Sale Analysis By [Rohit Kag]

In [3]:
```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
import scipy.stats as sts
```

In [4]:
```
df1 = pd.read_excel("ECOMM DATA.xlsx",sheet_name="Orders")
```

In [5]:
```
dfp = pd.read_excel("ECOMM DATA.xlsx",sheet_name="People")
```

In [6]:
```
dfo = pd.read_excel("ECOMM DATA.xlsx",sheet_name="Returns")
```

In [7]:
```
df1.head()
```

Out[7]:

	Row ID	Order ID	Order Date	Ship Date	Ship Mode	Customer ID	Customer Name	Segment	City	State	...	Product ID	Category	Sub-Category	Product Name	
0	32298	CA-2012-124891	2012-07-31	2012-07-31	Same Day	RH-19495	Rick Hansen	Consumer	New York City	New York	...	TEC-AC-10003033	Technology	Accessories	Plantronics CS510 - Over-the-Head monaural Wir...	23
1	26341	IN-2013-77878	2013-02-05	2013-02-07	Second Class	JR-16210	Justin Ritter	Corporate	Wollongong	New South Wales	...	FUR-CH-10003950	Furniture	Chairs	Novimex Executive Leather Armchair, Black	37
2	25330	IN-2013-71249	2013-10-17	2013-10-18	First Class	CR-12730	Craig Reiter	Consumer	Brisbane	Queensland	...	TEC-PH-10004664	Technology	Phones	Nokia Smart Phone, with Caller ID	51
3	13524	ES-2013-1579342	2013-01-28	2013-01-30	First Class	KM-16375	Katherine Murray	Home Office	Berlin	Berlin	...	TEC-PH-10004583	Technology	Phones	Motorola Smart Phone, Cordless	28
4	47221	SG-2013-4320	2013-11-05	2013-11-06	Same Day	RH-9495	Rick Hansen	Consumer	Dakar	Dakar	...	TEC-SHA-10000501	Technology	Copiers	Sharp Wireless Fax, High-Speed	28

5 rows × 24 columns

In [8]:
```
df1.columns
```

Out[8]:
```
Index(['Row ID', 'Order ID', 'Order Date', 'Ship Date', 'Ship Mode',
       'Customer ID', 'Customer Name', 'Segment', 'City', 'State', 'Country',
       'Postal Code', 'Market', 'Region', 'Product ID', 'Category',
       'Sub-Category', 'Product Name', 'Sales', 'Quantity', 'Discount',
       'Profit', 'Shipping Cost', 'Order Priority'],
      dtype='object')
```

In [9]:
```
df1.isnull().sum()
```

Out[9]:
```
Row ID               0
Order ID             0
Order Date           0
Ship Date            0
Ship Mode            0
Customer ID          0
Customer Name        0
Segment              0
City                 0
State                0
Country              0
Postal Code      41296
Market               0
Region               0
Product ID           0
Category             0
Sub-Category         0
Product Name         0
Sales                0
Quantity             0
Discount             0
Profit               0
Shipping Cost        0
Order Priority       0
dtype: int64
```

In [10]:
```
df1.drop('Postal Code',axis=1,inplace=True)
```

In [11]:
```
df1
```

Out[11]:

	Row ID	Order ID	Order Date	Ship Date	Ship Mode	Customer ID	Customer Name	Segment	City	State	...	Product ID	Category	Sub-Category	Pro N
0	32298	CA-2012-124891	2012-07-31	2012-07-31	Same Day	RH-19495	Rick Hansen	Consumer	New York City	New York	...	TEC-AC-10003033	Technology	Accessories	Plantro CS5 Over- H mon
1	26341	IN-2013-77878	2013-02-05	2013-02-07	Second Class	JR-16210	Justin Ritter	Corporate	Wollongong	New South Wales	...	FUR-CH-10003950	Furniture	Chairs	Nov Exec Lea Armc E
2	25330	IN-2013-71249	2013-10-17	2013-10-18	First Class	CR-12730	Craig Reiter	Consumer	Brisbane	Queensland	...	TEC-PH-10004664	Technology	Phones	Nokia S Phone, Call
3	13524	ES-2013-1579342	2013-01-28	2013-01-30	First Class	KM-16375	Katherine Murray	Home Office	Berlin	Berlin	...	TEC-PH-10004583	Technology	Phones	Moto S Ph Cor
4	47221	SG-2013-4320	2013-11-05	2013-11-06	Same Day	RH-9495	Rick Hansen	Consumer	Dakar	Dakar	...	TEC-SHA-10000501	Technology	Copiers	S Wireless High-Sp
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
51285	29002	IN-2014-62366	2014-06-19	2014-06-19	Same Day	KE-16420	Katrina Edelman	Corporate	Kure	Hiroshima	...	OFF-FA-10000746	Office Supplies	Fasteners	Adva Th Tack
51286	35398	US-2014-102288	2014-06-20	2014-06-24	Standard Class	ZC-21910	Zuschuss Carroll	Consumer	Houston	Texas	...	OFF-AP-10002906	Office Supplies	Appliances	Ho Replacer Be Comme Guard
51287	40470	US-2013-155768	2013-12-02	2013-12-02	Same Day	LB-16795	Laurel Beltran	Home Office	Oxnard	California	...	OFF-EN-10001219	Office Supplies	Envelopes	#10- 4 x 9 Security Envel

	Row ID	Order ID	Order Date	Ship Date	Ship Mode	Customer ID	Customer Name	Segment	City	State	...	Product ID	Category	Sub-Category	Pro N
51288	9596	MX-2012-140767	2012-02-18	2012-02-22	Standard Class	RB-19795	Ross Baird	Home Office	Valinhos	São Paulo	...	OFF-BI-10000806	Office Supplies	Binders	Acco I Econ
51289	6147	MX-2012-134460	2012-05-22	2012-05-26	Second Class	MC-18100	Mick Crebagga	Consumer	Tipitapa	Managua	...	OFF-PA-10004155	Office Supplies	Paper	E Comp Prir Paper,

51290 rows × 23 columns

In [12]:
```
df1.rename(columns={'Row ID':'Row_ID', 'Order ID':'Order_ID', 'Order Date':'Order_Date', 'Ship Date':'Ship_Date', 'Ship Mode':'Sh
       'Customer ID':'Customer_ID', 'Customer Name':'Customer_Name','Product ID':'Product_ID','Product Name':'Product_Name','Ship
```

In [13]:
```
df1.head()
```

Out[13]:

	Row_ID	Order_ID	Order_Date	Ship_Date	Ship_Mode	Customer_ID	Customer_Name	Segment	City	State	...	Product_ID	Category
0	32298	CA-2012-124891	2012-07-31	2012-07-31	Same Day	RH-19495	Rick Hansen	Consumer	New York City	New York	...	TEC-AC-10003033	Technology
1	26341	IN-2013-77878	2013-02-05	2013-02-07	Second Class	JR-16210	Justin Ritter	Corporate	Wollongong	New South Wales	...	FUR-CH-10003950	Furniture
2	25330	IN-2013-71249	2013-10-17	2013-10-18	First Class	CR-12730	Craig Reiter	Consumer	Brisbane	Queensland	...	TEC-PH-10004664	Technology
3	13524	ES-2013-1579342	2013-01-28	2013-01-30	First Class	KM-16375	Katherine Murray	Home Office	Berlin	Berlin	...	TEC-PH-10004583	Technology
4	47221	SG-2013-4320	2013-11-05	2013-11-06	Same Day	RH-9495	Rick Hansen	Consumer	Dakar	Dakar	...	TEC-SHA-10000501	Technology

5 rows × 23 columns

In [14]:
```
df1.columns
```

Out[14]:
```
Index(['Row_ID', 'Order_ID', 'Order_Date', 'Ship_Date', 'Ship_Mode',
       'Customer_ID', 'Customer_Name', 'Segment', 'City', 'State', 'Country',
       'Market', 'Region', 'Product_ID', 'Category', 'Sub-Category',
       'Product_Name', 'Sales', 'Quantity', 'Discount', 'Profit',
       'Shipping_Cost', 'Order_Priority'],
      dtype='object')
```

In [15]:
```
date_time = ['Order_Date', 'Ship_Date']
```

In [16]:
```
df1.Order_Date = pd.to_datetime(df1.Order_Date)
df1.Ship_Date = pd.to_datetime(df1.Ship_Date)
```

In [17]:
```
df1.Row_ID = df1.Row_ID.astype('int')
df1.Order_ID = df1.Order_ID.astype('string')
```

In [18]:
```
df1.select_dtypes(include='object').columns
```

Out[18]:
```
Index(['Ship_Mode', 'Customer_ID', 'Customer_Name', 'Segment', 'City', 'State',
       'Country', 'Market', 'Region', 'Product_ID', 'Category', 'Sub-Category',
       'Product_Name', 'Order_Priority'],
      dtype='object')
```

In [19]:
```
df1.Ship_Mode= df1.Ship_Mode.astype('string')
df1.Customer_ID= df1.Customer_ID.astype('string')
df1.Customer_Name= df1.Customer_Name.astype('string')
df1.Segment= df1.Segment.astype('string')
df1.City= df1.City.astype('string')
df1.Country= df1.Country.astype('string')
df1.State= df1.State.astype('string')
df1.Product_ID = df1.Product_ID.astype('string')
df1.Category = df1.Category.astype('string')
```

In [20]:
```
df1['Sub-Category'] = df1['Sub-Category'].astype('string')
df1.Product_Name = df1.Product_Name.astype('string')
df1.Quantity = df1.Quantity.astype('string')
df1.Discount = df1.Discount.astype('string')
df1.Profit = df1.Profit.astype('string')
df1.Shipping_Cost = df1.Shipping_Cost.astype('string')
df1.Order_Priority = df1.Order_Priority.astype('string')
```

In [21]:
```
df1.Market = df1.Market.astype('string')
df1.Sales = df1.Sales.astype('string')
```

In [22]:
```
df1.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 51290 entries, 0 to 51289
Data columns (total 23 columns):
 #   Column          Non-Null Count  Dtype
---  ------          --------------  -----
 0   Row_ID          51290 non-null  int32
 1   Order_ID        51290 non-null  string
 2   Order_Date      51290 non-null  datetime64[ns]
 3   Ship_Date       51290 non-null  datetime64[ns]
 4   Ship_Mode       51290 non-null  string
 5   Customer_ID     51290 non-null  string
 6   Customer_Name   51290 non-null  string
 7   Segment         51290 non-null  string
 8   City            51290 non-null  string
 9   State           51290 non-null  string
 10  Country         51290 non-null  string
 11  Market          51290 non-null  string
 12  Region          51290 non-null  object
 13  Product_ID      51290 non-null  string
 14  Category        51290 non-null  string
 15  Sub-Category    51290 non-null  string
 16  Product_Name    51290 non-null  string
 17  Sales           51290 non-null  string
 18  Quantity        51290 non-null  string
 19  Discount        51290 non-null  string
 20  Profit          51290 non-null  string
 21  Shipping_Cost   51290 non-null  string
 22  Order_Priority  51290 non-null  string
dtypes: datetime64[ns](2), int32(1), object(1), string(19)
memory usage: 8.8+ MB
```

In [23]:
```
df1['Order_Day'] = df1.Order_Date.dt.day_name()
df1['Ship_Day'] = df1.Ship_Date.dt.day_name()
```

In [24]:
```
df1['Order_Month'] = df1.Order_Date.dt.month_name()
df1['Ship_Month'] = df1.Ship_Date.dt.month_name()
```

In [25]:
```
df1.Ship_Mode.unique()
```

Out[25]:
```
<StringArray>
['Same Day', 'Second Class', 'First Class', 'Standard Class']
Length: 4, dtype: string
```

In [26]:
```
df1.head(2)
```

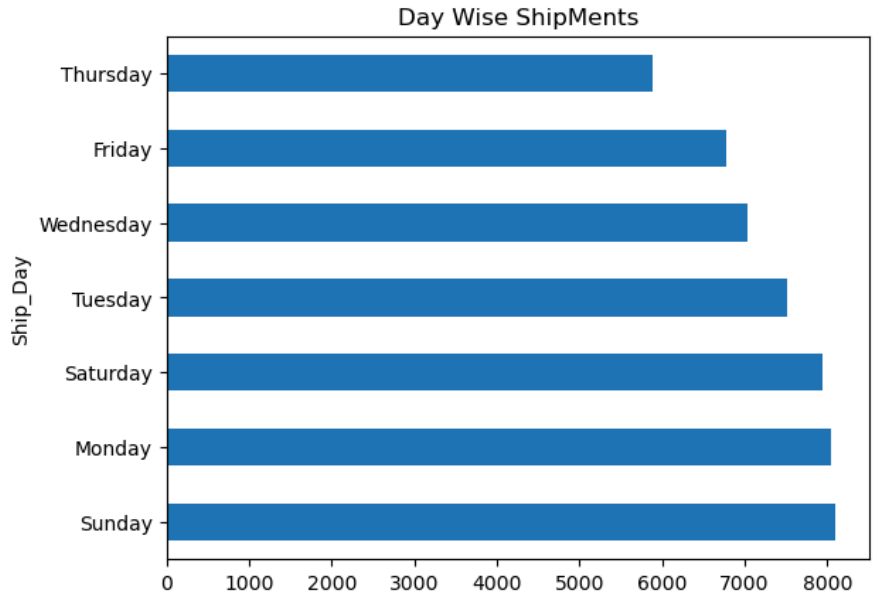
Out[26]:

	Row_ID	Order_ID	Order_Date	Ship_Date	Ship_Mode	Customer_ID	Customer_Name	Segment	City	State	...	Sales	Quantity	Discount
0	32298	CA-2012-124891	2012-07-31	2012-07-31	Same Day	RH-19495	Rick Hansen	Consumer	New York City	New York	...	2309.65	7	0.0
1	26341	IN-2013-77878	2013-02-05	2013-02-07	Second Class	JR-16210	Justin Ritter	Corporate	Wollongong	New South Wales	...	3709.395	9	0.1

2 rows × 27 columns

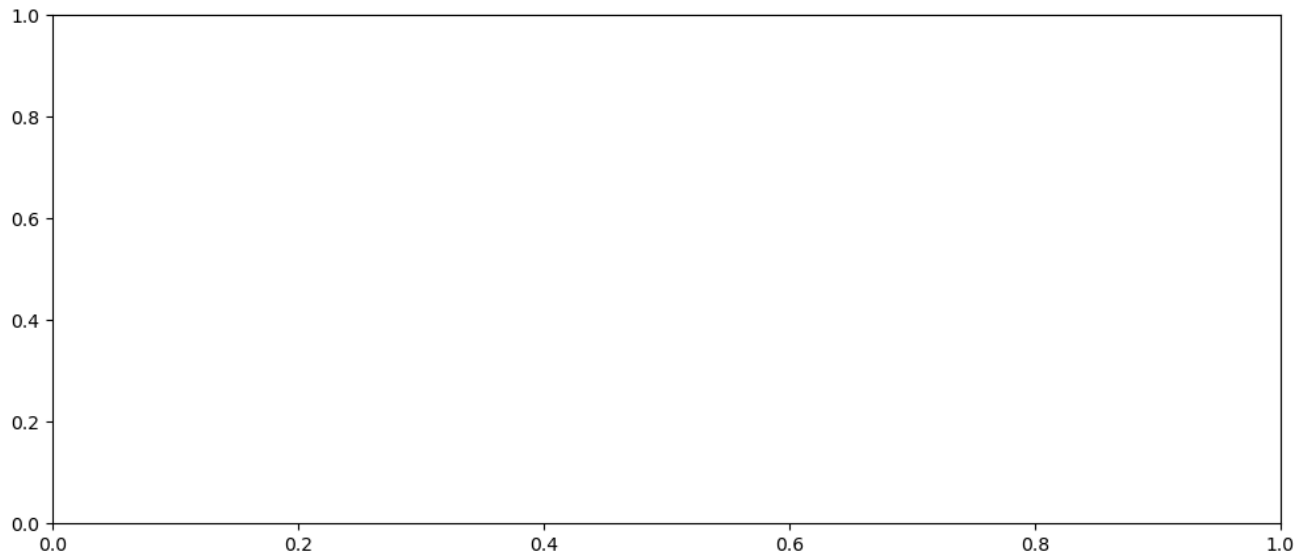
In [27]:
```
df1.Order_Day.value_counts().plot(kind='barh')
plt.title('Day Wise Orders')
plt.show()
```

In [28]:
```
df1.Ship_Day.value_counts().plot(kind='barh')
plt.title('Day Wise ShipMents')
plt.show()
```



In [29]:
```
plt.figure(figsize=(12,5))
sns.lineplot()
```

Out[29]:
```
<Axes: >
```



In [30]:
```
a = {'January': 3122, 'February': 2927, 'March': 3728, 'April': 3499, 'May': 3938, 'June': 4892, 'July': 3571, 'August': 4715, 'S
```

In [31]:
```
import pandas as pd

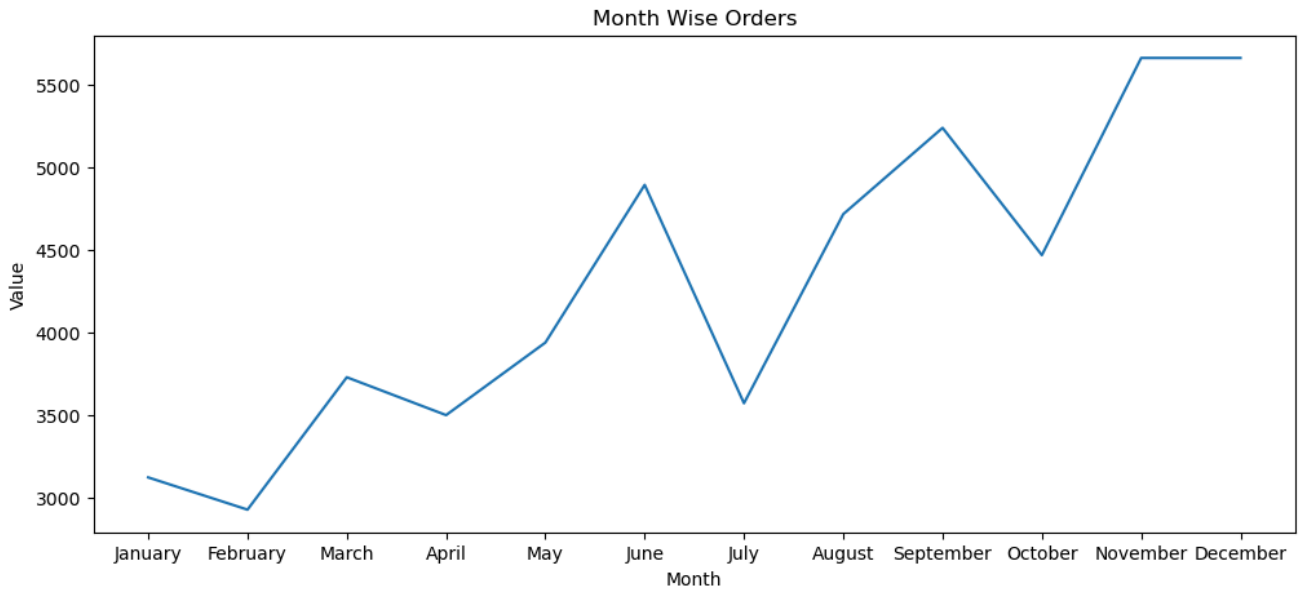
# Your dictionary
a = {'January': 3122, 'February': 2927, 'March': 3728, 'April': 3499, 'May': 3938, 'June': 4892, 'July': 3571, 'August': 4715, 'S

# Create DataFrame
df = pd.DataFrame(list(a.items()), columns=['Month', 'Value'])

# Display DataFrame
print(df)
```

```
        Month  Value
0     January   3122
1    February   2927
2       March   3728
3       April   3499
4         May   3938
5        June   4892
6        July   3571
7      August   4715
8   September   5237
9     October   4467
10   November   5660
11   December   5660
```

In [32]:
```
plt.figure(figsize=(12,5))
sns.lineplot(data=df,x='Month',y='Value')
plt.title('Month Wise Orders')
plt.show()
```



In [33]:
```
df1.head()
```

Out[33]:

	Row_ID	Order_ID	Order_Date	Ship_Date	Ship_Mode	Customer_ID	Customer_Name	Segment	City	State	...	Sales	Qua
0	32298	CA-2012-124891	2012-07-31	2012-07-31	Same Day	RH-19495	Rick Hansen	Consumer	New York City	New York	...	2309.65	
1	26341	IN-2013-77878	2013-02-05	2013-02-07	Second Class	JR-16210	Justin Ritter	Corporate	Wollongong	New South Wales	...	3709.395	
2	25330	IN-2013-71249	2013-10-17	2013-10-18	First Class	CR-12730	Craig Reiter	Consumer	Brisbane	Queensland	...	5175.171000000001	
3	13524	ES-2013-1579342	2013-01-28	2013-01-30	First Class	KM-16375	Katherine Murray	Home Office	Berlin	Berlin	...	2892.51	
4	47221	SG-2013-4320	2013-11-05	2013-11-06	Same Day	RH-9495	Rick Hansen	Consumer	Dakar	Dakar	...	2832.96	

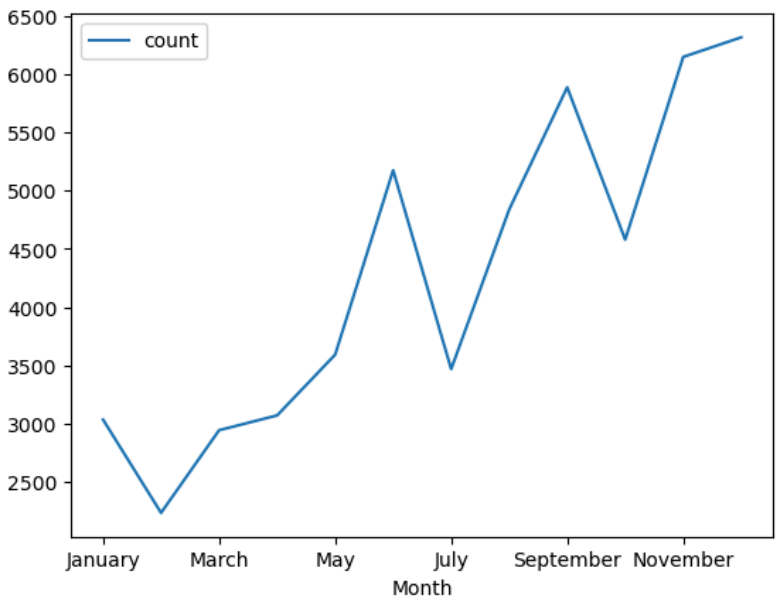
5 rows × 27 columns

In [34]:
```
a = df1['Ship_Month'].value_counts().reset_index()
```

In [35]:
```
months_order = ['January', 'February','March', 'April', 'May', 'June', 'July', 'August', 'September', 'October', 'November', 'Dec
ship_month_counts = a.set_index('Ship_Month').reindex(months_order)
```

In [36]:
```
plt.figure(figsize=(20,20))
ship_month_counts.plot(kind='line')
plt.xlabel('Month')
plt.show()
```

```
<Figure size 2000x2000 with 0 Axes>
```



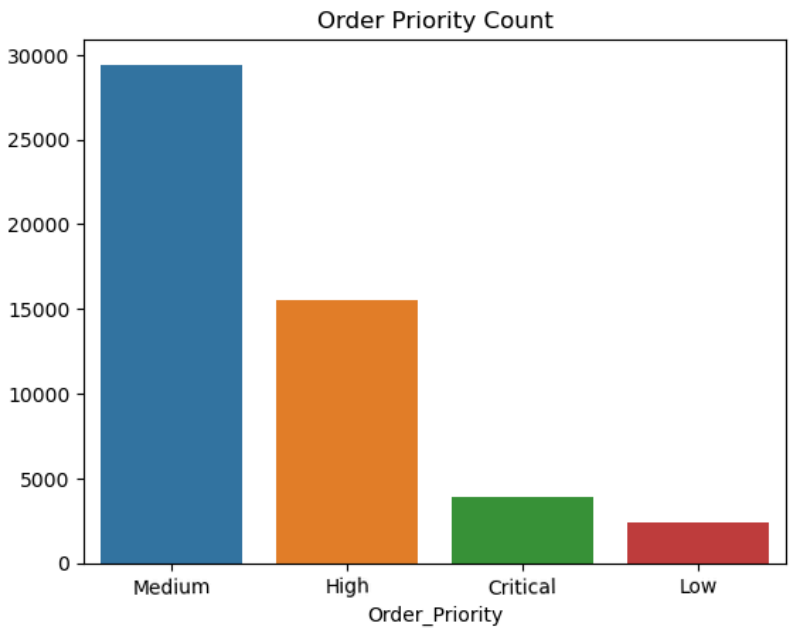
In [37]:
```
df1.head(4)
```

Out[37]:

	Row_ID	Order_ID	Order_Date	Ship_Date	Ship_Mode	Customer_ID	Customer_Name	Segment	City	State	...	Sales	Qua
0	32298	CA-2012-124891	2012-07-31	2012-07-31	Same Day	RH-19495	Rick Hansen	Consumer	New York City	New York	...	2309.65	
1	26341	IN-2013-77878	2013-02-05	2013-02-07	Second Class	JR-16210	Justin Ritter	Corporate	Wollongong	New South Wales	...	3709.395	
2	25330	IN-2013-71249	2013-10-17	2013-10-18	First Class	CR-12730	Craig Reiter	Consumer	Brisbane	Queensland	...	5175.171000000001	
3	13524	ES-2013-1579342	2013-01-28	2013-01-30	First Class	KM-16375	Katherine Murray	Home Office	Berlin	Berlin	...	2892.51	

4 rows × 27 columns

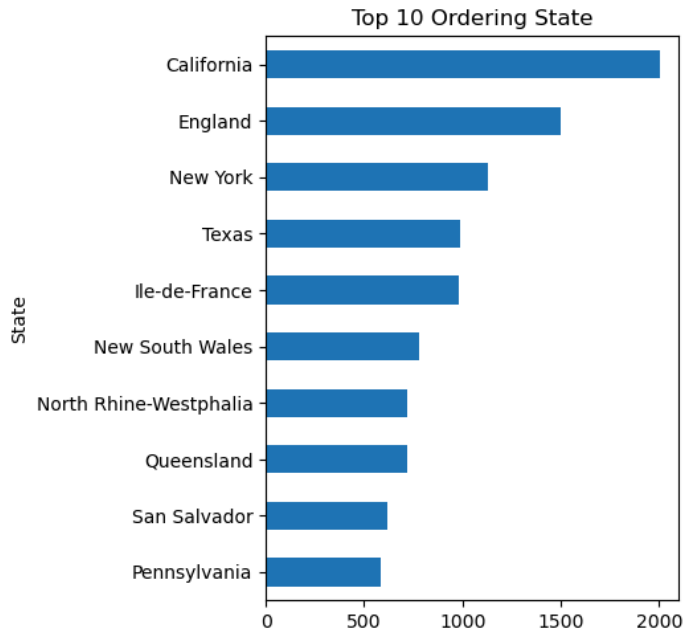
In [38]:
```
priority= df1.Order_Priority.value_counts()
sns.barplot(x=priority.index,y=priority.values)
plt.title('Order Priority Count')
plt.xticks(rotation=1)
plt.show()
```

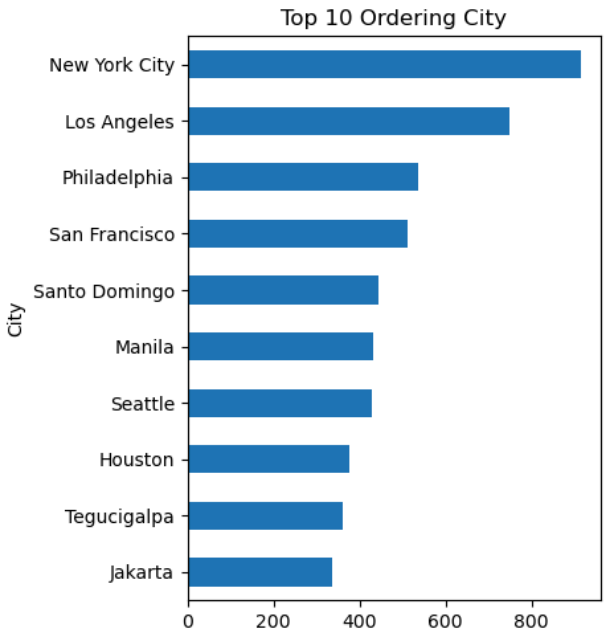


In [39]:
```
a = ['State', 'City']
rep = 1
nrows = 1
ncols = 2

plt.figure(figsize=(10, 5))
for i in a:
    plt.subplot(nrows, ncols, rep)
    df1[i].value_counts().head(10).sort_values(ascending=True).plot(kind='barh')
    plt.title('Top 10 Ordering {}'.format(i))
    rep += 1

plt.tight_layout()
plt.show()
```





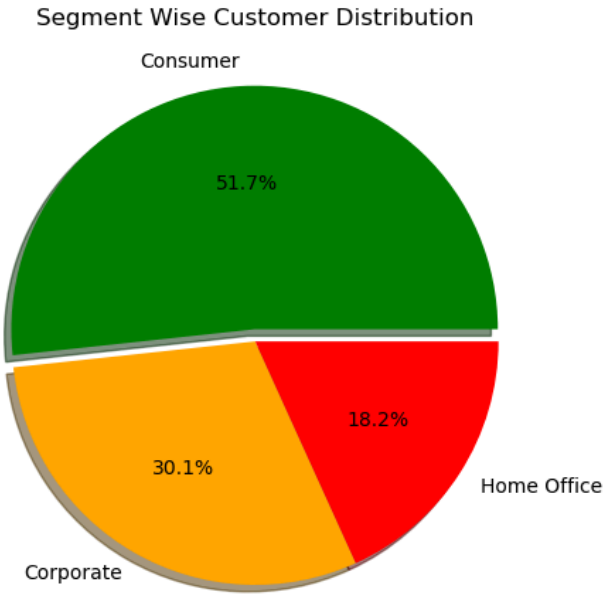
In [40]:
```
df1.head(2)
```

Out[40]:

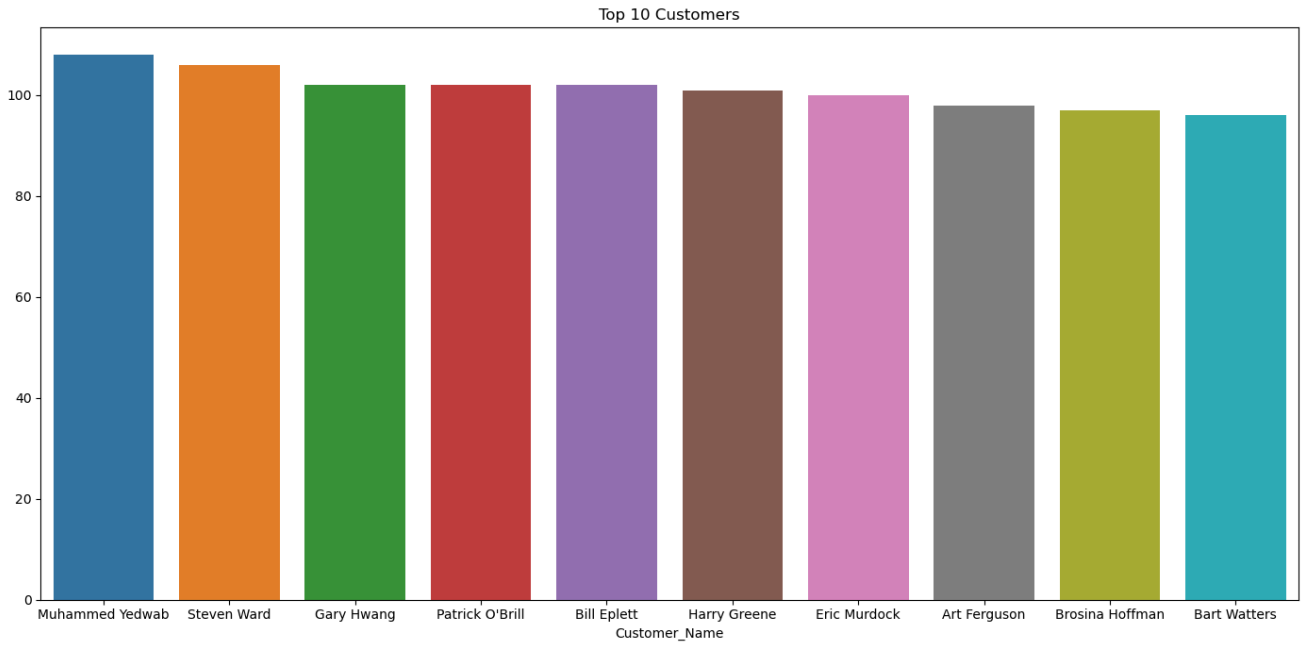
	Row_ID	Order_ID	Order_Date	Ship_Date	Ship_Mode	Customer_ID	Customer_Name	Segment	City	State	...	Sales	Quantity	Discount
0	32298	CA-2012-124891	2012-07-31	2012-07-31	Same Day	RH-19495	Rick Hansen	Consumer	New York City	New York	...	2309.65	7	0.0
1	26341	IN-2013-77878	2013-02-05	2013-02-07	Second Class	JR-16210	Justin Ritter	Corporate	Wollongong	New South Wales	...	3709.395	9	0.1

2 rows × 27 columns

In [41]:
```
plt.pie(data=df1,x=df1.Segment.value_counts(),
        labels=df1.Segment.unique(),explode=[0.05,0,0],labeldistance=1.1,autopct='%1.1f%%',shadow=True,
        colors=['Green','Orange','Red'])
plt.title('Segment Wise Customer Distribution')
plt.tight_layout()
plt.show()
```



In [42]:
```
plt.figure(figsize=(14,7))
sns.barplot(data=df1,x=df1.Customer_Name.value_counts().head(10).index,y=df1.Customer_Name.value_counts().head(10).values)
plt.title('Top 10 Customers')
plt.tight_layout()
plt.show()
```



In [43]:
```
df1.head(2)
```

Out[43]:

	Row_ID	Order_ID	Order_Date	Ship_Date	Ship_Mode	Customer_ID	Customer_Name	Segment	City	State	...	Sales	Quantity	Discount
0	32298	CA-2012-124891	2012-07-31	2012-07-31	Same Day	RH-19495	Rick Hansen	Consumer	New York City	New York	...	2309.65	7	0.0
1	26341	IN-2013-77878	2013-02-05	2013-02-07	Second Class	JR-16210	Justin Ritter	Corporate	Wollongong	New South Wales	...	3709.395	9	0.1

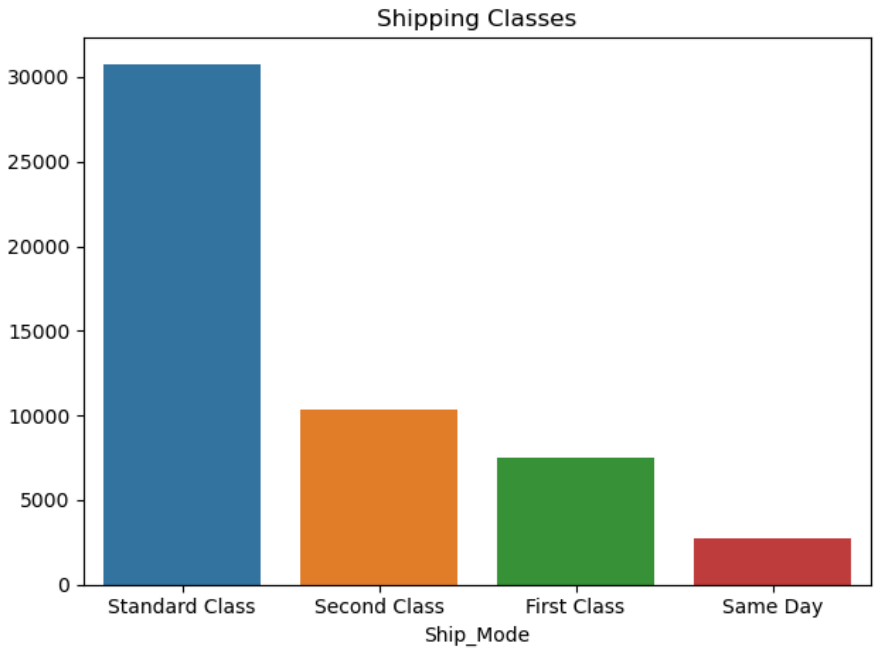
2 rows × 27 columns

In [44]:
```
df1['Sales'] = df1['Sales'].astype(float)
```

In [45]:
```
numcols = ['Sales','Quantity','Discount','Profit','Shipping_Cost']

for i in numcols:
    df1[i] = df1[i].astype(float)
```

In [46]:
```
a = df1['Ship_Mode'].value_counts()
sns.barplot(x=a.index,y=a.values)
plt.title('Shipping Classes')
plt.tight_layout()
plt.show()
```



In [47]:
```
rep=1
ncols=3
nrows=2

plt.figure(figsize=(10,8))
for i in numcols:
    plt.subplot(nrows,ncols,rep)
    sns.distplot(df1.loc[:,i])
    plt.title(i)
    rep+=1

plt.tight_layout()
plt.show()
```

```
C:\Users\dell\AppData\Local\Temp\ipykernel_9532\2692461090.py:8: UserWarning:

`distplot` is a deprecated function and will be removed in seaborn v0.14.0.

Please adapt your code to use either `displot` (a figure-level function with
similar flexibility) or `histplot` (an axes-level function for histograms).

For a guide to updating your code to use the new functions, please see
https://gist.github.com/mwaskom/de44147ed2974457ad6372750bbe5751

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C:\Users\dell\AppData\Local\Temp\ipykernel_9532\2692461090.py:8: UserWarning:

`distplot` is a deprecated function and will be removed in seaborn v0.14.0.

Please adapt your code to use either `displot` (a figure-level function with
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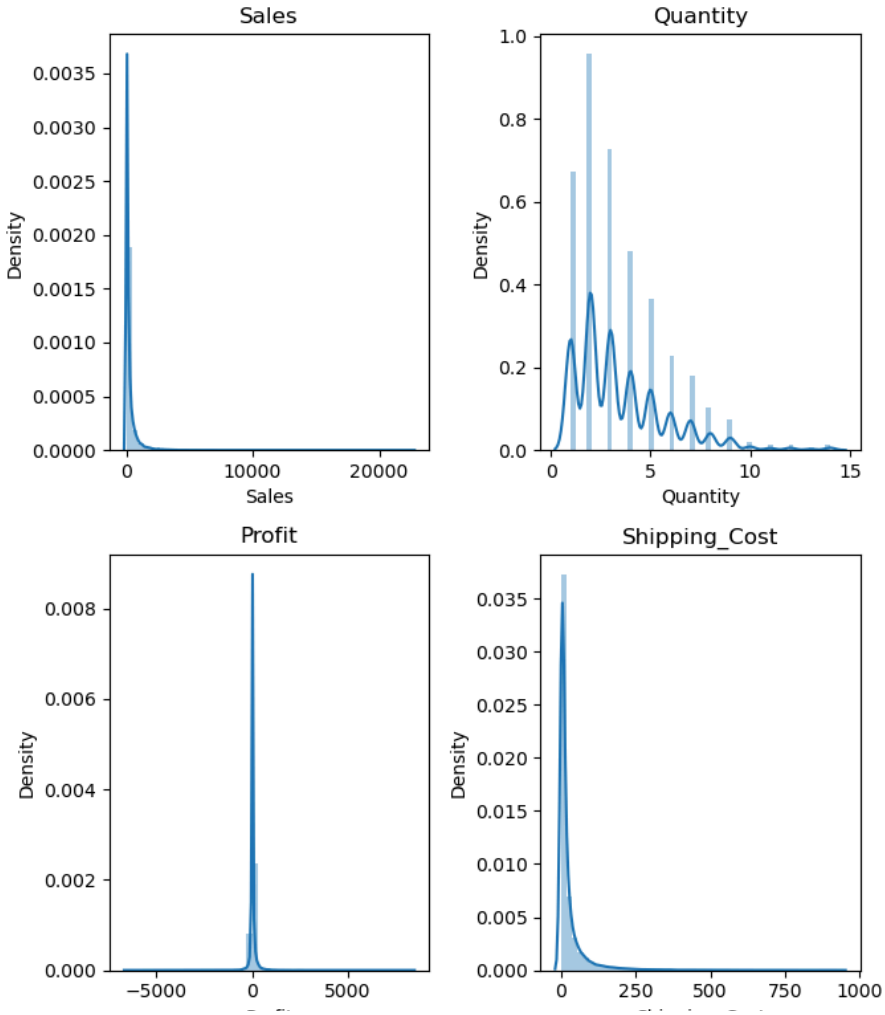

In [48]:
```
dfo
```

Out[48]:

	Returned	Order ID	Market
0	Yes	MX-2013-168137	LATAM
1	Yes	US-2011-165316	LATAM
2	Yes	ES-2013-1525878	EU
3	Yes	CA-2013-118311	United States
4	Yes	ES-2011-1276768	EU
...	...	...	...
1168	Yes	ES-2013-2639112	EU
1169	Yes	CA-2014-134194	United States
1170	Yes	ES-2012-3246286	EU
1171	Yes	ES-2012-4379168	EU
1172	Yes	CA-2014-168193	United States

1173 rows × 3 columns

In [49]:
```
sns.countplot(data=dfo,x=dfo.Market)
plt.title('Order Returned Market Wise')
plt.tight_layout()
plt.show()
```


Order Returned Market Wise
300
250
200
150
100
50
0
count
LATAM
EU
United States
APAC
Market

In [ ]: