 | scooter      | 599.99    | 2016-10-10 00:00:00   |                     |
| 5          | Blade                 | 2014 | scooter      | 699.99    | 2014-06-23 00:00:00   | 2015-01-27 00:00:00 |
| 8          | Bat Limited Edition   | 2017 | scooter      | 699.99    | 2017-02-15 00:00:00   |                     |
| 2          | Lemon Limited Edition | 2011 | scooter      | 799.99    | 2011-01-03 00:00:00   | 2011-03-30 00:00:00 |

(7 rows)

| sales_transaction_date | count | sum | lag | volume                 |
|------------------------|-------|-----|-----|------------------------|
| 2013-05-01             | 6     | 6   |     |                        |
| 2013-05-02             | 8     | 14  |     |                        |
| 2013-05-03             | 4     | 18  |     |                        |
| 2013-05-04             | 9     | 27  |     |                        |
| 2013-05-05             | 9     | 36  |     |                        |
| 2013-05-06             | 6     | 42  |     |                        |
| 2013-05-07             | 8     | 50  |     |                        |
| 2013-05-08             | 6     | 56  | 6   | 8.333333333333333      |
| 2013-05-09             | 6     | 62  | 14  | 3.4285714285714286     |
| 2013-05-10             | 9     | 71  | 18  | 2.9444444444444444     |
| 2013-05-11             | 3     | 74  | 27  | 1.7407407407407407     |
| 2013-05-12             | 4     | 78  | 36  | 1.1666666666666667     |
| 2013-05-13             | 7     | 85  | 42  | 1.0238095238095238     |
| 2013-05-14             | 3     | 88  | 50  | 0.7600000000000000     |
| 2013-05-15             | 3     | 91  | 56  | 0.6250000000000000     |
| 2013-05-16             | 4     | 95  | 62  | 0.53225806451612903226 |
| 2013-05-17             | 6     | 101 | 71  | 0.42253521126760563380 |
| 2013-05-18             | 9     | 110 | 74  | 0.48648648648648648649 |
| 2013-05-19             | 6     | 116 | 78  | 0.48717948717948717949 |
| 2013-05-20             | 6     | 122 | 85  | 0.43529411764705882353 |
| 2013-05-21             | 11    | 133 | 88  | 0.51136363636363636364 |
| 2013-05-22             | 8     | 141 | 91  | 0.54945054945054945055 |

(22 rows)

| email_id | customer_id | email_subject                 | opened | clicked | bounced | sent_date           | opened_date         | clicked_date |
|----------|-------------|-------------------------------|--------|---------|---------|---------------------|---------------------|--------------|
| 1        | 18          | Introducing A Limited Edition | f      | f       | f       | 2011-01-03 15:00:00 |                     |              |
| 2        | 30          | Introducing A Limited Edition | f      | f       | f       | 2011-01-03 15:00:00 |                     |              |
| 3        | 41          | Introducing A Limited Edition | t      | f       | f       | 2011-01-03 15:00:00 | 2011-01-04 10:41:11 |              |
| 4        | 52          | Introducing A Limited Edition | f      | f       | f       | 2011-01-03 15:00:00 |                     |              |
| 5        | 59          | Introducing A Limited Edition | f      | f       | f       | 2011-01-03 15:00:00 |                     |              |

(5 rows)

| email_subject                              | customer_id | opened | sent_date           | opened_date         | sales_transaction_date |
|--|-------------|--------|---------------------|---------------------|------------------------|
| A New Year, And Some New EVs               | 11678       | f      | 2019-01-07 15:00:00 |                     | 2016-10-10 00:00:00    |
| A Brand New Scooter...and Car              | 40250       | f      | 2014-05-06 15:00:00 |                     | 2016-10-10 00:00:00    |
| We Really Outdid Ourselves this Year       | 24125       | f      | 2017-01-15 15:00:00 |                     | 2016-10-10 00:00:00    |
| Tis' the Season for Savings                | 31307       | t      | 2015-11-21 15:00:00 | 2015-11-27 04:55:07 | 2016-10-10 00:00:00    |
| 25% off all EVs. It's a Christmas Miracle! | 42213       | f      | 2016-11-25 15:00:00 |                     | 2016-10-10 00:00:00    |
| Zoom Zoom Black Friday Sale                | 40250       | f      | 2014-11-28 15:00:00 |                     | 2016-10-10 00:00:00    |
| Save the Planet with some Holiday Savings. | 4553        | f      | 2018-11-23 15:00:00 |                     | 2016-10-10 00:00:00    |
| The 2013 Lemon Scooter Is Here             | 24125       | t      | 2013-03-01 15:00:00 | 2013-03-02 14:43:34 | 2016-10-10 00:00:00    |
| The 2013 Lemon Scooter Is Here             | 40250       | f      | 2013-03-01 15:00:00 |                     | 2016-10-10 00:00:00    |
| Save the Planet with some Holiday Savings. | 40250       | f      | 2018-11-23 15:00:00 |                     | 2016-10-10 00:00:00    |

(10 rows)

| email_subject                                 | customer_id | opened | sent_date           | opened_date         | sales_transaction_date |
|---|-------------|--------|---------------------|---------------------|------------------------|
| An Electric Car for a New Age                 | 7           | t      | 2015-04-01 15:00:00 | 2015-04-02 15:10:55 | 2019-04-25 00:00:00    |
| The 2013 Lemon Scooter is Here                | 7           | f      | 2013-03-01 15:00:00 |                     | 2019-04-25 00:00:00    |
| Tis' the Season for Savings                   | 7           | f      | 2015-11-26 15:00:00 |                     | 2019-04-25 00:00:00    |
| Black Friday. Green Cars.                     | 7           | f      | 2017-11-24 15:00:00 |                     | 2019-04-25 00:00:00    |
| We cut you a deal: 20% off a Blade            | 7           | t      | 2014-09-18 15:00:00 | 2014-09-19 15:11:17 | 2019-04-25 00:00:00    |
| Zoom Zoom Black Friday Sale                   | 7           | f      | 2014-11-28 15:00:00 |                     | 2019-04-25 00:00:00    |
| Like a Bat out of Heaven                      | 7           | f      | 2016-09-21 15:00:00 |                     | 2019-04-25 00:00:00    |
| Save the Planet with some Holiday Savings.    | 7           | f      | 2018-11-23 15:00:00 |                     | 2019-04-25 00:00:00    |
| Shocking Holiday Savings On Electric Scooters | 7           | f      | 2013-11-29 15:00:00 |                     | 2019-04-25 00:00:00    |
| 25% off all EVs. It's a Christmas Miracle!    | 7           | t      | 2016-11-25 15:00:00 | 2016-11-26 03:55:30 | 2019-04-25 00:00:00    |
| We Really Outdid Ourselves this Year          | 7           | f      | 2017-01-15 15:00:00 |                     | 2019-04-25 00:00:00    |
| A Brand New Scooter...and Car                 | 7           | f      | 2014-05-06 15:00:00 |                     | 2019-04-25 00:00:00    |
| A New Year, And Some New EVs                  | 7           | f      | 2019-01-07 15:00:00 |                     | 2019-04-25 00:00:00    |
| Tis' the Season for Savings                   | 22          | f      | 2015-11-26 15:00:00 |                     | 2017-08-14 00:00:00    |
| Like a Bat out of Heaven                      | 22          | f      | 2016-09-21 15:00:00 |                     | 2017-08-14 00:00:00    |
| Zoom Zoom Black Friday Sale                   | 22          | t      | 2014-11-28 15:00:00 | 2014-11-29 11:31:03 | 2017-08-14 00:00:00    |
| The 2013 Lemon Scooter is Here                | 22          | f      | 2013-03-01 15:00:00 |                     | 2017-08-14 00:00:00    |
| 25% off all EVs. It's a Christmas Miracle!    | 22          | f      | 2016-11-25 15:00:00 |                     | 2017-08-14 00:00:00    |
| We Really Outdid Ourselves this Year          | 22          | f      | 2017-01-15 15:00:00 |                     | 2017-08-14 00:00:00    |
| Shocking Holiday Savings On Electric Scooters | 22          | f      | 2013-11-29 15:00:00 |                     | 2017-08-14 00:00:00    |
| We cut you a deal: 20% off a Blade            | 22          | f      | 2014-09-18 15:00:00 |                     | 2017-08-14 00:00:00    |
| An Electric Car for a New Age                 | 22          | f      | 2015-04-01 15:00:00 |                     | 2017-08-14 00:00:00    |

(22 rows)

| email_subject                              | customer_id | opened | sent_date           | opened_date         | sales_transaction_date |
|--|-------------|--------|---------------------|---------------------|------------------------|
| 25% off all EVs. It's a Christmas Miracle! | 129         | t      | 2016-11-25 15:00:00 | 2016-11-26 06:31:37 | 2016-11-28 00:00:00    |
| A New Year, And Some New EVs               | 145         | f      | 2019-01-07 15:00:00 |                     | 2019-01-20 00:00:00    |
| Black Friday. Green Cars.                  | 150         | f      | 2017-11-24 15:00:00 |                     | 2017-12-19 00:00:00    |
| Black Friday. Green Cars.                  | 173         | f      | 2017-11-24 15:00:00 |                     | 2017-12-05 00:00:00    |
| We Really Outdid Ourselves this Year       | 196         | f      | 2017-01-15 15:00:00 |                     | 2017-01-23 00:00:00    |
| We Really Outdid Ourselves this Year       | 319         | f      | 2017-01-15 15:00:00 |                     | 2017-01-29 00:00:00    |
| Like a Bat out of Heaven                   | 369         | f      | 2016-09-21 15:00:00 |                     | 2016-10-13 00:00:00    |
| Like a Bat out of Heaven                   | 414         | f      | 2016-09-21 15:00:00 |                     | 2016-10-20 00:00:00    |
| 25% off all EVs. It's a Christmas Miracle! | 418         | f      | 2016-11-25 15:00:00 |                     | 2016-12-21 00:00:00    |
| A New Year, And Some New EVs               | 560         | t      | 2019-01-07 15:00:00 | 2019-01-08 15:56:14 | 2019-01-29 00:00:00    |
| We Really Outdid Ourselves this Year       | 600         | f      | 2017-01-15 15:00:00 |                     | 2017-01-18 00:00:00    |
| A New Year, And Some New EVs               | 660         | t      | 2019-01-07 15:00:00 | 2019-01-08 23:37:03 | 2019-01-08 00:00:00    |
| A New Year, And Some New EVs               | 681         | f      | 2019-01-07 15:00:00 |                     | 2019-01-13 00:00:00    |
| Black Friday. Green Cars.                  | 806         | t      | 2017-11-24 15:00:00 | 2017-11-25 16:59:40 | 2017-11-29 00:00:00    |
| A New Year, And Some New EVs               | 881         | t      | 2019-01-07 15:00:00 | 2019-01-08 21:07:28 | 2019-01-22 00:00:00    |
| 25% off all EVs. It's a Christmas Miracle! | 934         | t      | 2016-11-25 15:00:00 | 2016-11-26 09:22:45 | 2016-12-24 00:00:00    |
| 25% off all EVs. It's a Christmas Miracle! | 983         | f      | 2016-11-25 15:00:00 |                     | 2016-11-29 00:00:00    |
| A New Year, And Some New EVs               | 1060        | f      | 2019-01-07 15:00:00 |                     | 2019-01-27 00:00:00    |
| 25% off all EVs. It's a Christmas Miracle! | 1288        | f      | 2016-11-25 15:00:00 |                     | 2016-12-11 00:00:00    |
| 25% off all EVs. It's a Christmas Miracle! | 1317        | f      | 2016-11-25 15:00:00 |                     | 2016-12-13 00:00:00    |
| A New Year, And Some New EVs               | 1400        | t      | 2019-01-07 15:00:00 | 2019-01-08 15:01:00 | 2019-01-10 00:00:00    |
| Save the Planet with some Holiday Savings. | 1417        | f      | 2018-11-23 15:00:00 |                     | 2018-11-26 00:00:00    |

(22 rows)

## email\_subject

---

**Black Friday. Green Cars.**  
**25% off all EVs. It's a Christmas Miracle!**  
**A New Year, And Some New EVs**  
**Like a Bat out of Heaven**  
**Save the Planet with some Holiday Savings.**  
**We Really Outdid Ourselves this Year**  
(6 rows)

```
count
-----
 401
(1 row)
```

```
count
-----
 98
(1 row)
```

```
count
-----
 396
(1 row)
```

```
count
-----
 6659
(1 row)
```

```
email_rate
-----
 0.05946838864694398558
(1 row)
```

```
count
-----
 82
(1 row)
```

```
count
-----
 15
(1 row)
```

```
count
-----
 82
(1 row)
```

```
sale_rate
-----
 0.18292682926829268293
(1 row)
```

```
count
-----
 160
(1 row)
```

```
production_start_date
```

```
-----  
2013-05-01 00:00:00
```

```
(1 row)
```

```
email_subject
```

```
-----  
Tis' the Season for Savings
```

```
25% off all EVs. It's a Christmas Miracle!
```

```
A Brand New Scooter...and Car
```

```
Like a Bat out of Heaven
```

```
Save the Planet with some Holiday Savings.
```

```
Shocking Holiday Savings On Electric Scooters
```

```
We Really Outdid Ourselves this Year
```

```
An Electric Car for a New Age
```

```
We cut you a deal: 20% off a Blade
```

```
Black Friday. Green Cars.
```

```
Zoom Zoom Black Friday Sale
```

```
(11 rows)
```

```
count
```

```
-----  
128
```

```
(1 row)
```

```
count
```

```
-----  
506
```

```
(1 row)
```

```
email_rate
```

```
-----  
0.25296442687747035573  
(1 row)
```

```
count
```

```
-----  
13854  
(1 row)
```

```
email_sales
```

```
-----  
0.03652374765410711708  
(1 row)
```

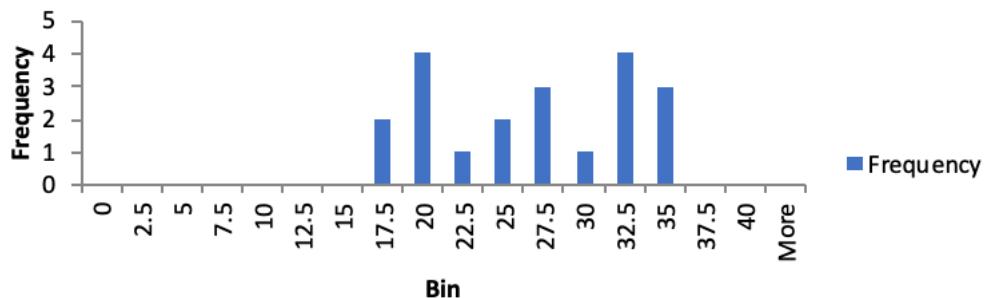
```
count
```

```
-----  
0  
(1 row)
```

Solutions:

| Location         | Net Annual Sales | Number of Female Employees |
|------------------|------------------|----------------------------|
| Millburn, NJ     | 150803012        | 27                         |
| Los Angeles, CA  | 110872084        | 17                         |
| Houston, TX      | 183945873        | 22                         |
| Miami, FL        | 156355396        | 18                         |
| San Mateo, CA    | 143108603        | 17                         |
| Seattle, WA      | 142755480        | 33                         |
| Arlington VA     | 144772604        | 28                         |
| Portland, OR     | 179608438        | 32                         |
| Reno, NV         | 145101244        | 19                         |
| Chicago, IL      | 171491596        | 24                         |
| Atlanta, GA      | 198386988        | 27                         |
| Orlando, FL      | 180188054        | 24                         |
| Jacksonville, FL | 158479693        | 32                         |
| Round Rock, TX   | 181820474        | 27                         |
| Phoenix, AZ      | 95512810.7       | 18                         |
| Charlotte, NC    | 199653776        | 32                         |
| Philadelphia, PA | 193111679        | 31                         |
| Kansas City, MO  | 176816637        | 35                         |
| Dallas, TX       | 168769837        | 33                         |
| Boston, MA       | 350520724        | 20                         |

## Number of Female Employees



| n-Quintile | Value        |
|------------|--------------|
| 1          | 144439803.80 |
| 2          | 157629974.20 |
| 3          | 177933357.40 |
| 4          | 185779034.20 |

|    | email<br>text                 |
|----|-------------------------------|
| 1  | aachrameevu44@goo.gl          |
| 2  | aambresinInt@walmart.com      |
| 3  | aanstiss12af@eepurl.com       |
| 4  | aantonove9l@last.fm           |
| 5  | aarnaudet1v3@cisco.com        |
| 6  | aarsmithxoe@dion.ne.jp        |
| 7  | aastle11rg@slate.com          |
| 8  | aaxelbey77x@cocolog-nifty.com |
| 9  | aazemary2f@washingtonpost.com |
| 10 | ababarm8m@ow.ly               |
| 11 | abarkessi6f@wikimedia.org     |

|    | first_name<br>text | last_name<br>text | email<br>text               |
|----|--------------------|-------------------|-----------------------------|
| 1  | Nell               | Abdy              | nabdyec4@fema.gov           |
| 2  | Thomasmine         | Absolon           | tabsolonomk@forbes.com      |
| 3  | Ram                | Acheson           | racheson1ai@bloglovin.com   |
| 4  | Pru                | Achrameev         | pachrameev2sr@example.com   |
| 5  | Jandy              | Adamowicz         | jadamowiczb1w@clickbank.net |
| 6  | Kati               | Adrian            | kadrianeem@51.la            |
| 7  | Orly               | Aers              | oaersx61@redcross.org       |
| 8  | Bradney            | Aglione           | baglione5n@usgs.gov         |
| 9  | Mellicent          | Ainslee           | mainsleer0@abc.net.au       |
| 10 | Fergus             | Aireton           | fairetonq16@yellowpages.com |
| 11 | Ugo                | Aldam             | ualdamhnc@wikimedia.org     |

| customer_id<br>bigint | title<br>text | first_name<br>text | last_name<br>text | suffix<br>text | email<br>text | gender<br>text  | ip_address<br>text | phone<br>text        | street_address<br>text | city<br>text | state<br>text | postal_code<br>text | latitude<br>double precision | longitude<br>double precision | date_added<br>timestamp without time zone |
|-----------------------|---------------|--------------------|-------------------|----------------|---------------|-----------------|--------------------|----------------------|------------------------|--------------|---------------|---------------------|------------------------------|-------------------------------|---|
| 2625 [null]           | Binky         | Dawtry             | [null]            | bdawtr..       | M             | 15.75.236.78    | 804-990...         | 0353 Iowa Road       | Rich... VA             | 23208        |               | 37.5593             | -77.4471                     | 2010-03-15 00:00:00           |   |
| 6173 [null]           | Danila        | Gristwood          | [null]            | dgrist...      | F             | 254.239.58.1... | 832-157...         | 79865 Hagan Terr...  | Katy TX                | 77493        |               | 29.8678             | -95.8298                     | 2010-03-15 00:00:00           |   |
| 13390 [null]          | Danika        | Lough              | [null]            | dlough...      | F             | 188.19.7.207    | 212-769...         | 38463 Forest Da...   | New ... NY             | 10019        |               | 40.7651             | -73.9858                     | 2010-03-15 00:00:00           |   |
| 7486 [null]           | Ciro          | FERENCOWICZ        | [null]            | cferen...      | M             | 8.151.167.184   | 786-458...         | 61 Village Crossing  | Miami FL               | 33111        |               | 25.5584             | -80.4582                     | 2010-03-15 00:00:00           |   |
| 17099 [null]          | Pearla        | Halksworth         | [null]            | phalks...      | F             | 114.138.82.24   | 541-198...         | 130 Marcy Crossi...  | Euge... OR             | 97405        |               | 44.0185             | -123.0998                    | 2010-03-15 00:00:00           |   |
| 18685 [null]          | Ingram        | Crossman           | [null]            | icross...      | M             | 207.145.1.202   | 503-352...         | 86 Michigan Junc...  | Salem OR               | 97306        |               | 44.8685             | -123.0438                    | 2010-03-15 00:00:00           |   |
| 30046 [null]          | Nanet         | Hassur             | [null]            | rhassu...      | F             | 232.115.170...  | 209-364...         | 13961 Steensland...  | Sto... CA              | 95205        |               | 37.9625             | -121.2624                    | 2010-03-15 00:00:00           |   |
| 35683 [null]          | Betteanne     | Rulf               | [null]            | brulfrj6...    | F             | 52.208.248.90   | 503-396...         | 1 Cordelia Crossing  | Salem OR               | 97306        |               | 44.8685             | -123.0438                    | 2010-03-15 00:00:00           |   |
| 22640 [null]          | Shana         | Nugent             | [null]            | snuge...       | F             | 207.239.127...  | 202-378...         | 96725 Cordelia La... | Was... DC              | 20010        |               | 38.9327             | -77.0322                     | 2010-03-16 00:00:00           |   |
| 34189 [null]          | Devlin        | Barhems            | [null]            | dbarhe...      | M             | 180.175.21.2... | 240-895...         | 0 Park Meadow St...  | Rock... MD             | 20851        |               | 39.0763             | -77.1234                     | 2010-03-16 00:00:00           |   |
| 46277 Mr              | Salomon       | Rillatt            | [null]            | srillatt...    | M             | 33.205.88.187   | 504-700...         | 5799 Thackeray C...  | New ... LA             | 70179        |               | 30.033              | -89.8826                     | 2010-03-16 00:00:00           |   |

| customer_id<br>bigint | title<br>text | first_name<br>text | last_name<br>text | suffix<br>text             | email<br>text | gender<br>text  | ip_address<br>text | phone<br>text        | street_address<br>text | city<br>text | state<br>text | postal_code<br>text | latitude<br>double precision | longitude<br>double precision | date_added<br>timestamp with time zone |
|-----------------------|---------------|--------------------|-------------------|----------------------------|---------------|-----------------|--------------------|----------------------|------------------------|--------------|---------------|---------------------|------------------------------|-------------------------------|--|
| 52 [null]             | Giusto        | Backe              | [null]            | gbacke...                  | M             | 26.56.68.189    | 212-959...         | 6 Onsgard Terrace    | New ... NY             | 10131        |               | 40.7808             | -73.9772                     | 2010-07-06 00:00:00           |  |
| 162 [null]            | Artair        | Betchley           | [null]            | abetchleyh@dagondesign.com | M             | 108.147.128...  | [null]             | 7 Boyd Road          | New ... NY             | 10090        |               | 40.7808             | -73.9772                     | 2014-06-25 00:00:00           |  |
| 374 [null]            | Verge         | Esel               | [null]            | veselad@vistaprint.com     | M             | 58.238.20.156   | 917-653...         | 6 Algoma Park        | New ... NY             | 10014        |               | 40.7339             | -74.0054                     | 2016-02-17 00:00:00           |  |
| 406 [null]            | Rozina        | Jean               | [null]            | rjeab9@howstuffworks.com   | F             | 50.235.32.29    | 917-610...         | 64653 Homewood...    | New ... NY             | 10105        |               | 40.7628             | -73.9785                     | 2010-09-15 00:00:00           |  |
| 456 Rev               | Cybil         | Noke               | [null]            | cnokecn@jgsy.com           | F             | 5.31.139.106    | 212-306...         | 88 Sycamore Park...  | New ... NY             | 10260        |               | 40.7808             | -73.9772                     | 2017-01-21 00:00:00           |  |
| 472 [null]            | Rawley        | Yegorov            | [null]            | ryegorovd@google.es        | M             | 183.199.243...  | 212-560...         | 872 Old Shore Par... | New ... NY             | 10034        |               | 40.8662             | -73.9221                     | 2014-11-24 00:00:00           |  |
| 496 [null]            | Layton        | Spolton            | [null]            | lspoltondr@free.fr         | M             | 108.112.8.165   | 646-900...         | 7 Old Gate Drive     | New ... NY             | 10024        |               | 40.7864             | -73.9764                     | 2010-12-20 00:00:00           |  |
| 1028 [null]           | Issy          | Andrieux           | [null]            | iandrieux@edell.com        | F             | 199.50.5.37     | 212-206...         | 33337 Dahle Way      | New ... NY             | 10115        |               | 40.8111             | -73.9642                     | 2017-11-27 00:00:00           |  |
| 1037 [null]           | Magdalene     | Veryard            | [null]            | mveryards@behance.net      | F             | 93.201.129.2... | [null]             | 41028 Katie Junct... | New ... NY             | 10039        |               | 40.8265             | -73.9383                     | 2014-03-04 00:00:00           |  |
| 1063 [null]           | Juliet        | Beadles            | [null]            | jbeadle@time.com           | F             | 47.96.88.226    | 212-645...         | 34984 Goodland...    | New ... NY             | 10120        |               | 40.7506             | -73.9894                     | 2014-08-17 00:00:00           |  |

| customer_id<br>bigint | title<br>text | first_name<br>text | last_name<br>text | suffix<br>text | email<br>text | gender<br>text  | ip_address<br>text | phone<br>text        | street_address<br>text | city<br>text | state<br>text | postal_code<br>text | latitude<br>double precision | longitude<br>double precision | date_added<br>timestamp without time zone | event<br>text |
|-----------------------|---------------|--------------------|-------------------|----------------|---------------|-----------------|--------------------|----------------------|------------------------|--------------|---------------|---------------------|------------------------------|-------------------------------|---|---------------|
| 52 [null]             | Giusto        | Backe              | [null]            | gbacke...      | M             | 26.56.68.189    | 212-959...         | 6 Onsgard Terrace    | New ... NY             | 10131        |               | 40.7808             | -73.9772                     | 2010-07-06 00:00:00           | thank-you party                           |               |
| 406 [null]            | Rozina        | Jean               | [null]            | rjeab9@...     | F             | 50.235.32.29    | 917-610...         | 64653 Homewood...    | New ... NY             | 10105        |               | 40.7628             | -73.9785                     | 2010-09-15 00:00:00           | thank-you party                           |               |
| 456 Rev               | Cybil         | Noke               | [null]            | cnoke...       | F             | 5.31.139.106    | 212-306...         | 88 Sycamore Park...  | New ... NY             | 10260        |               | 40.7808             | -73.9772                     | 2017-01-21 00:00:00           | thank-you party                           |               |
| 472 [null]            | Rawley        | Yegorov            | [null]            | ryegor...      | M             | 183.199.243...  | 212-560...         | 872 Old Shore Par... | New ... NY             | 10034        |               | 40.8662             | -73.9221                     | 2014-11-24 00:00:00           | thank-you party                           |               |
| 496 [null]            | Layton        | Spolton            | [null]            | lspolton...    | M             | 108.112.8.165   | 646-900...         | 7 Old Gate Drive     | New ... NY             | 10024        |               | 40.7864             | -73.9764                     | 2010-12-20 00:00:00           | thank-you party                           |               |
| 1028 [null]           | Issy          | Andrieux           | [null]            | iandrie...     | F             | 199.50.5.37     | 212-206...         | 33337 Dahle Way      | New ... NY             | 10115        |               | 40.8111             | -73.9642                     | 2017-11-27 00:00:00           | thank-you party                           |               |
| 1037 [null]           | Magdalene     | Veryard            | [null]            | mverya...      | F             | 93.201.129.2... | [null]             | 41028 Katie Junct... | New ... NY             | 10039        |               | 40.8265             | -73.9383                     | 2014-03-04 00:00:00           | thank-you party                           |               |
| 1063 [null]           | Juliet        | Beadles            | [null]            | jbeadle...     | F             | 47.96.88.226    | 212-645...         | 34984 Goodland...    | New ... NY             | 10120        |               | 40.7506             | -73.9894                     | 2014-08-17 00:00:00           | thank-you party                           |               |
| 1211 [null]           | Gwyneth       | McCobb             | [null]            | gmcco...       | F             | 38.182.151.2... | [null]             | 4 Jana Park          | New ... NY             | 10160        |               | 40.7808             | -73.9772                     | 2014-01-08 00:00:00           | thank-you party                           |               |
| 1262 [null]           | Conrado       | Escoffier          | [null]            | cescoff...     | M             | 23.120.12.44    | 646-523...         | 2 Atwood Court       | New ... NY             | 10060        |               | 40.7808             | -73.9772                     | 2015-02-17 00:00:00           | thank-you party                           |               |

| customer_id<br>bigint | title<br>text | first_name<br>text | last_name<br>text | suffix<br>text | email<br>text | gender<br>text | ip_address<br>text | phone<br>text       | street_address<br>text | city<br>text | state<br>text | postal_code<br>text | latitude<br>double precision | longitude<br>double precision | date_added<br>timestamp without time zone |
|-----------------------|---------------|--------------------|-------------------|----------------|---------------|----------------|--------------------|---------------------|------------------------|--------------|---------------|---------------------|------------------------------|-------------------------------|---|
| 1 [null]              | Arlena        | Riveles            | [null]            | arivele...     | F             | 98.36.172.246  | [null]             | [null]              | [null]                 | [null]       | [null]        | [null]              | [null]                       | [null]                        | 2017-04-23 00:00:00                       |
| 4 [null]              | Jessika       | Nussen             | [null]            | jnusse...      | F             | 159.165.138... | 615-824...         | 224 Village Circle  | Nash...                | TN           | 37215         |                     | 36.0986                      | -86.8219                      | 2017-09-03 00:00:00                       |
| 5 [null]              | Lonnie        | Rembaud            | [null]            | Iremba...      | F             | 18.131.58.65   | 786-499...         | 38 Lindbergh Way    | Miami                  | FL           | 33124         |                     | 25.5584                      | -80.4582                      | 2014-03-06 00:00:00                       |
| 6 [null]              | Cortie        | Locksley           | [null]            | clocksl...     | M             | 140.194.59.82  | [null]             | 6537 Delladonna ... | Miami                  | FL           | 33158         |                     | 25.6364                      | -80.3187                      | 2013-03-31 00:00:00                       |
| 7 [null]              | Wood          | Kennham            | [null]            | wkenn...       | M             | 191.190.135... | 407-552...         | 001 Onsgard Park    | Orla...                | FL           | 32891         |                     | 28.5663                      | -81.2608                      | 2011-08-25 00:00:00                       |
| 7 [null]              | Wood          | Kennham            | [null]            | wkenn...       | M             | 191.190.135... | 407-552...         | 001 Onsgard Park    | Orla...                | FL           | 32891         |                     | 28.5663                      | -81.2608                      | 2011-08-25 00:00:00                       |
| 11 Mrs                | Urbano        | Middlehurst        | [null]            | umiddl...      | M             | 185.118.6.23   | 918-339...         | 5203 7th Trail      | Tulsa                  | OK           | 74156         |                     | 36.3024                      | -95.9605                      | 2011-10-22 00:00:00                       |
| 12 Mr                 | Tyne          | Duggan             | [null]            | tdugga...      | F             | 13.29.231.228  | [null]             | [null]              | [null]                 | [null]       | [null]        |                     | [null]                       | [null]                        | 2017-10-25 00:00:00                       |

| state<br>text | sales_amount<br>double precision |
|---------------|----------------------------------|
| AK            | 1124268.776                      |
| AL            | 4820333.791                      |
| AR            | 1487923.589                      |
| AZ            | 4109364.447                      |
| CA            | 27942722.0350006                 |
| CO            | 5377388.30800006                 |
| CT            | 3038361.316                      |
| DC            | 7211615.1750001                  |
| DE            | 957264.298                       |

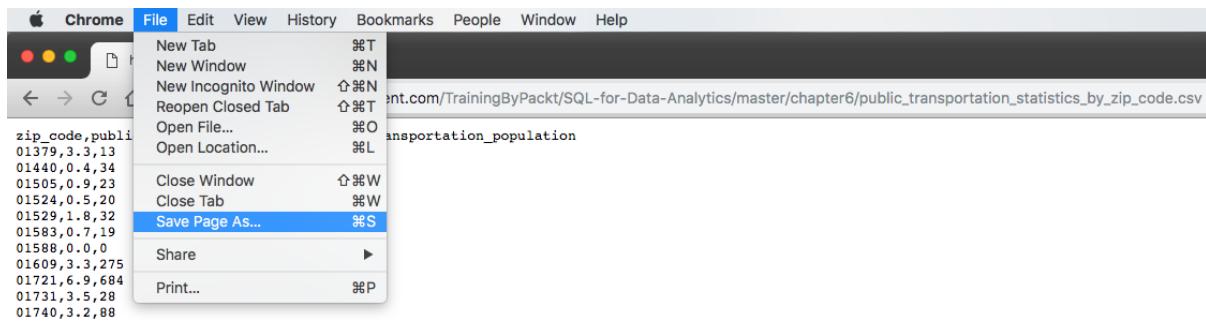
| dealership_id<br>double precision | count<br>bigint |
|-----------------------------------|-----------------|
| 10                                | 1781            |
| 7                                 | 1583            |
| 18                                | 1465            |
| 11                                | 1312            |
| 1                                 | 1297            |

| channel<br>text | product_id<br>bigint | avg_sales_amount<br>double precision |
|-----------------|----------------------|--------------------------------------|
| dealership      | 3                    | 477.253737607644                     |
| dealership      | 4                    | 109822.274881517                     |
| dealership      | 5                    | 664.330132075472                     |
| dealership      | 6                    | 62563.3763837638                     |
| dealership      | 7                    | 573.744146637002                     |
| dealership      | 8                    | 668.850500463391                     |
| dealership      | 9                    | 33402.6845637584                     |
| dealership      | 10                   | 81270.1121794872                     |
| dealership      | 11                   | 91589.7435897436                     |

| <b>sales_transaction_date</b><br>date | <b>total_sales_amount</b><br>double precision |
|---------------------------------------|---|
| 2018-01-01                            | 123689.951                                    |
| 2018-01-02                            | 183859.79                                     |
| 2018-01-03                            | 40029.854                                     |
| 2018-01-04                            | 187119.878                                    |
| 2018-01-05                            | 186459.904                                    |
| 2018-01-06                            | 100479.888                                    |
| 2018-01-07                            | 42989.864                                     |
| 2018-01-08                            | 11089.815                                     |
| 2018-01-09                            | 98119.878                                     |
| 2018-01-10                            | 10449.823                                     |
| 2018-01-11                            | 6449.891                                      |
| 2018-01-12                            | 160659.838                                    |
| 2018-01-13                            | 77789.869                                     |
| 2018-01-14                            | 234429.898                                    |
| 2018-01-15                            | 74429.847                                     |
| 2018-01-16                            | 129189.854                                    |
| 2018-01-17                            | 153839.873                                    |
| 2018-01-18                            | 255529.864                                    |

| <b>sales_transaction_date</b><br>date | <b>deals_moving_average_30</b><br>numeric |
|---------------------------------------|---|
| 2018-01-01                            | 17.9354838709677419                       |
| 2018-01-02                            | 18.3548387096774194                       |
| 2018-01-03                            | 18.3548387096774194                       |
| 2018-01-04                            | 18.1290322580645161                       |
| 2018-01-05                            | 17.9354838709677419                       |
| 2018-01-06                            | 17.5806451612903226                       |
| 2018-01-07                            | 17.5161290322580645                       |
| 2018-01-08                            | 17.8064516129032258                       |
| 2018-01-09                            | 17.8709677419354839                       |
| 2018-01-10                            | 17.8387096774193548                       |
| 2018-01-11                            | 17.4193548387096774                       |
| 2018-01-12                            | 17.1935483870967742                       |

| <b>dealership_id</b><br>double precision | <b>total_sales_amount</b><br>double precision | <b>ntile</b><br>integer |
|--|---|-------------------------|
| 13                                       | 538079.414                                    | 1                       |
| 9  | 618263.995                                    | 1                       |
| 8  | 671619.251                                    | 2                       |
| 4  | 905158.609                                    | 2                       |
| 17                                       | 907058.842                                    | 3                       |
| 20                                       | 949849.053                                    | 3                       |
| 12                                       | 1086033.376                                   | 4                       |
| 15                                       | 1197118.234                                   | 4                       |
| 6  | 1316253.465                                   | 5                       |
| 14                                       | 1551108.481                                   | 5                       |
| 3  | 1622872.801                                   | 6                       |
| 16                                       | 1981062.341                                   | 6                       |



Out[11]:

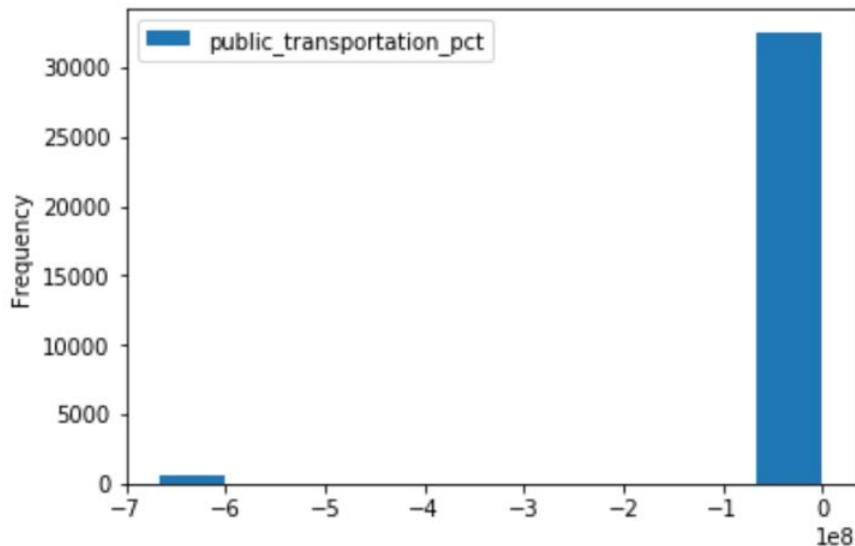
|   | zip_code | public_transportation_pct | public_transportation_population |
|---|----------|---------------------------|----------------------------------|
| 0 | 01379    | 3.3                       | 13                               |
| 1 | 01440    | 0.4                       | 34                               |
| 2 | 01505    | 0.9                       | 23                               |
| 3 | 01524    | 0.5                       | 20                               |
| 4 | 01529    | 1.8                       | 32                               |

| max_pct | min_pct    |
|---------|------------|
| 100     | -666666666 |

| is_high_public_transport | sales_per_customer     |
|--------------------------|------------------------|
| f                        | 0.71703932151117964534 |
| t                        | 0.80502739284563325814 |
| (2 rows)                 |                        |

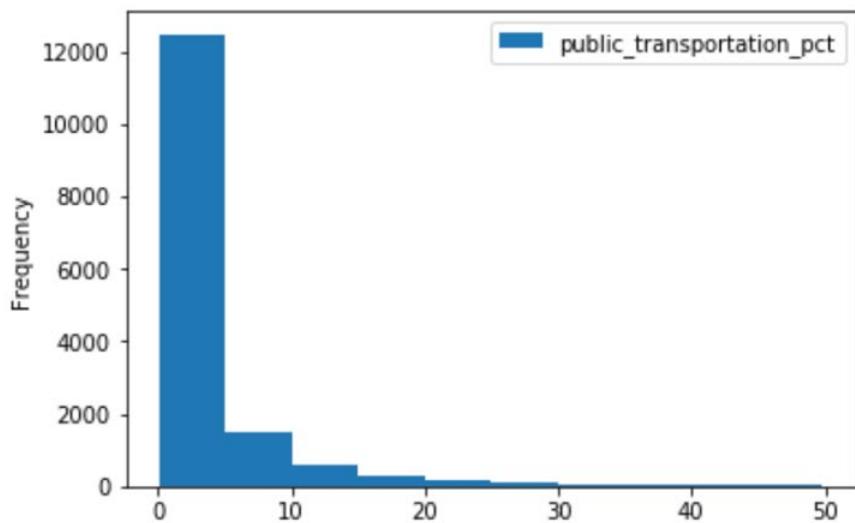
```
In [7]: data.plot.hist(y='public_transportation_pct')
```

```
Out[7]: <matplotlib.axes._subplots.AxesSubplot at 0x11b508080>
```



```
In [13]: data = pd.read_sql_query("""
    SELECT *
    FROM public_transportation_by_zip
    WHERE public_transportation_pct > 0
    AND public_transportation_pct < 50""", engine)
data.plot.hist(y='public_transportation_pct')
```

```
Out[13]: <matplotlib.axes._subplots.AxesSubplot at 0x1193ef160>
```



```
In [4]: import csv
from io import StringIO

def psql_insert_copy(table, conn, keys, data_iter):
    # gets a DBAPI connection that can provide a cursor
    dbapi_conn = conn.connection
    with dbapi_conn.cursor() as cur:
        s_buf = StringIO()
        writer = csv.writer(s_buf)
        writer.writerows(data_iter)
        s_buf.seek(0)

        columns = ', '.join('"%s"' % k for k in keys)
        if table.schema:
            table_name = '%s.%s' % (table.schema, table.name)
        else:
            table_name = table.name

        sql = 'COPY %s (%s) FROM STDIN WITH CSV'.format(
            table_name, columns)
        cur.copy_expert(sql=sql, file=s_buf)

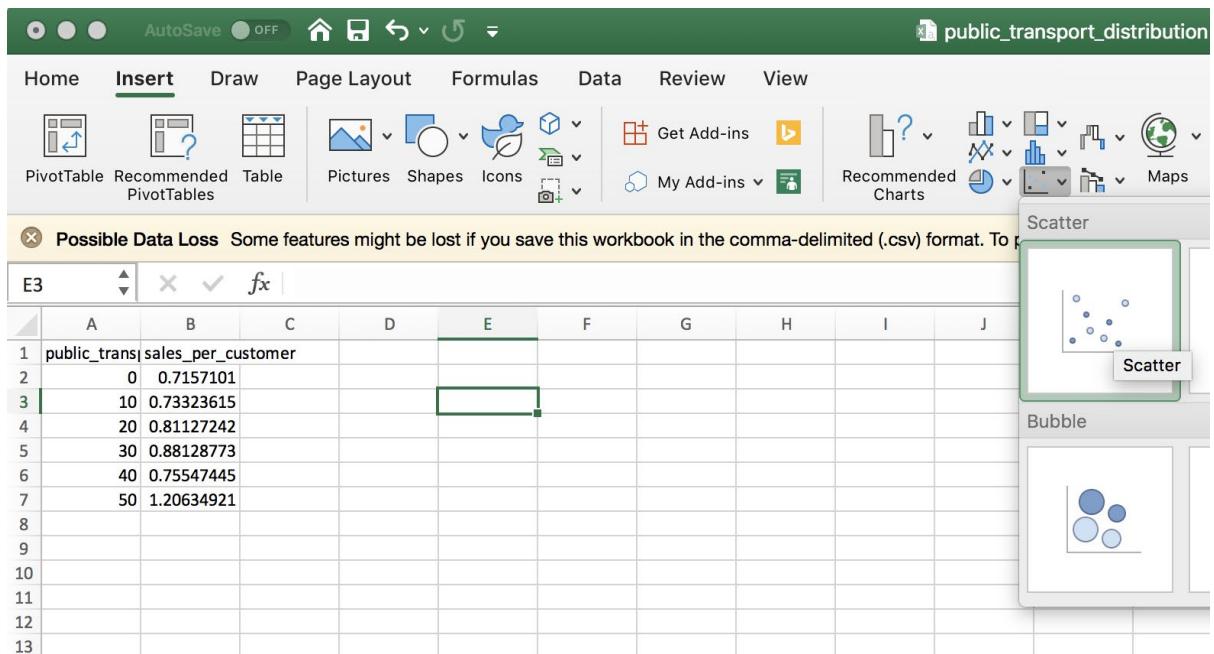
%time data.to_sql('public_transportation_by_zip', engine, method=psql_insert_copy, if_exists='replace')
CPU times: user 102 ms, sys: 21.1 ms, total: 123 ms
Wall time: 1.2 s
```

With COPY: ~1 Second

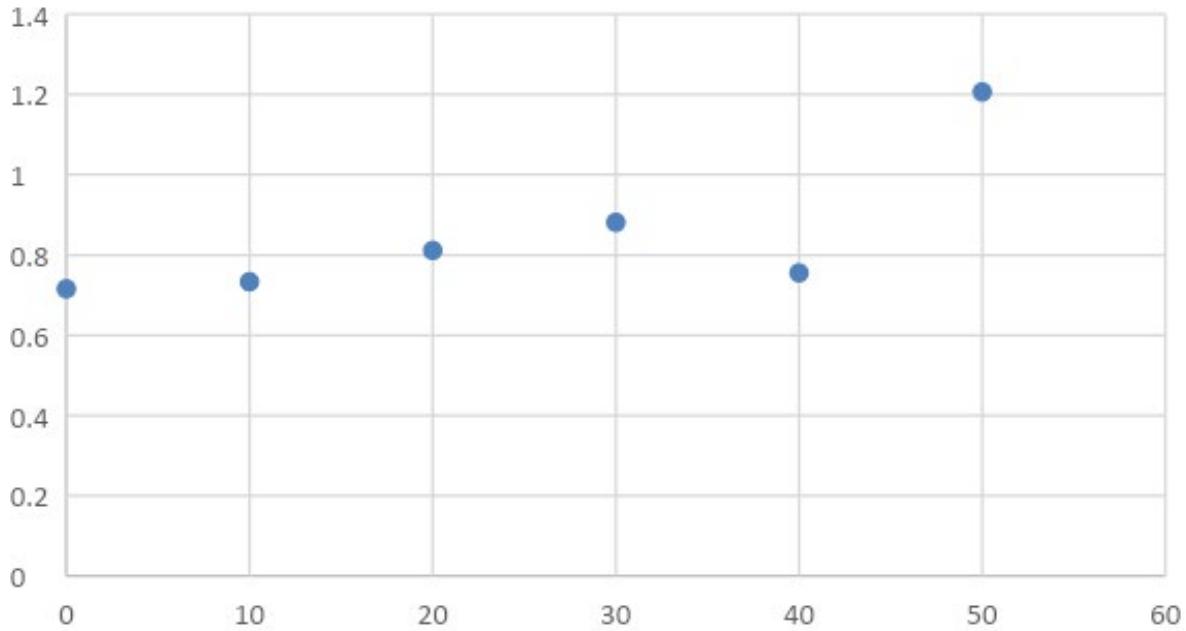
  

```
In [5]: %time data.to_sql('public_transportation_by_zip', engine, if_exists='replace')
CPU times: user 4.58 s, sys: 4.16 s, total: 8.75 s
Wall time: 9min 15s
```

Without COPY: ~9 minutes



## sales\_per\_customer



```
{"email": "darundale87e@nytimes.com", "phone": null, "sales": [{"product_id": 8, "product_name": "Bat Limited Edition", "sales_amount": 699.99, "sales_transaction_date": "2017-05-16T08:41:03"}], "last_name": "Arundale", "date_added": "2016-10-15T00:00:00", "first_name": "Danni", "customer_id": 10635}, {"email": "dsinkins8vv@theatlantic.com", "phone": null, "sales": [{"product_id": 7, "product_name": "Bat", "sales_amount": 599.99, "sales_transaction_date": "2018-01-10T14:25:09"}], "last_name": "Sinkins", "date_added": "2018-01-20T00:00:00", "first_name": "Danny", "customer_id": 11516}, {"email": "dfalkusrrn@mysql.com", "phone": "360-138-1212", "sales": [{"product_id": 7, "product_name": "Bat", "sales_amount": 599.99, "sales_transaction_date": "2018-08-07T01:05:05"}, {"product_id": 3, "product_name": "Lemon", "sales_amount": 399.992, "sales_transaction_date": "2018-07-05T09:51:51"}], "last_name": "Falkus", "date_added": "2018-06-16T00:00:00", "first_name": "Dan nie", "customer_id": 35848}, {"email": "dtyddwax@weebly.com", "phone": "626-781-3263", "sales": [{"product_id": 7, "product_name": "Bat", "sales_amount": 479.992, "sales_transaction_date": "2016-12-15T07:12:57"}], "last_name": "Tydd", "date_added": "2016-12-08T00:00:00", "first_name": "Dannie", "customer_id": 41866}, {"email": "dberthelmotxt5@jigsy.com", "phone": "559-535-5099", "sales": [{"product_id": 8, "product_name": "Bat Limited Edition", "sales_amount": 699.99, "sales_transaction_date": "2019-01-30T12:58:20"}], "last_name": "Berthelmot", "date_added": "2018-01-09T00:00:00", "first_name": "Danni", "customer_id": 43818}, {"email": "ddanenv1b5@geocities.com", "phone": "415-491-7645", "sales": [{"product_id": 7, "product_name": "Bat", "sales_amount": 479.992, "sales_transaction_date": "2017-07-12T01:07:30"}, {"product_id": 3, "product_name": "Lemon", "sales_amount": 499.99, "sales_transaction_date": "2016-12-09T08:02:24"}, {"product_id": 3, "product_name": "Lemon", "sales_amount": 499.99, "sales_transaction_date": "2015-08-09T15:56:15"}], "last_name": "Daney", "date_added": "2015-08-21T00:00:00", "first_name": "Danni", "customer_id": 1698}, {"email": "dlamondpy@soundcloud.com", "phone": "585-779-9709", "sales": [{"product_id": 7, "product_name": "Bat", "sales_amount": 599.99, "sales_transaction_date": "2017-01-01T22:30:02"}, {"product_id": 3, "product_name": "Lemon", "sales_amount": 499.99, "sales_transaction_date": "2016-12-19T03:55:45"}], "last_name": "Lamond", "date_added": "2016-12-17T00:00:00", "first_name": "Danny", "customer_id": 33625}, {"email": "dmagister113r@canalblog.com", "phone": "860-336-0719", "sales": [{"product_id": 8, "product_name": "Bat Limited Edition", "sales_amount": 699.99, "sales_transaction_date": "2017-03-14T02:25:39"}], "last_name": "Magister", "date_added": "2017-02-27T00:00:00", "first_name": "Danni", "customer_id": 48088} (8 rows)
```

| model        |  | model         |
|--------------|--|---------------|
| Bat          |  | Model Chi     |
| Bat          |  | Model Epsilon |
| Bat          |  | Model Gamma   |
| Bat          |  | Model Sigma   |
| Blade        |  | Model Chi     |
| Blade        |  | Model Epsilon |
| Blade        |  | Model Gamma   |
| Blade        |  | Model Sigma   |
| Lemon        |  | Model Chi     |
| Lemon        |  | Model Epsilon |
| Lemon        |  | Model Gamma   |
| Lemon        |  | Model Sigma   |
| Lemon Zester |  | Model Chi     |
| Lemon Zester |  | Model Epsilon |
| Lemon Zester |  | Model Gamma   |
| Lemon Zester |  | Model Sigma   |

(16 rows)

```
'bat' & 'model' & 'chi'
'bat' & 'model' & 'sigma'
'blade' & 'model' & 'chi'
'lemon' & 'model' & 'chi'
'bat' & 'model' & 'gamma'
'blade' & 'model' & 'sigma'
'lemon' & 'model' & 'sigma'
'bat' & 'model' & 'epsilon'
'blade' & 'model' & 'gamma'
'lemon' & 'model' & 'gamma'
'blade' & 'model' & 'epsilon'
'lemon' & 'model' & 'epsilon'
'lemon' & 'zester' & 'model' & 'chi'
'lemon' & 'zester' & 'model' & 'sigma'
'lemon' & 'zester' & 'model' & 'gamma'
'lemon' & 'zester' & 'model' & 'epsilon'
```

(16 rows)

| query                                    | count |
|--|-------|
| 'lemon' & 'model' & 'sigma'              | 340   |
| 'lemon' & 'model' & 'chi'                | 331   |
| 'bat' & 'model' & 'epsilon'              | 241   |
| 'bat' & 'model' & 'sigma'                | 226   |
| 'bat' & 'model' & 'chi'                  | 221   |
| 'lemon' & 'model' & 'epsilon'            | 217   |
| 'bat' & 'model' & 'gamma'                | 153   |
| 'lemon' & 'model' & 'gamma'              | 133   |
| 'lemon' & 'zester' & 'model' & 'chi'     | 28    |
| 'lemon' & 'zester' & 'model' & 'epsilon' | 22    |
| 'blade' & 'model' & 'chi'                | 21    |
| 'lemon' & 'zester' & 'model' & 'sigma'   | 17    |
| 'blade' & 'model' & 'sigma'              | 12    |
| 'lemon' & 'zester' & 'model' & 'gamma'   | 11    |
| 'blade' & 'model' & 'epsilon'            | 4     |
| 'blade' & 'model' & 'gamma'              | 4     |

(16 rows)

#### QUERY PLAN

```
Seq Scan on customers  (cost=0.00..1536.00 rows=50000 width=140)
(1 row)
```

#### QUERY PLAN

```
Limit  (cost=0.00..0.46 rows=15 width=140)
 -> Seq Scan on customers  (cost=0.00..1536.00 rows=50000 width=140)
(2 rows)
```

#### QUERY PLAN

```
Seq Scan on customers  (cost=0.00..1786.00 rows=26439 width=140)
 Filter: ((latitude > '30'::double precision) AND (latitude < '40'::double precision))
(2 rows)
```

#### QUERY PLAN

```
Seq Scan on customers  (cost=0.00..1661.00 rows=1 width=140) (actual time=0.019..15.592 rows=1 loops=1)
 Filter: (ip_address = '18.131.58.65'::text)
 Rows Removed by Filter: 49999
 Planning Time: 0.191 ms
 Execution Time: 15.625 ms
(5 rows)
```

---

#### QUERY PLAN

```
Index Scan using customers_ip_address_idx on customers  (cost=0.29..8.31 rows=1 width=140) (actual time=0.072..0.075 rows=1 loops=1)
 Index Cond: (ip_address = '18.131.58.65'::text)
 Planning Time: 0.467 ms
 Execution Time: 0.123 ms
(4 rows)
```

-----  
QUERY PLAN

```
Index Scan using ix_ip_where on customers  (cost=0.12..8.14 rows=1 width=140) (actual time=0.021..0.023 rows=1 loops=1)
Planning Time: 0.458 ms
Execution Time: 0.056 ms
(3 rows)
```

-----  
QUERY PLAN

```
Seq Scan on customers  (cost=0.00..1661.00 rows=107 width=140) (actual time=0.023..14.191 rows=102 loops=1)
  Filter: (suffix = 'Jr'::text)
  Rows Removed by Filter: 49898
Planning Time: 0.153 ms
Execution Time: 14.238 ms
(5 rows)
```

-----  
QUERY PLAN

```
Bitmap Heap Scan on customers  (cost=5.12..318.44 rows=107 width=140) (actual time=0.146..0.440 rows=102 loops=1)
  Recheck Cond: (suffix = 'Jr'::text)
  Heap Blocks: exact=100
    -> Bitmap Index Scan on ix_jr  (cost=0.00..5.09 rows=107 width=0) (actual time=0.092..0.092 rows=102 loops=1)
      Index Cond: (suffix = 'Jr'::text)
Planning Time: 0.411 ms
Execution Time: 0.511 ms
(7 rows)
```

-----  
QUERY PLAN

```
Seq Scan on emails  (cost=0.00..10651.98 rows=19863 width=79) (actual time=7.843..117.840 rows=19873 loops=1)
  Filter: (email_subject = 'Shocking Holiday Savings On Electric Scooters'::text)
  Rows Removed by Filter: 398285
Planning Time: 0.117 ms
Execution Time: 119.801 ms
(5 rows)
```

-----  
QUERY PLAN

```
Seq Scan on emails  (cost=0.00..10651.98 rows=40645 width=79) (actual time=65.643..124.249 rows=41399 loops=1)
  Filter: (email_subject = 'Black Friday. Green Cars.'::text)
  Rows Removed by Filter: 376759
Planning Time: 0.097 ms
Execution Time: 127.736 ms
(5 rows)
```

-----  
QUERY PLAN

```
Bitmap Heap Scan on emails  (cost=641.94..6315.23 rows=19863 width=79) (actual time=2.096..15.061 rows=19873 loops=1)
  Recheck Cond: (email_subject = 'Shocking Holiday Savings On Electric Scooters'::text)
  Heap Blocks: exact=289
    -> Bitmap Index Scan on ix_email_subject  (cost=0.00..636.97 rows=19863 width=0) (actual time=1.936..1.936 rows=19873 loops=1)
      Index Cond: (email_subject = 'Shocking Holiday Savings On Electric Scooters'::text)
Planning Time: 0.130 ms
Execution Time: 17.028 ms
(7 rows)
```

-----  
QUERY PLAN

```
Bitmap Heap Scan on emails  (cost=1311.00..7244.06 rows=40645 width=79) (actual time=4.085..29.296 rows=41399 loops=1)
  Recheck Cond: (email_subject = 'Black Friday. Green Cars.'::text)
  Heap Blocks: exact=531
    -> Bitmap Index Scan on ix_email_subject  (cost=0.00..1300.84 rows=40645 width=0) (actual time=3.817..3.817 rows=41399 loops=1)
      Index Cond: (email_subject = 'Black Friday. Green Cars.'::text)
Planning Time: 0.403 ms
Execution Time: 33.216 ms
(7 rows)
```

-----  
QUERY PLAN

```
Seq Scan on emails  (cost=0.00..10651.98 rows=417309 width=79) (actual time=0.024..121.483 rows=417315 loops=1)
  Filter: (customer_id > 100)
  Rows Removed by Filter: 843
Planning Time: 0.199 ms
Execution Time: 152.656 ms
(5 rows)
```

| customer_id | first_name | last_name  | opened | clicked |
|-------------|------------|------------|--------|---------|
| 18          | Mareah     | Edgell     | f      | f       |
| 30          | Kath       | Rivel      | f      | f       |
| 41          | Rycca      | Oakwell    | t      | f       |
| 52          | Giusto     | Backe      | f      | f       |
| 59          | Laurene    | Lobbe      | f      | f       |
| 78          | West       | Hampson    | f      | f       |
| 82          | Claudie    | Cancott    | f      | f       |
| 84          | Nels       | Beefon     | f      | f       |
| 103         | Natalina   | Dell 'Orto | f      | f       |
| 119         | Hugibert   | Bullocke   | f      | f       |
| 132         | Orrin      | Evennett   | f      | f       |
| 134         | Emmalyn    | Hackney    | f      | f       |
| 135         | Myrilla    | Starcks    | f      | f       |
| 137         | Cindee     | Prandi     | f      | f       |

| customer_id | first_name | last_name  | opened | clicked |
|-------------|------------|------------|--------|---------|
| 554         | Chet       | Melchior   | t      | t       |
| 673         | Hirsch     | Kulver     | t      | t       |
| 1255        | Randi      | Benzing    | t      | t       |
| 1916        | Gabrielle  | Skeermer   | t      | t       |
| 2109        | Augie      | Rhymer     | t      | t       |
| 2308        | Natale     | Ruddiman   | t      | t       |
| 2909        | Wilton     | Silversmid | t      | t       |
| 3367        | Aidan      | Hinzer     | t      | t       |
| 3718        | Myrah      | Capstack   | t      | t       |
| 4013        | Dalton     | Turrill    | t      | t       |
| 4303        | Benson     | Pruvost    | t      | t       |
| 4370        | Krystle    | Roiz       | t      | t       |
| 6405        | Valaree    | Wedmore    | t      | t       |

| customer_id | first_name   | last_name   | city            |
|-------------|--------------|-------------|-----------------|
| 1           | Arlena       | Riveles     |                 |
| 2           | Ode          | Stovin      | Saint Louis     |
| 3           | Braden       | Jordan      | Pensacola       |
| 4           | Jessika      | Nussen      | Nashville       |
| 5           | Lonnie       | Rembaud     | Miami           |
| 6           | Cortie       | Locksley    | Miami           |
| 7           | Wood         | Kennham     | Orlando         |
| 8           | Rutger       | Humblestone | New Haven       |
| 9           | Melantha     | Tibb        | Shawnee Mission |
| 10          | Barbara-anne | Gowlett     | El Paso         |
| 11          | Urbano       | Middlehurst | Tulsa           |

| customer_id | first_name | last_name   | city |
|-------------|------------|-------------|------|
| 1           | Arlena     | Riveles     |      |
| 12          | Tyne       | Duggan      |      |
| 21          | Pryce      | Geist       |      |
| 24          | Barbi      | Lanegrان    |      |
| 30          | Kath       | Rivel       |      |
| 38          | Carter     | Lagneaux    |      |
| 44          | Waldemar   | Paroni      |      |
| 49          | Hannah     | McGlew      |      |
| 56          | Riva       | Cathesyed   |      |
| 63          | Gweneth    | Maior       |      |
| 70          | Caty       | Woolveridge |      |
| 72          | Jodi       | Faulty      |      |

max  
-----  
115000  
(1 row)

### avg\_sales\_window

| order_id | avg_qty           |
|----------|-------------------|
| 1625     | 4.750000000000000 |
| 1626     | 5.000000000000000 |
| 1627     | 5.300000000000000 |

(3 rows)

| pid   | query   |
|-------|---|
| 14117 | SELECT pid, query FROM pg_stat_activity WHERE state = 'active'; |
| 14131 | SELECT pg_sleep(1000);  |

(2 rows)

### pg\_terminate\_backend

| t |
|---|
|   |

(1 row)

```

sqlda=# SELECT pg_sleep(1000);
FATAL: terminating connection due to administrator command
server closed the connection unexpectedly
    This probably means the server terminated abnormally
        before or while processing the request.
The connection to the server was lost. Attempting reset: Succeeded.
sqlda=#

```

| sales_transaction_date | count | sum |
|------------------------|-------|-----|
| 2016-10-10 00:00:00    | 9     | 9   |
| 2016-10-11 00:00:00    | 6     | 15  |
| 2016-10-12 00:00:00    | 10    | 25  |
| 2016-10-13 00:00:00    | 10    | 35  |
| 2016-10-14 00:00:00    | 5     | 40  |
| 2016-10-15 00:00:00    | 10    | 50  |
| 2016-10-16 00:00:00    | 14    | 64  |
| 2016-10-17 00:00:00    | 9     | 73  |
| 2016-10-18 00:00:00    | 11    | 84  |
| 2016-10-19 00:00:00    | 12    | 96  |
| 2016-10-20 00:00:00    | 10    | 106 |
| 2016-10-21 00:00:00    | 6     | 112 |
| 2016-10-22 00:00:00    | 2     | 114 |
| 2016-10-23 00:00:00    | 5     | 119 |
| 2016-10-24 00:00:00    | 6     | 125 |
| 2016-10-25 00:00:00    | 9     | 134 |
| 2016-10-26 00:00:00    | 2     | 136 |
| 2016-10-27 00:00:00    | 4     | 140 |
| 2016-10-28 00:00:00    | 7     | 147 |
| 2016-10-29 00:00:00    | 5     | 152 |
| 2016-10-30 00:00:00    | 5     | 157 |
| 2016-10-31 00:00:00    | 3     | 160 |

| sales_transaction_date | count | sum | lag |
|------------------------|-------|-----|-----|
| 2016-10-10 00:00:00    | 9     | 9   |     |
| 2016-10-11 00:00:00    | 6     | 15  |     |
| 2016-10-12 00:00:00    | 10    | 25  |     |
| 2016-10-13 00:00:00    | 10    | 35  |     |
| 2016-10-14 00:00:00    | 5     | 40  |     |
| 2016-10-15 00:00:00    | 10    | 50  |     |
| 2016-10-16 00:00:00    | 14    | 64  |     |
| 2016-10-17 00:00:00    | 9     | 73  | 9   |
| 2016-10-18 00:00:00    | 11    | 84  | 15  |
| 2016-10-19 00:00:00    | 12    | 96  | 25  |
| 2016-10-20 00:00:00    | 10    | 106 | 35  |
| 2016-10-21 00:00:00    | 6     | 112 | 40  |
| 2016-10-22 00:00:00    | 2     | 114 | 50  |
| 2016-10-23 00:00:00    | 5     | 119 | 64  |
| 2016-10-24 00:00:00    | 6     | 125 | 73  |

(15 rows)

| <code>sales_transaction_date</code> | <code>count</code> | <code>sum</code> | <code>lag</code> | <code>volume</code>        |
|-------------------------------------|--------------------|------------------|------------------|----------------------------|
| 2016-10-10 00:00:00                 | 9                  | 9                |                  |                            |
| 2016-10-11 00:00:00                 | 6                  | 15               |                  |                            |
| 2016-10-12 00:00:00                 | 10                 | 25               |                  |                            |
| 2016-10-13 00:00:00                 | 10                 | 35               |                  |                            |
| 2016-10-14 00:00:00                 | 5                  | 40               |                  |                            |
| 2016-10-15 00:00:00                 | 10                 | 50               |                  |                            |
| 2016-10-16 00:00:00                 | 14                 | 64               |                  |                            |
| 2016-10-17 00:00:00                 | 9                  | 73               | 9                | 7.11111111111111           |
| 2016-10-18 00:00:00                 | 11                 | 84               | 15               | 4.600000000000000          |
| 2016-10-19 00:00:00                 | 12                 | 96               | 25               | 2.840000000000000          |
| 2016-10-20 00:00:00                 | 10                 | 106              | 35               | 2.0285714285714286         |
| 2016-10-21 00:00:00                 | 6                  | 112              | 40               | 1.800000000000000          |
| 2016-10-22 00:00:00                 | 2                  | 114              | 50               | 1.280000000000000          |
| 2016-10-23 00:00:00                 | 5                  | 119              | 64               | 0.859375000000000          |
| 2016-10-24 00:00:00                 | 6                  | 125              | 73               | 0.71232876712328767123     |
| 2016-10-25 00:00:00                 | 9                  | 134              | 84               | 0.59523809523809523810     |
| 2016-10-26 00:00:00                 | 2                  | 136              | 96               | 0.4166666666666666666667   |
| 2016-10-27 00:00:00                 | 4                  | 140              | 106              | 0.32075471698113207547     |
| 2016-10-28 00:00:00                 | 7                  | 147              | 112              | 0.3125000000000000000000   |
| 2016-10-29 00:00:00                 | 5                  | 152              | 114              | 0.333333333333333333333333 |
| 2016-10-30 00:00:00                 | 5                  | 157              | 119              | 0.31932773109243697479     |
| 2016-10-31 00:00:00                 | 3                  | 160              | 125              | 0.2800000000000000000000   |

(22 rows)

`count`

-----

16558

(1 row)

`max`

-----

2018-12-27 19:12:10

(1 row)

| <code>sales_transaction_date</code> | <code>count</code> | <code>sum</code> | <code>lag</code> | <code>volume</code>    |
|-------------------------------------|--------------------|------------------|------------------|------------------------|
| 2013-05-01                          | 6                  | 6                |                  |                        |
| 2013-05-02                          | 8                  | 14               |                  |                        |
| 2013-05-03                          | 4                  | 18               |                  |                        |
| 2013-05-04                          | 9                  | 27               |                  |                        |
| 2013-05-05                          | 9                  | 36               |                  |                        |
| 2013-05-06                          | 6                  | 42               |                  |                        |
| 2013-05-07                          | 8                  | 50               |                  |                        |
| 2013-05-08                          | 6                  | 56               | 6                | 8.33333333333333       |
| 2013-05-09                          | 6                  | 62               | 14               | 3.4285714285714286     |
| 2013-05-10                          | 9                  | 71               | 18               | 2.944444444444444      |
| 2013-05-11                          | 3                  | 74               | 27               | 1.7407407407407407     |
| 2013-05-12                          | 4                  | 78               | 36               | 1.1666666666666667     |
| 2013-05-13                          | 7                  | 85               | 42               | 1.0238095238095238     |
| 2013-05-14                          | 3                  | 88               | 50               | 0.7600000000000000     |
| 2013-05-15                          | 3                  | 91               | 56               | 0.6250000000000000     |
| 2013-05-16                          | 4                  | 95               | 62               | 0.53225806451612903226 |
| 2013-05-17                          | 6                  | 101              | 71               | 0.42253521126760563380 |
| 2013-05-18                          | 9                  | 110              | 74               | 0.48648648648648648649 |
| 2013-05-19                          | 6                  | 116              | 78               | 0.48717948717948717949 |
| 2013-05-20                          | 6                  | 122              | 85               | 0.43529411764705882353 |
| 2013-05-21                          | 11                 | 133              | 88               | 0.51136363636363636364 |
| 2013-05-22                          | 8                  | 141              | 91               | 0.54945054945054945055 |

(22 rows)