```python
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
import plotly.express as px
```

```
pip install pandas
```

```
Requirement already satisfied: pandas in c:\users\vedant kakade\
anaconda\lib\site-packages (2.2.2)
Requirement already satisfied: numpy>=1.26.0 in c:\users\vedant
kakade\anaconda\lib\site-packages (from pandas) (1.26.4)
Requirement already satisfied: python-dateutil>=2.8.2 in c:\users\
vedant kakade\anaconda\lib\site-packages (from pandas) (2.9.0.post0)
Requirement already satisfied: pytz>=2020.1 in c:\users\vedant kakade\
anaconda\lib\site-packages (from pandas) (2024.1)
Requirement already satisfied: tzdata>=2022.7 in c:\users\vedant
kakade\anaconda\lib\site-packages (from pandas) (2023.3)
Requirement already satisfied: six>=1.5 in c:\users\vedant kakade\
anaconda\lib\site-packages (from python-dateutil>=2.8.2->pandas)
(1.16.0)
Note: you may need to restart the kernel to use updated packages.
```

```python
shop=pd.read_csv('shopping_trends_updated.csv')
```

```python
shop.shape
```

```
(3900, 18)
```

```python
shop.to_excel('shopping_trends_updated.xlsx')
```

```python
shop.head()
```

```
   Customer ID  Age Gender Item Purchased  Category  Purchase Amount
(USD)  \
0            1   55   Male         Blouse  Clothing
53
1            2   19   Male        Sweater  Clothing
64
2            3   50   Male          Jeans  Clothing
73
3            4   21   Male        Sandals  Footwear
90
4            5   45   Male         Blouse  Clothing
49

        Location Size       Color  Season  Review Rating Subscription
Status  \
0       Kentucky    L        Gray  Winter            3.1
Yes
1          Maine    L      Maroon  Winter            3.1
```

```
Yes
2  Massachusetts    S     Maroon  Spring            3.1
Yes
3   Rhode Island    M     Maroon  Spring            3.5
Yes
4         Oregon    M  Turquoise  Spring            2.7
Yes

   Shipping Type Discount Applied Promo Code Used  Previous Purchases
\
0        Express              Yes             Yes                  14

1        Express              Yes             Yes                   2

2  Free Shipping              Yes             Yes                  23

3   Next Day Air              Yes             Yes                  49

4  Free Shipping              Yes             Yes                  31


  Payment Method Frequency of Purchases
0          Venmo            Fortnightly
1           Cash            Fortnightly
2    Credit Card                 Weekly
3         PayPal                 Weekly
4         PayPal               Annually
```

```
shop.dtypes
```

```
Customer ID                 int64
Age                         int64
Gender                     object
Item Purchased             object
Category                   object
Purchase Amount (USD)       int64
Location                   object
Size                       object
Color                      object
Season                     object
Review Rating             float64
Subscription Status        object
Shipping Type              object
Discount Applied           object
Promo Code Used            object
Previous Purchases          int64
Payment Method             object
Frequency of Purchases     object
dtype: object
```

```
shop.columns
```

```
Index(['Customer ID', 'Age', 'Gender', 'Item Purchased', 'Category',
       'Purchase Amount (USD)', 'Location', 'Size', 'Color', 'Season',
       'Review Rating', 'Subscription Status', 'Shipping Type',
       'Discount Applied', 'Promo Code Used', 'Previous Purchases',
       'Payment Method', 'Frequency of Purchases'],
      dtype='object')
```

```
shop.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 3900 entries, 0 to 3899
Data columns (total 18 columns):
 #   Column                  Non-Null Count  Dtype  
---  ------                  --------------  -----  
 0   Customer ID             3900 non-null   int64  
 1   Age                     3900 non-null   int64  
 2   Gender                  3900 non-null   object 
 3   Item Purchased          3900 non-null   object 
 4   Category                3900 non-null   object 
 5   Purchase Amount (USD)   3900 non-null   int64  
 6   Location                3900 non-null   object 
 7   Size                    3900 non-null   object 
 8   Color                   3900 non-null   object 
 9   Season                  3900 non-null   object 
 10  Review Rating           3900 non-null   float64
 11  Subscription Status     3900 non-null   object 
 12  Shipping Type           3900 non-null   object 
 13  Discount Applied        3900 non-null   object 
 14  Promo Code Used         3900 non-null   object 
 15  Previous Purchases      3900 non-null   int64  
 16  Payment Method          3900 non-null   object 
 17  Frequency of Purchases  3900 non-null   object 
dtypes: float64(1), int64(4), object(13)
memory usage: 548.6+ KB
```

```
shop.isnull().sum()
```

```
Customer ID               0
Age                       0
Gender                    0
Item Purchased            0
Category                  0
Purchase Amount (USD)     0
Location                  0
Size                      0
Color                     0
Season                    0
Review Rating             0
Subscription Status       0
Shipping Type             0
```

```
Discount Applied          0
Promo Code Used           0
Previous Purchases        0
Payment Method            0
Frequency of Purchases    0
dtype: int64
```

```
shop.describe()
```

```
       Customer ID          Age  Purchase Amount (USD)  Review Rating  
\
count  3900.000000  3900.000000            3900.000000    3900.000000

mean   1950.500000    44.068462              59.764359       3.749949

std    1125.977353    15.207589              23.685392       0.716223

min       1.000000    18.000000              20.000000       2.500000

25%     975.750000    31.000000              39.000000       3.100000

50%    1950.500000    44.000000              60.000000       3.700000

75%    2925.250000    57.000000              81.000000       4.400000

max    3900.000000    70.000000             100.000000       5.000000


       Previous Purchases  
count         3900.000000  
mean            25.351538  
std             14.447125  
min              1.000000  
25%             13.000000  
50%             25.000000  
75%             38.000000  
max             50.000000  
```

```
shop.describe(include="object")
```

```
       Gender Item Purchased  Category Location  Size  Color
Season  \
count    3900           3900     3900     3900  3900   3900    3900

unique      2             25        4       50     4     25       4

top      Male         Blouse  Clothing  Montana     M  Olive  Spring

freq     2652            171     1737       96  1755    177     999
```

```
       Subscription Status  Shipping Type Discount Applied Promo Code
Used  \
count                 3900           3900             3900
3900
unique                   2              6                2
2
top                     No  Free Shipping               No
No
freq                  2847            675             2223
2223

       Payment Method Frequency of Purchases
count            3900                   3900
unique              6                      7
top            PayPal         Every 3 Months
freq              677                    584
```

```python
print(f"The unique values of the 'Gender' column are:
{shop['Gender'].unique()}")
print()  # This will print a blank line

print(f"The unique values of the 'Category' column are:
{shop['Category'].unique()}")
print()  # This will print a blank line

print(f"The unique values of the 'Size' column are:
{shop['Size'].unique()}")
print()  # This will print a blank line

print(f"The unique values of the 'Subscription Status' column are:
{shop['Subscription Status'].unique()}")
print()  # This will print a blank line

print(f"The unique values of the 'Shipping Type' column are:
{shop['Shipping Type'].unique()}")
print()  # This will print a blank line

print(f"The unique values of the 'Discount Applied' column are:
{shop['Discount Applied'].unique()}")
print()  # This will print a blank line

print(f"The unique values of the 'Promo Code Used' column are:
{shop['Promo Code Used'].unique()}")
print()  # This will print a blank line

print(f"The unique values of the 'Payment Method' column are:
{shop['Payment Method'].unique()}")
print()  # This will print a blank line
```

```
The unique values of the 'Gender' column are: ['Male' 'Female']
The unique values of the 'Category' column are: ['Clothing' 'Footwear'
'Outerwear' 'Accessories']

The unique values of the 'Size' column are: ['L' 'S' 'M' 'XL']

The unique values of the 'Subscription Status' column are: ['Yes'
'No']

The unique values of the 'Shipping Type' column are: ['Express' 'Free
Shipping' 'Next Day Air' 'Standard' '2-Day Shipping'
 'Store Pickup']

The unique values of the 'Discount Applied' column are: ['Yes' 'No']

The unique values of the 'Promo Code Used' column are: ['Yes' 'No']

The unique values of the 'Payment Method' column are: ['Venmo' 'Cash'
'Credit Card' 'PayPal' 'Bank Transfer' 'Debit Card']
```

**1) What is the overall distribution of customer ages in the dataset?**

```
shop['Age'].value_counts()  #
name_of_dataframe['column'].value_counts()

Age
69    88
57    87
41    86
25    85
49    84
50    83
54    83
27    83
62    83
32    82
19    81
58    81
42    80
43    79
28    79
31    79
37    77
46    76
29    76
68    75
59    75
63    75
56    74
36    74
```

```
55    73
52    73
64    73
35    72
51    72
65    72
40    72
45    72
47    71
66    71
30    71
23    71
38    70
53    70
18    69
21    69
26    69
34    68
48    68
24    68
39    68
70    67
22    66
61    65
60    65
33    63
20    62
67    54
44    51
Name: count, dtype: int64
```

```
shop['Age'].mean()
```

```
44.06846153846154
```

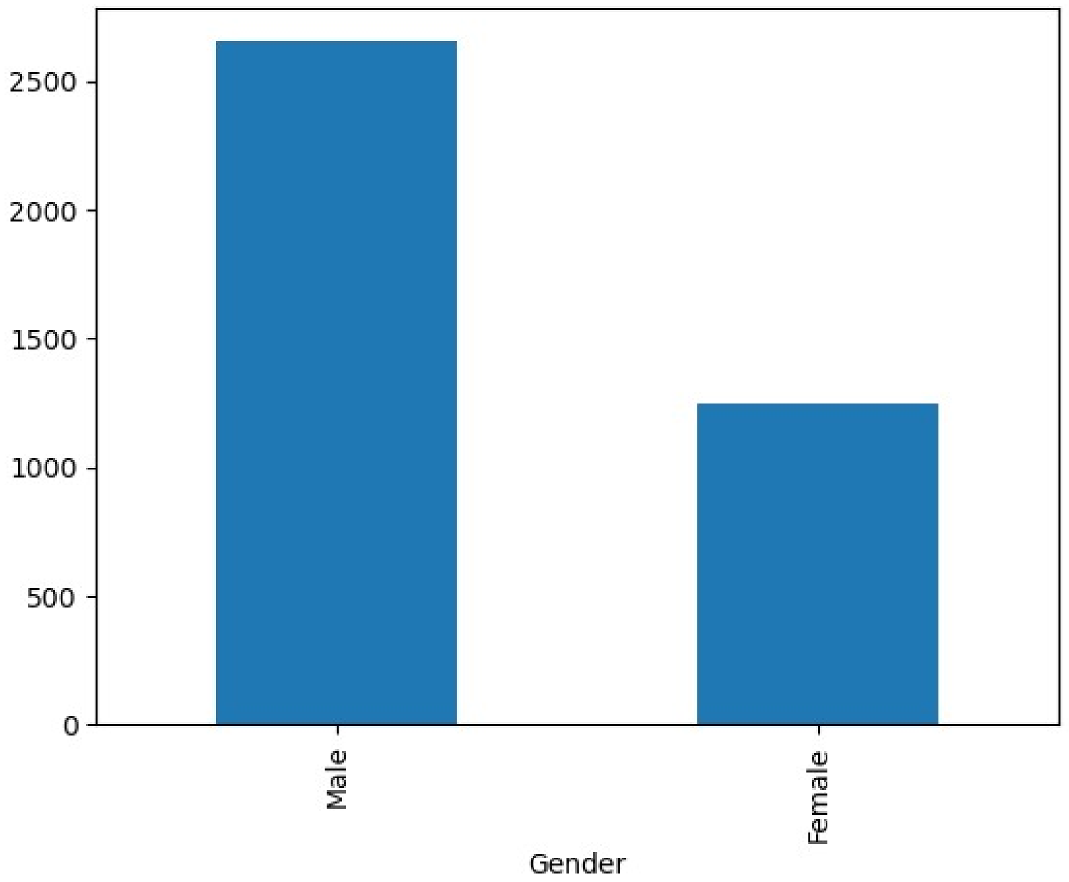
```
shop['Gender'].unique()
```

```
array(['Male', 'Female'], dtype=object)
```

```
shop['Age_category'] = pd.cut(shop['Age'],
                              bins=[0, 15, 18, 30, 50, 70],
                              labels=['child', 'teen', 'Young Adults',
'Middle-Aged Adults', 'old'])
```

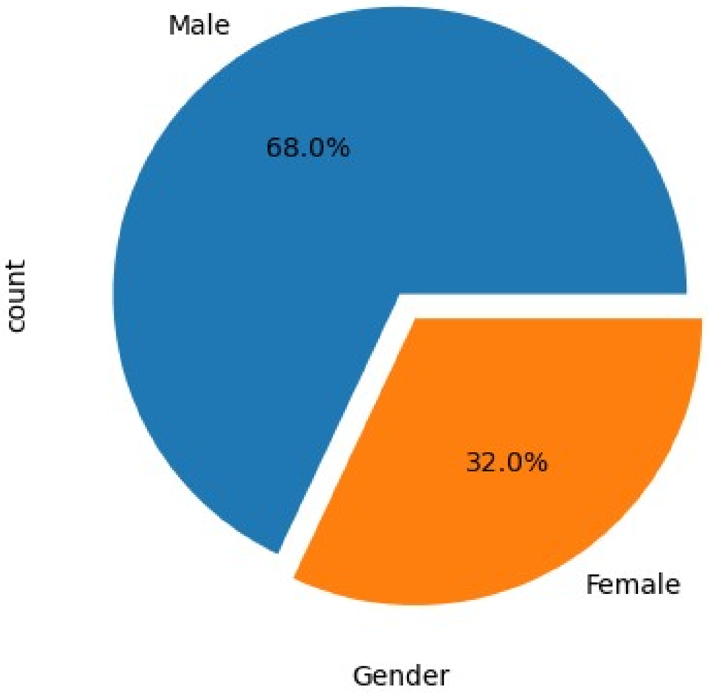
```
shop["Gender"].value_counts().plot(kind='bar')
```

```
<Axes: xlabel='Gender'>
```

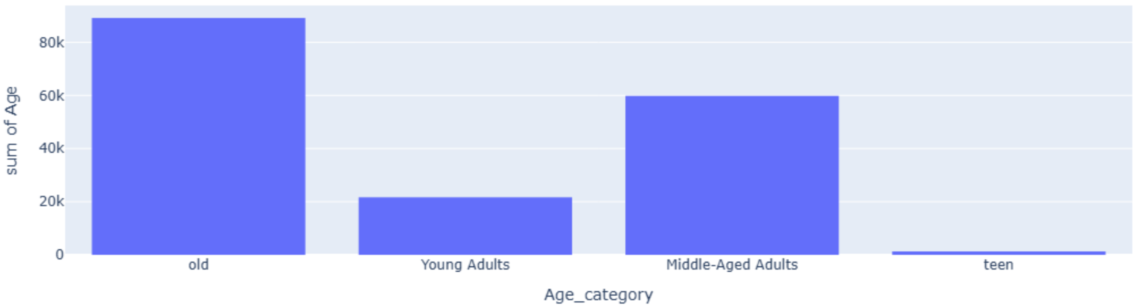


```
data = shop["Gender"].value_counts()
data.plot(kind='pie', explode=(0,0.1),autopct='%1.1f%%')
plt.xlabel("Gender")
```

```
Text(0.5, 0, 'Gender')
```



```
fig = px.histogram(shop, y='Age', x='Age_category')
fig.show()
```



**2) How does the average purchase amount vary across different product categories?**

```
shop.columns

Index(['Customer ID', 'Age', 'Gender', 'Item Purchased', 'Category',
       'Purchase Amount (USD)', 'Location', 'Size', 'Color', 'Season',
       'Review Rating', 'Subscription Status', 'Shipping Type',
       'Discount Applied', 'Promo Code Used', 'Previous Purchases',
       'Payment Method', 'Frequency of Purchases', 'Age_category'],
      dtype='object')
```

```
shop['Category'].unique()
```

```
array(['Clothing', 'Footwear', 'Outerwear', 'Accessories'],
dtype=object)
```

```
shop.groupby('Category')['Purchase Amount (USD)'].mean()
```

```
Category
Accessories    59.838710
Clothing       60.025331
Footwear       60.255426
Outerwear      57.172840
Name: Purchase Amount (USD), dtype: float64
```

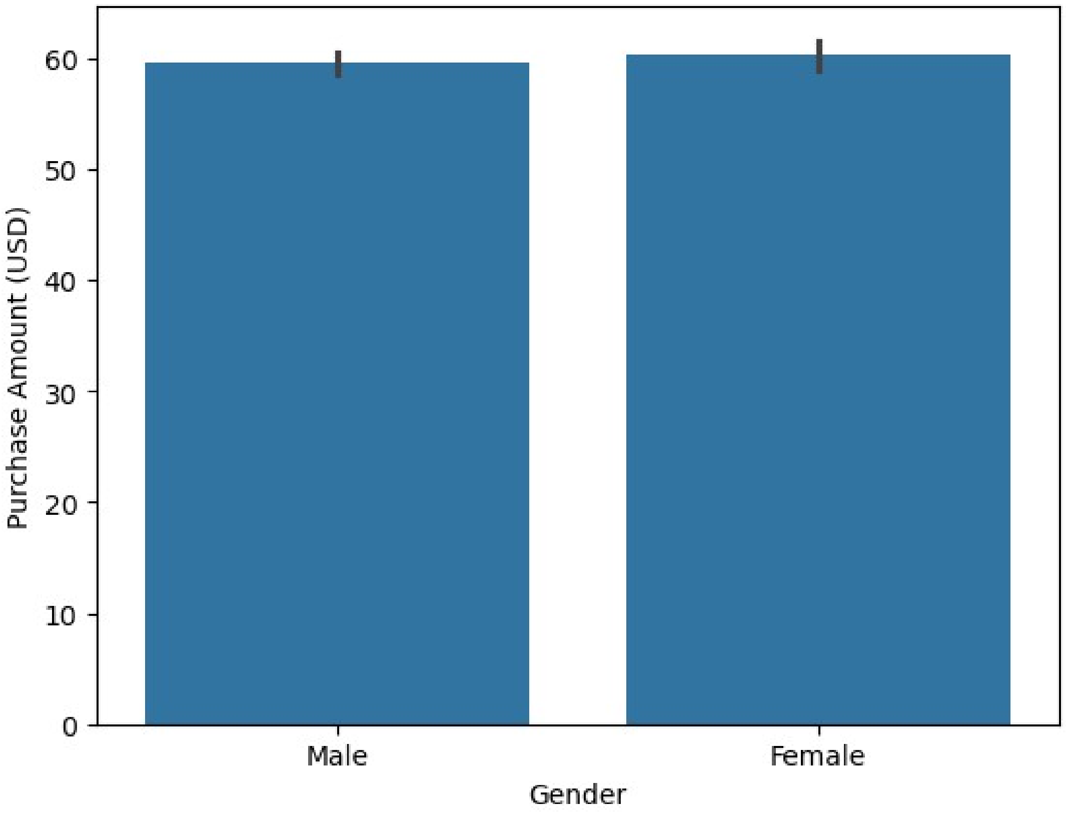
**3) Which gender has the highest number of purchases?**

```
shop.columns
```

```
Index(['Customer ID', 'Age', 'Gender', 'Item Purchased', 'Category',
       'Purchase Amount (USD)', 'Location', 'Size', 'Color', 'Season',
       'Review Rating', 'Subscription Status', 'Shipping Type',
       'Discount Applied', 'Promo Code Used', 'Previous Purchases',
       'Payment Method', 'Frequency of Purchases', 'Age_category'],
      dtype='object')
```

```
sns.barplot(x='Gender', y='Purchase Amount (USD)', data=shop)
```

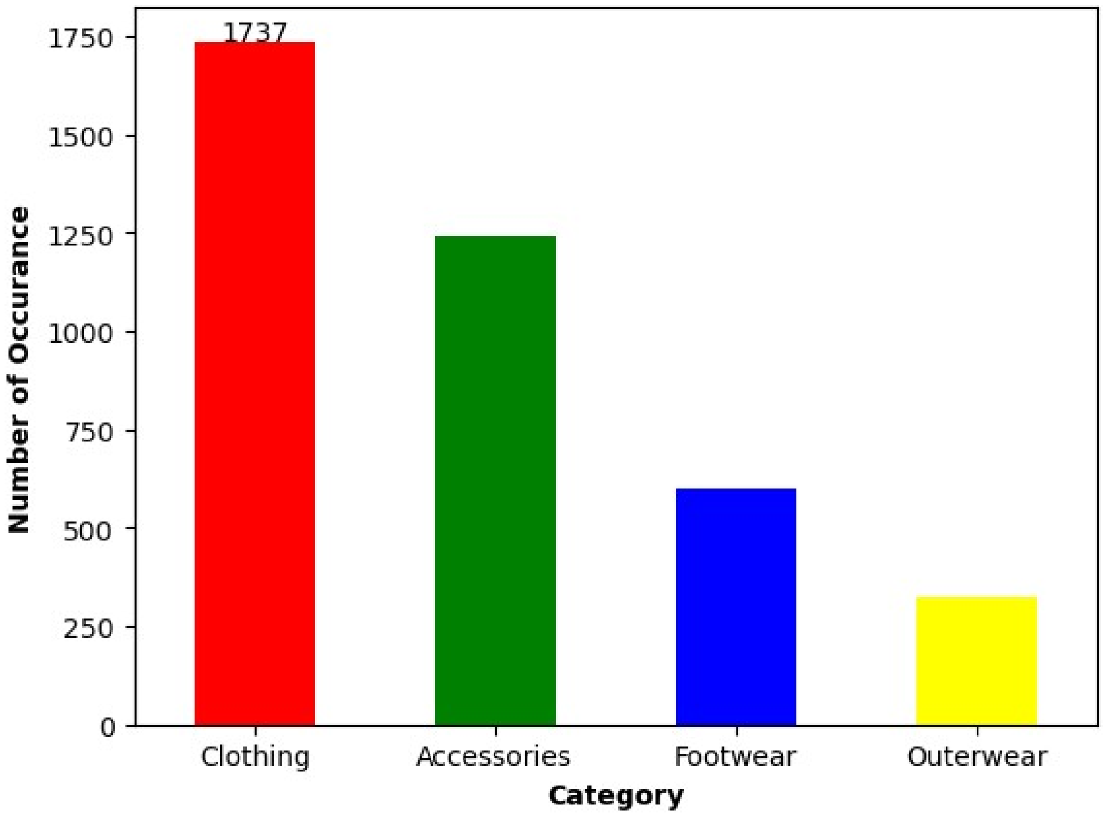
```
<Axes: xlabel='Gender', ylabel='Purchase Amount (USD)'>
```

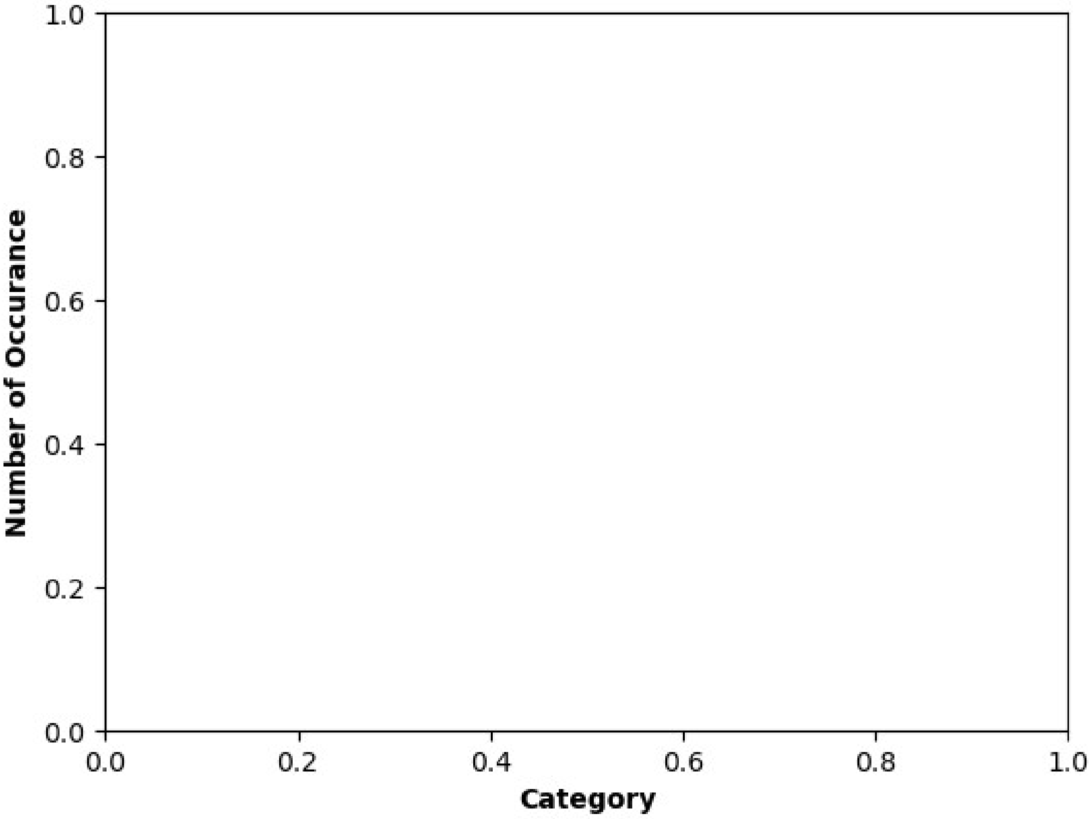


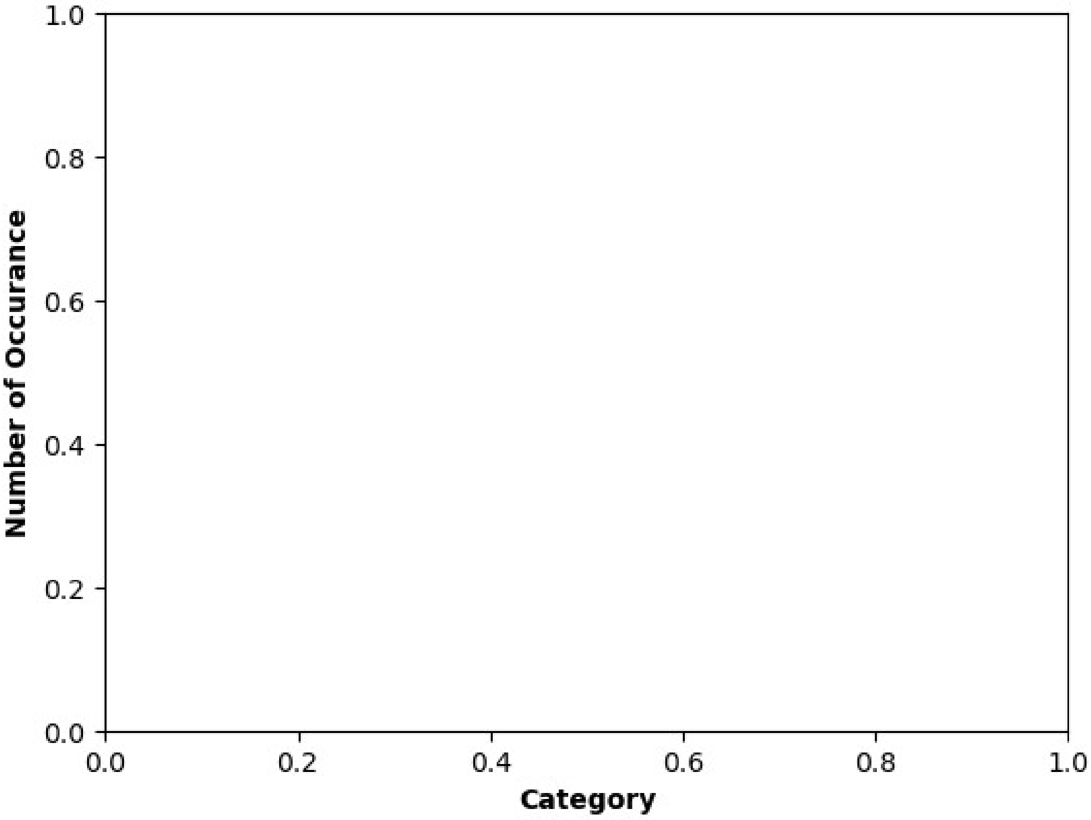
**4) What are the most commonly purchased items in each category?**

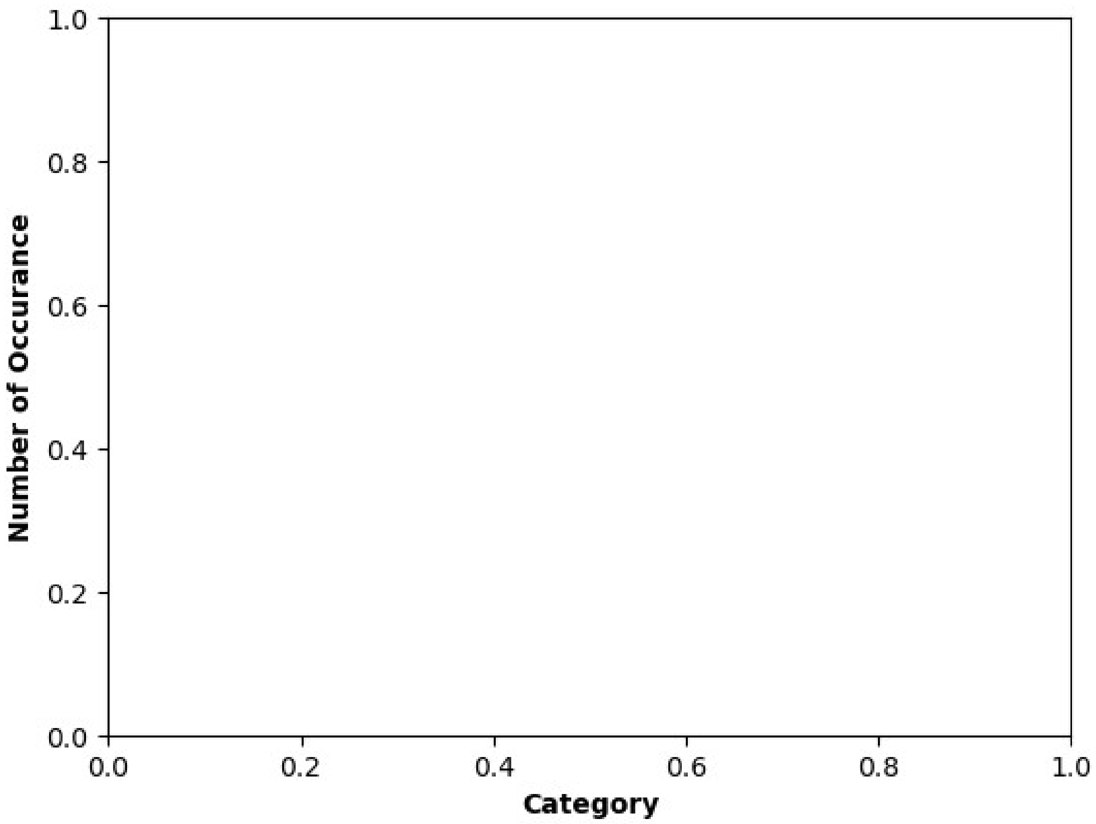
```
shop.columns

Index(['Customer ID', 'Age', 'Gender', 'Item Purchased', 'Category',
       'Purchase Amount (USD)', 'Location', 'Size', 'Color', 'Season',
       'Review Rating', 'Subscription Status', 'Shipping Type',
       'Discount Applied', 'Promo Code Used', 'Previous Purchases',
       'Payment Method', 'Frequency of Purchases', 'Age_category'],
      dtype='object')

shop.groupby('Category')['Item Purchased'].value_counts()

Category     Item Purchased
Accessories  Jewelry          171
             Belt             161
             Sunglasses       161
             Scarf            157
             Hat              154
             Handbag          153
             Backpack         143
             Gloves           140
Clothing     Blouse           171
             Pants            171
             Shirt            169
             Dress                 166
             Sweater               164
             Socks                 159
             Skirt                 158
             Shorts                157
             Hoodie                151
             T-shirt               147
             Jeans                 124
Footwear     Sandals               160
             Shoes                 150
             Sneakers              145
             Boots                 144
Outerwear    Jacket                163
             Coat                  161
Name: count, dtype: int64
```

```
ax = shop['Category'].value_counts().plot(kind='bar', rot=0, color=
['red', 'green', 'blue', 'yellow']) # Example list of colors
for p in ax.patches:
    ax.annotate(str(p.get_height()), (p.get_x()+0.25, p.get_height()
+1), ha='center')
    plt.xlabel("Category", weight="bold")
    plt.ylabel("Number of Occurance", weight="bold")
    plt.show()
```

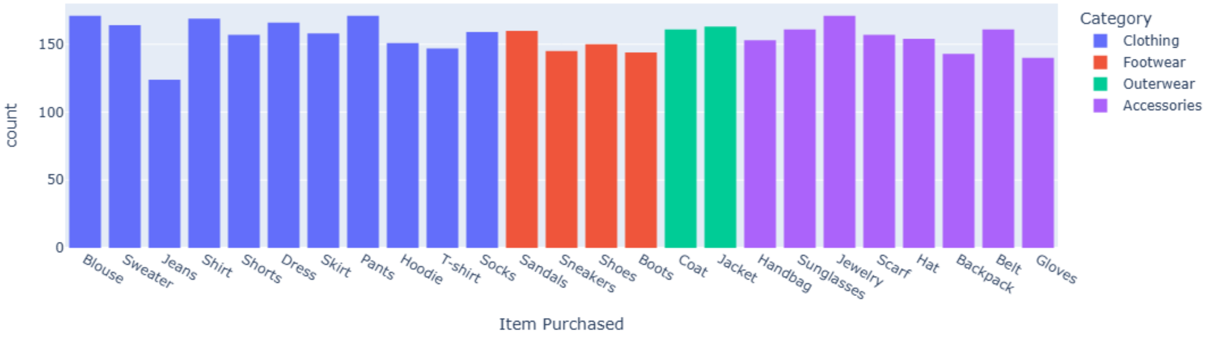



1.0
0.8
0.6
0.4
0.2
0.0
Number of Occurance
0.0
0.2
0.4
0.6
0.8
1.0
Category

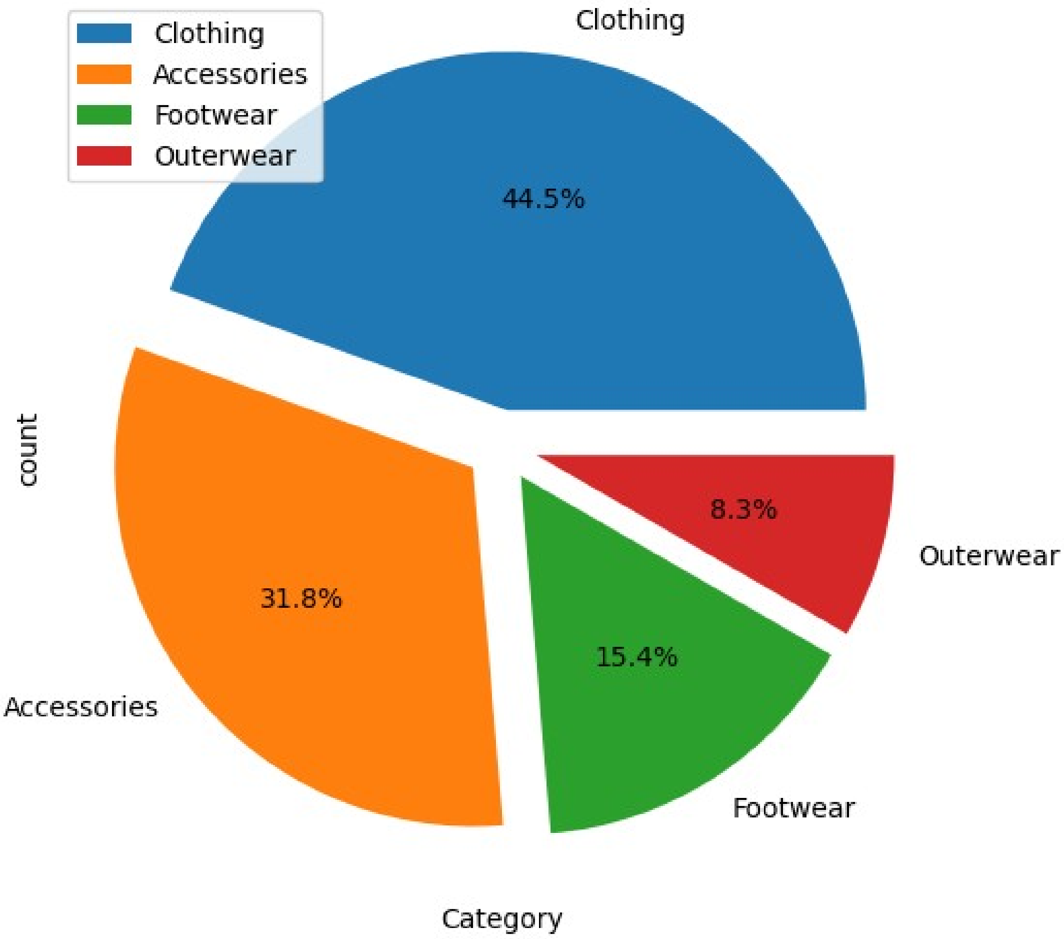

1.0
0.8
0.6
0.4
0.2
0.0
Number of Occurance
0.0
0.2
0.4
0.6
0.8
1.0
Category



```
fig = px.histogram(shop, x='Item Purchased', color='Category')
fig.show()
```



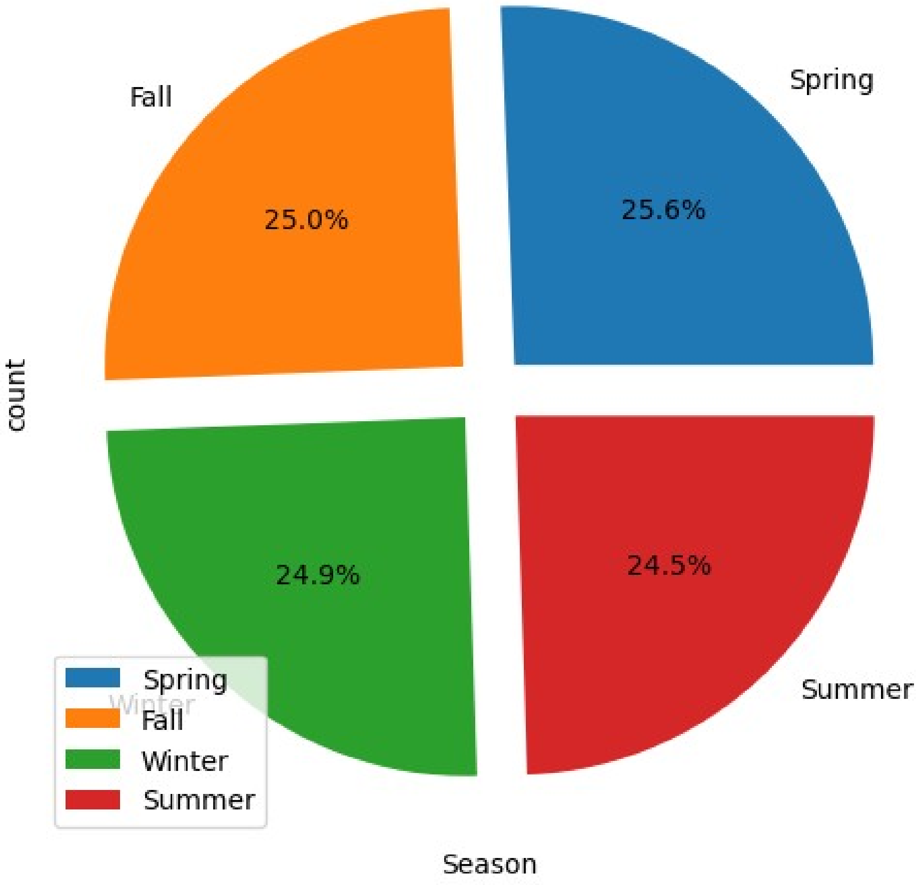
```
plt.figure(figsize=(20,6))
data = shop['Category'].value_counts()
explode = [0.1]*len(data)
data.plot(kind='pie', explode=explode, autopct='%1.1f%%')
plt.xlabel("Category")
plt.legend()
plt.show()
```



**5) Are there any specific seasons or months where customer spending is significantly higher?**

```
shop.columns

Index(['Customer ID', 'Age', 'Gender', 'Item Purchased', 'Category',
       'Purchase Amount (USD)', 'Location', 'Size', 'Color', 'Season',
       'Review Rating', 'Subscription Status', 'Shipping Type',
       'Discount Applied', 'Promo Code Used', 'Previous Purchases',
       'Payment Method', 'Frequency of Purchases', 'Age_category'],
      dtype='object')

data = shop["Season"].value_counts()
data

Season
Spring    999
Fall      975
Winter    971
Summer    955
Name: count, dtype: int64
```

```
plt.figure(figsize=(20,6))
data = shop['Season'].value_counts()
explode = [0.1]*len(data)
data.plot(kind='pie', explode=explode, autopct='%1.1f%%')
plt.xlabel("Season")
plt.legend()
plt.show()
```



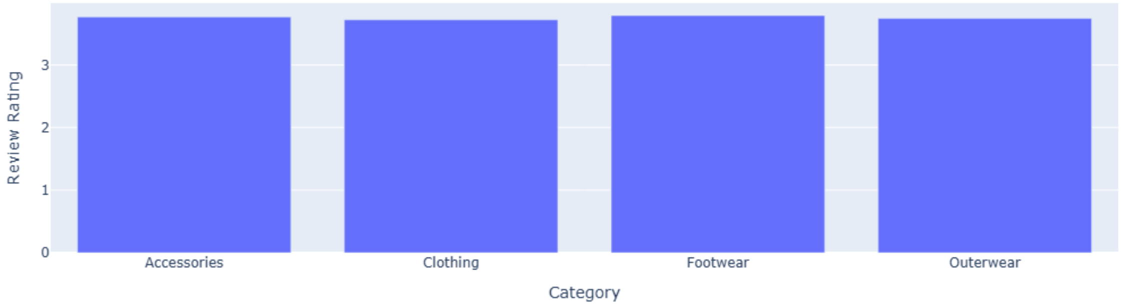
**6) What is the average rating given by customers for each product category?**

```
shop.groupby('Category')['Review Rating'].mean()

Category
Accessories    3.768629
Clothing       3.723143
Footwear       3.790651
Outerwear      3.746914
Name: Review Rating, dtype: float64
```

```
shop_groupby = shop.groupby('Category')['Review
Rating'].mean().reset_index()
print(shop_groupby)
```

```
      Category  Review Rating
0  Accessories       3.768629
1     Clothing       3.723143
2     Footwear       3.790651
3    Outerwear       3.746914
```

```
fig = px.bar(shop_groupby, x= 'Category', y= 'Review Rating')
fig.show()
```



**7) Are there any notable differences in purchase behavior between subscribed and non-subscribed customers?**

```
shop.columns
```

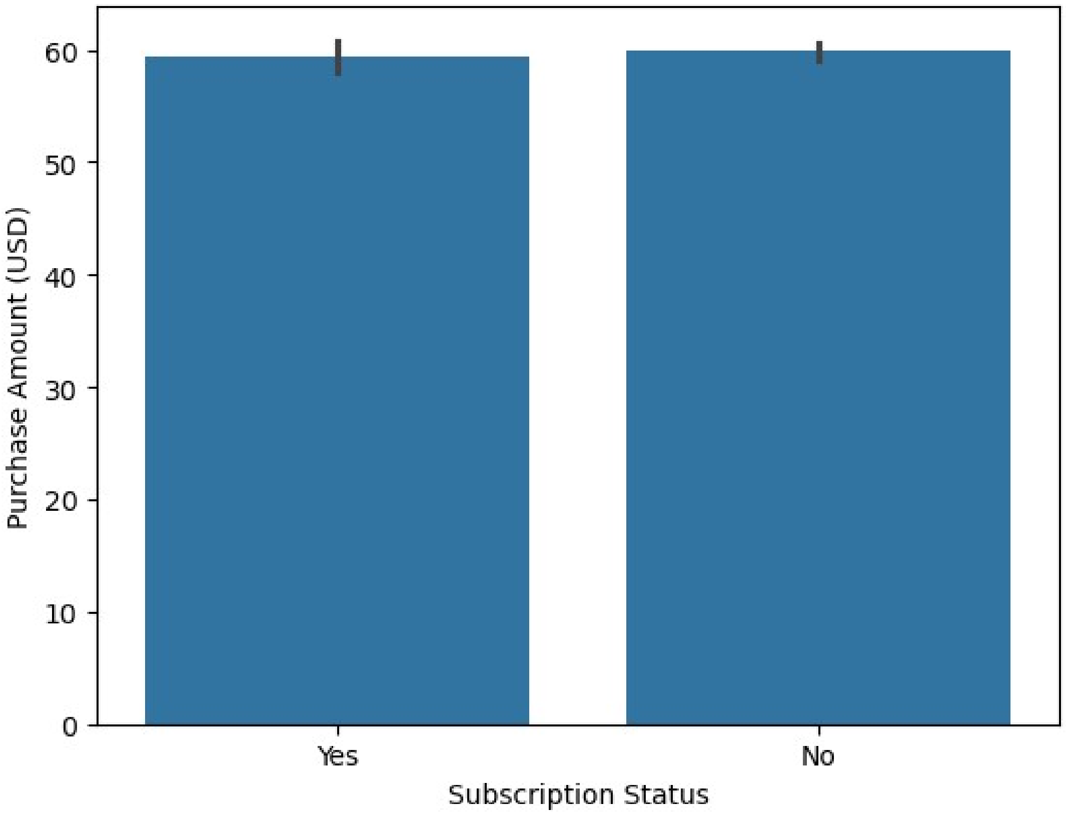
```
Index(['Customer ID', 'Age', 'Gender', 'Item Purchased', 'Category',
       'Purchase Amount (USD)', 'Location', 'Size', 'Color', 'Season',
       'Review Rating', 'Subscription Status', 'Shipping Type',
       'Discount Applied', 'Promo Code Used', 'Previous Purchases',
       'Payment Method', 'Frequency of Purchases', 'Age_category'],
      dtype='object')
```

```
shop["Subscription Status"].value_counts()
```

```
Subscription Status
No     2847
Yes    1053
Name: count, dtype: int64
```

```
sns.barplot(shop, x='Subscription Status', y='Purchase Amount (USD)')
```

```
<Axes: xlabel='Subscription Status', ylabel='Purchase Amount (USD)'>
```



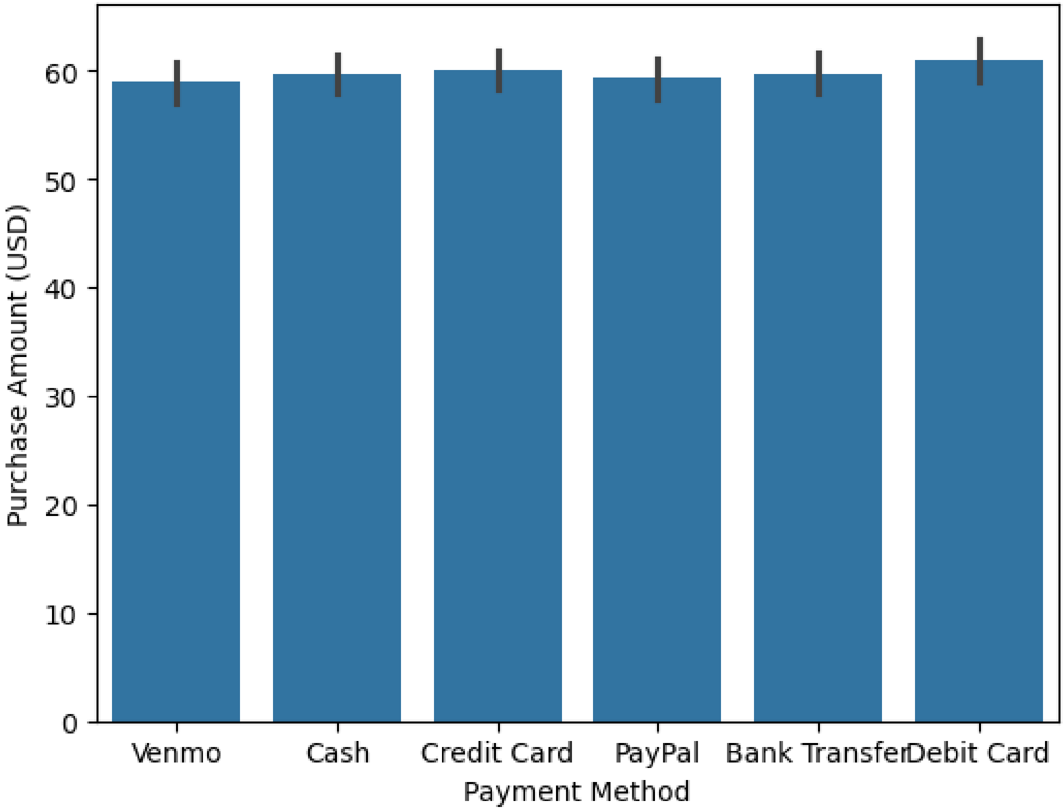
```
shop['Purchase Amount (USD)'].sum()

233081

shop.groupby('Subscription Status')['Purchase Amount (USD)'].mean()

Subscription Status
No     59.865121
Yes    59.491928
Name: Purchase Amount (USD), dtype: float64
```

**8) Which payment method is the most popular among customers?**

```
shop.groupby('Payment Method')['Purchase Amount
(USD)'].mean().sort_values(ascending=False)

Payment Method
Debit Card       60.915094
Credit Card      60.074516
Bank Transfer    59.712418
Cash             59.704478
PayPal           59.245199
Venmo            58.949527
Name: Purchase Amount (USD), dtype: float64
```

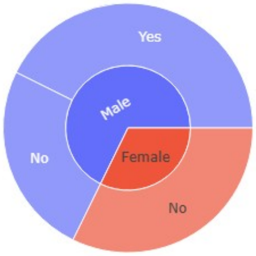
```
sns.barplot( x="Payment Method", y="Purchase Amount (USD)" ,
data=shop)
```

```
<Axes: xlabel='Payment Method', ylabel='Purchase Amount (USD)'>
```

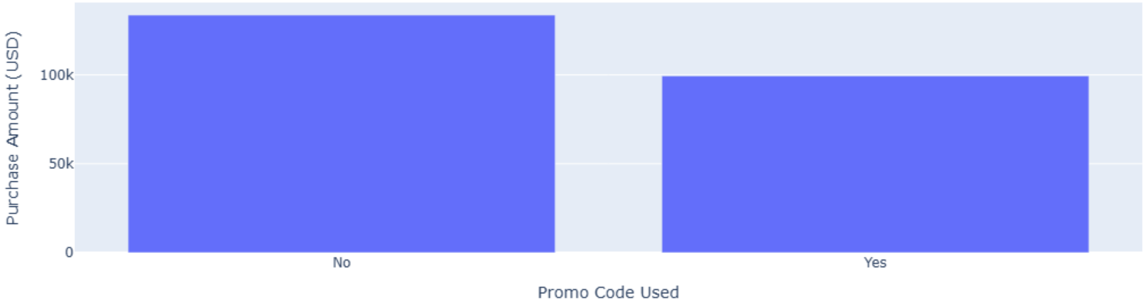


**9) Do customers who use promo codes tend to spend more than those who don't?**

```
shop_groupby = shop.groupby('Promo Code Used')['Purchase Amount
(USD)'].sum().reset_index()

fig = px.sunburst(shop, path=['Gender' , 'Promo Code Used'], values =
'Purchase Amount (USD)')
fig.show()
```



```
fig = px.bar(shop_groupby , x='Promo Code Used' , y='Purchase Amount
(USD)')
fig.show()
```



### 10) How does the frequency of purchases vary across different age groups?

```
shop[['Age' , 'Age_category']]
```

```
      Age        Age_category
0      55                 old
1      19        Young Adults
2      50  Middle-Aged Adults
3      21        Young Adults
4      45  Middle-Aged Adults
...   ...                 ...
3895   40  Middle-Aged Adults
3896   52                 old
3897   46  Middle-Aged Adults
3898   44  Middle-Aged Adults
3899   52                 old

[3900 rows x 2 columns]
```

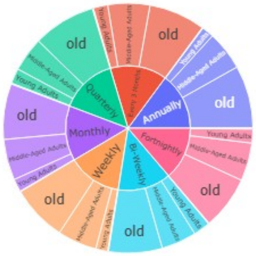
```
shop['Age_category'].unique()
```

```
['old', 'Young Adults', 'Middle-Aged Adults', 'teen']
Categories (5, object): ['child' < 'teen' < 'Young Adults' < 'Middle-
Aged Adults' < 'old']
```

```
shop_group = shop.groupby('Frequency of Purchases')['Age'].sum()
```

```
px.sunburst(shop, path=['Frequency of Purchases','Age_category'],
values='Age')
```

```
C:\Users\Vedant Kakade\anaconda\Lib\site-packages\plotly\express\
_core.py:1727: FutureWarning:

The default of observed=False is deprecated and will be changed to
True in a future version of pandas. Pass observed=False to retain
current behavior or observed=True to adopt the future default and
silence this warning.
```



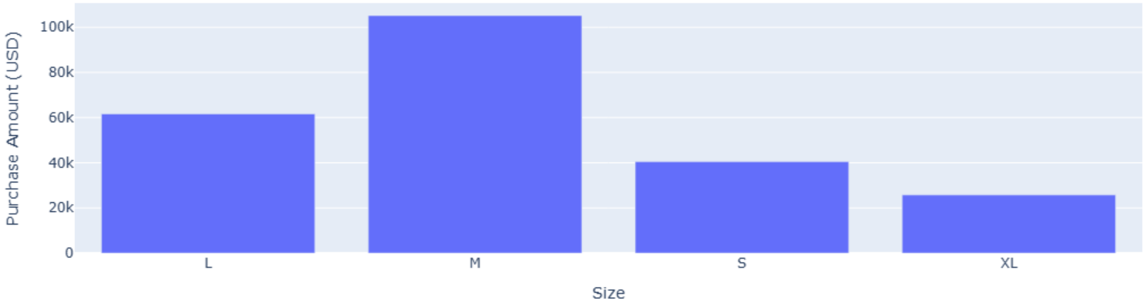
### 11) Are there any correlations between the size of the product and the purchase amount?

```
shop.columns
```

```
Index(['Customer ID', 'Age', 'Gender', 'Item Purchased', 'Category',
       'Purchase Amount (USD)', 'Location', 'Size', 'Color', 'Season',
       'Review Rating', 'Subscription Status', 'Shipping Type',
       'Discount Applied', 'Promo Code Used', 'Previous Purchases',
       'Payment Method', 'Frequency of Purchases', 'Age_category'],
      dtype='object')
```

```
shop_groupby = shop.groupby('Size')['Purchase Amount
(USD)'].sum().reset_index()
```

```
fig = px.bar(shop_groupby, x ='Size', y='Purchase Amount (USD)')
fig.show()
```



**12) Which shipping type is preferred by customers for different product categories?**

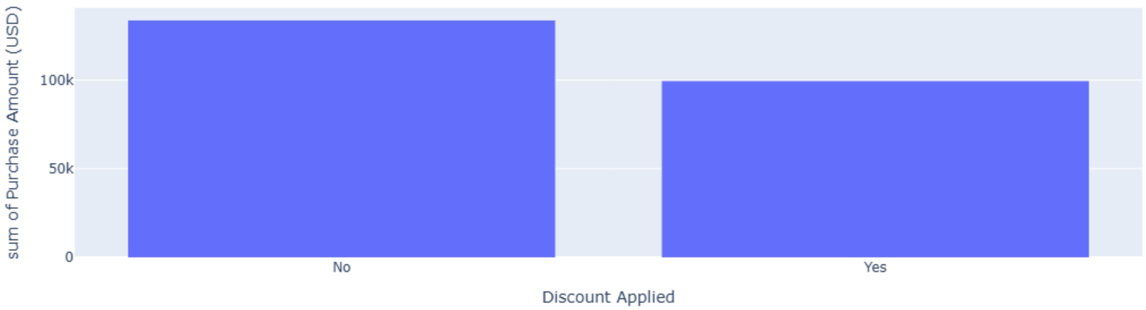
```
shop.groupby('Category')['Shipping
Type'].value_counts().sort_values(ascending=False)

Category     Shipping Type 
Clothing     Standard          297
             Free Shipping     294
             Next Day Air      293
             Express           290
             Store Pickup      282
             2-Day Shipping    281
Accessories  Store Pickup      217
             Next Day Air      211
             Standard          208
             2-Day Shipping    206
             Express           203
             Free Shipping     195
Footwear     Free Shipping     122
             Standard          100
             Store Pickup       98
             Express            96
             Next Day Air       93
             2-Day Shipping     90
Outerwear    Free Shipping      64
             Express            57
             Store Pickup       53
             Next Day Air       51
             2-Day Shipping     50
             Standard           49
Name: count, dtype: int64

shop['Category'].unique()

array(['Clothing', 'Footwear', 'Outerwear', 'Accessories'],
dtype=object)
```

**13) How does the presence of a discount affect the purchase decision of customers?**

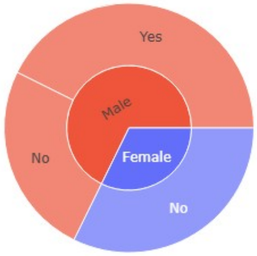
```
shop.columns
```

```
Index(['Customer ID', 'Age', 'Gender', 'Item Purchased', 'Category',
       'Purchase Amount (USD)', 'Location', 'Size', 'Color', 'Season',
       'Review Rating', 'Subscription Status', 'Shipping Type',
       'Discount Applied', 'Promo Code Used', 'Previous Purchases',
       'Payment Method', 'Frequency of Purchases', 'Age_category'],
      dtype='object')
```

```
shop_group = shop.groupby('Discount Applied')['Purchase Amount
(USD)'].sum().reset_index()

px.histogram(shop_group , x='Discount Applied' , y='Purchase Amount
(USD)')
```

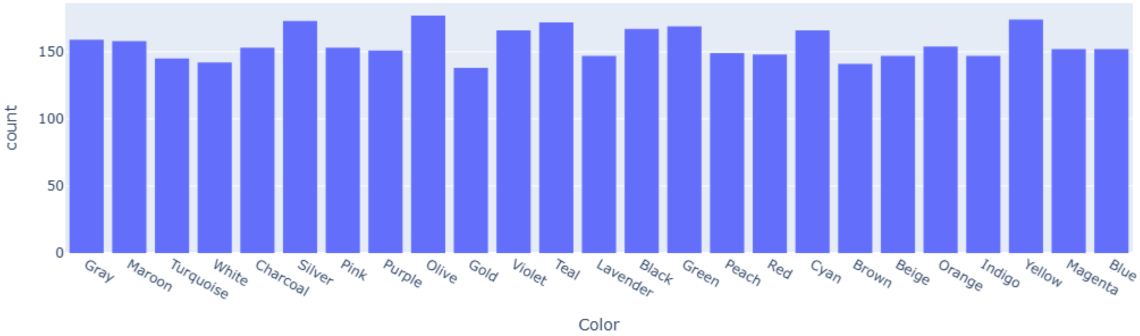


```
fig = px.sunburst(shop, path=['Gender' , 'Discount Applied'],
values='Purchase Amount (USD)', color='Gender')
fig.show()
```



### 14) Are there any specific colors that are more popular among customers?

```
px.histogram(shop , x = 'Color')
```



```
shop['Color'].value_counts()
```

```
Color
Olive        177
Yellow       174
Silver       173
Teal         172
Green        169
Black        167
Cyan         166
Violet       166
Gray         159
Maroon       158
Orange       154
Charcoal     153
Pink         153
Magenta      152
Blue         152
Purple       151
Peach        149
Red          148
Beige        147
Indigo       147
Lavender     147
Turquoise    145
White        142
Brown        141
Gold         138
Name: count, dtype: int64
```

### 15) What is the average number of previous purchases made by customers?

```
shop['Previous Purchases'].mean()
```

```
25.35153846153846
```

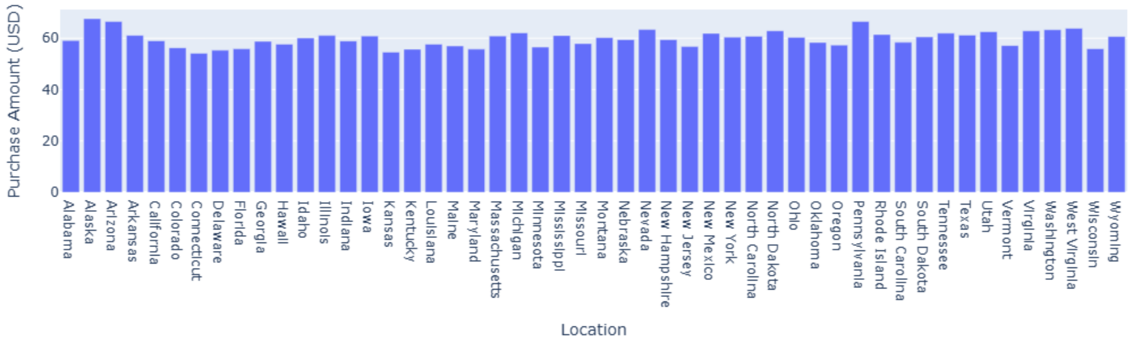
### 16) Are there any noticeable differences in purchase behavior between different locations?

```
shop.groupby('Location')['Purchase Amount
(USD)'].mean().sort_values(ascending=False)
```

```
Location
Alaska            67.597222
Pennsylvania      66.567568
Arizona           66.553846
West Virginia     63.876543
Nevada            63.379310
Washington        63.328767
North Dakota      62.891566
Virginia          62.883117
Utah              62.577465
Michigan          62.095890
Tennessee         61.974026
New Mexico        61.901235
Rhode Island      61.444444
Texas             61.194805
Arkansas          61.113924
Illinois          61.054348
Mississippi       61.037500
Massachusetts     60.888889
Iowa              60.884058
North Carolina    60.794872
Wyoming           60.690141
South Dakota      60.514286
New York          60.425287
Ohio              60.376623
Montana           60.250000
Idaho             60.075269
Nebraska          59.448276
New Hampshire     59.422535
Alabama           59.112360
California        59.000000
Indiana           58.924051
Georgia           58.797468
South Carolina    58.407895
Oklahoma          58.346667
Missouri          57.913580
Hawaii            57.723077
Louisiana         57.714286
Oregon            57.337838
Vermont           57.176471
Maine             56.987013
New Jersey        56.746269
Minnesota         56.556818
Colorado          56.293333
Wisconsin         55.946667
Florida           55.852941
Maryland          55.755814
```

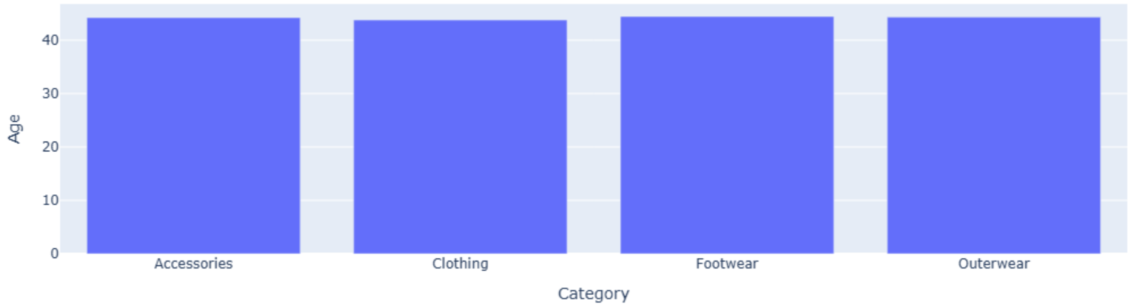
```
Kentucky          55.721519
Delaware          55.325581
Kansas            54.555556
Connecticut       54.179487
Name: Purchase Amount (USD), dtype: float64
```

```
shop_group = shop.groupby('Location')['Purchase Amount
(USD)'].mean().reset_index()

fig = px.bar(shop_group, x = 'Location', y = 'Purchase Amount (USD)')
fig.show()
```



### 17) Is there a relationship between customer age and the category of products they purchase?

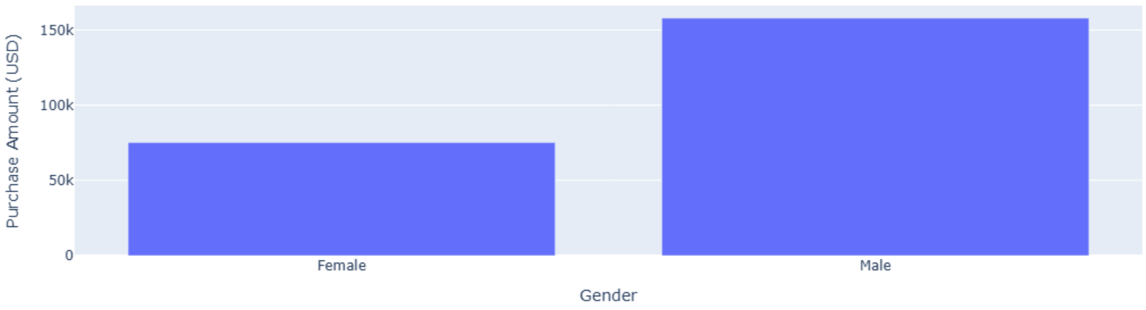
```
shop_group = shop.groupby('Category')['Age'].mean().reset_index()

fig = px.bar(shop_group, y='Age', x='Category')
fig.show()
```



### 18) How does the average purchase amount differ between male and female customers?

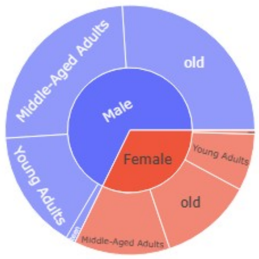
```
shop_group = shop.groupby('Gender')['Purchase Amount
(USD)'].sum().reset_index()
```

```
fig = px.bar(shop_group, x='Gender', y='Purchase Amount (USD)')
fig.show()
```



```
px.sunburst(data_frame=shop, path=['Gender', 'Age_category'],
values='Purchase Amount (USD)')
```

```
C:\Users\Vedant Kakade\anaconda\Lib\site-packages\plotly\express\
_core.py:1727: FutureWarning:

The default of observed=False is deprecated and will be changed to
True in a future version of pandas. Pass observed=False to retain
current behavior or observed=True to adopt the future default and
silence this warning.
```


Middle-Aged Adults
old
Male
Young Adults
Female
Young Adults
old
Middle-Aged Adults