```
import boto3
               import json
               session = boto3.session.Session()
               client = session.client(
                     service_name='secretsmanager'
               get_secret_value_response = client.get_secret_value(
                     SecretId=secret_name
               if 'SecretString' in get_secret_value_response:
                     connection_info = json.loads(get_secret_value_response['SecretString'])
                     print("ERROR: no secret data found")
In [41]: | expected_keys = set(['dbname', 'host', 'dbClusterIdentifier', 'password', 'port', 'engine', 'username'])
               if not expected_keys.issubset(connection_info.keys()):
                     print("Expected values for ", expected_keys)
                     print("Received values for ", set(connection_info.keys()))
                     print("Please adjust query or assignment as required!")
In [42]: import time
               import psycopg2
               con=psycopg2.connect(
                     dbname = connection_info["dbname"],
                     host
                                   = connection_info["host"],
                     port
                                   = connection_info["port"],
                               = connection_info["username"],
                     password = connection_info["password"]
In [43]: cur = con.cursor()
               cur.execute("select * from usa_housing_population limit 5")
               res = cur.fetchall()
               print(res)
               cur.close()
               [('cleveland', 'OH', '11/1/17', 142952, 44102, 191450, 0.161, 1.7389, 133, -0.0764, 0.031, None, 0.163265306, 0.17931
               0345, 24, -0.25, -0.1429, 4, None, None, 20, -0.375, -0.1667, 65, 0.1017, 3.3333, 115.2431818, 0.1815, 1.5241, 1628,
               0.0317, 0.1922, 284058.5734, 0.0704, 1.0009, 198, -0.0246, 0.375, 0.488721805), ('greenville', 'NC', '11/1/17', 13224
               1, 27834, 142400, -0.0659, 0.1005, 126, -0.0455, -0.2921, 88, 0.257142857, -0.293172691, 24, -0.1429, -0.25, 4, None,
               None, 20, 0.6667, -0.375, 90, -0.0816, 0.1688, 86.73016101, -0.0537, 0.0581, 1604, -0.0795, 0.0409, 203423.6565, -0.0
               572, 0.0966, 216, -0.0609, -0.1529, 0.714285714), ('tampa', 'FL', '11/1/17', 201871, 33616, 259900, 0.0, 0.0554, 73,
               -0.0135, -0.0519, 69, -0.086092715, 0.568181818, 28, 0.1667, 0.0, 4, 0.0, None, 20, -0.5455, -0.1667, 45, -0.1346, 0.
               25, 172.6422387, -0.0024, 0.0661, None, -0.0245, 0.058, 323086.6429, 0.0136, 0.0115, 118, -0.0635, 0.0442, 0.61643835
               6), ('miami', 'FL', '11/1/17', 278083, 33185, 439500, 0.0163, 0.0222, 84, 0.0244, -0.1429, 62, -0.107913669, -0.21019
               1083, 28, -0.125, -0.3, 4, 0.0, 0.0, 20, 0.25, 0.6667, 61, -0.0615, 0.0, 189.8023434, 0.0189, 0.0895, None, 0.0905, -
               0.0654, 432623.6469, 0.0214, 0.0107, 145, -0.0136, -0.0881, 0.726190476), ('denver', 'CO', '11/1/17', 408911, 80231,
               427250, 0.5399, -0.1453, 48, -0.25, -0.0943, 36, 0.2, -0.152941176, 32, -0.3846, 0.1429, 4, None, None, 20, -0.2857,
               0.0, 1, -0.5, 0.0, 172.9302533, 0.0053, 0.0435, 2642, 0.5783, -0.0833, 618434.2169, 0.1667, -0.1487, 49, -0.2576, -0.
               0926, 0.020833333)]
In [44]: import pandas as pd
               import pandas.io.sql as sqlio
               import psycopg2
               import pandas as pd
               import numpy as np
               import seaborn as sns
               import datetime
               import matplotlib.pyplot as plt
               %matplotlib inline
In [45]: sql = "select * from usa_housing_population;"
               housing_population= sqlio.read_sql_query(sql, con)
In [46]: housing_population
Out[46]:
                                                  date population postal_code median_listing_price median_listing_price_mm median_listing_price_yy active_listing_count active_l
                                 city state
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                                                                                                                                        0.1610
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                214088
                                          IN 7/1/21
                                                              116519
                                                                                47303
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                                                                                                                                                                         NaN
                             muncie
               214089 rows × 39 columns
               housing_population.describe()
Out[47]:
                                             postal_code median_listing_price median_listing_price_mm median_listing_price_yy active_listing_count active_listing_count_mm 
                            population
                count 2.140890e+05 214089.000000
                                                                      1.989090e+05
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                 mean 2.354718e+05
                   std 1.545481e+05
                                           26330.251459
                                                                      3.530873e+05
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               8 rows × 36 columns
In [48]: housing_population= housing_population.sort_values(['state', 'date'], ascending = (True, True)).reset_index(drop = T
In [49]: | housing_population['median_square_feet_yy'].mean()
               housing_population['average_listing_price'].mean()
Out[49]: 422409.51317344076
In [50]: | housing_population[['average_listing_price', 'median_square_feet_yy', 'median_listing_price_mm', 'median_listing_price_
               yy']] = housing_population[['average_listing_price','median_square_feet_yy','median_listing_price_mm','median_listin
               g_price_yy']].fillna(value=housing_population[['average_listing_price', 'median_square_feet_yy', 'median_listing_price')
                _mm','median_listing_price_yy']].mean())
In [51]: housing_population[['average_listing_price_mm','average_listing_price_yy','total_listing_count_mm','total_listing_co
               unt_yy']] = housing_population[['average_listing_price_mm', 'average_listing_price_yy', 'total_listing_count_mm', 'tota
               l\_listing\_count\_yy']]. fillna(value=housing\_population[['average\_listing\_price\_mm', 'average\_listing\_price\_yy', 'total\_price\_yy', 'total
               listing_count_mm', 'total_listing_count_yy']].mean())
In [52]: filters = [
                     (housing\_population['average\_listing\_price\_yy'] < 0) \& (housing\_population['median\_listing\_price\_yy'] < 0), \\
                     (housing_population['average_listing_price_mm'] < 0) & (housing_population['median_listing_price_mm'] < 0),
               values = ["Down from last year", "Down from last month"]
               housing_population["category"] = np.select(filters, values, default="Increase in prices")
               print('Price ratios for all the records:')
               housing_population['category'].value_counts()/len(housing_population['category'])*100
               #compared to previous years, there has been an increase in prices by 65.38%
               Price ratios for all the records:
Out[52]: Increase in prices
                                                      65.388693
               Down from last month
                                                      19.763276
                                                      14.848030
               Down from last year
               Name: category, dtype: float64
In [54]: housing_population[["month", "day", "year"]] = housing_population["date"].str.split("/", expand = True)
In [55]: data1=housing_population[['population', 'median_listing_price', 'median_days_on_market', 'new_listing_count', 'median_s
               sns.pairplot(data1.iloc[:,:5])
               plt.show()
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                    1.25
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                  草 0.75
                 B 0.50
                    0.25
                    0.00
                  n_days_on_market
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In [56]: housing_population.iloc[:,:].hist(figsize=(25,35))
               plt.show()
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                        price_reduced_count_mm
                                                         price_reduced_count_yy
                                                                                         pending_listing_count
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In [57]: fig, ax = plt.subplots(1,1, figsize=(12, 8), dpi=80)
               fig.text(0.09, 1, 'States housing price range comparison', fontsize=20, fontweight='bold', fontfamily='serif')
               #plt.figure(figsize=(10, 8), dpi=80)
               box_plot = sns.boxplot(x = 'state', y = 'average_listing_price', data = housing_population.sort_values('average_listing_price')
               g_price', ascending=False))
               plt.ylabel('Price')
               plt.xlabel('State')
               ax = box_plot.axes
               lines = ax.get_lines()
               categories = ax.get_xticks()
               ax.tick_params(axis='x', rotation=90)
               for s in ['top', 'left', 'right']:
                     ax.spines[s].set_visible(False)
               ax.grid(axis='y', linestyle='-', alpha=0.4)
               box_plot.figure.tight_layout()
               #fig = box_plot.get_figure()
                               States housing price range comparison
                          1e7
                   1.75
                   1.50
                   1.25
                   1.00
                   0.75
                   0.50
```

In [40]: # Put the ARN of your AWS Secrets Manager secret for your redshift cluster here:

This will get the secret from AWS Secrets Manager.

secret_name="arn:aws:secretsmanager:us-west-1:603574119146:secret:secretkey-project-EQOP4N"

average listing price - 1 0.94 0.78 0.061 0.14 0.1 0.021 - 0.8 0.85 0.048 0.098 0.1 -0.029 median listing price - 0.94 - 0.6 median_listing_price_per_square_foot - 0.78 0.85 0.00046 0.052 0.063 -0.061 price_reduced_count - 0.061 0.048 0.00046

0.21

-0.18

In [59]: | df_reduced = housing_population[['average_listing_price', 'median_listing_price', 'median_listing_price_per_square_foo

-1.0

- 0.4

0.2

0.0

t', 'price_reduced_count', 'active_listing_count', 'new_listing_count', 'median_days_on_market', 'year']]

sns.heatmap(df_reduced.corr(), annot = True)

active listing count

0.14 0.098 0.052

median_days_on_market - 0.021 -0.029 -0.061 -0.017 0.21

0.1 0.063

Out[59]: <AxesSubplot:>