dennislamcv1 last year

Set up the Tableau Workspace for data analysis

Import Libraries

In [1]:

```
import numpy as np
from numpy import count_nonzero, median, mean
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import random

# Plotly
# import plotly.express as px
# import plotly.offline as py
# import plotly.graph_objs as go

import sweetviz

import statsmodels.api as sm
import statsmodels.formula.api as smf
from statsmodels.formula.api import ols
# import researchpy as rp
```

```
import datetime
from datetime import datetime, timedelta

# import eli5
# from IPython.display import display

#import os
#import zipfile
import scipy.stats
from collections import Counter

import sklearn
# from sklearn.preprocessing import StandardScaler, MinMaxScal
# from sklearn.linear_model import LinearRegression, LogisticR
# from sklearn.model_selection import cross_val_score, train_t
# from sklearn.metrics import accuracy_score, auc, classificat
# from sklearn.metrics import plot_confusion_matrix, plot_roc_
# from sklearn.metrics import mean_absolute_error, mean_square

# from sklearn.linear_model import ElasticNet, Lasso, LinearRe
# from sklearn.tree import DecisionTreeClassifier, DecisionTre
# from sklearn.svm import SVC, SVR, LinearSVC, LinearSVR
# from sklearn.naive_bayes import GaussianNB, MultinomialNB

%matplotlib inline
#sets the default autosave frequency in seconds
%autosave 60
sns.set_style('dark')
sns.set(font_scale=1.2)

plt.rc('axes', titlesize=9)
plt.rc('axes', labelsize=14)
plt.rc('xtick', labelsize=12)
plt.rc('ytick', labelsize=12)

import warnings
warnings.filterwarnings('ignore')

# Use Feature-Engine library
#import feature_engine
#from feature_engine import imputation as mdi
#from feature_engine.outlier_removers import Winsorizer
#from feature_engine import categorical_encoders as ce
#from feature_engine.discretisation import EqualWidthDiscretis
#from feature_engine.discretisation import ArbitraryDiscretise
#from feature_engine.encoding import OrdinalEncoder

pd.set_option('display.max_columns',None)
#pd.set_option('display.max_rows',None)
pd.set_option('display.width', 1000)
pd.set_option('display.float_format','{:.2f}'.format)

random.seed(0)
np.random.seed(0)
np.set_printoptions(suppress=True)
```

Autosaving every 60 seconds

Autosaving every 60 seconds

Exploratory Data Analysis

In [2]:
```
df = pd.read_csv("LittleLemondata.csv", parse_dates=["Order Da
```

In [3]:
```
df.head()
```

Out[3]:

	Row Number	Order ID	Order Date	Delivery Date	Customer ID	Customer Name	City	C
0	975	92-392-7061	2019-06-23	10/10/2019	48-951-1953	Lowrance Kleinmintz	Beigang	
1	1975	92-392-7061	2019-06-23	10/10/2019	48-951-1953	Lowrance Kleinmintz	Beigang	
2	2975	92-392-7061	2019-06-23	10/10/2019	48-951-1953	Lowrance Kleinmintz	Beigang	
3	3975	92-392-7061	2019-06-23	10/10/2019	48-951-1953	Lowrance Kleinmintz	Beigang	
4	4975	92-392-7061	2019-06-23	10/10/2019	48-951-1953	Lowrance Kleinmintz	Beigang	

In [4]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 21000 entries, 0 to 20999
Data columns (total 21 columns):
 #   Column         Non-Null Count  Dtype
---  ------         --------------  -----
 0   Row Number     21000 non-null  int64
 1   Order ID       21000 non-null  object
 2   Order Date     21000 non-null  datetime64[ns]
 3   Delivery Date  21000 non-null  object
 4   Customer ID    21000 non-null  object
 5   Customer Name  21000 non-null  object
 6   City           21000 non-null  object
 7   Country        21000 non-null  object
 8   Postal Code    21000 non-null  object
 9   Country Code   20958 non-null  object
 10  Cost           21000 non-null  float64
 11  Sales          21000 non-null  float64
 12  Quantity       21000 non-null  int64
```

```
 13  Discount       21000 non-null  float64
 14  Delivery Cost  21000 non-null  float64
 15  Course Name    21000 non-null  object
 16  Cuisine Name   21000 non-null  object
 17  Starter Name   21000 non-null  object
 18  Desert Name    21000 non-null  object
 19  Drink          21000 non-null  object
 20  Sides          21000 non-null  object
dtypes: datetime64[ns](1), float64(4), int64(2), object(14)
memory usage: 3.4+ MB
```

In [5]:
```
df["Profit"] = df["Sales"] - df["Cost"]
```

In [6]:
```
df.head()
```

Out[6]:

	Row Number	Order ID	Order Date	Delivery Date	Customer ID	Customer Name	City	C
0	975	92-392-7061	2019-06-23	10/10/2019	48-951-1953	Lowrance Kleinmintz	Beigang	
1	1975	92-392-7061	2019-06-23	10/10/2019	48-951-1953	Lowrance Kleinmintz	Beigang	
2	2975	92-392-7061	2019-06-23	10/10/2019	48-951-1953	Lowrance Kleinmintz	Beigang	
3	3975	92-392-7061	2019-06-23	10/10/2019	48-951-1953	Lowrance Kleinmintz	Beigang	
4	4975	92-392-7061	2019-06-23	10/10/2019	48-951-1953	Lowrance Kleinmintz	Beigang	

In [7]:
```
#df.to_csv("modified.csv", index=False)
```

In [8]:
```
df.describe()
```

Out[8]:

	Row Number	Cost	Sales	Quantity	Discount	Delivery Cost	
count	21000.00	21000.00	21000.00	21000.00	21000.00	21000.00	210
mean	10500.50	147.04	220.56	2.12	49.16	50.98	
std	6062.32	76.57	114.85	0.78	31.53	28.45	

min	1.00	44.57	66.86	1.00	9.12	1.11	
25%	5250.75	91.84	137.76	1.75	20.00	26.64	
50%	10500.50	125.00	187.50	2.00	47.84	51.11	
75%	15750.25	210.00	315.00	3.00	80.34	76.12	1
max	21000.00	320.00	480.00	3.00	99.24	99.91	1

In [9]:
```
df.columns
```

Out[9]:
```
Index(['Row Number', 'Order ID', 'Order Date', 'Delivery Dat
e', 'Customer ID', 'Customer Name', 'City', 'Country', 'Postal
Code', 'Country Code', 'Cost', 'Sales', 'Quantity', 'Discoun
t', 'Delivery Cost', 'Course Name', 'Cuisine Name', 'Starter N
ame', 'Desert Name', 'Drink', 'Sides', 'Profit'], dtype='objec
t')
```

Data Visualization

In the first task, you need to create a bar chart that shows customers sales and filter data based on sales with at least $70.

In [10]:
```
df2 = df[df["Sales"] >= 70.00]
```

In [11]:
```
df2
```

Out[11]:

	Row Number	Order ID	Order Date	Delivery Date	Customer ID	Customer Name	Ci
0	975	92-392-7061	2019-06-23	10/10/2019	48-951-1953	Lowrance Kleinmintz	Beigar
1	1975	92-392-7061	2019-06-23	10/10/2019	48-951-1953	Lowrance Kleinmintz	Beigar
2	2975	92-392-7061	2019-06-23	10/10/2019	48-951-1953	Lowrance Kleinmintz	Beigar
3	3975	92-392-7061	2019-06-23	10/10/2019	48-951-1953	Lowrance Kleinmintz	Beigar
4	4975	92-392-7061	2019-06-23	10/10/2019	48-951-1953	Lowrance Kleinmintz	Beigar

...	...	...	...	...	...	...	
20995	16721	67-723-0322	2022-03-13	7/1/2023	69-530-7688	Devonne Whal	Balbo
20996	17721	67-723-0322	2022-03-13	7/1/2023	69-530-7688	Devonne Whal	Balbo
20997	18721	67-723-0322	2022-03-13	7/1/2023	69-530-7688	Devonne Whal	Balbo
20998	19721	67-723-0322	2022-03-13	7/1/2023	69-530-7688	Devonne Whal	Balbo
20999	20721	67-723-0322	2022-03-13	7/1/2023	69-530-7688	Devonne Whal	Balbo

20045 rows × 22 columns

In [12]:
```
df2.groupby(["Customer Name"])["Sales"].sum()
```

Out[12]:
```
Customer Name
Aaron Cromley        4527.56
Abigail Struis       4323.54
Adah Adamczewski     4812.30
Adaline Reichartz    4301.04
Adamo Rumens         4812.30
                        ...
Zita Coldbath        4631.37
Zolly Heinzel        4466.61
Zora Hanalan         4728.87
Zorana Diggin        4453.78
Zorine Delacourt     4453.78
Name: Sales, Length: 1000, dtype: float64
```

In [13]:
```
task1 = pd.DataFrame(df2.groupby(["Customer Name"])["Sales"].su
```

In [14]:
```
task1
```

Out[14]:

Customer Name	Sales
Aaron Cromley	4527.56
Abigail Struis	4323.54

Adah Adamczewski	4812.30
Adaline Reichartz	4301.04
Adamo Rumens	4812.30
...	...
Zita Coldbath	4631.37
Zolly Heinzel	4466.61
Zora Hanalan	4728.87
Zorana Diggin	4453.78
Zorine Delacourt	4453.78

1000 rows × 1 columns

In [15]:

```
# Sort Barplots by Values and Single Plot

fig = plt.figure(figsize=(20,10))


sns.barplot(x=task1.index, y=task1.Sales, data=task1)
plt.title("Customer Sales", size=20)
plt.xlabel("Customer Name")
#plt.ylabel("Average Ticket Prices")
plt.xticks(rotation=90)
#plt.ticklabel_format(style='plain', axis='y')
plt.xlim(-1, 9.5)
plt.tight_layout()
plt.show()
```

In the second task, you need to create a line chart to show the sales trend from 2019 to 2022.

In [16]:
```
df3 = df[df["Order Date"] < "2023-01-01"]
```

In [17]:
```
df3.head()
```

Out[17]:

	Row Number	Order ID	Order Date	Delivery Date	Customer ID	Customer Name	City	C
0	975	92-392-7061	2019-06-23	10/10/2019	48-951-1953	Lowrance Kleinmintz	Beigang	
1	1975	92-392-7061	2019-06-23	10/10/2019	48-951-1953	Lowrance Kleinmintz	Beigang	
2	2975	92-392-7061	2019-06-23	10/10/2019	48-951-1953	Lowrance Kleinmintz	Beigang	
3	3975	92-392-7061	2019-06-23	10/10/2019	48-951-1953	Lowrance Kleinmintz	Beigang	
4	4975	92-392-7061	2019-06-23	10/10/2019	48-951-1953	Lowrance Kleinmintz	Beigang	

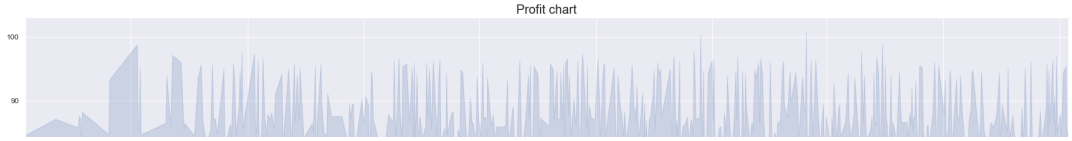
In [18]:
```
df3["Order Date"].min()
```

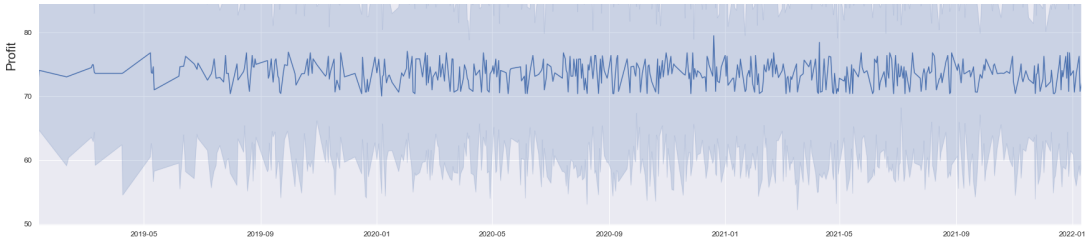
Out[18]:
```
Timestamp('2019-01-10 00:00:00')
```

In [19]:
```
df3["Order Date"].max()
```

Out[19]:
```
Timestamp('2022-12-31 00:00:00')
```

In [20]:
```
fig = plt.figure(figsize=(30,10))
sns.lineplot(x=df3["Order Date"], y=df3.Profit, data=df3, esti
plt.title("Profit chart", fontsize=20)
plt.xlabel("", fontsize=20)
plt.ylabel("Profit", fontsize=20)
plt.xlim('2019-01-10', '2022-01-10')
#plt.legend(['',''])
plt.show()
```





In the third task, you need to create a Bubble chart of sales for all customers. The chart should show the names of all customers. Once you roll over a bubble, the chart should show the name, profit and sale.

In [21]:
```
df.groupby(["Customer Name"])["Sales","Profit"].sum()
```

Out[21]:

Customer Name	Sales	Profit
Aaron Cromley	4661.27	1553.76
Abigail Struis	4457.25	1485.75
Adah Adamczewski	4812.30	1604.10
Adaline Reichartz	4434.75	1478.25
Adamo Rumens	4812.30	1604.10
...	...	...
Zita Coldbath	4631.37	1543.79
Zolly Heinzel	4600.32	1533.44
Zora Hanalan	4728.87	1576.29
Zorana Diggin	4587.49	1529.16
Zorine Delacourt	4587.49	1529.16

1000 rows × 2 columns

In [22]:
```
df4 = pd.DataFrame(df.groupby(["Customer Name"])["Sales","Prof
```

In [23]:
```
df4
```

Out[23]:

Customer Name	Sales	Profit
Aaron Cromley	4661.27	1553.76

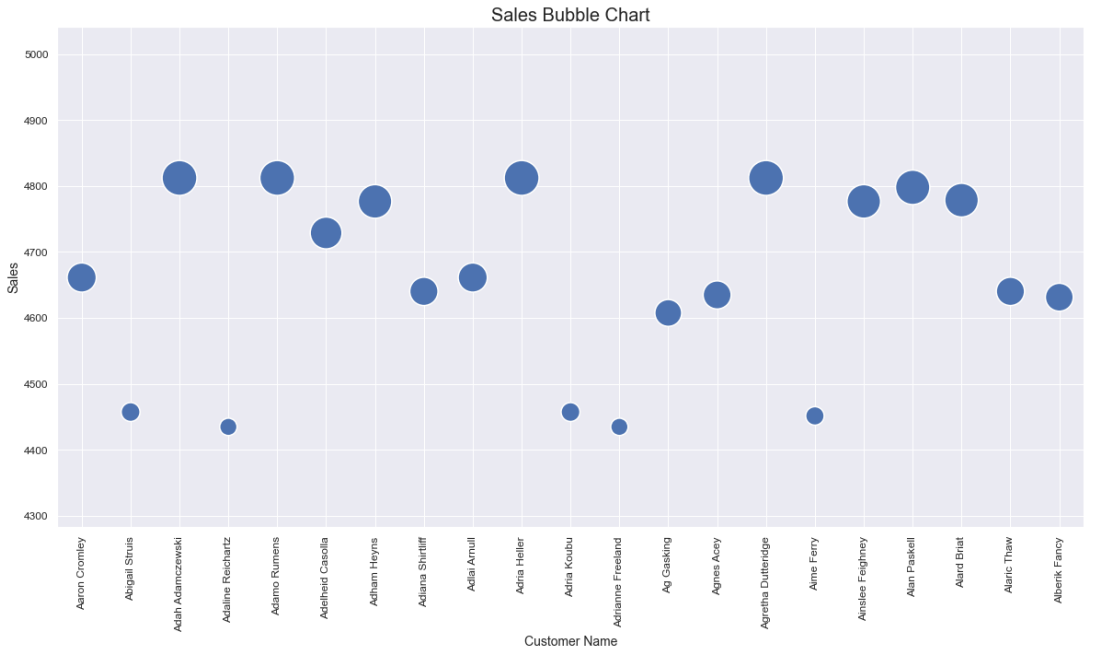
Abigail Struis	4457.25	1485.75
Adah Adamczewski	4812.30	1604.10
Adaline Reichartz	4434.75	1478.25
Adamo Rumens	4812.30	1604.10
...	...	...
Zita Coldbath	4631.37	1543.79
Zolly Heinzel	4600.32	1533.44
Zora Hanalan	4728.87	1576.29
Zorana Diggin	4587.49	1529.16
Zorine Delacourt	4587.49	1529.16

1000 rows × 2 columns

In [24]:

```
plt.figure(figsize=(20,10))

sns.scatterplot(x=df4.index, y=df4.Sales, size='Profit', data=
plt.title("Sales Bubble Chart", fontsize=20)
#plt.xlabel("Flight Number",fontsize=20)
#plt.ylabel("Launch Site",fontsize=20)
plt.xlim(-0.5, 20.5)
plt.xticks(rotation = 90)
plt.show()
```



In this task, you need to compare the sales of the three different cuisines sold at Little Lemon. Create a Bar chart that shows the sales of the Turkish, Italian and Greek cuisines.

In [25]:
```
df3.head()
```

Out[25]:

	Row Number	Order ID	Order Date	Delivery Date	Customer ID	Customer Name	City	C
0	975	92-392-7061	2019-06-23	10/10/2019	48-951-1953	Lowrance Kleinmintz	Beigang	
1	1975	92-392-7061	2019-06-23	10/10/2019	48-951-1953	Lowrance Kleinmintz	Beigang	
2	2975	92-392-7061	2019-06-23	10/10/2019	48-951-1953	Lowrance Kleinmintz	Beigang	
3	3975	92-392-7061	2019-06-23	10/10/2019	48-951-1953	Lowrance Kleinmintz	Beigang	
4	4975	92-392-7061	2019-06-23	10/10/2019	48-951-1953	Lowrance Kleinmintz	Beigang	

In [26]:
```
df3.groupby("Cuisine Name").sum()
```

Out[26]:

Cuisine Name	Row Number	Cost	Sales	Quantity	Discount	De
Greek	54893769	779435.97	1169153.96	10458	256964.57	2725
Italian	109814922	1537555.91	2306333.86	18333	514305.95	5285
Turkish	55135500	761790.33	1142685.50	15750	258158.21	2665

In [27]:
```
df3["Year"] = df3["Order Date"].dt.year
```

In [28]:
```
df3.head()
```

Out[28]:

	Row Number	Order ID	Order Date	Delivery Date	Customer ID	Customer Name	City	C
0	975	92-392-	2019-06-	10/10/2019	48-951-	Lowrance	Beigang	

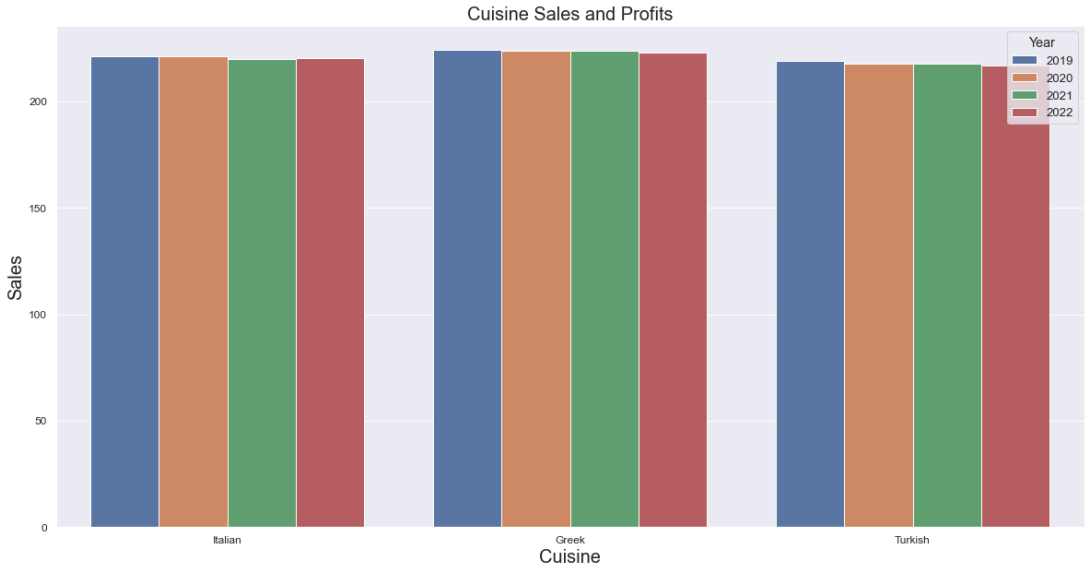
		7061	23		1953	Kleinmintz	
1	1975	92-392-7061	2019-06-23	10/10/2019	48-951-1953	Lowrance Kleinmintz	Beigang
2	2975	92-392-7061	2019-06-23	10/10/2019	48-951-1953	Lowrance Kleinmintz	Beigang
3	3975	92-392-7061	2019-06-23	10/10/2019	48-951-1953	Lowrance Kleinmintz	Beigang
4	4975	92-392-7061	2019-06-23	10/10/2019	48-951-1953	Lowrance Kleinmintz	Beigang

In [29]:

```
plt.figure(figsize=(20,10))


sns.barplot(y="Sales", x="Cuisine Name", hue="Year", data=df3,
plt.xlabel("Cuisine",fontsize=20)
plt.ylabel("Sales",fontsize=20)
plt.title("Cuisine Sales and Profits", fontsize=20)

plt.show()
```



In [30]:

```
plt.figure(figsize=(20,10))


sns.barplot(y="Profit", x="Cuisine Name", hue="Year", data=df3
plt.xlabel("Cuisine",fontsize=20)
plt.ylabel("Profit",fontsize=20)
plt.title("Cuisine Sales and Profits", fontsize=20)
```

```
plt.show()
```

In this final task, you need to create an interactive dashboard that combines the Bar chart called Customers sales and the Sales Bubble Chart.

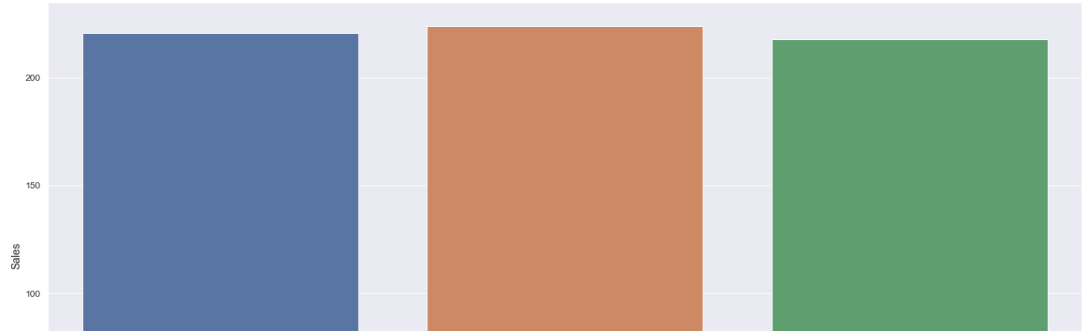
In [50]:

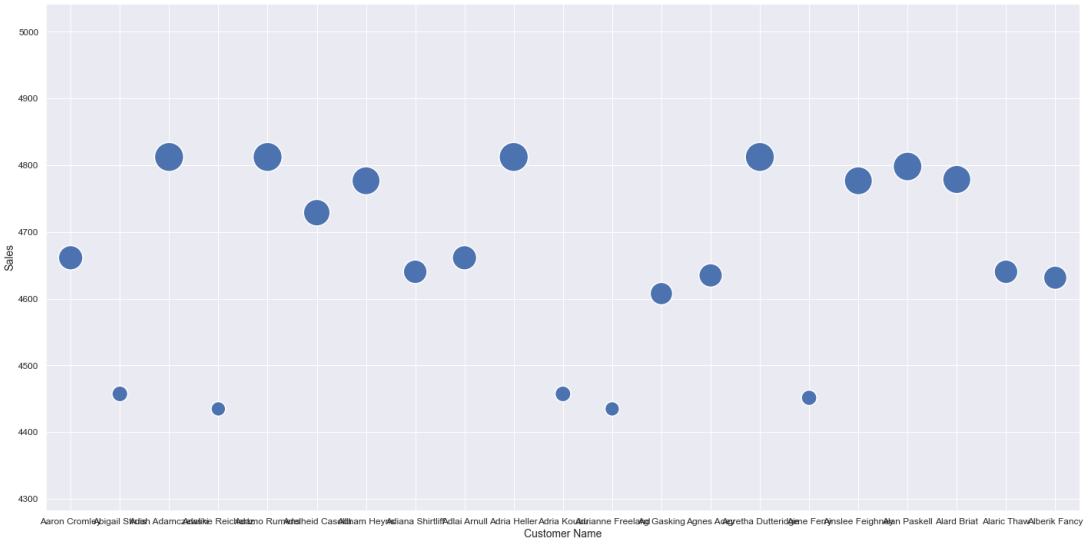
```
fig, ax = plt.subplots(2,1, sharex=False, figsize=(20,20))
#fig.suptitle('Main Title')


sns.barplot(x="Cuisine Name", y="Sales", data=df3, ci=None, ax=
#ax[0].set_title('Title of the first chart')
#ax[0].tick_params('x', labelrotation=45)
ax[0].set_xlabel("Cuisine Name")
ax[0].set_ylabel("Sales")

sns.scatterplot(x=df4.index, y=df4.Sales, size='Profit', data=d
#ax[1].set_title('Title of the second chart')
#ax[1].tick_params('x', labelrotation=45)
ax[1].set_xlabel("Customer Name")
ax[1].set_ylabel("Sales")
ax[1].set_xlim(-0.5, 20.5)

plt.ticklabel_format(style='plain', axis='y')
plt.tight_layout()
plt.show()
```





Python code done by Dennis Lam

In [ ]: