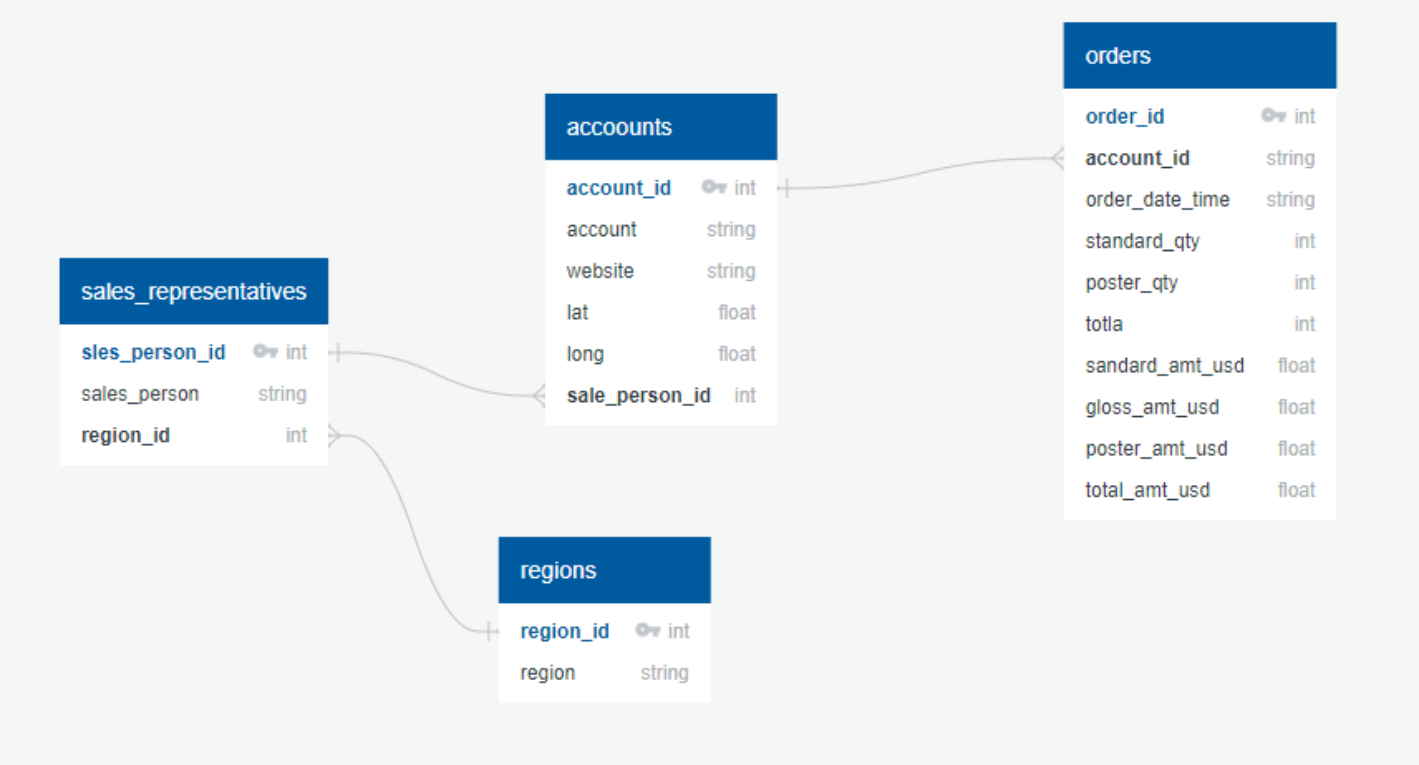
Data Model


orders
order_id int
account_id string
order_date_time string
standard_qty int
poster_qty int
totla int
sandard_amt_usd float
gloss_amt_usd float
poster_amt_usd float
total_amt_usd float
accoounts
account_id int
account string
website string
lat float
long float
sale_person_id int
sales_representatives
sles_person_id int
sales_person string
region_id int
regions
region_id int
region string

Parch & Posey Business Data Analysis

This project is authored by Waleed

Problem Statment

Parch and Posey is a comapny that sells 3 paper types (standard, gloss, poster). The company's data is accumulated for the several years and stored in 4 csv files ; orders, accounts, sales_persons and regions. As a data analyst you are required to help the management to make informed decisions by analyzing the the data and generate business insights. The management wants to acquire general knowledge of the data, and get answers for specific questions from the departments of Sales & Marketing, HR and Finance.

Part 1: General EDA - Getting to Know the Data

1.1. Importing Required Packages

```
try:
  import pandas as pd
except:
  !pip install pandas
finally:
  import pandas as pd

try:
  import matplotlib.pyplot as plt
except:
  !pip install matplotlib
finally:
  import matplotlib.pyplot as plt
  plt.style.use('ggplot')

try:
  import seaborn as sns
except:
  !pip install seaborn
finally:
  import seaborn as sns
```

```
try:
  import plotly.express as px
except:
  !pip install plotly-express==4.8.2
finally:
  import plotly.express as px


try:
  import folium
except:
  !pip install folium
finally:
  import folium

try:
  import geocoder
except:
  !pip install geocoder
finally:
  import geocoder
```

```
try:
  import geopy
except:
  !pip install geopy
finally:
  import geopy

!pip install plotly==4.8.2
import plotly.graph_objects as go

try:
  from scipy.stats import ttest_ind
except:
  !pip install scipy
finally:
  from scipy.stats import ttest_ind
```

```
Requirement already satisfied: certifi>=2017.4.17 in /shared-libs/python3.7/py/lib/python3.7/site-packages (from req
Requirement already satisfied: zipp>=0.5 in /shared-libs/python3.7/py-core/lib/python3.7/site-packages (from importl
Requirement already satisfied: typing-extensions>=3.6.4; python_version < "3.8" in /shared-libs/python3.7/py-core/li
Installing collected packages: ratelim, geocoder
Successfully installed geocoder-1.38.1 ratelim-0.1.6
WARNING: You are using pip version 20.1.1; however, version 21.3.1 is available.
You should consider upgrading via the '/root/venv/bin/python -m pip install --upgrade pip' command.
Collecting geopy
  Downloading geopy-2.2.0-py3-none-any.whl (118 kB)
     |████████████████████████████████| 118 kB 37.0 MB/s
Collecting geographiclib<2,>=1.49
  Downloading geographiclib-1.52-py3-none-any.whl (38 kB)
Installing collected packages: geographiclib, geopy
Successfully installed geographiclib-1.52 geopy-2.2.0
WARNING: You are using pip version 20.1.1; however, version 21.3.1 is available.
You should consider upgrading via the '/root/venv/bin/python -m pip install --upgrade pip' command.
Collecting plotly==4.8.2
  Downloading plotly-4.8.2-py2.py3-none-any.whl (11.5 MB)
     |████████████████████████████████| 11.5 MB 18.6 MB/s
Requirement already satisfied: six in /shared-libs/python3.7/py-core/lib/python3.7/site-packages (from plotly==4.8.2
Collecting retrying>=1.3.3
  Downloading retrying-1.3.3.tar.gz (10 kB)
Building wheels for collected packages: retrying
  Building wheel for retrying (setup.py) ... done
  Created wheel for retrying: filename=retrying-1.3.3-py3-none-any.whl size=11429 sha256=74e5eeb41d225ff420f352226ca
  Stored in directory: /root/.cache/pip/wheels/f9/8d/8d/f6af3f7f9eea3553bc2fe6d53e4b287dad18b06a861ac56ddf
Successfully built retrying
```

1.2. Data Collection and Transfromation

1.2.1. Load Data

```
orders = pd.read_csv('orders.csv', index_col = None)
accounts = pd.read_csv('accounts.csv',index_col = None)
sr = pd.read_csv('sales_representatives.csv',index_col = None)
regions = pd.read_csv('regions.csv',index_col = None)
```

1.2.2. Check the Data Data

```
for table in [orders, accounts, sr, regions]:
    print(table.info())
    print('\n')
```

```
 2   website       350 non-null    object
 3   lat           350 non-null    float64
 4   long          350 non-null    float64
 5   primary_poc   350 non-null    object
 6   sales_rep_id  350 non-null    int64
dtypes: float64(2), int64(2), object(3)
memory usage: 19.3+ KB
None


<class 'pandas.core.frame.DataFrame'>
RangeIndex: 50 entries, 0 to 49
Data columns (total 3 columns):
 #   Column     Non-Null Count  Dtype
---  ------     --------------  -----
 0   id         50 non-null     int64
 1   name       50 non-null     object
 2   region_id  50 non-null     int64
dtypes: int64(2), object(1)
memory usage: 1.3+ KB
None


<class 'pandas.core.frame.DataFrame'>
RangeIndex: 4 entries, 0 to 3
Data columns (total 2 columns):
 #   Column  Non-Null Count  Dtype
---  ------  --------------  -----
 0   id      4 non-null      int64
 1   name    4 non-null      object
```

1.2.3. Prepare and transform Data

```
# change the some of the columns names in the loaded tables
orders.rename(columns = {'occurred_at':'order_date_time','id':'order_id'}, inplace = True)

accounts.rename(columns = {'id':'account_id','sales_rep_id':'sales_person_id','name':'account'}, inp

sr.rename(columns = {'id':'sales_person_id','name':'sales_person'}, inplace = True)

regions.rename(columns = {'id':'region_id','name':'region'}, inplace = True)
```

```
# merge the 4 dataframes
df = (orders.merge(accounts, 'inner', left_on = 'account_id', right_on = 'account_id').
      merge(sr, 'inner', left_on = 'sales_person_id', right_on = 'sales_person_id').
      merge(regions, 'inner', left_on = 'region_id', right_on = 'region_id')
      )
```

```
# delete the coluns that cotains 'id' except for the 'orders_id'
cols = [col for col in df.columns if 'id' in col and col != 'order_id']
df.drop(cols, axis = 1, inplace = True)

df.head()
```

	order_id int64	order_date_t…	standard_qty i…	gloss_qty int…	poster_qty in…	total int64
0	1	10/6/2015 17:31	123	22	24	
1	2	11/5/2015 3:34	190	41	57	
2	3	12/4/2015 4:21	85	47	0	
3	4	1/2/2016 1:18	144	32	0	
4	5	2/1/2016 19:27	108	29	28	

```
# make a new coumln of 'coordinates'
df['coordinates'] = list(df[['lat', 'long']].itertuples(index=False, name=None))

# drop the 'lat' and 'long' columns
df.drop(columns = ['lat', 'long'], inplace = True)

# convert the 'order_date_time' to Datetime data type
df['order_date_time'] = pd.to_datetime(df['order_date_time'])
```

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 6911 entries, 0 to 6910
Data columns (total 16 columns):
 #   Column            Non-Null Count  Dtype         
---  ------            --------------  -----         
 0   order_id          6911 non-null   int64         
 1   order_date_time   6911 non-null   datetime64[ns]
 2   standard_qty      6911 non-null   int64         
 3   gloss_qty         6911 non-null   int64         
 4   poster_qty        6911 non-null   int64         
 5   total             6911 non-null   int64         
 6   standard_amt_usd  6911 non-null   float64       
 7   gloss_amt_usd     6911 non-null   float64       
 8   poster_amt_usd    6911 non-null   float64       
 9   total_amt_usd     6911 non-null   float64       
 10  account           6911 non-null   object        
 11  website           6911 non-null   object        
 12  primary_poc       6911 non-null   object        
 13  sales_person      6911 non-null   object        
 14  region            6911 non-null   object        
 15  coordinates       6911 non-null   object        
dtypes: datetime64[ns](1), float64(4), int64(5), object(6)
memory usage: 917.9+ KB
```

1.3. Categorical Columns EDA

```
# list the categorical columns
cate_cols = df.select_dtypes(include = 'object').columns
cate_cols
```

```
Index(['account', 'website', 'primary_poc', 'sales_person', 'region',
       'coordinates'],
      dtype='object')
```

1.3.1. Analysis of 'account' Columns

```
df['account'].value_counts()
```

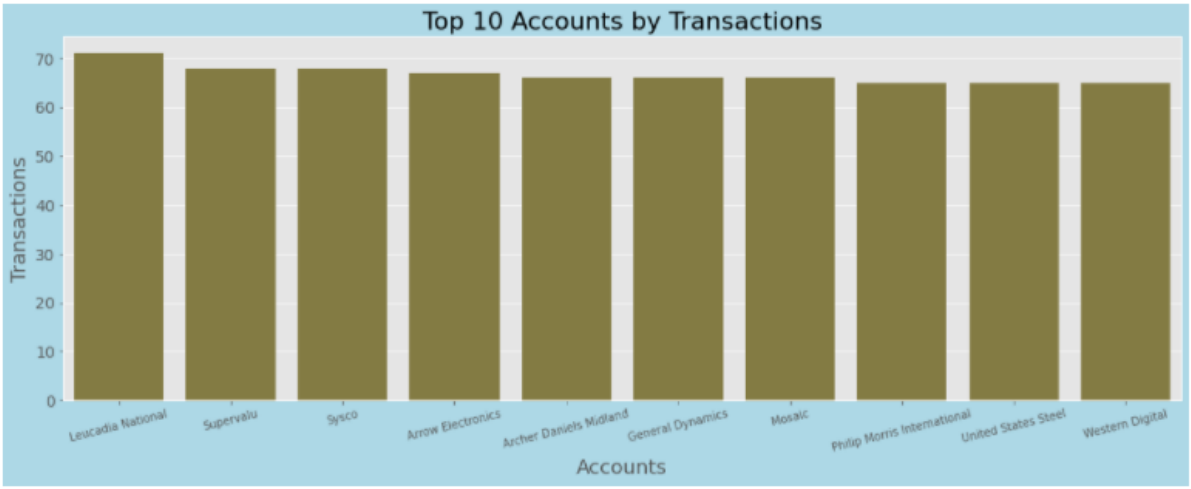
```
Leucadia National         71
Supervalu                 68
Sysco                     68
Arrow Electronics         67
Archer Daniels Midland    66
                          ..
Lennar                     1
INTL FCStone               1
Mohawk Industries          1
Berkshire Hathaway         1
Bed Bath & Beyond          1
Name: account, Length: 349, dtype: int64
```

```
print('Total number of distinct accounts is', len(df['account'].value_counts()))
print("Due to the large number of accounts, I'll focus on the top 10")
```

```
Total number of distinct accounts is 349
Due to the large number of accounts, I'll focus on the top 10
```

```
top10_accounts_by_count = (df['account'].
                           value_counts().
                           head(10).
                           to_frame().
                           reset_index().
                           rename(columns = {'index':'account','account':'transactions'})
                          )
print(top10_accounts_by_count)
print('\n')


# plot the values in top10_accounts_by_count
plt.figure(figsize = (18,6), facecolor = 'lightblue')
sns.barplot(x = 'account', y = 'transactions', data = top10_accounts_by_count, color ='#8d8339')

plt.title('Top 10 Accounts by Transactions', size = 22)
plt.xlabel('Accounts', size = 18)
plt.xticks(rotation = 14)
plt.ylabel('Transactions', size = 18)
plt.yticks(size =14)
plt.show()
```

	account	transactions
0	Leucadia National	71
1	Supervalu	68
2	Sysco	68
3	Arrow Electronics	67
4	Archer Daniels Midland	66
5	General Dynamics	66
6	Mosaic	66
7	Philip Morris International	65
8	United States Steel	65
9	Western Digital	65



1.3.2. Analysis of 'website' Column

```
df['website'].value_counts()
```

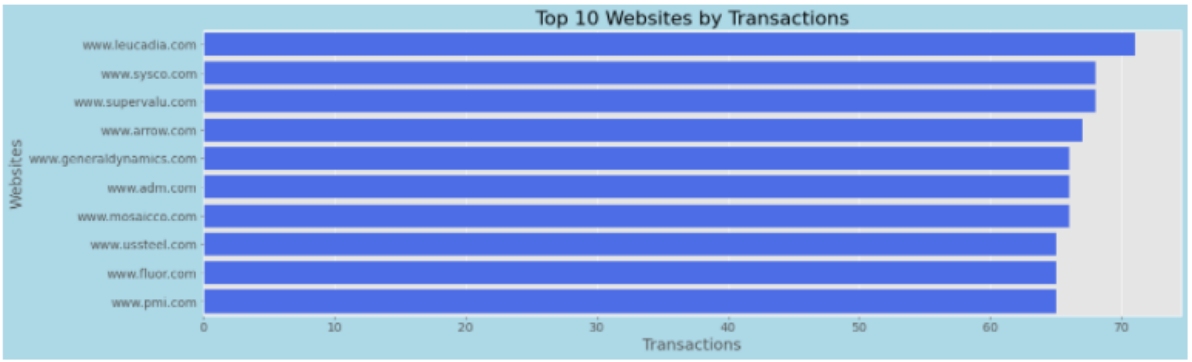
```
www.leucadia.com           71
www.sysco.com              68
www.supervalu.com          68
www.arrow.com              67
www.generaldynamics.com    66
                           ..
www.loews.com               1
www.lockheedmartin.com      1
www.johndeere.com           1
www.lennar.com              1
www.pricelinegroup.com      1
Name: website, Length: 349, dtype: int64
```

```
print('Total number of distinct websites is',len(df['website'].value_counts()))
print("Due to the large number of websites, I'll focus on the top 10")
```

```
Total number of distinct websites is 349
Due to the large number of websites, I'll focus on the top 10
```

```
  top10_websites_by_count =  (df['website'].
                              value_counts().
                              head(10).
                              to_frame().
                              reset_index().rename(columns = {'index':'website','website':'transactio
                              )
print(top10_websites_by_count)
print('\n')

# plot top10_websites_by_count
plt.figure(figsize = (20,6), facecolor = 'lightblue')
sns.barplot(y= 'website', x = 'transactions', data = top10_websites_by_count, orient = 'h',color ='#3

plt.title('Top 10 Websites by Transactions', size=22)
plt.xlabel('Transactions',size =18)
plt.xticks(size = 14)
plt.ylabel('Websites',size =18)
plt.yticks(size = 14)
plt.show()
```

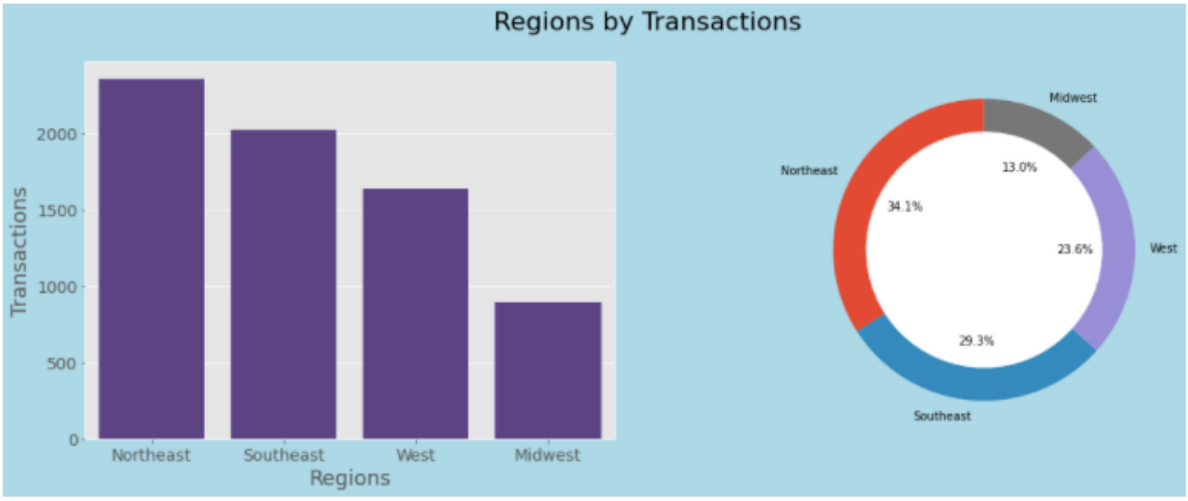
```
                website  transactions
0        www.leucadia.com           71
1           www.sysco.com           68
2       www.supervalu.com           68
3           www.arrow.com           67
4  www.generaldynamics.com           66
5             www.adm.com           66
6        www.mosaicco.com           66
7         www.ussteel.com           65
8           www.fluor.com           65
9             www.pmi.com           65
```



1.3.3. Analysis of 'region' Column

```
regions_count = (df['region'].value_counts().
                 to_frame().reset_index().
                 rename(columns = {'index':'region','region':'transactions'}))

print(regions_count)
print('\n')

# plot the values in regions_count
plt.figure(figsize = (18,6), facecolor = 'lightblue')
plt.suptitle('Regions by Transactions', size = 22)

plt.subplot(1,2,1)
sns.barplot(x = 'region',y= 'transactions', data = regions_count, color = '#59398d' )
plt.xlabel('Regions',size = 18)
plt.xticks(size = 14)
plt.ylabel('Transactions',size = 18)
plt.yticks(size = 14)

plt.subplot(1,2,2)
plt.pie(x = regions_count['transactions'],
        labels = regions_count['region'],
        startangle= 90,
        autopct= '%2.1F%%')
circle = plt.Circle((0,0), 0.78, color = 'white')
get_current_figure = plt.gcf()
get_current_figure.gca().add_artist(circle)


plt.show()
```

```
      region  transactions
0  Northeast          2356
1  Southeast          2024
2       West          1634
3    Midwest           897
```



1.3.4. Analysis of 'sales_person' Column

```
df['sales_person'].value_counts()
```

```
Earlie Schleusner       335
Vernita Plump           299
Tia Amato               267
Georgianna Chisholm     256
Moon Torian             250
Nelle Meaux             241
Maren Musto             224
Dorotha Seawell         208
Charles Bidwell         205
Maryanna Fiorentino     204
Calvin Ollison          199
Sibyl Lauria            192
Hilma Busick            191
Elwood Shutt            191
Arica Stoltzfus         186
Delilah Krum            185
Gianna Dossey           184
Micha Woodford          179
Michel Averette         173
Elna Condello           168
```

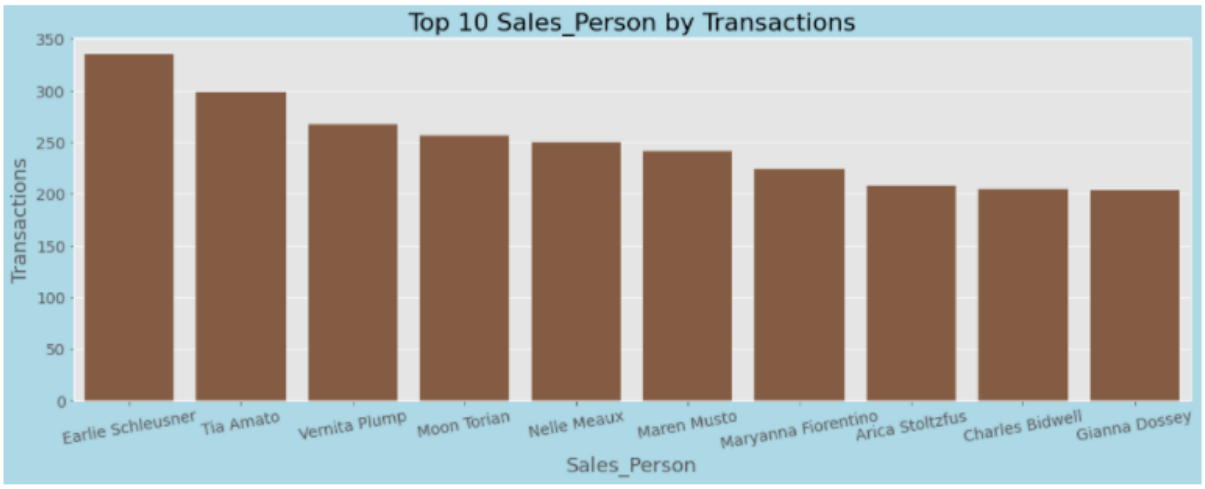
```
Brandie Riva             167
Cliff Meints             151
Necole Victory           136
Samuel Racine            134
Eugena Esser             116
Dawna Agnew              116
Debroah Wardle           116
Julia Behrman            115
Saran Ram                106
Derrick Boggess          102
Shawanda Selke           100
Cordell Rieder            99
Marquetta Laycock         90
Ernestine Pickron         89
Ayesha Monica             86
Renetta Carew             83
Lavera Oles               73
Akilah Drinkard           66
Silvana Virden            65
Retha Sears               64
Sherlene Wetherington     63
Chau Rowles               63
Elba Felder               62
Carletta Kosinski         61
Babette Soukup            60
Cara Clarke               54
Soraya Fulton             54
Kathleen Lalonde          35
Julie Starr               35
Nakesha Renn              13
Name: sales_person, dtype: int64
```

```
print('Total number of distinct salespeople is',len(df['sales_person'].value_counts()))
print("Due to the large number of salespeople, I'll focus on the top 10")
```

```
Total number of distinct salespeople is 50
Due to the large number of salespeople, I'll focus on the top 10
```

```
sales_persons_count = df['sales_person'].\
                      value_counts().\
                      to_frame().reset_index().\
                      rename(columns = {'index':'sales_person','sales_person':'transactions'}).\
                      head(10)

print(sales_persons_count)
print('\n')

# plot the values in sales_persons_count
plt.figure(figsize = (18,6), facecolor = 'lightblue')
ax = sns.barplot(x = 'sales_person',y= 'transactions', data = sales_persons_count, color = '#8D5939'
ax.set_xticklabels(labels = ['Earlie Schleusner','Tia Amato','Vernita Plump','Moon Torian',
                             'Nelle Meaux','Maren Musto','Maryanna Fiorentino','Arica Stoltzfus',
                             'Charles Bidwell','Gianna Dossey'], ha = 'center')

plt.title('Top 10 Sales_Person by Transactions', size = 22)
plt.xlabel('Sales_Person',size = 18)
plt.xticks(size = 14, rotation = 10)
plt.ylabel('Transactions',size = 18)
plt.yticks(size = 14)
plt.show()
```

	sales_person	transactions
0	Earlie Schleusner	335
1	Vernita Plump	299
2	Tia Amato	267
3	Georgianna Chisholm	256
4	Moon Torian	250
5	Nelle Meaux	241
6	Maren Musto	224
7	Dorotha Seawell	208
8	Charles Bidwell	205
9	Maryanna Fiorentino	204



1.3.5. Analysis of 'primary_poc' Column

```
df['primary_poc'].value_counts()
```

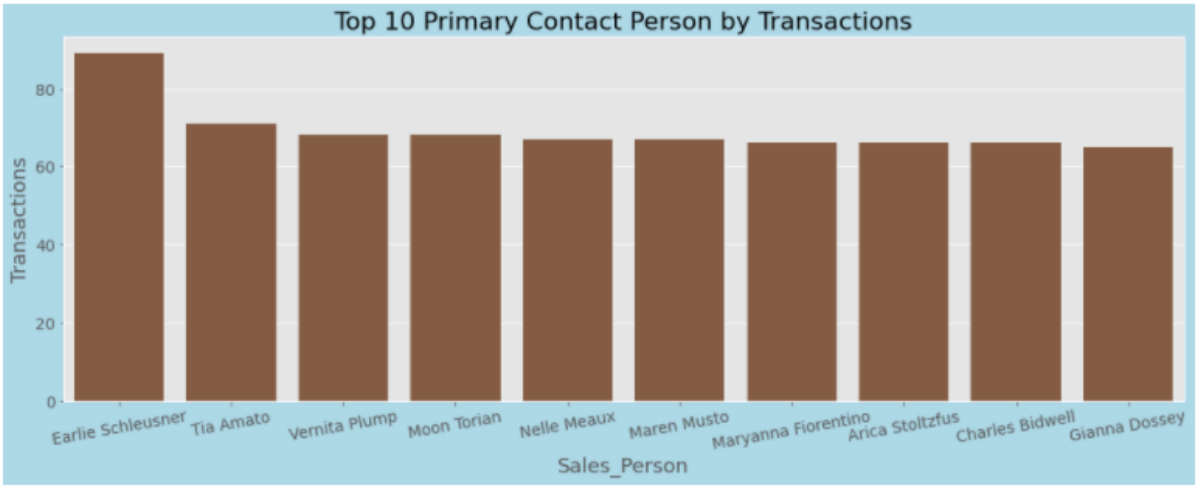
```
Tamara Tuma          89
Merrill Rubino       71
Julia Laracuente     68
Kristopher Moton     68
Jodee Lupo           67
                     ..
Sherell Yankey        1
Harrison Foss         1
Audria Witter         1
Susy Jantzen          1
Melda Ensey           1
Name: primary_poc, Length: 328, dtype: int64
```

```
print('Total number of distinct primary-poc is',len(df['primary_poc'].value_counts()))
print("Due to the large number of primary-poc, I'll focus on the top 10")
```

```
Total number of distinct primary-poc is 328
Due to the large number of primary-poc, I'll focus on the top 10
```

```
priamry_poc_counts=(df['primary_poc'].value_counts().
                    to_frame().reset_index().
                    rename(columns = {'index':'primary_poc','primary_poc':'transactions'}).head(10)
                   )
print(priamry_poc_counts)
print('\n')

# plot the values in sales_persons_count
plt.figure(figsize = (18,6), facecolor = 'lightblue')
ax = sns.barplot(x = 'primary_poc',y= 'transactions', data = priamry_poc_counts, color = '#8D5939' )
ax.set_xticklabels(labels = ['Earlie Schleusner','Tia Amato','Vernita Plump','Moon Torian',
                             'Nelle Meaux','Maren Musto','Maryanna Fiorentino','Arica Stoltzfus',
                             'Charles Bidwell','Gianna Dossey'], ha = 'center')

plt.title('Top 10 Primary Contact Person by Transactions', size = 22)
plt.xlabel('Sales_Person',size = 18)
plt.xticks(size = 14, rotation = 10)
plt.ylabel('Transactions',size = 18)
plt.yticks(size = 14)
plt.show()
```

```
        primary_poc  transactions
0       Tamara Tuma            89
1    Merrill Rubino            71
2  Julia Laracuente            68
3  Kristopher Moton            68
4        Jodee Lupo            67
5    Craig Mcalpine            67
6     Lorette Blasi            66
7      Fay Rogowski            66
8    Erin Viverette            66
9    Racquel Andrus            65
```



1.3.6. Analysis of 'coordinates' Column

For 'coordinates' column, it would be more beneficial if I assign the corresponding city or county to a column then analyze it. This requires a few more steps than previous. I will do the following:

- Initialize the geolocator, and make an empty list named 'locations'.
- Loop through each coordinate value to get the location dictionary.
- Select the 'address' key in the location dictionary and get its dictionary.
- If 'city' is among the keys of 'address', append its value to 'locations', else assign the values of 'county' to the 'locations'.
- Assign the values of the 'locations' list to a new column in the dataframe.

```
df['coordinates'].value_counts()
```

```
(35.52252305, -86.10327108)    71
(40.76252413, -73.97753022)    68
(33.78951934, -84.43800424)    68
(41.87858356, -87.62737294)    67
(41.92373676, -75.99411481)    66
                               ..
(36.15614254, -115.137486)      1
(33.78584433, -84.31104078)     1
(36.18032753, -115.1359641)     1
(34.05021492, -118.2419363)     1
(30.42191113, -84.27288598)     1
Name: coordinates, Length: 349, dtype: int64
```

```
print('Total number of distinct coordinates tuples is',len(df['coordinates'].value_counts()))
print("Due to the large number of coordinates, I'll focus on the top 10")
```

```
Total number of distinct coordinates tuples is 349
Due to the large number of coordinates, I'll focus on the top 10
```

```
top10_locations_count = df['coordinates'].value_counts().\
                        to_frame().reset_index().\
                        rename(columns = {'index':'coordinates','coordinates':'transactions'}).\
                        head(10)
top10_locations_count
```

	coordinates o… (35.522523… … 10% (40.762524… … 10% 8 others 80%	transactions i… 65 - 71 
0	(35.52252305, -86.10327108)	71
1	(40.76252413, -73.97753022)	68
2	(33.78951934, -84.43800424)	68
3	(41.87858356, -87.62737294)	67
4	(41.92373676, -75.99411481)	66
5	(38.6431842, -121.9092885)	66
6	(42.35930205, -71.05137356)	66
7	(42.35788906, -71.06260265)	65
8	(33.70114178, -84.38702725)	65
9	(36.64788461, -85.75108445)	65

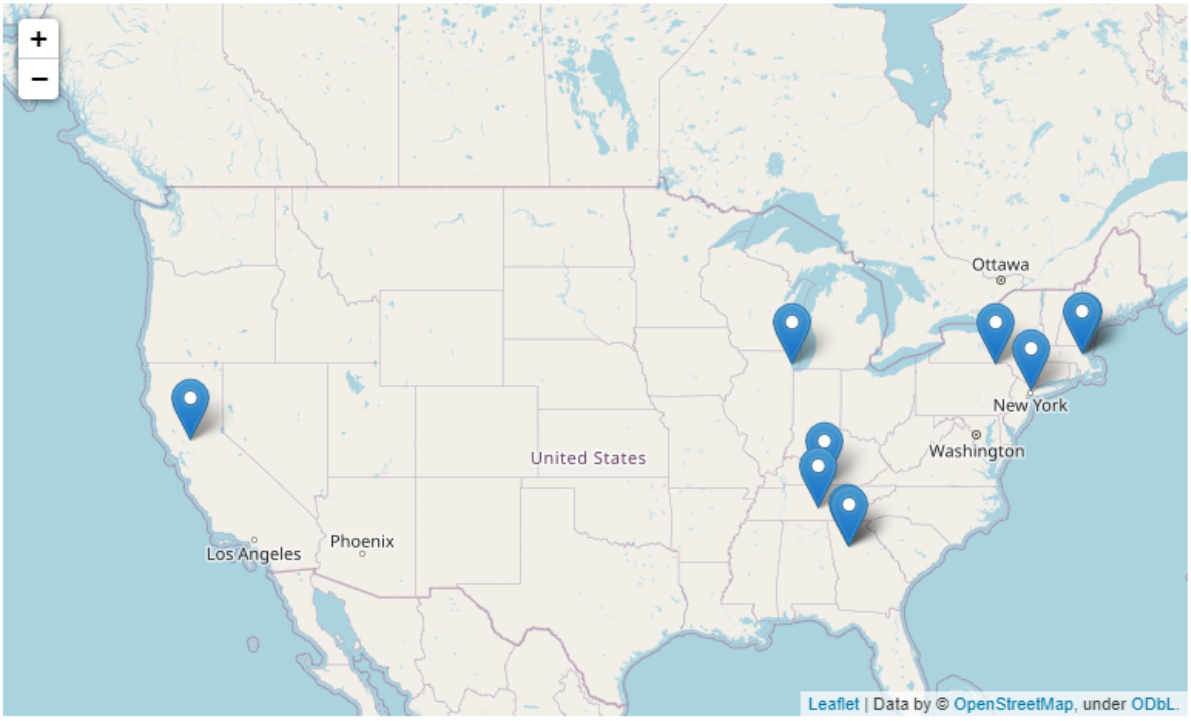
```
# import geopy.geocoders
from geopy.geocoders import Nominatim
# initialize the geopy.geocoders
geolocator = Nominatim(user_agent="locations_count")

# make an empty list of locations
locations = []
# loop through each values in the 'oordinates'
for val in top10_locations_count['coordinates'].values:
    # get the location info for each coordinate which is a dictionary
    loc = geolocator.reverse(str(val[0])+","+str(val[1]))
    # use the .raw method to get the dictionary assigned to the 'address' key in the loc ditionary
    # use the .keys() method to get the keys of the 'address' dictionary
    # check if 'city' among the keys of the 'address' dictionary
    if 'city' in  loc.raw['address'].keys():
        # append the value of the key 'city' to 'locations' list
        city = loc.raw['address']['city']
        locations.append(city)
        # if 'city' is not among the keys of the 'address' dictionary, check for 'county'
    elif 'county' in  loc.raw['address'].keys():
        # assign the valu of th 'county' key to variable named county
        county = loc.raw['address']['county']
        # append the county value to the locations
        locations.append(county)
    else:
        locations.append('NA')

# assign the values of locations list ot the new column 'locations' in the dataframe
top10_locations_count['locations'] = locations

top10_locations_count
```

	coordinates o…	transactions i…	locations obj…	
	(35.522523… … 10% (40.762524… … 10% 8 others 80%	65 - 71 	Atlanta ..... 20% Boston ..... 20% 6 others 60%	
0	(35.52252305, -86.10327108)	71	Coffee County	
1	(40.76252413, -73.97753022)	68	New York County	
2	(33.78951934, -84.43800424)	68	Atlanta	
3	(41.87858356, -87.62737294)	67	Chicago	
4	(41.92373676, -75.99411481)	66	Susquehanna County	
5	(38.6431842, -121.9092885)	66	Yolo County	
6	(42.35930205, -71.05137356)	66	Boston	
7	(42.35788906, -71.06260265)	65	Boston	
8	(33.70114178, -84.38702725)	65	Atlanta	
9	(36.64788461, -85.75108445)	65	Monroe County	

```
# make a basic map
top10_locations_map = folium.Map(location = (42.0988316272597 ,-98.82989549371113),zoom_start=4)

# loop through th rows of top10_locations_count
for index,row in top10_locations_count.iterrows():
    # add a merker for each corrdinate with popup and tooltip
    folium.Marker(location = [str(row.loc['coordinates'][0]),str(row.loc['coordinates'][1])],
                  popup = row.loc['locations'],
                  tooltip = row.loc['locations']+' '+'Transactions: '+ str(row.loc['transactions']))

print('Top 10 Locations by Transactions (Zoom in to see the 2 values of Atlanta)')
top10_locations_map
```

```
Top 10 Locations by Transactions (Zoom in to see the 2 values of Atlanta)
```

```
Top 10 Locations by Transactions (Zoom in to see the 2 values of Atlanta)
```



Most of the top 10 orders are from the East Region of the USA

1.4. Numeric Columns EDA

1.4.1. Revenue Columns EDA

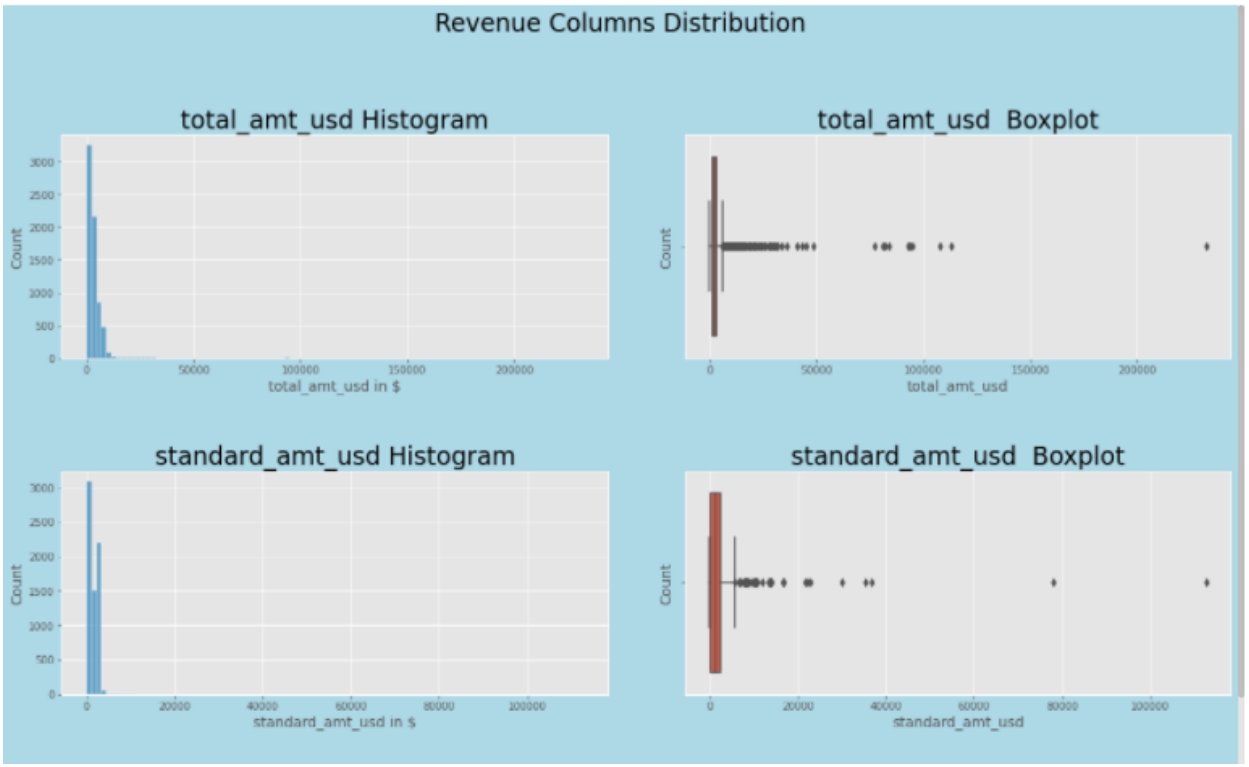
```
rev_cols = ['total_amt_usd','standard_amt_usd','gloss_amt_usd','poster_amt_usd']
qty_cols = ['total','standard_qty','gloss_qty','poster_qty']
```

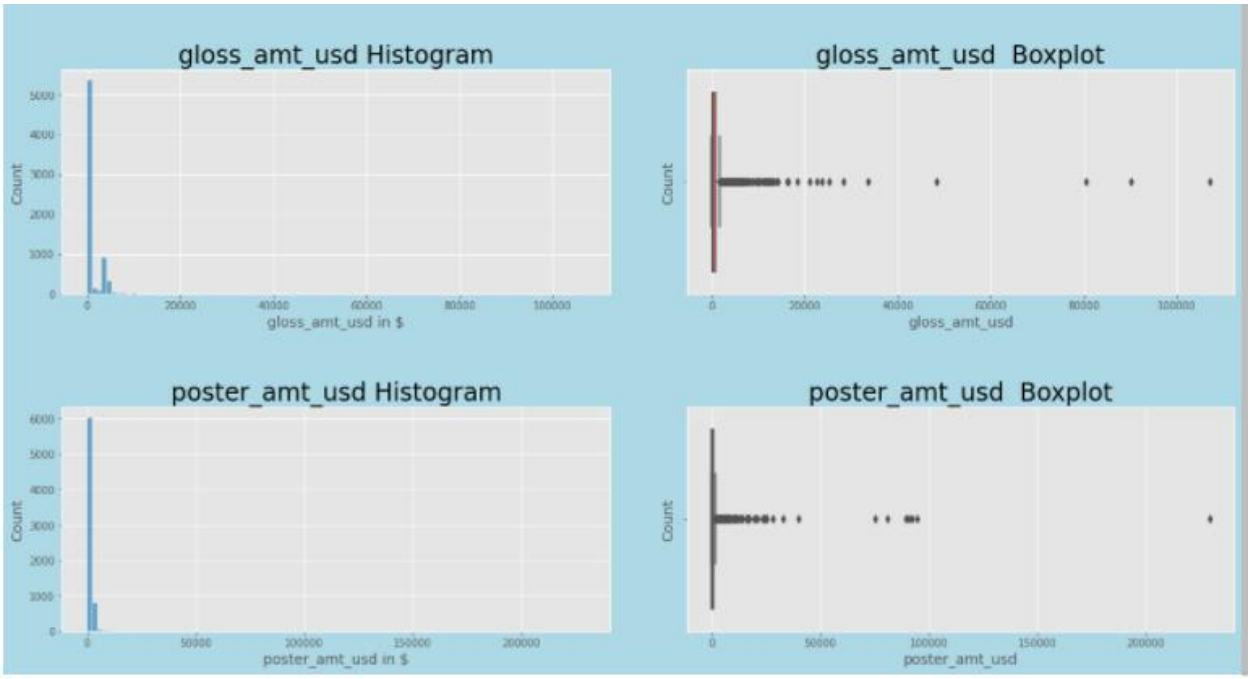
```
for col in rev_cols:
  print(col,' Statistics:')
  print(df[col].describe())
  print('\n\n')
```

```
total_amt_usd  Statistics:
count      6911.000000
mean       3348.447631
std        5462.421417
min           0.000000
25%        1415.155000
50%        2483.160000
75%        3362.250000
max      232207.070000
Name: total_amt_usd, dtype: float64



standard_amt_usd  Statistics:
count      6911.000000
mean       1399.558174
std        2175.798911
min           0.000000
25%         259.480000
50%        1447.100000
75%        2455.080000
max      112729.090000
Name: standard_amt_usd, dtype: float64
```

```
gloss_amt_usd  Statistics:
count      6911.000000
mean       1098.679282
std        2715.291124
min           0.000000
25%          74.900000
50%         232.190000
75%         749.000000
max      106964.690000
Name: gloss_amt_usd, dtype: float64



poster_amt_usd  Statistics:
count      6911.000000
mean        850.210175
std        4087.276878
min           0.000000
25%          64.960000
50%         203.000000
75%         747.040000
max      229487.440000
Name: poster_amt_usd, dtype: float64
```

```
plt.figure(figsize = (18,20), facecolor = 'lightblue')
for i,col in enumerate(rev_cols):
    plt.suptitle('Revenue Columns Distribution', fontsize = 24)
    plt.subplot(4,2,i*2+1)
    #plt.hist(df[col],bins = 100,color = '#335EFF',alpha = 0.75, edgecolor = 'black', linewidth=2)
    sns.histplot(x= df[col], bins = 100)
    plt.title(f'{col} Histogram', fontsize = 24)
    plt.xlabel(f'{col} in $', fontsize = 14)
    plt.ylabel(f'Count', fontsize = 14)
    plt.tight_layout(pad=5.0)

    plt.subplot(4,2,i*2+2)
    sns.boxplot(x = df[col])
    plt.title(f'{col}  Boxplot', fontsize = 24)
    plt.xlabel(f'{col}', fontsize = 14)
    plt.ylabel(f'Count', fontsize = 14)
    plt.tight_layout(pad=5.0)
```



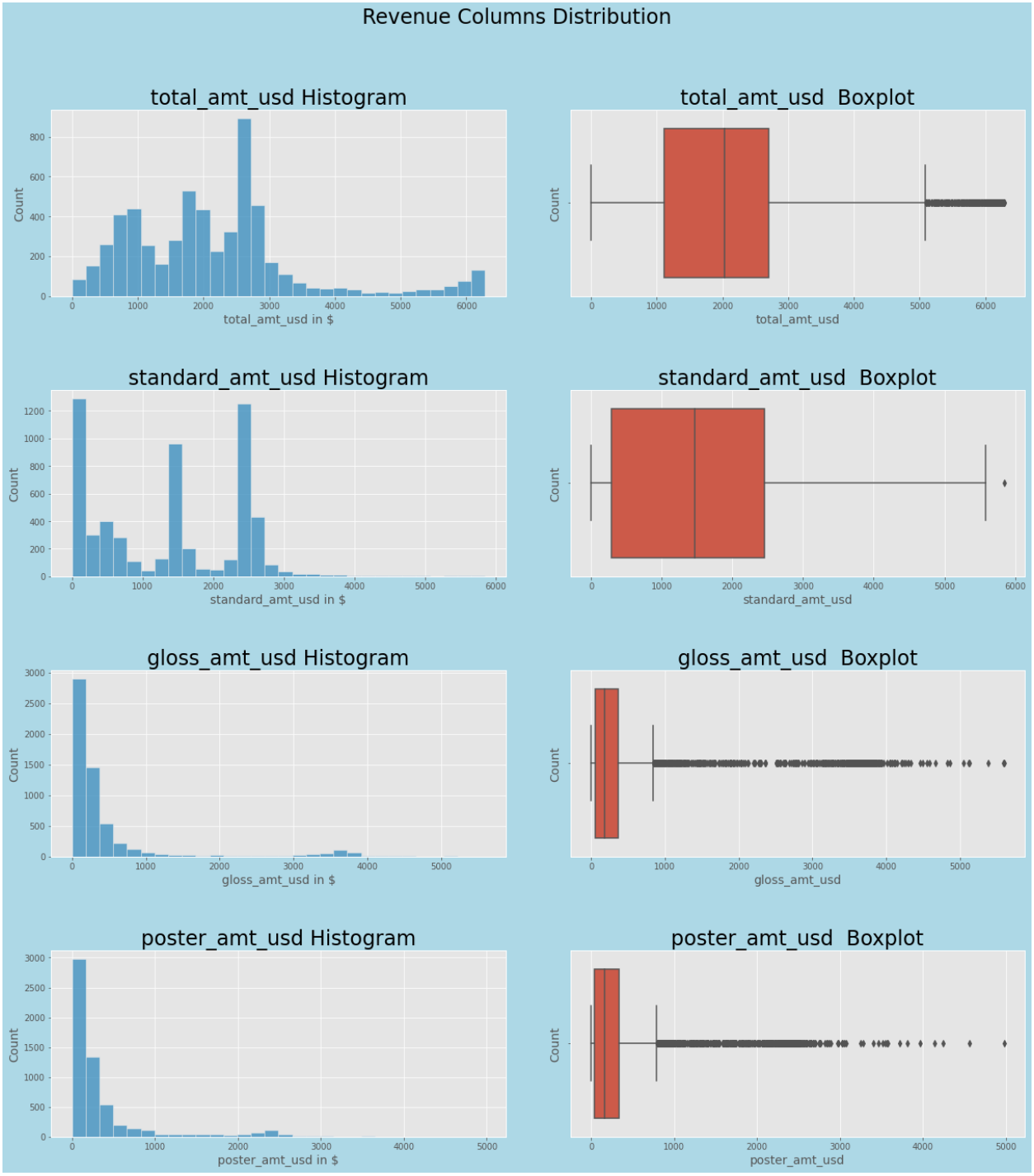


There are few large orders that caused the revenue data (and hence the quantity data) to be skewed to the right.For now, I just want to take a glance at the data without the outliers. I'll use the revenue to filter the data and I'll change the bin size to 30. Since the lower_limit is going to be negative, I'll use only the upper_limit for filtering.

```
q1 = df['total_amt_usd'].quantile(q = 0.25)
q3 = df['total_amt_usd'].quantile(q = 0.75)
iqr = q3-q1
lower_limit = q1 - 1.5*iqr
upper_limit = q3 + 1.5*iqr
```

```
df_without_outliers = df[df['total_amt_usd'] <= upper_limit]
```

```
plt.figure(figsize = (18,20), facecolor = 'lightblue')
for i,col in enumerate(rev_cols):
    plt.suptitle('Revenue Columns Distribution', fontsize = 24)
    plt.subplot(4,2,i*2+1)
    #plt.hist(df[col],bins = 100,color = '#335EFF',alpha = 0.75, edgecolor = 'black', linewidth=2)
    sns.histplot(x= df_without_outliers[col], bins = 30)
    plt.title(f'{col} Histogram', fontsize = 24)
    plt.xlabel(f'{col} in $', fontsize = 14)
    plt.ylabel(f'Count', fontsize = 14)
    plt.tight_layout(pad=5.0)

    plt.subplot(4,2,i*2+2)
    sns.boxplot(x = df_without_outliers[col])
    plt.title(f'{col}  Boxplot', fontsize = 24)
    plt.xlabel(f'{col}', fontsize = 14)
    plt.ylabel(f'Count', fontsize = 14)
    plt.tight_layout(pad=5.0)
```


Revenue Columns Distribution
total_amt_usd Histogram
Count
total_amt_usd in $
total_amt_usd Boxplot
Count
total_amt_usd
standard_amt_usd Histogram
Count
standard_amt_usd in $
standard_amt_usd Boxplot
Count
standard_amt_usd
gloss_amt_usd Histogram
Count
gloss_amt_usd in $
gloss_amt_usd Boxplot
Count
gloss_amt_usd
poster_amt_usd Histogram
Count
poster_amt_usd in $
poster_amt_usd Boxplot
Count
poster_amt_usd

There are still outliers in the revnue columns even after removing the outliers in the original data. The histogram of the satndard_amt_usd resembles that of the total_amt_usd which suggests highest correlation among 'standard_amt_usd', 'poster_amt_usd' and 'gloss_amt_usd'.

1.4.2. Quantity Columns EDA

```
for col in qty_cols:
  print(col,' Statistics:')
  print(df[col].describe())
  print('\n\n')
```

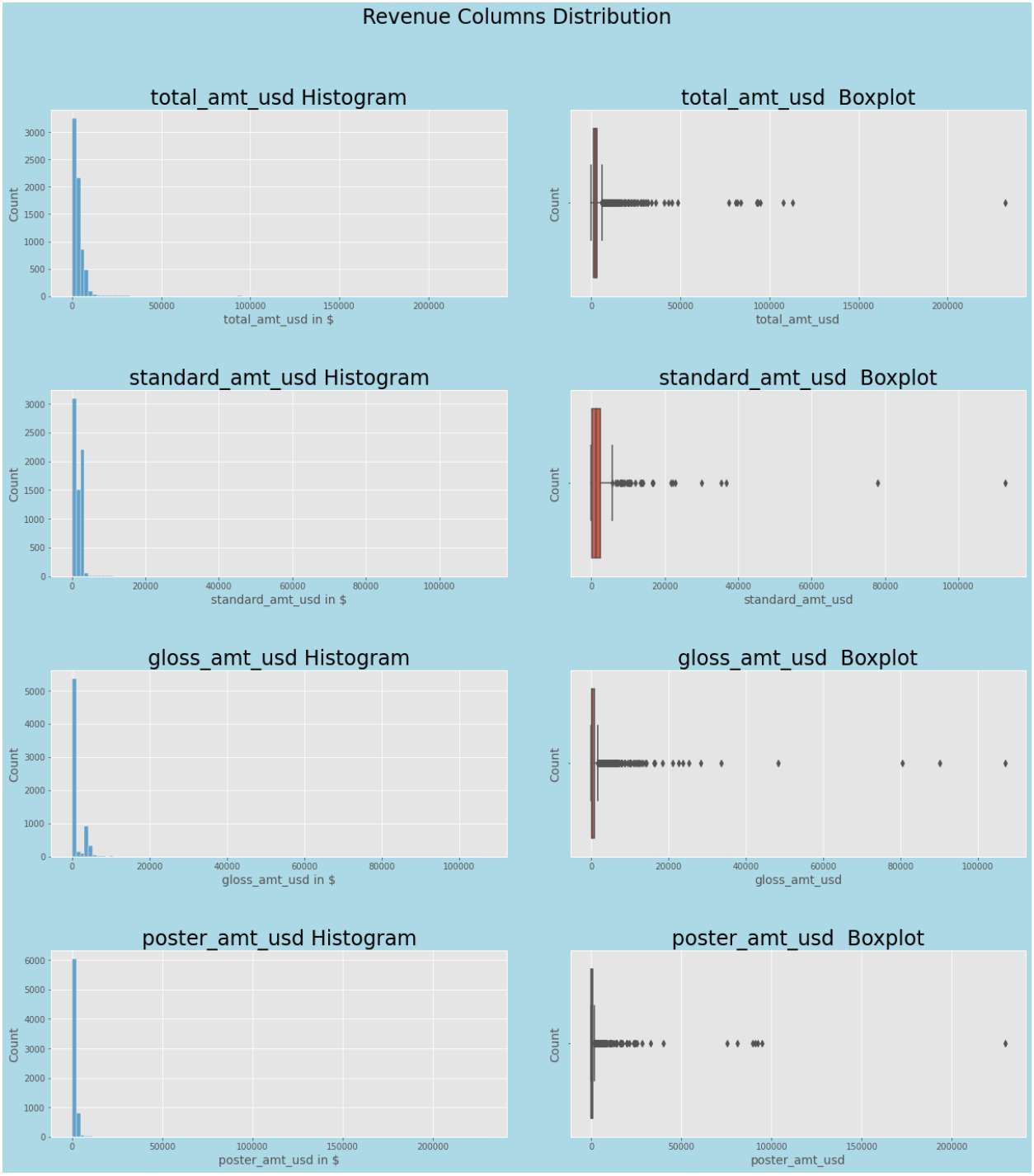
```
total  Statistics:
count     6911.000000
mean       531.864419
std        761.558145
min          0.000000
25%        214.500000
50%        480.000000
75%        603.500000
max      28799.000000
Name: total, dtype: float64
```

```
standard_qty  Statistics:
count     6911.000000
mean       280.472580
std        436.031846
min          0.000000
25%         52.000000
50%        290.000000
75%        492.000000
max      22591.000000
Name: standard_qty, dtype: float64
```

```
gloss_qty  Statistics:
count     6911.000000
mean       146.686153
std        362.522179
min          0.000000
25%         10.000000
50%         31.000000
75%        100.000000
max      14281.000000
Name: gloss_qty, dtype: float64
```

```
poster_qty  Statistics:
count     6911.000000
mean       104.705687
std        503.359221
min          0.000000
25%          8.000000
50%         25.000000
75%         92.000000
max      28262.000000
Name: poster_qty, dtype: float64
```

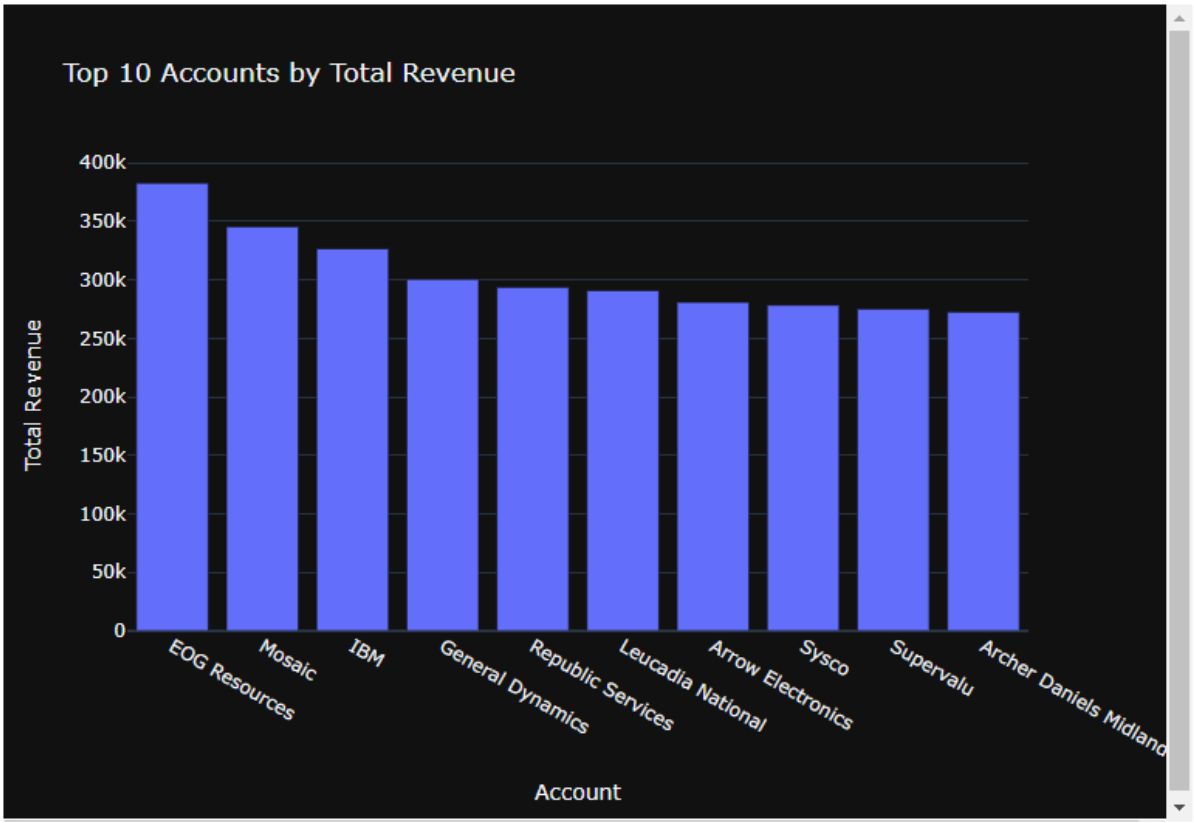
```
plt.figure(figsize = (18,20), facecolor = 'lightblue')
for i,col in enumerate(rev_cols):
    plt.suptitle('Revenue Columns Distribution', fontsize = 24)
    plt.subplot(4,2,i*2+1)
    #plt.hist(df[col],bins = 100,color = '#335EFF',alpha = 0.75, edgecolor = 'black', linewidth=2)
    sns.histplot(x= df[col], bins = 100)
    plt.title(f'{col} Histogram', fontsize = 24)
    plt.xlabel(f'{col} in $', fontsize = 14)
    plt.ylabel(f'Count', fontsize = 14)
    plt.tight_layout(pad=5.0)

    plt.subplot(4,2,i*2+2)
    sns.boxplot(x = df[col])
    plt.title(f'{col}  Boxplot', fontsize = 24)
    plt.xlabel(f'{col}', fontsize = 14)
    plt.ylabel(f'Count', fontsize = 14)
    plt.tight_layout(pad=5.0)
```



2.1. Sales & Marketing Business Requests

Q1- Show the top 10 accounts in term of revenue?

```
q1 = df.loc[:,['account','total_amt_usd']].\
        groupby('account').\
        sum().sort_values('total_amt_usd', ascending = False).\
        head(10).\
        rename(columns = {'total_amt_usd':'Total Revenue'})

q1.index.name = 'Account'

px.bar(q1,x = q1.index,
       y = 'Total Revenue',
       title = 'Top 10 Accounts by Total Revenue',
       template = 'plotly_dark')
```



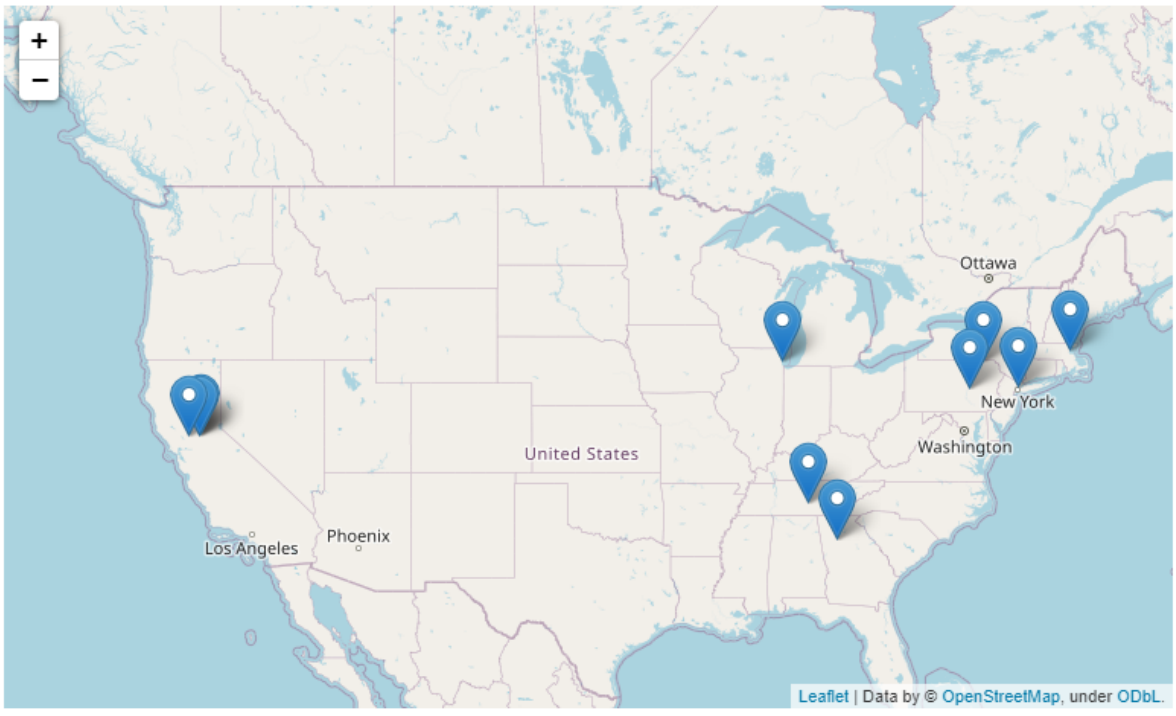
Q2- Show the top 10 locations by revenue?

```
# aggregating the 'total_amt_usd' by 'coordinates'
q2  = df.loc[:,['coordinates','total_amt_usd']].\
        groupby('coordinates').sum().\
        sort_values('total_amt_usd', ascending = False).\
        head(10)


# initialize the geopy.geocoders
geolocator = Nominatim(user_agent="top10revenuelocations")

locations = []
# loop through each values in the 'oordinates'
for val in q2.index.values:
    # get the location info for each coordinate which is a dictionary
    loc = geolocator.reverse(str(val[0])+","+str(val[1]))
    # use the .raw method to get the dictionary assigned to the 'address' key in the loc ditionary
    # use the .keys() method to get the keys of the 'address' dictionary
    # check if 'city' among the keys of the 'address' dictionary
    if 'city' in  loc.raw['address'].keys():
        # append the value of the key 'city' to 'locations' list
        city = loc.raw['address']['city']
        locations.append(city)
        # if 'city' is not among the keys of the 'address' dictionary, check for 'county'
    elif 'county' in  loc.raw['address'].keys():
        # assign the valu of th 'county' key to variable named county
        county = loc.raw['address']['county']
        # append the county value to the locations
        locations.append(county)
```

```
    else:
        locations.append('NA')

q2['location'] = locations


q2
```

	total_amt_usd 272672.83999999…	location obje… Sacramento… … 20% Yolo County …… 10% 7 others …… 70%
(38.60 82033…	382873.3	Sacramento County
(38.64 31842…	345618.5900000001	Yolo County
(40.74 38145…	326819.4800000004	Northumberland County
(42.35 93020…	300694.7899999999	Boston
(38.71 18291…	293861.1400000013	Sacramento County
(35.52 25230…	291047.2500000006	Coffee County
(41.87 85835…	281018.36	Chicago
(40.76 25241…	278575.6399999996	New York County
(33.78 95193…	275288.3000000005	Atlanta
(41.92 37367…	272672.8399999997	Susquehanna County

```
q2.reset_index(inplace = True)

# make a basic map
top10_revenue_locations_map = folium.Map(location = (42.0988316272597 ,-98.82989549371113),zoom_start
# loop through th rows of top10_locations_count

for index,row in q2.iterrows():
    # add a merker for each corrdinate with popup and tooltip
    folium.Marker(location = [str(row['coordinates'][0]),str(row['coordinates'][1])],
                  popup = row['location'],
                  tooltip = row['location']+' Revenue ' +str(row['total_amt_usd'])).add_to(top10_reve
top10_revenue_locations_map
```

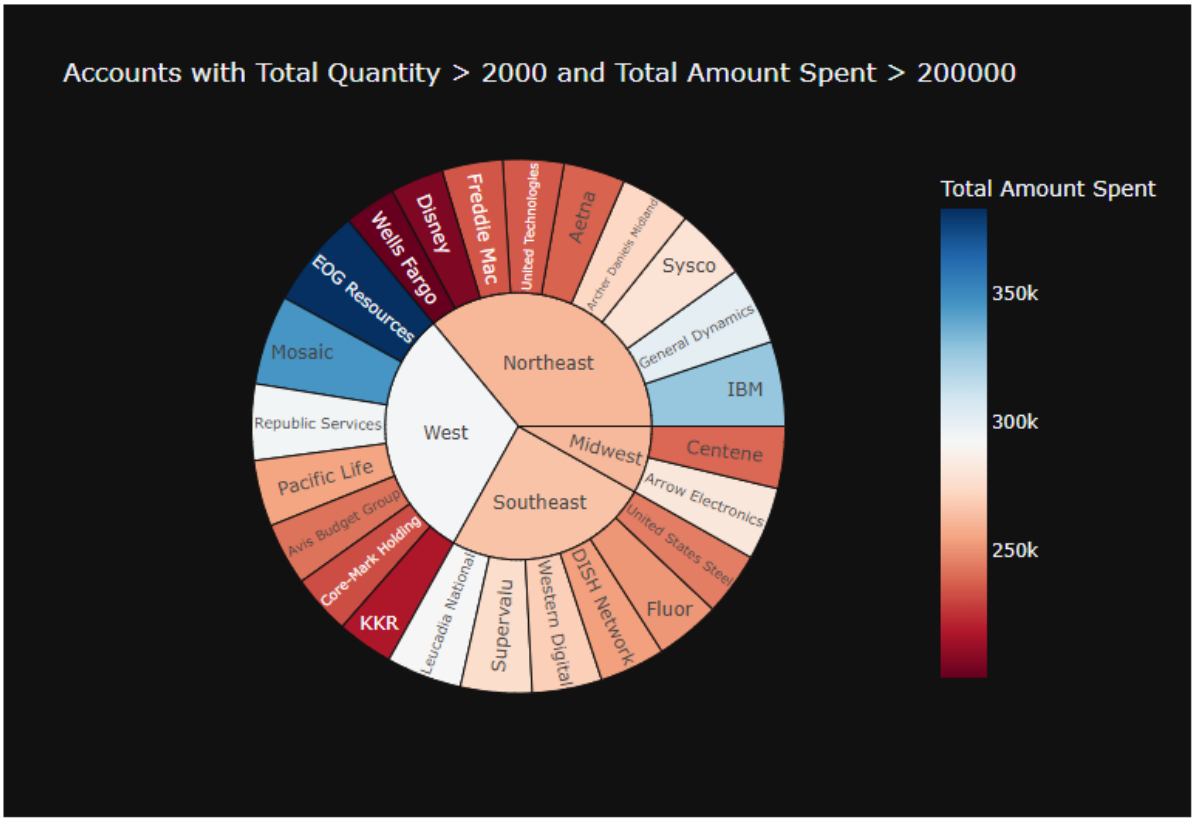


Q3 - Provide the name for each region for every order, as well as the account name and the total amount spent. However, you should only provide the results if the total quantity exceeds 2000 and the total amount spent exceeds 200000. Your final table should have 3 the region name, account name, and order total amount spent. Sort for the smallest unit price first.

```
q3 = df.loc[:, ['account','region','primary_poc','total_amt_usd','total']].\
        groupby(['region','account','primary_poc']).\
        sum()

cond1 = q3['total_amt_usd'] > 200000 ; cond2 = q3['total'] > 2000

q3 = q3.loc[(cond1) & (cond2), 'total_amt_usd'].\
        reset_index().\
        sort_values('total_amt_usd',ascending = False).\
        rename(columns = {'total_amt_usd':'Total Amount Spent'})

q3.to_csv('sales&marketingq3.csv')
q3.head()
```

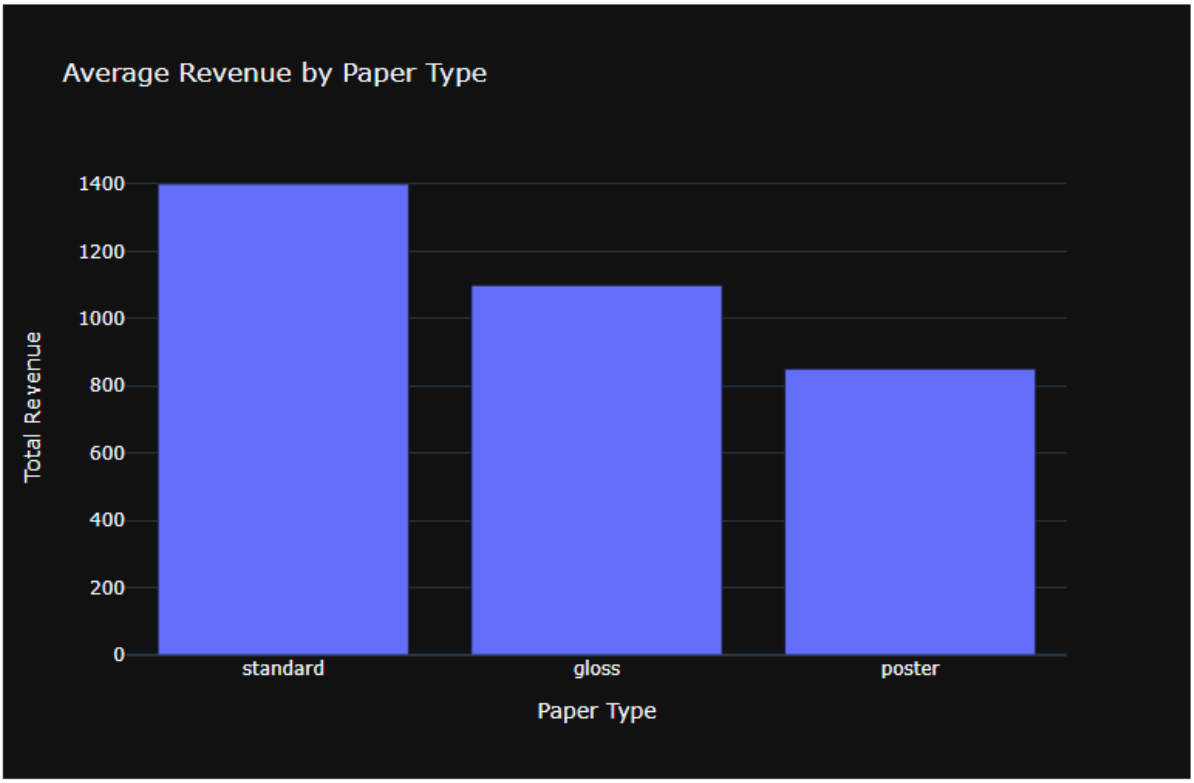
	region object	account object	primary_poc o…	Total Amount…
19	West	EOG Resources	Alida Desrosier	382873.3
21	West	Mosaic	Lorette Blasi	345618.5900000001
7	Northeast	IBM	Denis Gros	326819.4800000004
6	Northeast	General Dynamics	Erin Viverette	300694.7899999999
23	West	Republic Services	Gail Widmer	293861.1400000013

```
px.sunburst(q3,
            path = ['region','account'],
            values = 'Total Amount Spent',
            title = 'Accounts with Total Quantity > 2000 and Total Amount Spent > 200000',
            hover_name= 'primary_poc',
            color = 'Total Amount Spent',
            color_continuous_scale='RdBu',
            template = 'plotly_dark')
```



Q4- The Sales & Marketing Dept. is running on limited resources currently, and would like to focus on the 2 type of papers instead of three. Show the two types of papers that generates more revenue on average?

```
q4 = df.loc[:,['standard_amt_usd','gloss_amt_usd','poster_amt_usd']].\
        melt(var_name = 'Paper Type', value_name = 'Total Revenue').\
        groupby('Paper Type').mean().\
        reset_index().\
        sort_values('Total Revenue', ascending = False)

q4['Paper Type'] = q4['Paper Type'].str.replace('_amt_usd','')

px.bar(q4, x = 'Paper Type', y = 'Total Revenue',
       title = 'Average Revenue by Paper Type',
       height = 500,
       template = 'plotly_dark')
```




```
from scipy.stats import ttest_ind
```

Stating the Hypothesis:

- H0: No differnece in average revenue between standard and gloss.
- H1: standard type generates more revenue on average.

```
stats, p = ttest_ind(df['standard_amt_usd'], df['gloss_amt_usd'])
print('t_score:',stats, 'p_value:',p)
```

```
t_score: 7.1886206762729445 p_value: 6.880737845735116e-13
```

Since the p-value is less than 0.05, there is a significant evidence that standard paper generates more revenue on average

Stating the Hypothesis:

- H0: No differnece in average revenue between gloss and poster.
- H1: gloss type generates more revenue on average.

```
stats, p = ttest_ind(df['gloss_amt_usd'], df['poster_amt_usd'])
print('t_score:',stats, 'p_value:',p)
```

```
t_score: 4.209464833487789 p_value: 2.575948857476572e-05
```

Since the p-value is less than 0.05, there is a significant evidence that gloss paper generates more revenue on average

2.2. HR Business Requests

Q1- Provide a table with the region for each sales representative along with their associated accounts. Your final table should include three columns: the region name, the sales rep name, and the account name. Sort the accounts alphabetically (A-Z) according to account name?

```
q1 = df[['region','sales_person','account']].sort_values(by = 'account', ascending= True).drop_duplic
print(q1.head())
q1.to_csv('hrq1.csv',index = False)
del q1
```

```
        region       sales_person account
978   Northeast       Sibyl Lauria      3M
3557  Southeast  Earlie Schleusner     ADP
3592  Southeast        Moon Torian   AECOM
4670  Southeast     Calvin Ollison     AES
643   Northeast        Elba Felder     AIG
```

Q2- Provide a table that provides the region for each sales representative along with their associated accounts. This time only for the Midwest region. Your final table should include three columns: the region name, the sales rep name, and the account name. Sort the accounts alphabetically (A-Z) according to account name?

```
q2 = df[df['region']=='Midwest'][['region','sales_person','account']].\
        sort_values('account').\
        drop_duplicates()
q2.to_csv('hrq2.csv')
print(q2.head())
del q2
```

```
       region     sales_person              account
3128  Midwest      Julie Starr               AbbVie
2462  Midwest      Chau Rowles  Abbott Laboratories
2813  Midwest     Cliff Meints                Aflac
2434  Midwest      Chau Rowles                Alcoa
2705  Midwest  Charles Bidwell         Altria Group
```

Q3- Provide a table with the region for each sales representative along with their associated accounts. This time only for accounts where the sales rep has a first name starting with S and in the Midwest region. Your final table should include three columns: the region name, the sales representative name, and the account name. Sort the accounts alphabetically (A-Z) according to account name?

```
q3 = df[df['sales_person'].str.startswith('S')][['region','sales_person','account']].\
        sort_values('account').\
        drop_duplicates()
q3.to_csv('hrq3.csv')
print(q3.head())
del q3
```

```
        region    sales_person                 account
980   Northeast    Sibyl Lauria                      3M
103   Northeast   Samuel Racine  American Airlines Group
4872  Southeast       Saran Ram                     CSX
4826  Southeast       Saran Ram                  CarMax
1865  Northeast  Silvana Virden             Caterpillar
```

Q4- Provide a table that provides the region for each sales representative along with their associated accounts. This time only for accounts where the sales rep has a last name starting with K and in the Midwest region. Your final table should include three columns: the region name, the sales rep name, and the account name. Sort the accounts alphabetically (A-Z) according to account name?

```
sales_person_condition = df['sales_person'].str.split(' ').str.get(1).str.startswith('K')
region_condition = df['region'] == 'Midwest'

q4 = df[sales_person_condition & region_condition][['region','sales_person','account']].\
        sort_values('account').\
        drop_duplicates()
print(q4.head())

q4.to_csv('hrq4.csv')
del q4
```

```
      region       sales_person                account
2931  Midwest       Delilah Krum                  Amgen
2960  Midwest       Delilah Krum             AutoNation
2917  Midwest       Delilah Krum  Capital One Financial
3059  Midwest       Delilah Krum                Cummins
2522  Midwest  Carletta Kosinski                Danaher
```

Q5- Find the number of sales reps in each region. Your final table should have two columns - the region and the number of sales representative. Order from fewest reps to most reps?

```
 q5 = (df.groupby('region').
       agg({'sales_person':'count'}).
       reset_index().
       rename(columns = {'sales_person':'sales_person_count'}).
       sort_values('sales_person_count'))

print(q5)

del q5
```

```
      region  sales_person_count
0    Midwest                 897
3       West                1634
2  Southeast                2024
1  Northeast                2356
```

Q6- Have any sales reps worked on more than 10 account?

```
q6 = df[['sales_person','account']].\
     drop_duplicates().\
     groupby('sales_person').\
     agg({'account':'count'}).\
     rename(columns = {'account':'account_count'})

print(q6[q6['account_count']>10])

q6 = len(q6[q6['account_count']>10])


print('Number of sales person worked with more than one account:', q6)

del q6
```

```
                   account_count
sales_person
Calvin Ollison                11
Dorotha Seawell               11
Earlie Schleusner             11
Georgianna Chisholm           15
Maren Musto                   11
Maryanna Fiorentino           11
Micha Woodford                11
Vernita Plump                 11
Number of sales person worked with more than one account: 8
```

Q7- How many of the sales reps have more than 4 accounts that they manage?

```
q7 = df[['sales_person','account']].\
     drop_duplicates().\
     groupby('sales_person').\
     agg({'account':'count'}).\
     rename(columns = {'account':'account_count'})

q7 = len(q7[q7['account_count']>4])

print('Number of sales person worked with more than one account:', q7)

del q7
```

```
Number of sales person worked with more than one account: 37
```

Q8- We would like to identify top performing salespeople, which are sales reps associated with more than 200 orders or more than 750000 in total sales. The middle group has any rep with more than 150 orders or 500000 in sales. Create a table with the sales person name, the total number of orders, total sales across all orders, and a column with top, middle, or low depending on this criteria. Place the top sales people based on dollar amount of sales first in your final table?

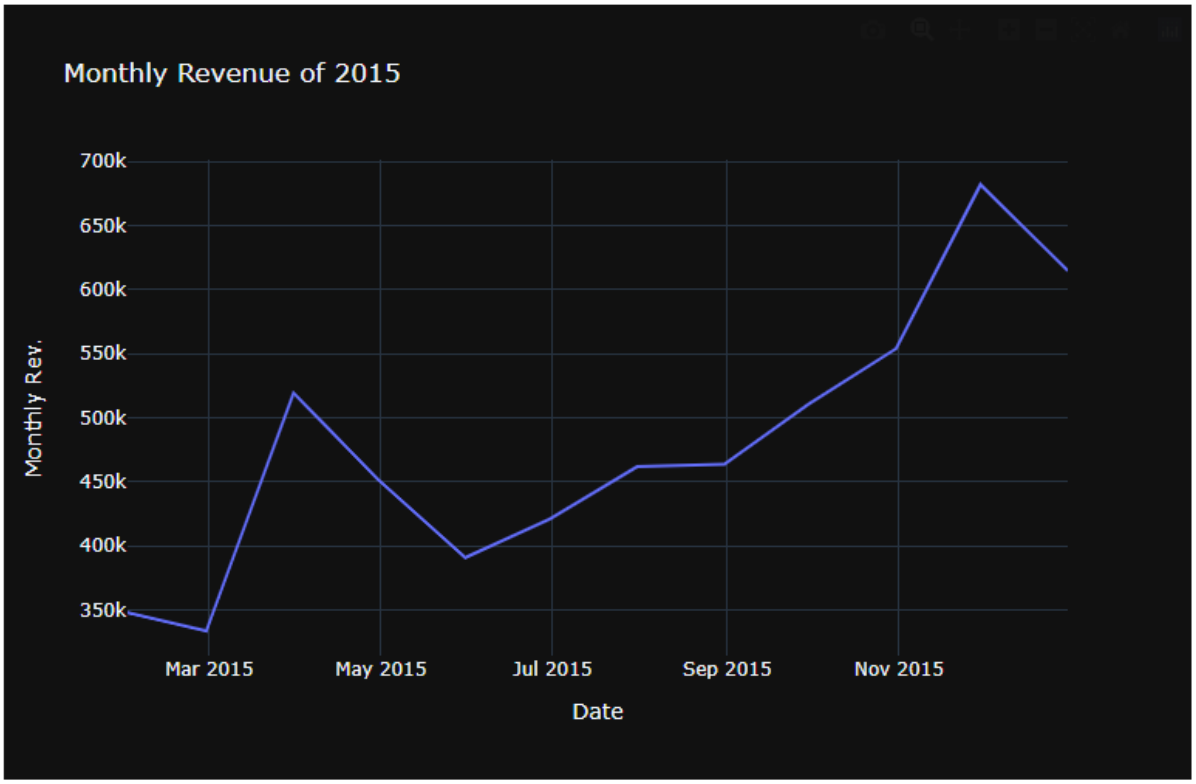
```
q8 = df.groupby('sales_person').\
     agg({'order_id':'count','total_amt_usd':'sum'}).\
     rename(columns = {'order_id':'orders_count','total_amt_usd':'total_sales'}).\
     reset_index()

q8.loc[(q8['orders_count'] > 200)|(q8['total_sales']>750000), 'sales_person_level'] = 'high'
q8.loc[(q8['orders_count'] > 150)|(q8['total_sales'] >500000),'sales_person_level'] = 'middle'
q8.loc[(q8['orders_count'] <= 150)|(q8['total_sales'] <=500000),'sales_person_level'] = 'low'

q8.sort_values('total_sales', ascending=False , inplace = True)

print(q8)

q8.to_csv('hrq8.csv')

del q8
```

	sales_person	orders_count	total_sales	sales_person_level
17	Earlie Schleusner	335	1098137.72	middle
48	Tia Amato	267	1010690.60	middle
49	Vernita Plump	299	934212.93	middle
23	Georgianna Chisholm	256	886244.12	middle
1	Arica Stoltzfus	186	810353.34	middle
16	Dorotha Seawell	208	766935.04	middle
38	Nelle Meaux	241	749076.16	middle
45	Sibyl Lauria	192	721694.02	middle
30	Maren Musto	224	702697.29	middle
4	Brandie Riva	167	675917.64	middle
8	Charles Bidwell	205	675637.19	middle
20	Elwood Shutt	191	662500.24	middle
32	Maryanna Fiorentino	204	655954.74	middle
35	Moon Torian	250	650393.52	middle
25	Hilma Busick	191	622808.04	middle
12	Dawna Agnew	116	604519.38	low
5	Calvin Ollison	199	594516.08	middle
10	Cliff Meints	151	556105.34	middle
24	Gianna Dossey	184	550973.02	middle
34	Michel Averette	173	523977.06	middle
14	Delilah Krum	185	512179.11	middle
19	Elna Condello	168	508913.05	middle
33	Micha Woodford	179	488448.47	low
37	Necole Victory	136	475282.05	low
41	Samuel Racine	134	470408.98	low
11	Cordell Rieder	99	447934.80	low
26	Julia Behrman	115	447712.91	low
15	Derrick Boggess	102	383933.65	low
42	Saran Ram	106	362689.34	low
39	Renetta Carew	83	330188.69	low
43	Shawanda Selke	100	327828.61	low
22	Eugena Esser	116	311801.45	low
31	Marquetta Laycock	90	307940.94	low
13	Debroah Wardle	116	293374.01	low
21	Ernestine Pickron	89	283243.25	low
40	Retha Sears	64	283203.03	low
46	Silvana Virden	65	262170.64	low
29	Lavera Oles	73	258316.81	low
44	Sherlene Wetherington	63	218909.58	low
2	Ayesha Monica	86	217146.59	low
3	Babette Soukup	60	215905.27	low
7	Carletta Kosinski	61	213032.45	low
47	Soraya Fulton	54	210436.05	low
9	Chau Rowles	63	184282.60	low
6	Cara Clarke	54	166138.65	low
0	Akilah Drinkard	66	136613.99	low
28	Kathleen Lalonde	35	116307.79	low
18	Elba Felder	62	114976.59	low
27	Julie Starr	35	89097.65	low
36	Nakesha Renn	13	49361.11	low

2.3. Finance Business Requests

Q1- Provide a timeline for montly revenue in 2015?

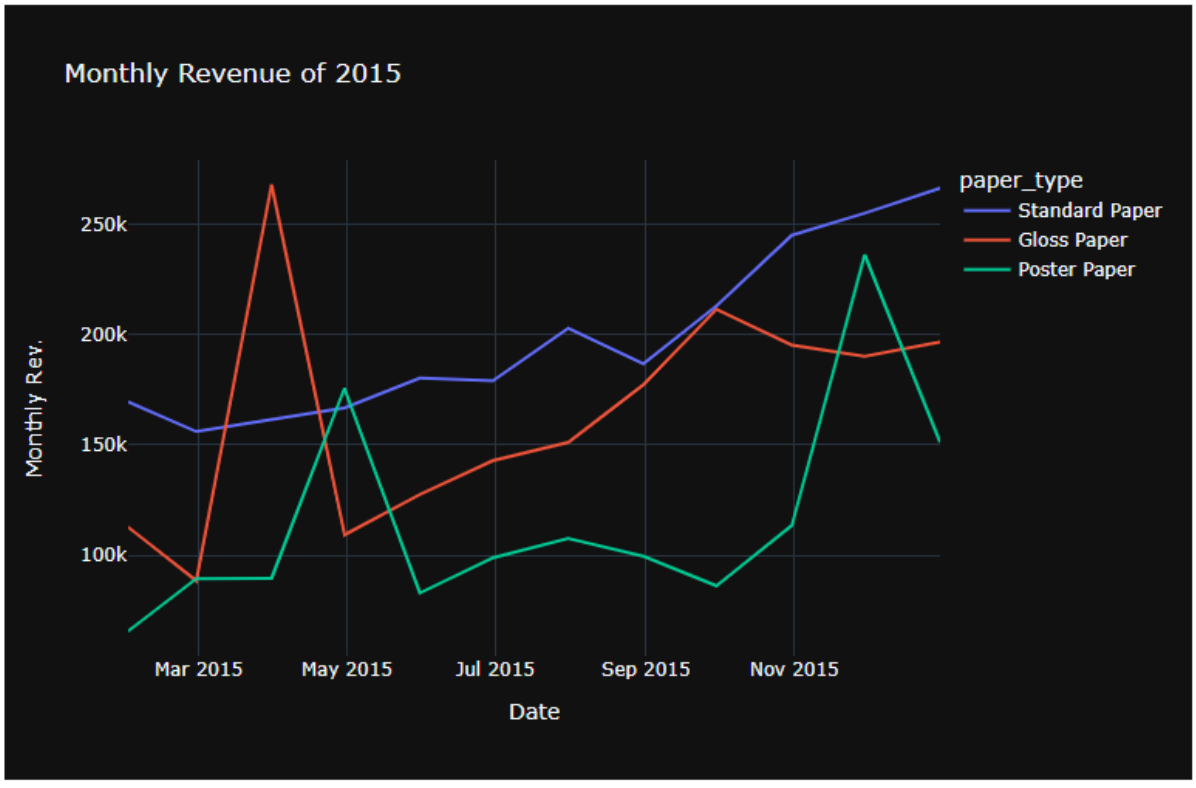
```
q1 = (df.loc[df['order_date_time'].dt.year == 2015,['order_date_time','total_amt_usd']].
      set_index('order_date_time').resample('m').
      sum()
     )
q1.to_csv('financialq1.csv')

q1= px.line(q1, y = 'total_amt_usd',
            title = 'Monthly Revenue of 2015',
            template = 'plotly_dark',
            height =500)

q1.update_layout(xaxis_title = 'Date',yaxis_title = 'Monthly Rev.')
```



Q2- Provide a monthly revenue for each type of paprer in 2015?

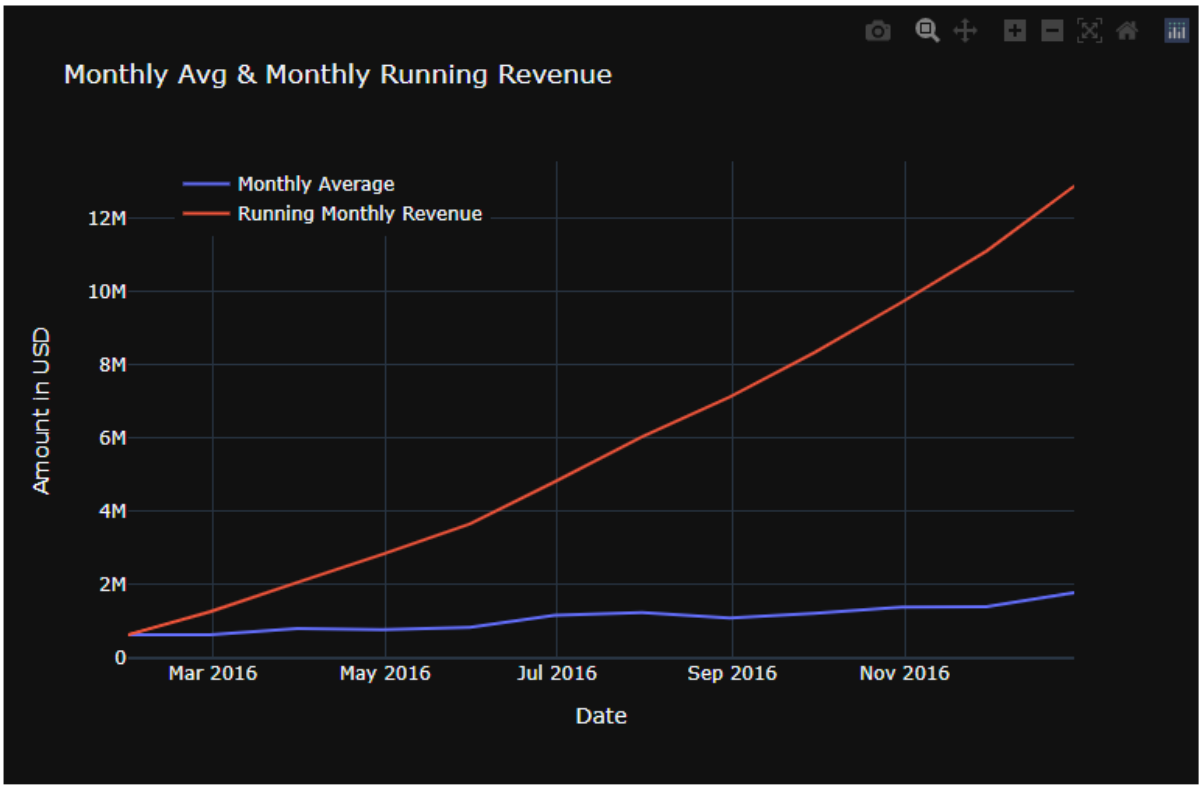
```
# make a dataframe for monthly revenue of standard paper in 2015
q2_standard = df.loc[df['order_date_time'].dt.year == 2015,['order_date_time','standard_amt_usd']]
q2_standard = q2_standard.set_index('order_date_time').resample('m').sum()
q2_standard = q2_standard.rename(columns = {'standard_amt_usd':'revenue'})
q2_standard['paper_type'] = 'Standard Paper'

# make a dataframe for monthly revenue of gloss paper in 2015
q2_gloss = df.loc[df['order_date_time'].dt.year == 2015,['order_date_time','gloss_amt_usd']]
q2_gloss = q2_gloss.set_index('order_date_time').resample('m').sum()
q2_gloss = q2_gloss.rename(columns = {'gloss_amt_usd':'revenue'})
q2_gloss['paper_type'] = 'Gloss Paper'

# make a dataframe for monthly revenue of poster paper in 2015
q2_poster = df.loc[df['order_date_time'].dt.year == 2015,['order_date_time','poster_amt_usd']]
q2_poster = q2_poster.set_index('order_date_time').resample('m').sum()
q2_poster = q2_poster.rename(columns = {'poster_amt_usd':'revenue'})
q2_poster['paper_type'] = 'Poster Paper'

# concatenate the 3 dataframes
q2 = q2_standard.append(q2_gloss).append(q2_poster)
```

```
q2.to_csv('financialq2.csv')

# plot the resultant dataframe
q2 = px.line(q2, y = 'revenue',
             title = 'Monthly Revenue of 2015',
             template = 'plotly_dark',
             color = 'paper_type',
             height =500)

q2.update_layout(xaxis_title = 'Date',yaxis_title = 'Monthly Rev.')
```



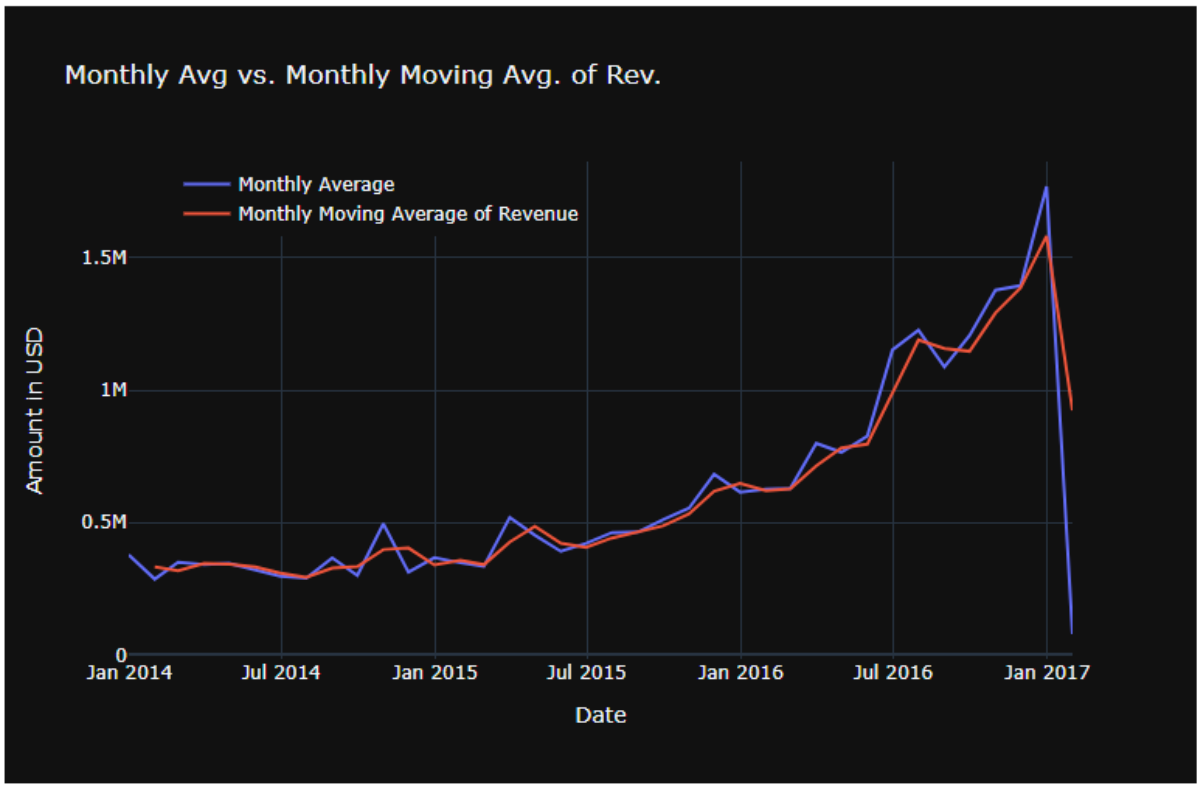
Q3- For the year 2016, provide the monthly revenue and the runnning monthly revenue?

```
q3 = df.loc[df['order_date_time'].dt.year == 2016, ['order_date_time','total_amt_usd']].\
        set_index('order_date_time').\
        resample('M').sum().\
        rename(columns = {'total_amt_usd':'monthly_revenue'})



q3['running_monthly_revenue'] = q3.expanding().sum()



q3.to_csv('financialq4.csv')

trace1 = go.Scatter(x = q3.index,y= q3['monthly_revenue'], mode ='lines', name = 'Monthly Average')
trace2 = go.Scatter(x = q3.index,y= q3['running_monthly_revenue'], mode ='lines', name = 'Running Mor

traces = [trace1, trace2]

fig = go.Figure(data = traces)

fig.update_layout(title='Monthly Avg & Monthly Running Revenue',
                  xaxis_title='Date',
                  yaxis_title='Amount in USD',
                 height = 500)
fig.layout.template = ('plotly_dark')
fig.layout.legend.x = 0.05


fig.show()
```



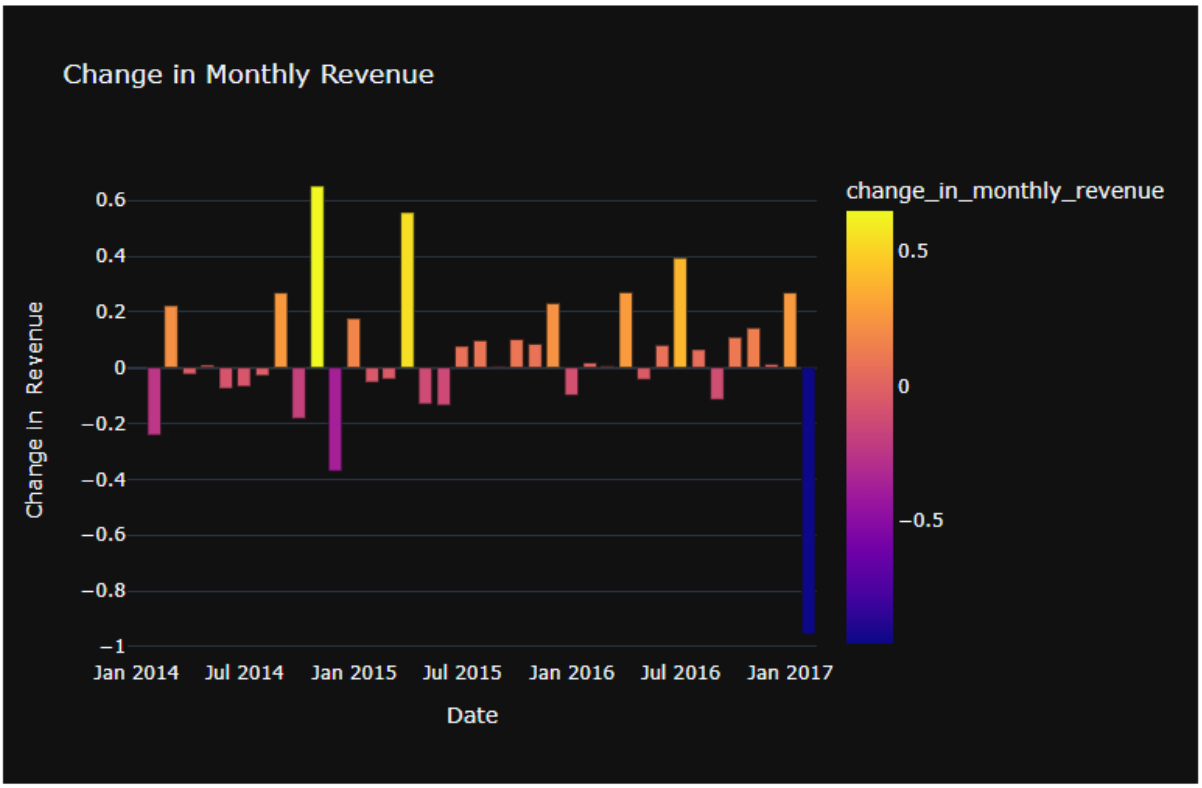
Q4- Provide the montly revenue along with monthly moving average of revenue (2 periods) for the timeline of the entire period ?

```
q4 = df.loc[:,['order_date_time','total_amt_usd']].\
        set_index('order_date_time').\
        resample('M').sum()

q4['monthly_moving_avg_of_revenue'] = q4.rolling(2).mean()

q4.rename(columns = {'total_amt_usd':'monthly_revenue'}, inplace = True)



trace1 = go.Scatter(x = q4.index,y= q4['monthly_revenue'], mode ='lines', name = 'Monthly Average')
trace2 = go.Scatter(x = q4.index,y= q4['monthly_moving_avg_of_revenue'], mode ='lines',
                    name = 'Monthly Moving Average of Revenue')
traces = [trace1, trace2]
fig = go.Figure(data = traces,
                )
fig.update_layout(title='Monthly Avg vs. Monthly Moving Avg. of Rev.',
                  xaxis_title='Date',
                  yaxis_title='Amount in USD',
                 height = 500)
fig.layout.template = ('plotly_dark')
fig.layout.legend.x = 0.05

fig.show()
```

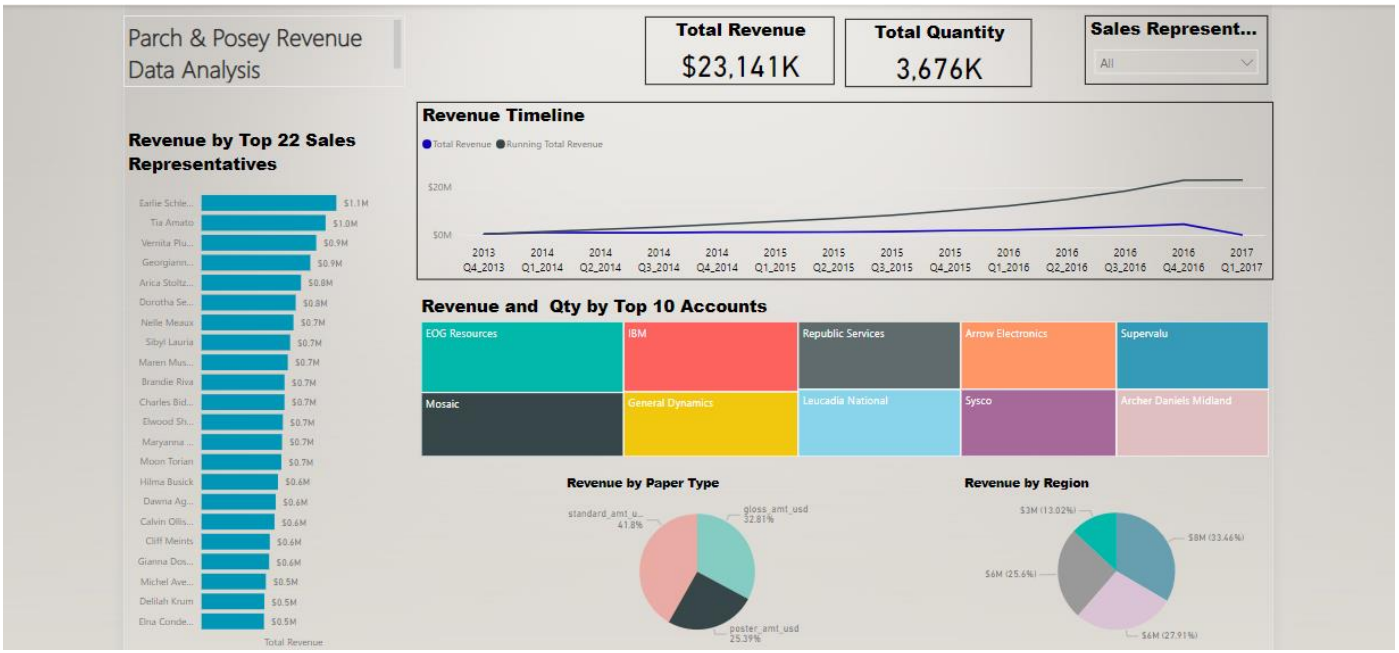


Q5- Show the monthly change in revenue of the entire period ?

```
q5 = df.loc[:,['order_date_time','total_amt_usd']].\
        set_index('order_date_time').\
        resample('M').sum()
q5['change_in_monthly_revenue'] = q5['total_amt_usd'].pct_change()

fig = px.bar(q5, x = q5.index, y = 'change_in_monthly_revenue',color = 'change_in_monthly_revenue',
       title = 'Change in Monthly Revenue',
       template = 'plotly_dark'
            )
fig.update_layout( xaxis_title='Date',
                  yaxis_title='Change in  Revenue',
                 height = 500)
fig.show()
```



Dashboard



Project link:

https://github.com/Waleed18574/Waleed_Data_Analyst_Portfolio_Projects/tree/main/Python_Data_Analytics_Projects/Business_Data_Analysis_Projects/Parch%26Posey_Business_Data_Analysis