In [1]:

```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
```

In [5]:

```
Dataset = pd.read_excel("C:\\Users\\DELL\\Desktop\\Data Analytics\\DataSets\\Sup
print(Dataset)
```

```
      Row ID Order Priority  Discount  Unit Price  Shipping Cost  Customer ID  \
0      18606  Not Specified      0.01        2.88           0.50            2
1      20847           High      0.01        2.84           0.93            3
2      23086  Not Specified      0.03        6.68           6.15            3
3      23087  Not Specified      0.01        5.68           3.60            3
4      23088  Not Specified      0.00      205.99           2.50            3
...      ...            ...       ...         ...            ...          ...
9421   20275       Critical      0.06       35.89          14.72         3402
9422   20276       Critical      0.00        3.34           7.49         3402
9423   24491  Not Specified      0.08      550.98          45.70         3402
9424   25914           High      0.10      105.98          13.99         3403
9425   24492  Not Specified      0.09        7.78           2.50         3403

        Customer Name       Ship Mode Customer Segment Product Category  ...  \
0     Janice Fletcher     Regular Air        Corporate  Office Supplies  ...
1       Bonnie Potter     Express Air        Corporate  Office Supplies  ...
2       Bonnie Potter     Express Air        Corporate  Office Supplies  ...
3       Bonnie Potter     Regular Air        Corporate  Office Supplies  ...
4       Bonnie Potter     Express Air        Corporate       Technology  ...
...               ...             ...              ...              ...  ...
9421   Frederick Cole     Regular Air         Consumer  Office Supplies  ...
9422   Frederick Cole     Regular Air         Consumer  Office Supplies  ...
9423   Frederick Cole  Delivery Truck         Consumer        Furniture  ...
9424    Tammy Buckley     Express Air         Consumer        Furniture  ...
9425    Tammy Buckley     Express Air         Consumer  Office Supplies  ...

       Region State or Province        City  Postal Code Order Date  \
0     Central          Illinois     Addison        60101 2012-05-28
1        West        Washington   Anacortes        98221 2010-07-07
2        West        Washington   Anacortes        98221 2011-07-27
3        West        Washington   Anacortes        98221 2011-07-27
4        West        Washington   Anacortes        98221 2011-07-27
...       ...               ...         ...          ...        ...
9421     East     West Virginia  Charleston        25314 2013-05-14
9422     East     West Virginia  Charleston        25314 2013-05-14
9423     East     West Virginia  Charleston        25314 2013-09-12
9424     West           Wyoming    Cheyenne        82001 2010-02-08
9425     West           Wyoming    Cheyenne        82001 2013-09-12

      Ship Date       Profit  Quantity ordered new    Sales Order ID
0    2012-05-30     1.320000                     2     5.90    88525
1    2010-07-08     4.560000                     4    13.01    88522
2    2011-07-28   -47.640000                     7    49.92    88523
3    2011-07-28   -30.510000                     7    41.64    88523
4    2011-07-27   998.202300                     8  1446.67    88523
...         ...          ...                   ...      ...      ...
9421 2013-05-15   137.860000                    13   447.87    87532
9422 2013-05-14   -39.070000                     3    13.23    87532
9423 2013-09-14 -1225.029097                     4  2215.93    87533
9424 2010-02-11   349.485000                     5   506.50    87530
9425 2013-09-14    78.062400                    23   172.48    87533

[9426 rows x 24 columns]
```

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

Out[6]:

	Row ID	Order Priority	Discount	Unit Price	Shipping Cost	Customer ID	Customer Name	Ship Mode	Custome Segmer
0	18606	Not Specified	0.01	2.88	0.50	2	Janice Fletcher	Regular Air	Corporat
1	20847	High	0.01	2.84	0.93	3	Bonnie Potter	Express Air	Corporat
2	23086	Not Specified	0.03	6.68	6.15	3	Bonnie Potter	Express Air	Corporat
3	23087	Not Specified	0.01	5.68	3.60	3	Bonnie Potter	Regular Air	Corporat
4	23088	Not Specified	0.00	205.99	2.50	3	Bonnie Potter	Express Air	Corporat

5 rows × 24 columns

In [97]:
```
Dataset.tail()
```

Out[97]:

	Row ID	Order Priority	Discount	Unit Price	Shipping Cost	Customer ID	Customer Name	Ship Mode	Cust Seg
9421	20275	Critical	0.06	35.89	14.72	3402	Frederick Cole	Regular Air	Cons
9422	20276	Critical	0.00	3.34	7.49	3402	Frederick Cole	Regular Air	Cons
9423	24491	Not Specified	0.08	550.98	45.70	3402	Frederick Cole	Delivery Truck	Cons
9424	25914	High	0.10	105.98	13.99	3403	Tammy Buckley	Express Air	Cons
9425	24492	Not Specified	0.09	7.78	2.50	3403	Tammy Buckley	Express Air	Cons

5 rows × 25 columns

In [7]:
```
Dataset.shape
```

Out[7]:
```
(9426, 24)
```

In [11]:

```
# Step - 1, Analysis of Missing Values
Dataset.isnull().sum()
```

Out[11]:

```
Row ID                   0
Order Priority           0
Discount                 0
Unit Price               0
Shipping Cost            0
Customer ID              0
Customer Name            0
Ship Mode                0
Customer Segment         0
Product Category         0
Product Sub-Category     0
Product Container        0
Product Name             0
Product Base Margin      0
Region                   0
State or Province        0
City                     0
Postal Code              0
Order Date               0
Ship Date                0
Profit                   0
Quantity ordered new     0
Sales                    0
Order ID                 0
dtype: int64
```

Empty Values filled with Mean values, "Inplace = True" for replacing it with current Dataset

In [10]:

```
Dataset['Product Base Margin'].fillna(Dataset['Product Base Margin'].mean(), inp
```

```
C:\Users\DELL\AppData\Local\Temp\ipykernel_15328\3331580767.py:1: FutureWarning:
A value is trying to be set on a copy of a DataFrame or Series through chained as
signment using an inplace method.
The behavior will change in pandas 3.0. This inplace method will never work becau
se the intermediate object on which we are setting values always behaves as a cop
y.

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.meth
od({col: value}, inplace=True)' or df[col] = df[col].method(value) instead, to pe
rform the operation inplace on the original object.


  Dataset['Product Base Margin'].fillna(Dataset['Product Base Margin'].mean(), in
place=True)
```

ORDER PRIORITY

In [12]:

```
Dataset['Order Priority'].value_counts()
```

Out[12]:

```
Order Priority
High                1970
Low                 1926
Not Specified       1881
Medium              1844
Critical            1804
Critical               1
Name: count, dtype: int64
```

In [13]:

```
Dataset['Order Priority'].unique()
```

Out[13]:

```
array(['Not Specified', 'High', 'Medium', 'Low', 'Critical', 'Critical '],
      dtype=object)
```

In [17]:

```
Dataset['Order Priority'] = Dataset['Order Priority'].replace("Critical ", "Crit
```

In [18]:

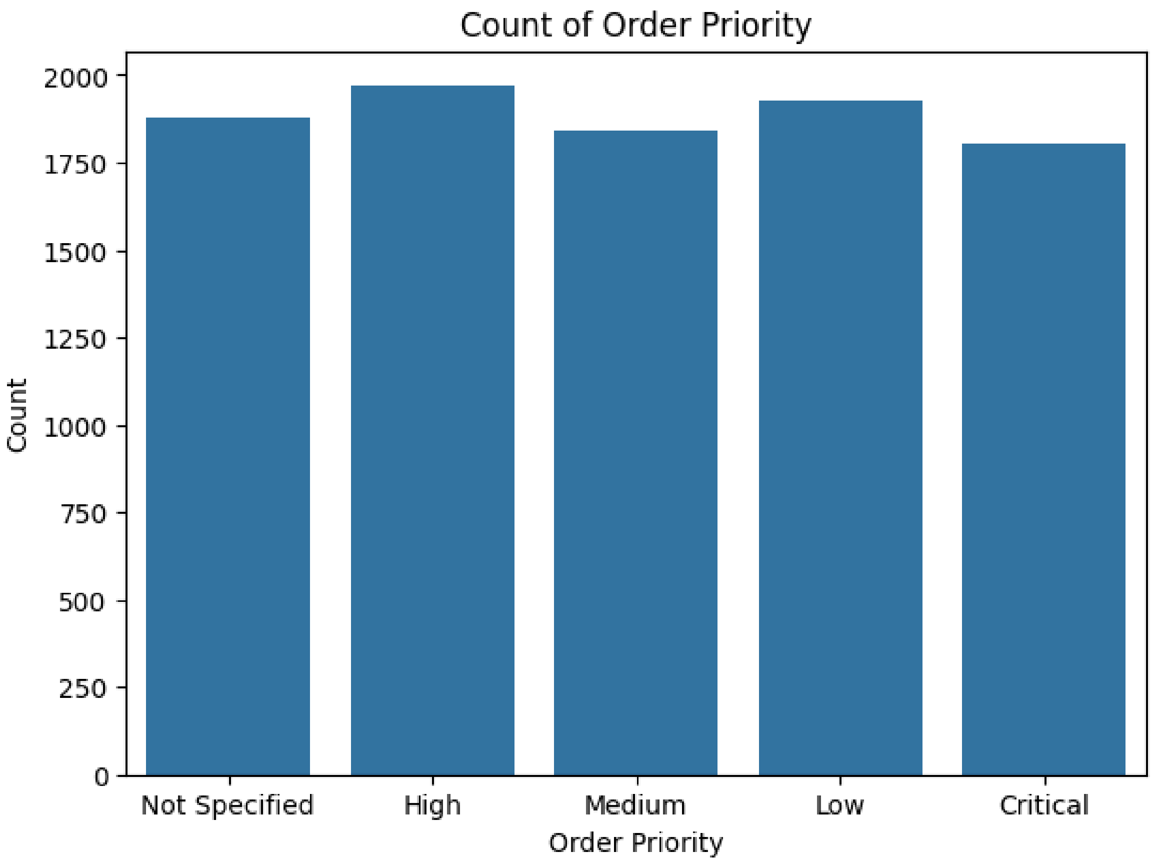
```
Dataset['Order Priority'].value_counts()
```

Out[18]:

```
Order Priority
High                1970
Low                 1926
Not Specified       1881
Medium              1844
Critical            1805
Name: count, dtype: int64
```

In [120…

```
plt.figure(figsize=(7,5))
sns.countplot(x="Order Priority", data=Dataset)
plt.ylabel("Count")
plt.title("Count of Order Priority")
plt.savefig("Order Priority Count.jpg")
plt.show()
```



SHIPPING MODE

In [28]:

```
Dataset['Ship Mode'].value_counts()
```

Out[28]:

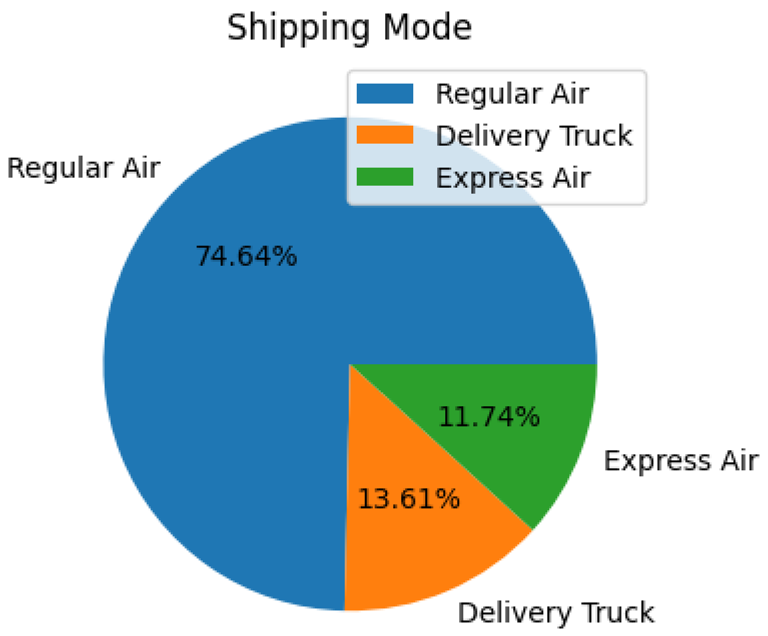
```
Ship Mode
Regular Air       7036
Delivery Truck    1283
Express Air       1107
Name: count, dtype: int64
```

In [32]:

```
x = Dataset['Ship Mode'].value_counts().index
y = Dataset['Ship Mode'].value_counts().values
```

In [108…

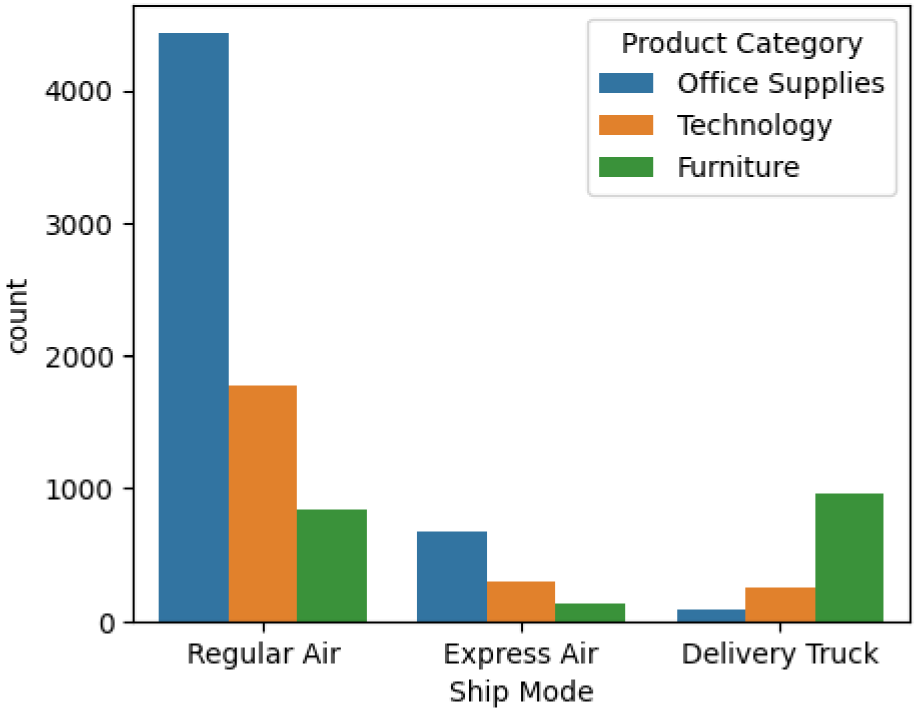
```
plt.figure(figsize=(5,4))
plt.title("Shipping Mode")
plt.pie(y, labels = x, autopct="%0.2f%%")
plt.legend()
plt.savefig("Ship Mode.jpg")
plt.show()
```



RELATIONSHIP BETWEEN PRODUCT CATEGORY & SHIPPING MODE

In [119…

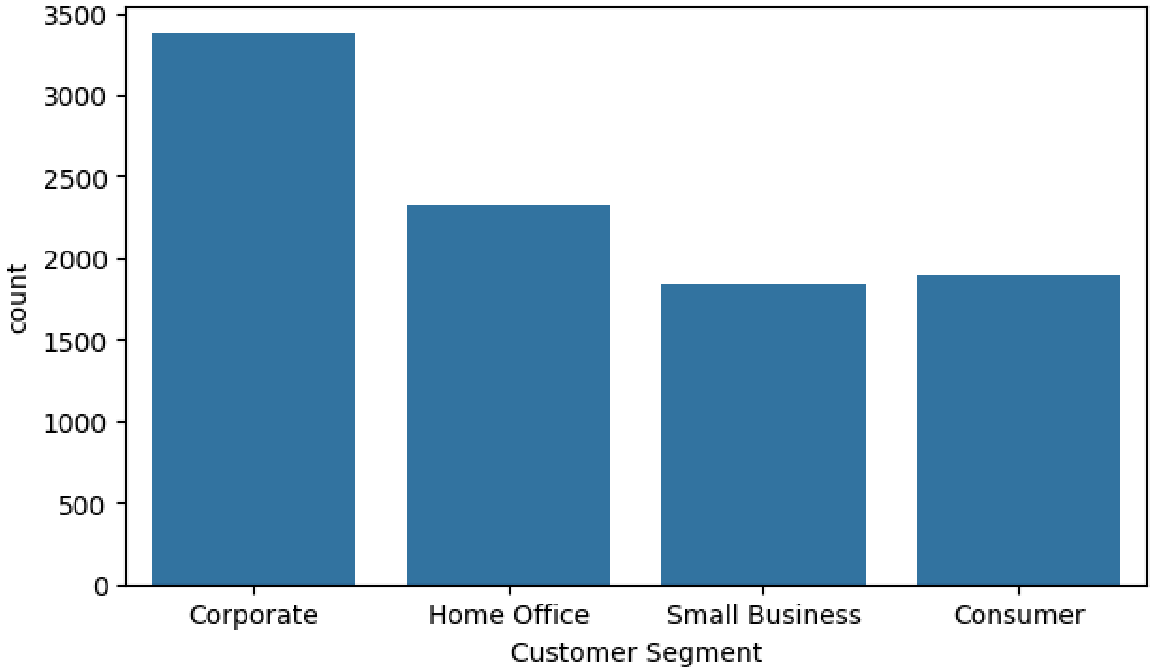
```
plt.figure(figsize=(5,4))
sns.countplot(x='Ship Mode', data = Dataset, hue = 'Product Category')
plt.show()
```



CUSTOMER SEGEMENTATION

In [117…

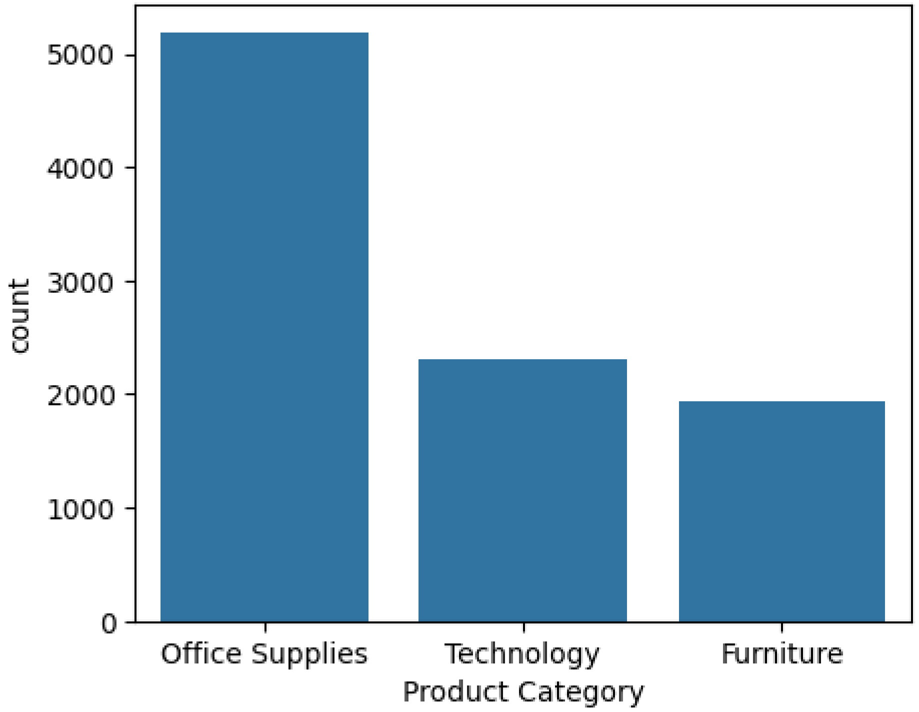
```
plt.figure(figsize=(7,4))
sns.countplot(x='Customer Segment', data = Dataset)
plt.show()
```



PRODUCT CATEGORY

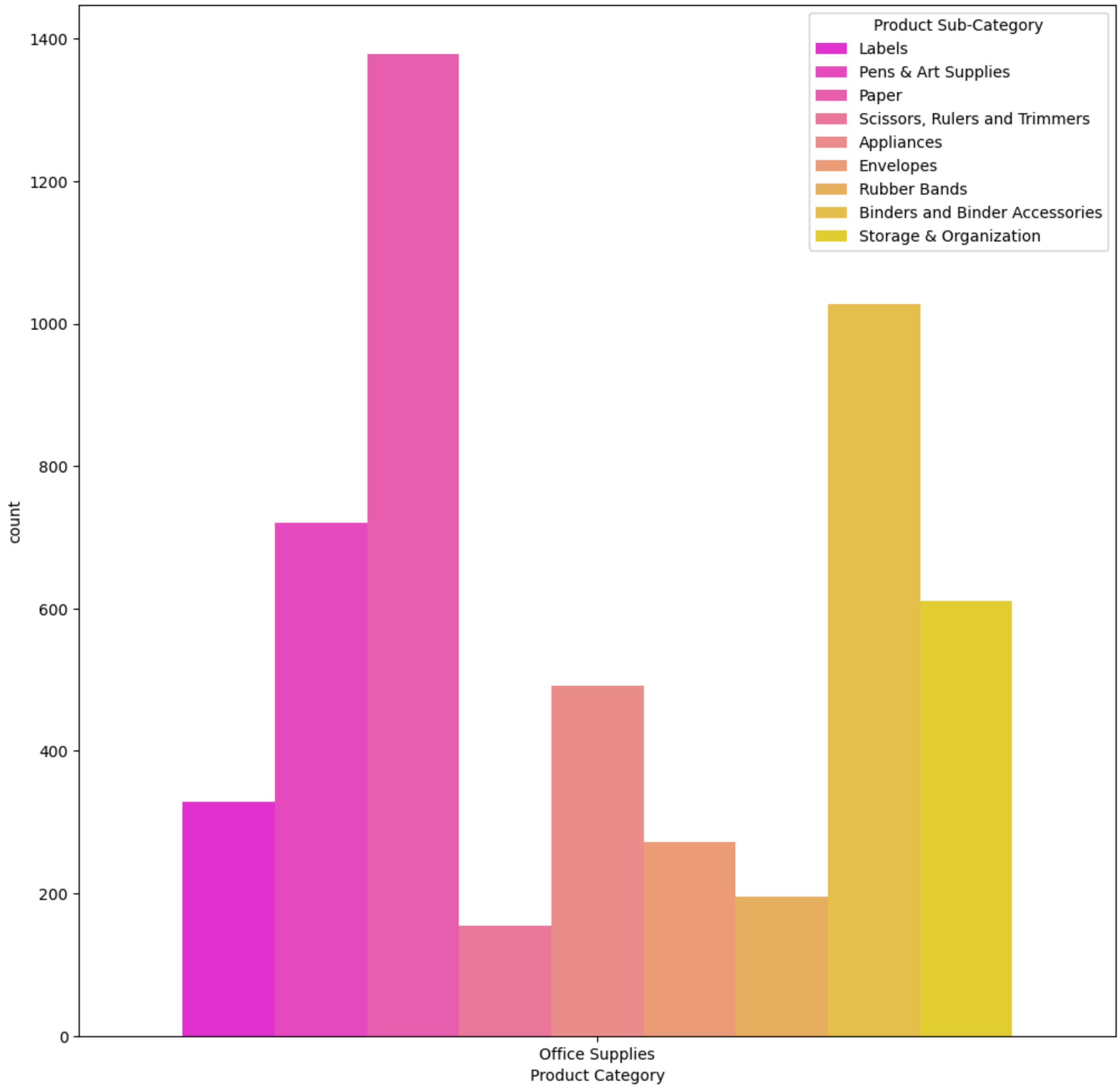
In [118…

```
plt.figure(figsize=(5,4))
sns.countplot(x='Product Category', data = Dataset)
plt.show()
```



BIVARIATE ANALYSIS - OFFICE SUPPLIES - SUB CATEGORY DRILL DOWN

In [98]:
```
plt.figure(figsize=(12,12))
sns.countplot(x='Product Category', data = Dataset[Dataset['Product Category']==
plt.show()
```



ORDERS PER YEAR

In [69]:
```
Dataset.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 9426 entries, 0 to 9425
Data columns (total 24 columns):
 #   Column                Non-Null Count  Dtype
---  ------                --------------  -----
 0   Row ID                9426 non-null   int64
 1   Order Priority        9426 non-null   object
 2   Discount              9426 non-null   float64
 3   Unit Price            9426 non-null   float64
 4   Shipping Cost         9426 non-null   float64
 5   Customer ID           9426 non-null   int64
 6   Customer Name         9426 non-null   object
 7   Ship Mode             9426 non-null   object
 8   Customer Segment      9426 non-null   object
 9   Product Category      9426 non-null   object
 10  Product Sub-Category  9426 non-null   object
 11  Product Container     9426 non-null   object
 12  Product Name          9426 non-null   object
 13  Product Base Margin   9426 non-null   float64
 14  Region                9426 non-null   object
 15  State or Province     9426 non-null   object
 16  City                  9426 non-null   object
 17  Postal Code           9426 non-null   int64
 18  Order Date            9426 non-null   datetime64[ns]
 19  Ship Date             9426 non-null   datetime64[ns]
 20  Profit                9426 non-null   float64
 21  Quantity ordered new  9426 non-null   int64
 22  Sales                 9426 non-null   float64
 23  Order ID              9426 non-null   int64
dtypes: datetime64[ns](2), float64(6), int64(5), object(11)
memory usage: 1.7+ MB
```

In [72]:

```
Dataset['Order Year'] = Dataset['Order Date'].dt.year
```

In [73]:

```
Dataset.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 9426 entries, 0 to 9425
Data columns (total 25 columns):
 #   Column                 Non-Null Count  Dtype         
---  ------                 --------------  -----         
 0   Row ID                 9426 non-null   int64         
 1   Order Priority         9426 non-null   object        
 2   Discount               9426 non-null   float64       
 3   Unit Price             9426 non-null   float64       
 4   Shipping Cost          9426 non-null   float64       
 5   Customer ID            9426 non-null   int64         
 6   Customer Name          9426 non-null   object        
 7   Ship Mode              9426 non-null   object        
 8   Customer Segment       9426 non-null   object        
 9   Product Category       9426 non-null   object        
 10  Product Sub-Category   9426 non-null   object        
 11  Product Container      9426 non-null   object        
 12  Product Name           9426 non-null   object        
 13  Product Base Margin    9426 non-null   float64       
 14  Region                 9426 non-null   object        
 15  State or Province      9426 non-null   object        
 16  City                   9426 non-null   object        
 17  Postal Code            9426 non-null   int64         
 18  Order Date             9426 non-null   datetime64[ns]
 19  Ship Date              9426 non-null   datetime64[ns]
 20  Profit                 9426 non-null   float64       
 21  Quantity ordered new   9426 non-null   int64         
 22  Sales                  9426 non-null   float64       
 23  Order ID               9426 non-null   int64         
 24  Order Year             9426 non-null   int32         
dtypes: datetime64[ns](2), float64(6), int32(1), int64(5), object(11)
memory usage: 1.8+ MB
```

In [74]:

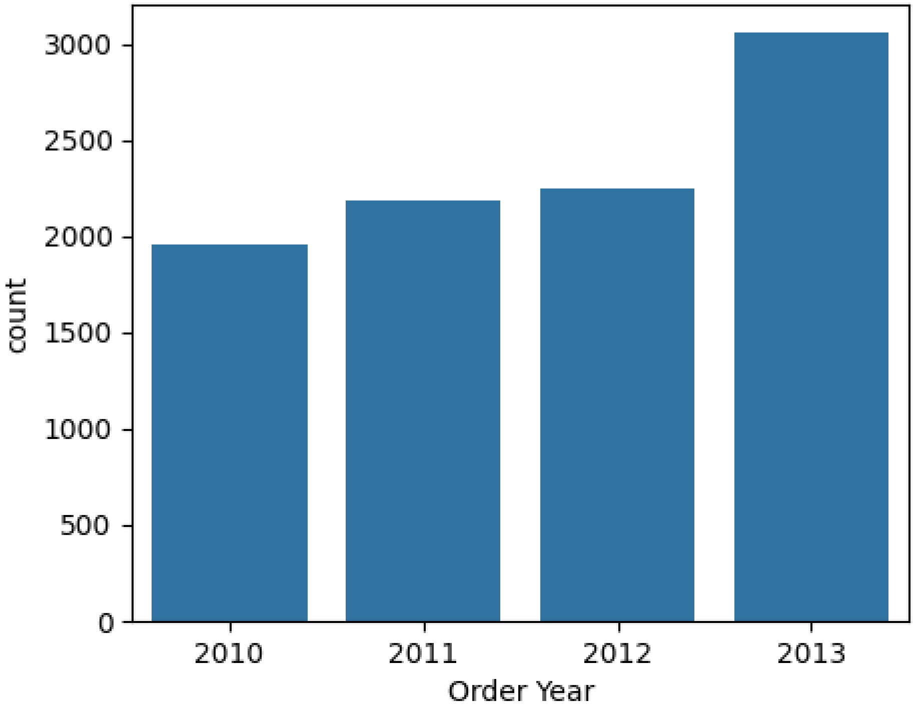
```
Dataset['Order Year'].value_counts()
```

Out[74]:

```
Order Year
2013    3054
2012    2241
2011    2179
2010    1952
Name: count, dtype: int64
```

In [116…

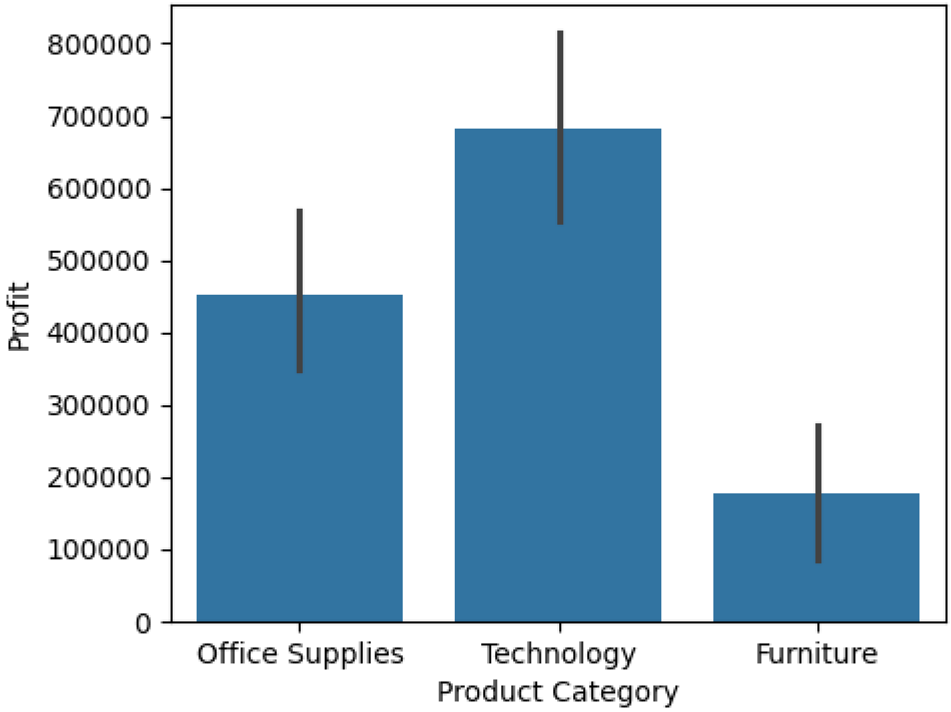
```
plt.figure(figsize=(5,4))
sns.countplot(x = "Order Year", data = Dataset)
plt.show()
```



PROFIT BY PRODUCT CATEGORY

In [115…

```
plt.figure(figsize=(5,4))
sns.barplot(x = "Product Category", y = "Profit", data= Dataset, estimator = "su
plt.show()
```



TOP 5 STATES BY SALES

In [94]:

```
DATA = Dataset['State or Province'].value_counts()[:5]
```

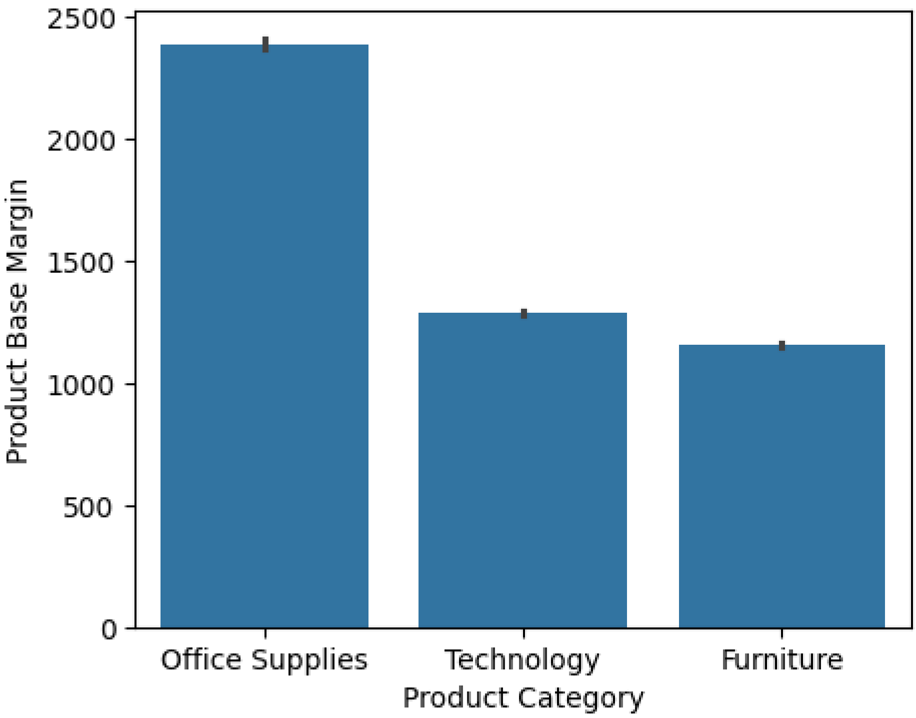
Out[94]:

```
State or Province
California    1021
Texas          646
Illinois       584
New York       574
Florida        522
Name: count, dtype: int64
```

MARGIN BY PRODUCT CATEGORY - BIVARIATE ANALYSIS

In [114…

```
plt.figure(figsize=(5,4))
sns.barplot(x = "Product Category", y = "Product Base Margin", data= Dataset, es
plt.show()
```



In [ ]: