In [2]:
```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import numpy as np
```

In [4]:
```
#Load your dataset using pandas
dataset = pd.read_excel("Superstore_USA.xlsx")
```

In [5]:
```
dataset.head(4)
```

Out[5]:

ınt	Unit Price	Shipping Cost	Customer ID	Customer Name	Ship Mode	Customer Segment	Product Category	...	Region	State or Province	City	Pc C
.01	2.88	0.50	2	Janice Fletcher	Regular Air	Corporate	Office Supplies	...	Central	Illinois	Addison	6(
.01	2.84	0.93	3	Bonnie Potter	Express Air	Corporate	Office Supplies	...	West	Washington	Anacortes	9{
.03	6.68	6.15	3	Bonnie Potter	Express Air	Corporate	Office Supplies	...	West	Washington	Anacortes	9{
.01	5.68	3.60	3	Bonnie Potter	Regular Air	Corporate	Office Supplies	...	West	Washington	Anacortes	9{

In [12]:
```
dataset.shape #Tuple that returns rows, column count
```

Out[12]:
```
(9426, 24)
```

In [11]:
```
#Missing value analysis
dataset.isnull().sum() #Identifies count of NaN values for attributes
```

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     72
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
```

In [13]:
```
#Fill missing values with mean
dataset['Product Base Margin'].fillna(dataset['Product Base Margin'].mean(),inplace=True
```

In [14]:
```
dataset.isnull().sum()
```

Out[14]:
```
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
```

Order Priority Analysis

In [16]:
```
#How many high priority order were placed?
#Univariate analysis
dataset['Order Priority'].value_counts()
#Critical appears twice in below group
```

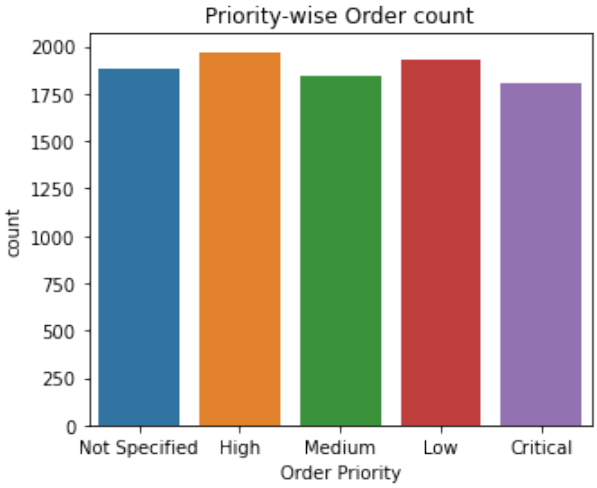
Out[16]:
```
High            1970
Low             1926
Not Specified    1881
Medium          1844
Critical        1804
Critical           1
Name: Order Priority, dtype: int64
```

In [18]:
```
#Check unique values for Order Priority column
dataset['Order Priority'].unique()
#'Critical' & 'Critical ' both are present
#This is a Data cleansing issue
```

Out[18]:
```
array(['Not Specified', 'High', 'Medium', 'Low', 'Critical', 'Critical '],
      dtype=object)
```

In [21]:
```
#Clean the data
dataset['Order Priority']=dataset['Order Priority'].replace('Critical ','Critical')
```

In [42]:
```
#Graphically analyze Order priority
#Countplot on categorical variable Order Priority
plt.figure(figsize=(5,4))
plt.title('Priority-wise Order count')
sns.countplot(x='Order Priority',data=dataset)
#Save the graph for later use in ppt or dashboard
plt.savefig('Priority-wise Order count.jpg')
plt.show()
```



In [44]:
```
dataset.head(2)
```

Out[44]:

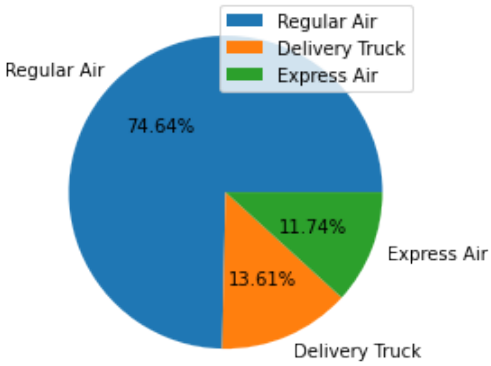
unt	Unit Price	Shipping Cost	Customer ID	Customer Name	Ship Mode	Customer Segment	Product Category	...	Region	State or Province	City	Po
.01	2.88	0.50	2	Janice Fletcher	Regular Air	Corporate	Office Supplies	...	Central	Illinois	Addison	6(
.01	2.84	0.93	3	Bonnie Potter	Express Air	Corporate	Office Supplies	...	West	Washington	Anacortes	9(

Shipping mode Analysis

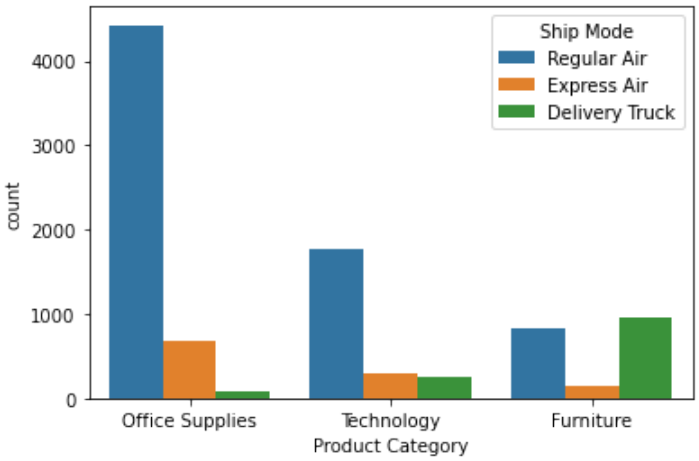
In [47]:
```
#Identify most utilized shipping mode
#Opportunity to negotiate margin deal with the vendors due to bulk utilization
#Reduce operational cost
dataset['Ship Mode'].value_counts()
```

Out[47]:
```
Regular Air       7036
Delivery Truck    1283
Express Air       1107
Name: Ship Mode, dtype: int64
```

In [69]:
```
#Graphical analysis
x=dataset['Ship Mode'].value_counts().index
y=dataset['Ship Mode'].value_counts().values
plt.pie(y,labels=x,autopct='%0.2f%%')
plt.legend()
plt.show()
#Regular air shipping is the most used mode
```

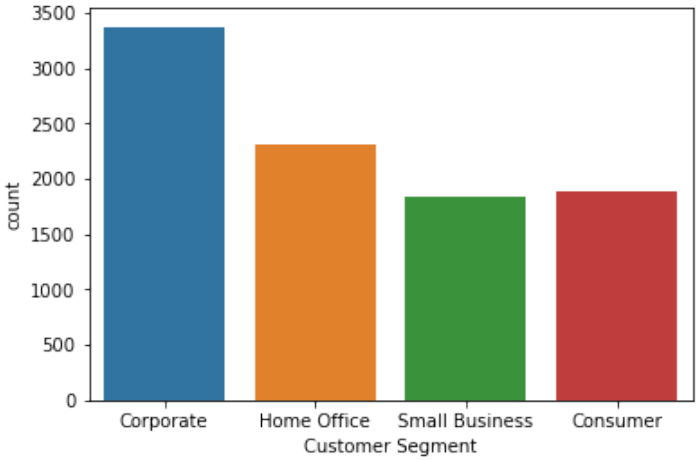


In [71]:
```
#Bivariate Analysis
#What are the shipping mode usage pattern in each Product category?
sns.countplot(x='Product Category',data=dataset,hue='Ship Mode')
plt.show()
```



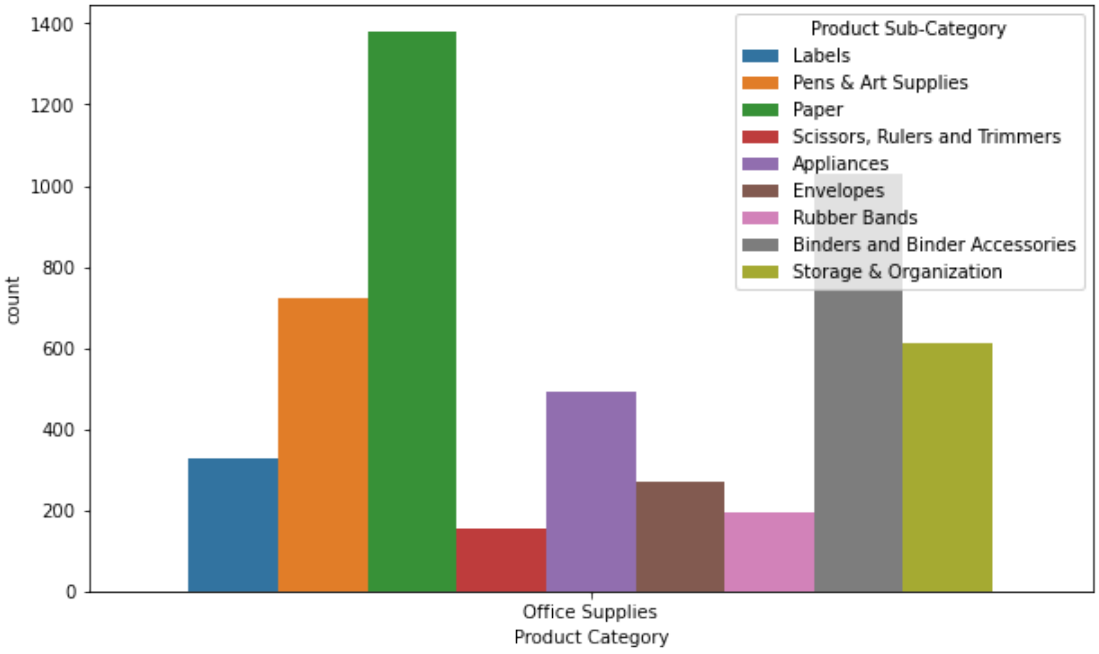
Customer Segment Analysis

In [73]:
```
#What is the largest customer segment base for our business?
sns.countplot(x='Customer Segment',data=dataset)
plt.show()
#Coporate customers buy the most from us
#We can design special bundle deals or targeted marketing campaigns to generate more rev
```

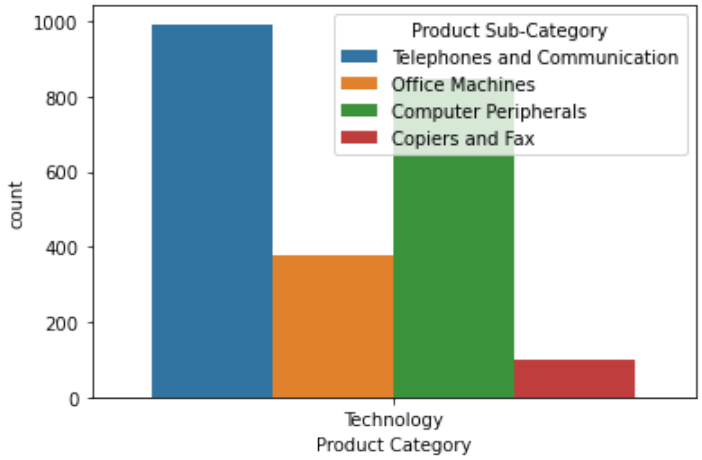


Product Category vs Sub-Category Analysis

In [82]:
```
data=dataset[dataset['Product Category']=='Office Supplies'],hue='Product Sub-Category')
```



In [84]:
```
#plt.figure(figsize=(10,6))
sns.countplot(x='Product Category',data=dataset[dataset['Product Category']=='Technology
plt.show()
```



Time-series analysis

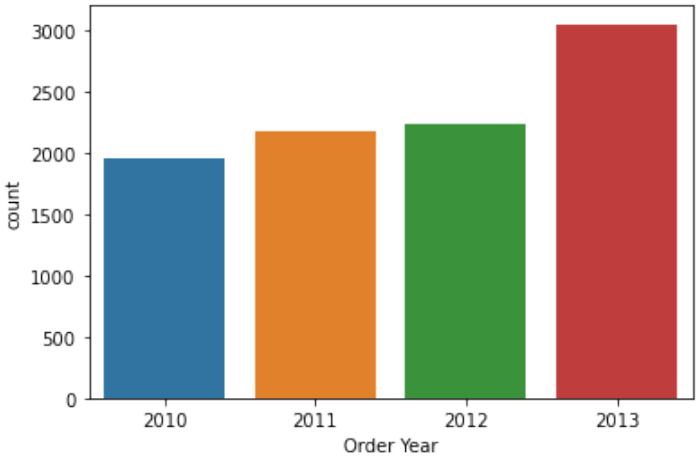
In [85]:
```
#Determining datatype for Order Date
dataset.info()
```

```
<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 [92]:
```
#Year-wise number of total orders placed
dataset['Order Year']=dataset['Order Date'].dt.year
dataset['Order Year'].value_counts()
#Order placement has increased YoY
```

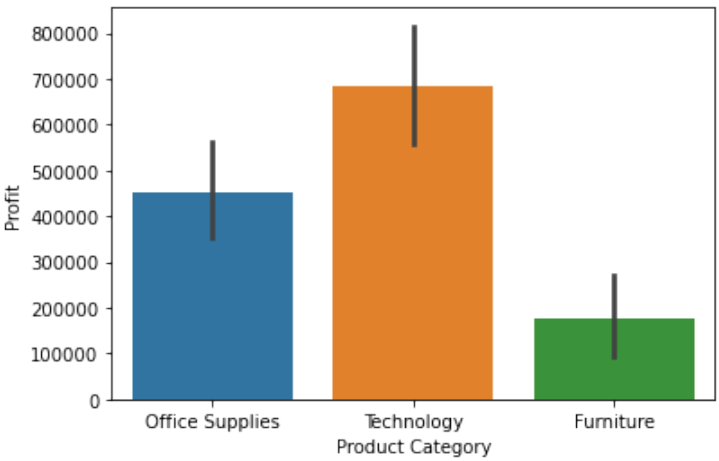
Out[92]:
```
2013    3054
2012    2241
2011    2179
2010    1952
Name: Order Year, dtype: int64
```

In [90]:
```
sns.countplot(x='Order Year',data=dataset)
plt.show()
```

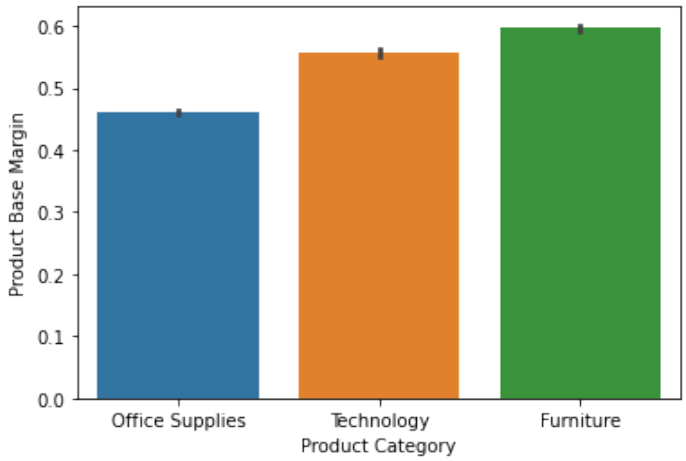


Category-wise Profit

In [108]:
```
sns.barplot(x='Product Category',y='Profit',data=dataset,estimator=sum)
plt.show()
#Technology products are the highest profit making category followed by Office supplies
```



In [109]:
```
sns.barplot(x='Product Category',y='Product Base Margin',data=dataset,estimator=np.mean)
plt.show()
#Furniture makes the most income per sale as they more expensive items
#Opportunity to increase $ earned from this category by increasing sales number
#Can follow IKEA like setup to encourage cutomers into buying complementary sets
```



State-wise Sales (Top & Bottom 5)

In [100]:
```
#Top 5 states
print('Top 5 states with highest overall sales:')
dataset['State or Province'].value_counts()[:5]
#Increase revenue earned per customer by introducing loyalty programs with special acces
```

```
Top 5 states with highest sales:
```

Out[100]:
```
California    1021
Texas          646
Illinois       584
New York       574
Florida        522
Name: State or Province, dtype: int64
```

In [101]:
```
#Bottom 5 states
print('Bottom 5 states with lowest overall sales:')
dataset['State or Province'].value_counts()[-5:]
#Launch special festive offers for these states to drive purchase
```

```
Bottom 5 states with lowest sales:
```

Out[101]:
```
North Dakota    34
South Dakota    28
Wyoming         21
Rhode Island    20
Delaware        15
Name: State or Province, dtype: int64
```

In [ ]: