In [1]:

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

Import Excel File / Dataset

In [2]:

```
# Load the data sets
dataset = pd.read_excel('Superstore_USA.xlsx')
```

In [3]:

```
# check the top 5 rows
dataset.head(5)
```

Out[3]:

	Row ID	Order Priority	Discount	Unit Price	Shipping Cost	Customer ID	Customer Name	Ship Mode	Customer Segment	Product Category	...	Region	State or Province	City	Postal Code	Order Date
0	18606	Not Specified	0.01	2.88	0.50	2	Janice Fletcher	Regular Air	Corporate	Office Supplies	...	Central	Illinois	Addison	60101	2012-05-28
1	20847	High	0.01	2.84	0.93	3	Bonnie Potter	Express Air	Corporate	Office Supplies	...	West	Washington	Anacortes	98221	2010-07-07
2	23086	Not Specified	0.03	6.68	6.15	3	Bonnie Potter	Express Air	Corporate	Office Supplies	...	West	Washington	Anacortes	98221	2011-07-27
3	23087	Not Specified	0.01	5.68	3.60	3	Bonnie Potter	Regular Air	Corporate	Office Supplies	...	West	Washington	Anacortes	98221	2011-07-27
4	23088	Not Specified	0.00	205.99	2.50	3	Bonnie Potter	Express Air	Corporate	Technology	...	West	Washington	Anacortes	98221	2011-07-27

5 rows × 24 columns

In [4]:

```
# check the shape
dataset.shape
```

Out[4]:

```
(9426, 24)
```

In [5]:

```
# check the info
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   9354 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
```

Missing value analysis

In [6]:

```
# check for missing values
dataset.isnull().sum()
```

Out[6]:

```
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 [7]:

```
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    9354 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 [8]:
```
dataset['Order Year']=dataset['Order Date'].dt.year
```

In [9]:
```
dataset['Product Base Margin'].fillna(dataset['Product Base Margin'].mean(),inplace = True)
```

Data visualizaion

In [10]:
```
dataset['Order Priority'].value_counts()
```

Out[10]:

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

In [11]:

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

Out[11]:

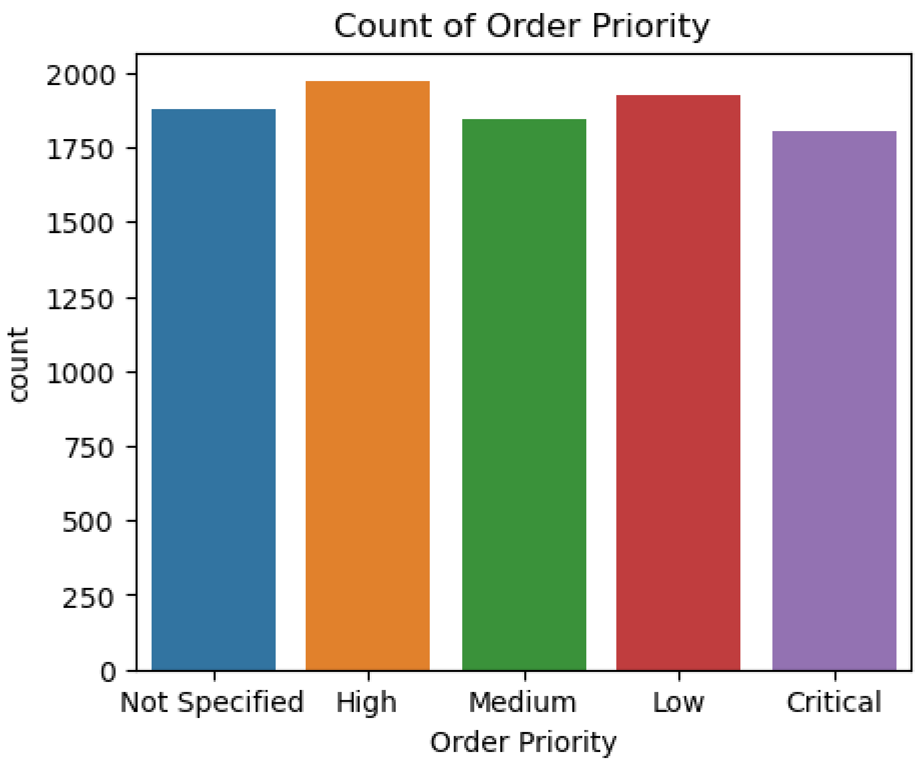
```
array(['Not Specified', 'High', 'Medium', 'Low', 'Critical', 'Critical '],
      dtype=object)
```

In [12]:

```
dataset["Order Priority"] = dataset["Order Priority"].replace("Critical ", "Critical")
```

In [13]:

```
plt.figure(figsize=(5,4))
sns.countplot(x ="Order Priority", data=dataset)
plt.title("Count of Order Priority")
plt.show()
```



This count plot shows the distribution of different order priorities in the dataset. It provides insights into the frequency of each order priority category.

In [14]:

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

Out[14]:

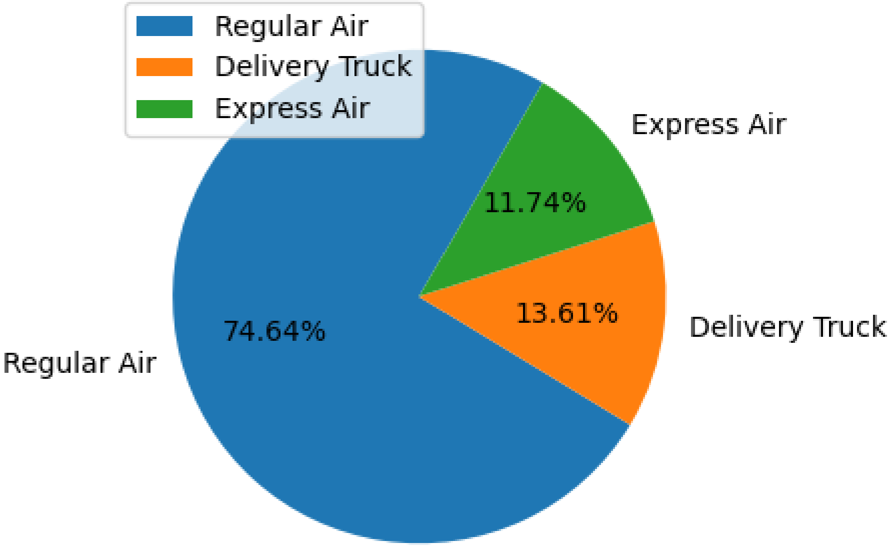
```
Ship Mode
Regular Air       7036
Delivery Truck    1283
Express Air       1107
Name: count, dtype: int64
```

In [15]:

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

In [16]:

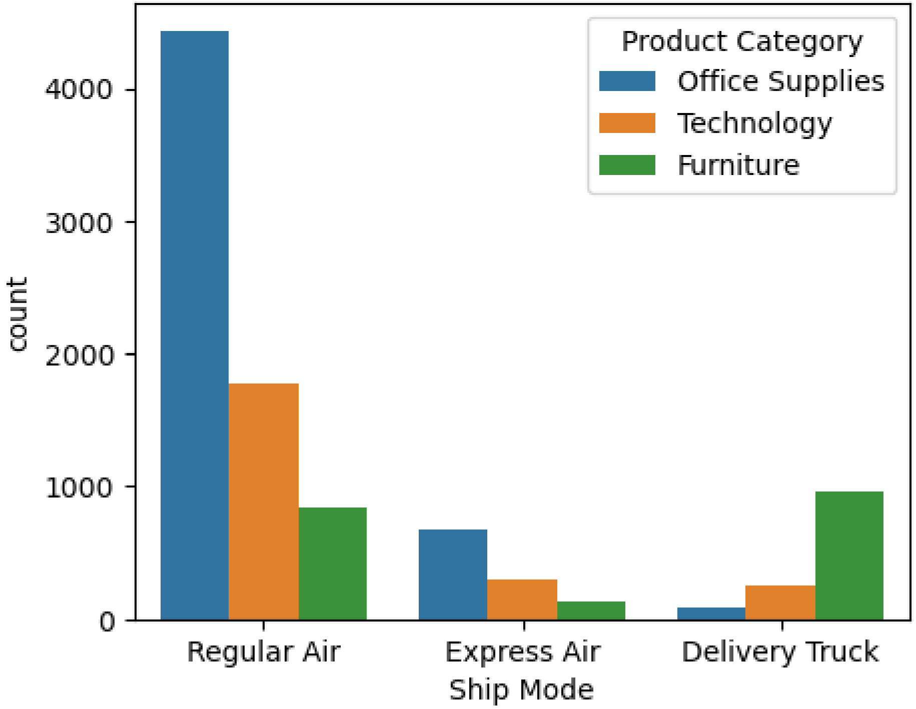
```
plt.figure(figsize=(5,4))
plt.pie(y,labels = x, startangle = 60, autopct="%0.2f%%")
plt.legend(loc = 2)
plt.show()
```



This pie chart depicts the distribution of different ship modes in the dataset. It helps understand the relative proportions of each ship mode used for product delivery.

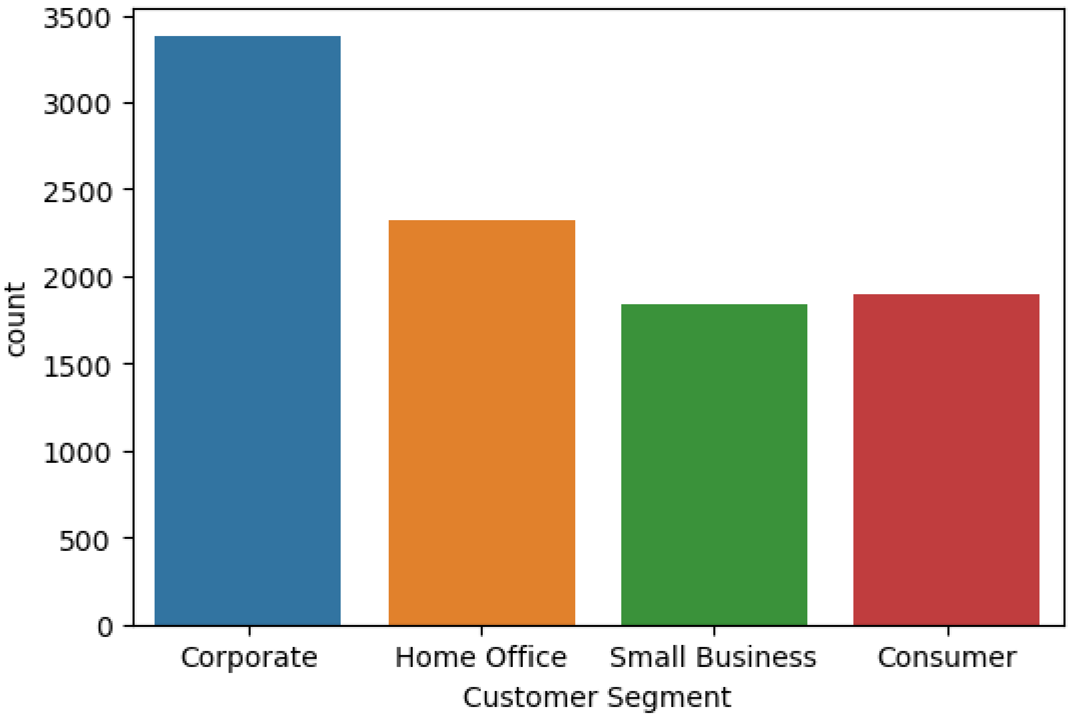
In [17]:

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



This count plot displays the count of different ship modes used for each product category. It provides insights into the preferred shipping methods for different types of products.

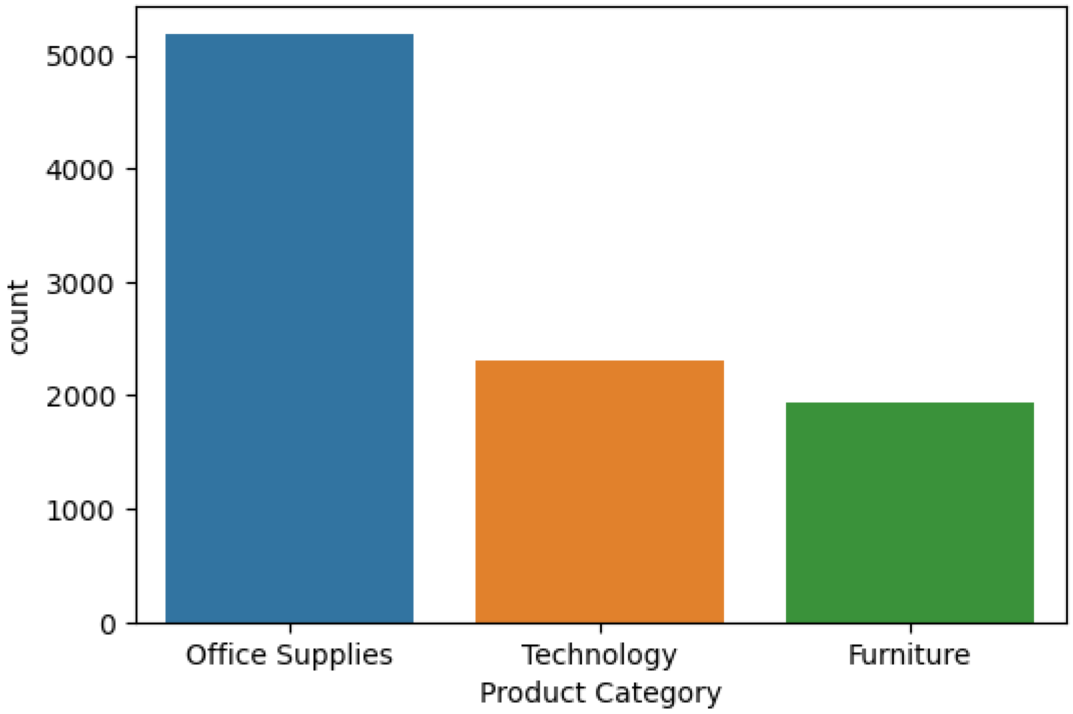
```
In [18]: plt.figure(figsize=(6,4))
         sns.countplot(x = "Customer Segment", data = dataset)
         plt.show()
```



This count plot shows the distribution of different customer segments in the dataset. It helps understand the relative size and importance of each customer segment.

In [19]:

```
plt.figure(figsize=(6,4))
sns.countplot(x = "Product Category", data = dataset)
plt.show()
```

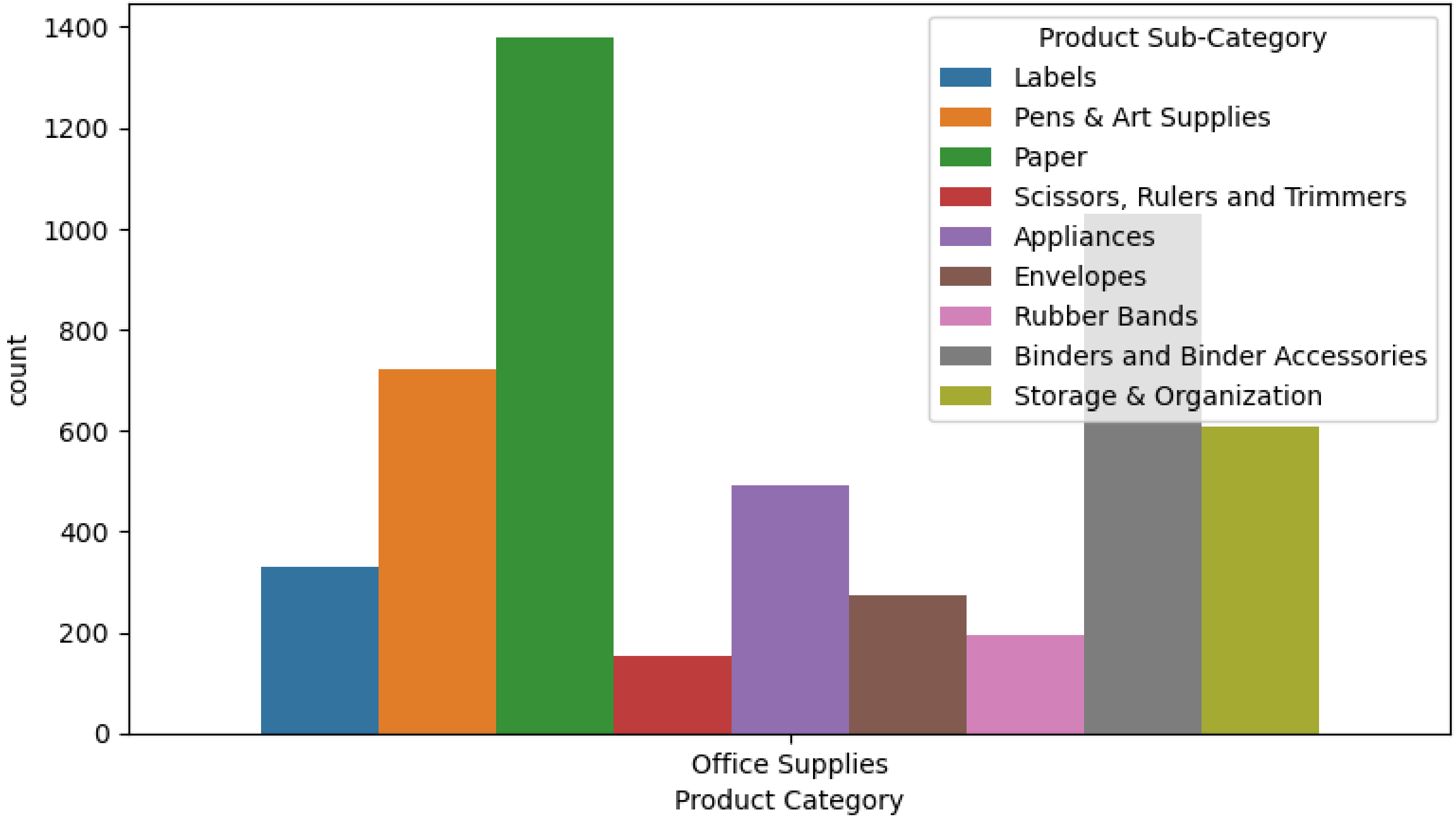


This count plot displays the count of products in each product category. It provides insights into the relative popularity and sales volume of different product categories.

In [20]:
```
dataset["Product Category"].info
```

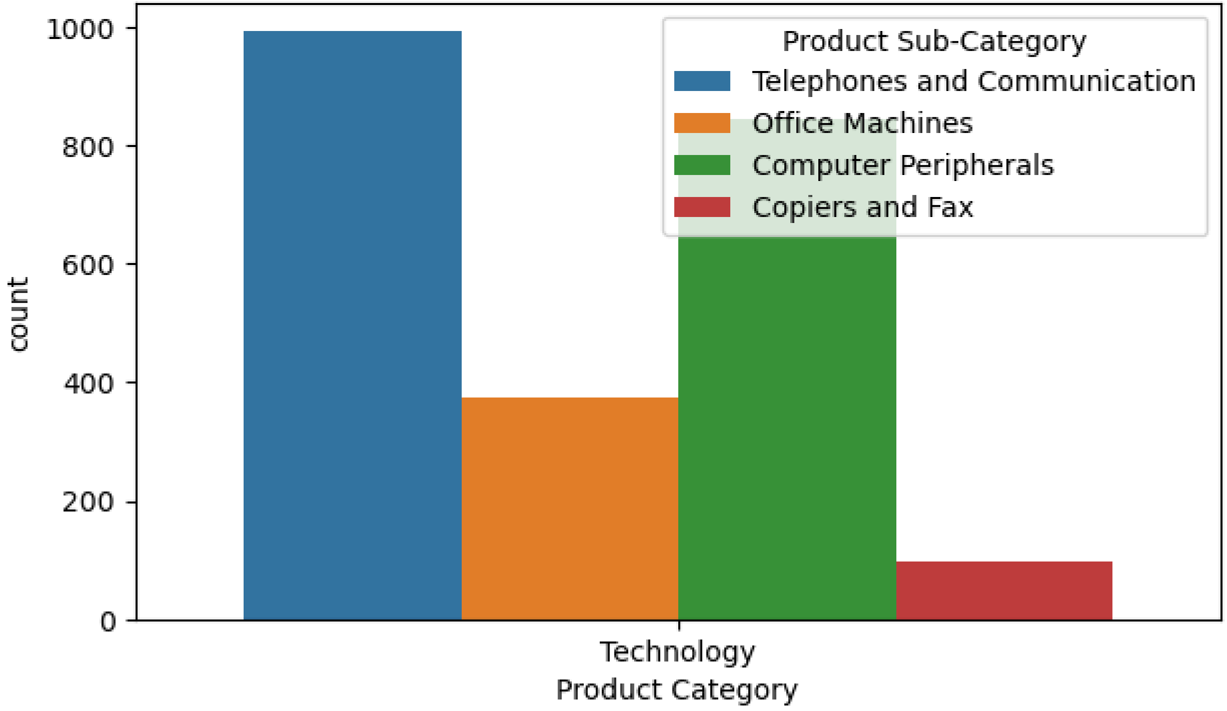
Out[20]:
```
<bound method Series.info of 0       Office Supplies
1       Office Supplies
2       Office Supplies
3       Office Supplies
4            Technology
             ...
9421    Office Supplies
9422    Office Supplies
9423          Furniture
9424          Furniture
9425    Office Supplies
Name: Product Category, Length: 9426, dtype: object>
```

In [21]:
```
plt.figure(figsize=(9,5))
sns.countplot(x = "Product Category", data = dataset[dataset["Product Category"]=="Office Supplies"], hue="Product Sub-Category")
plt.show()
```



This count plot shows the distribution of product sub-categories within the Office Supplies category. It helps identify the most popular sub-categories within the Office Supplies segment.

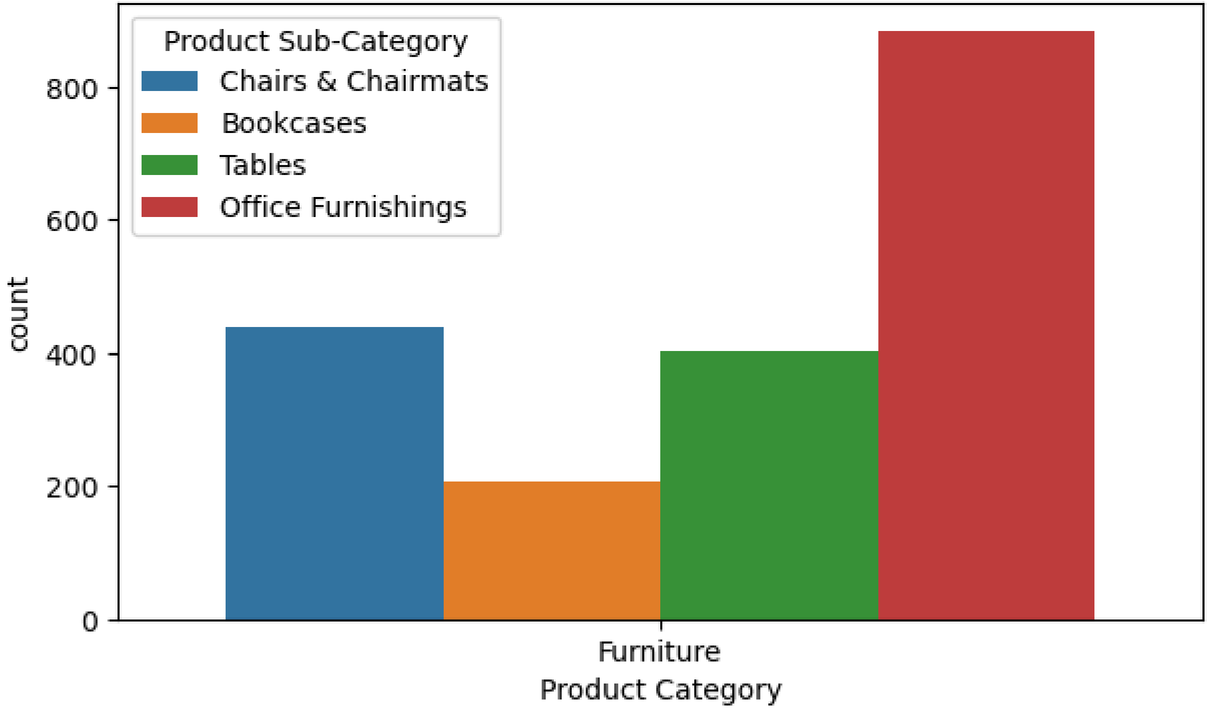
In [22]:
```
plt.figure(figsize=(7,4))
sns.countplot(x = "Product Category", data = dataset[dataset["Product Category"]=="Technology"], hue="Product Sub-Category")
plt.show()
```



This count plot displays the distribution of product sub-categories within the Technology category. It provides insights into the relative popularity of different sub-categories within the Technology segment.

In [23]:

```
plt.figure(figsize=(7,4))
sns.countplot(x = "Product Category", data = dataset[dataset["Product Category"]=="Furniture"], hue="Product Sub-Category")
plt.show()
```



This count plot shows the distribution of product sub-categories within the Furniture category. It helps identify the most popular sub-categories within the Furniture segment.

In [24]:

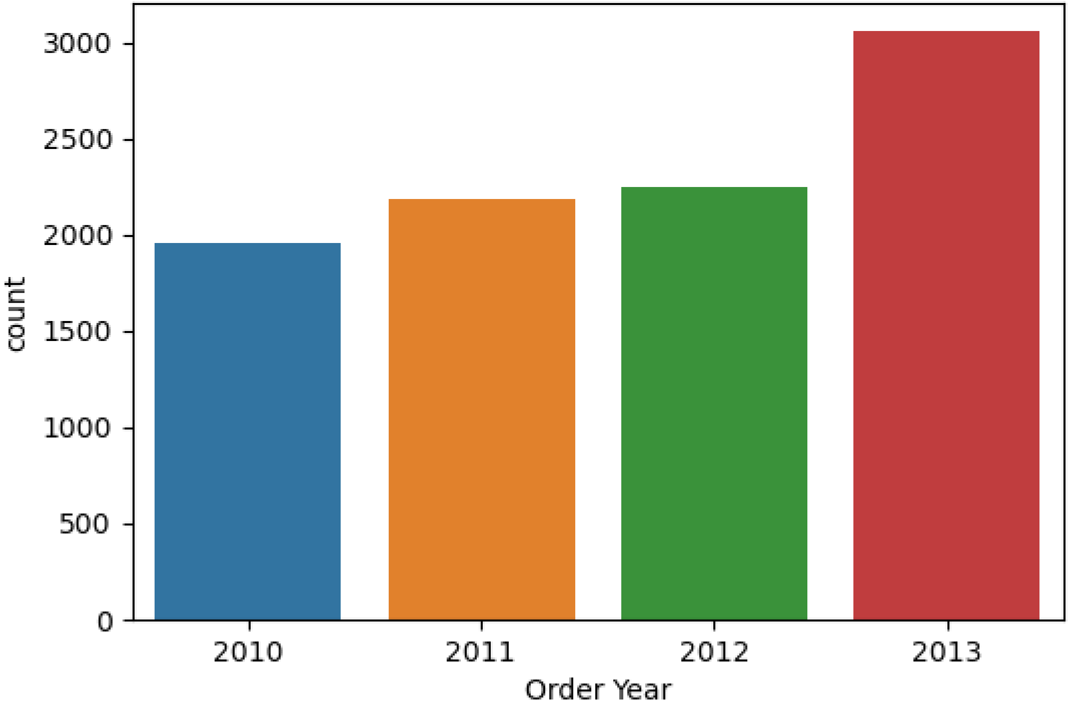
```
dataset['Order Year'].value_counts()
```

Out[24]:

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

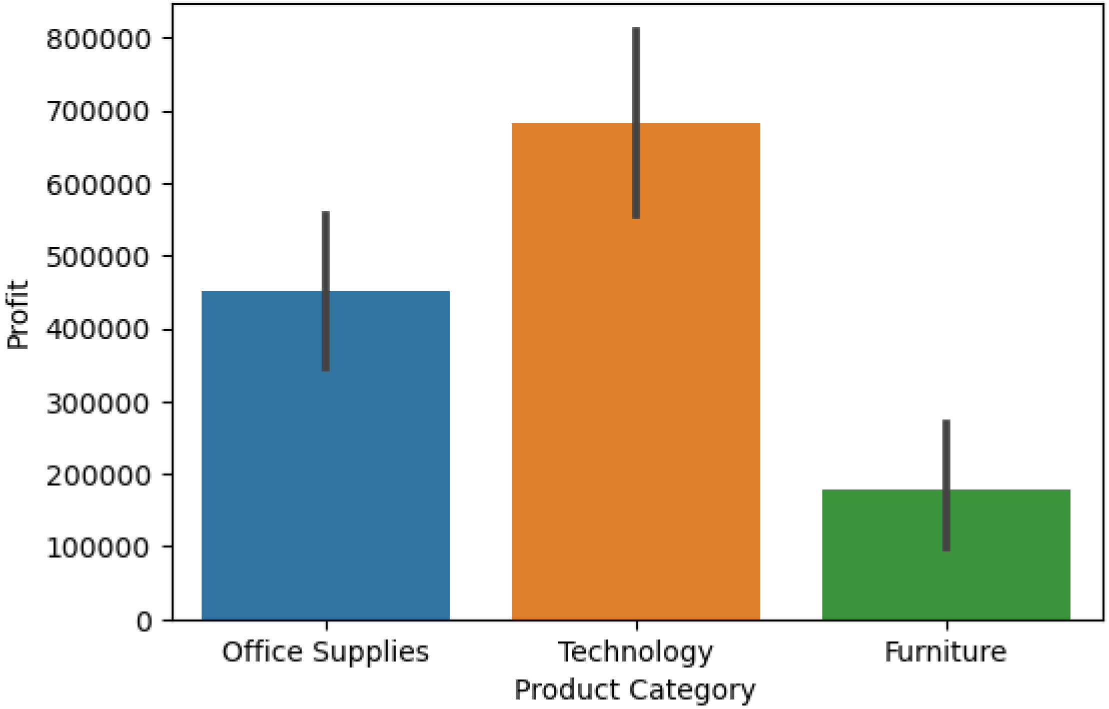
In [25]:

```
plt.figure(figsize=(6,4))
sns.countplot(x = "Order Year", data = dataset)
plt.show()
```



This count plot displays the count of orders placed in each year. It provides insights into the trend and growth of orders over time.

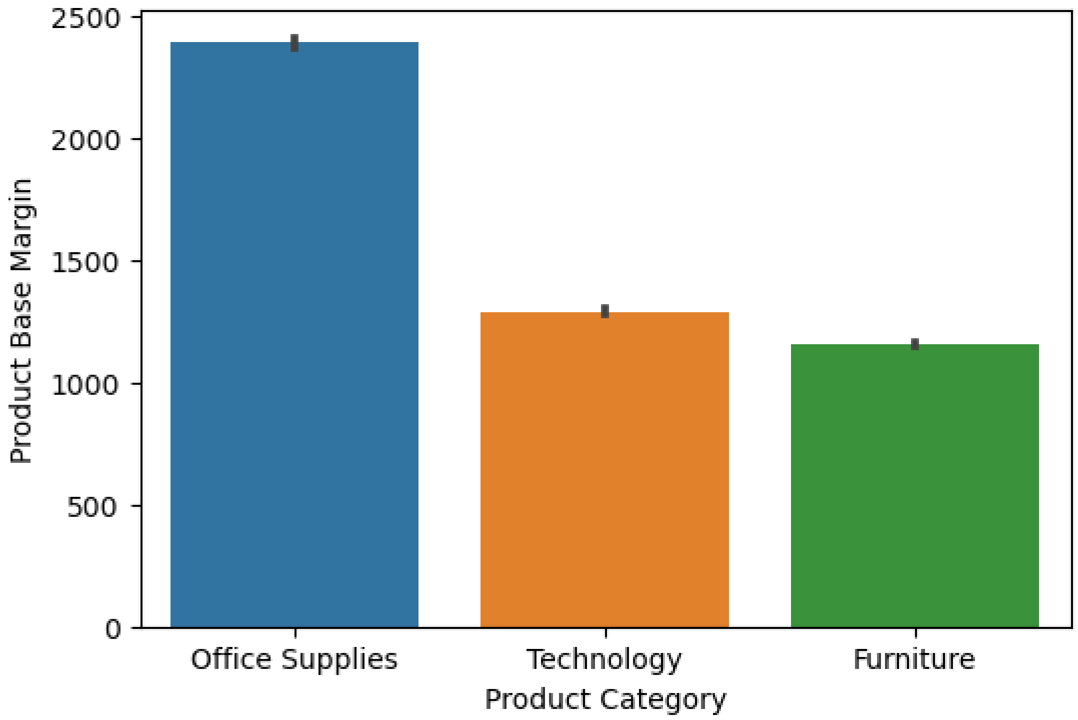
In [26]:
```
plt.figure(figsize=(6,4))
sns.barplot(x="Product Category", y ="Profit", data= dataset, estimator='sum')
plt.show()
```



This bar plot shows the total profit earned for each product category. It helps identify the most profitable product categories and their relative contributions to overall profitability.

In [27]:

```
plt.figure(figsize=(6,4))
sns.barplot(x="Product Category", y ="Product Base Margin", data= dataset, estimator='sum')
plt.show()
```



This bar plot displays the total product base margin for each product category. It provides insights into the relative profit margins of different product categories.

In [28]:

```
##count of State wise Sale
x = dataset['State or Province'].value_counts().head().index
print(x)
```

```
Index(['California', 'Texas', 'Illinois', 'New York', 'Florida'], dtype='object', name='State or Province')
```

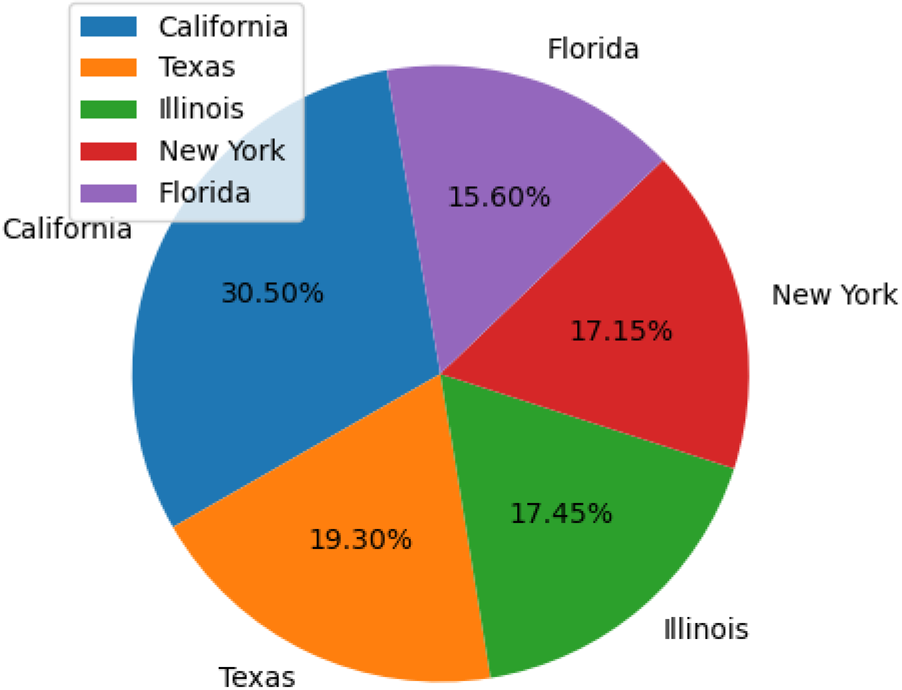
In [29]:

```
y=dataset['State or Province'].value_counts().head().values
print(y)
```

```
[1021  646  584  574  522]
```

In [30]:

```
plt.figure(figsize=(10,5))
plt.pie(y,labels=x,startangle=100,autopct="%0.2f%%")
plt.legend(loc=2)
plt.show()
```



This pie chart shows the distribution of sales across different states or provinces. It helps identify the states with the highest sales contributions and their relative proportions.

In [ ]: