

```
# import python libraries
```

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt # visualizing data
%matplotlib inline
import seaborn as sns
```

```
# import csv file
```

```
df = pd.read_csv('Diwali Sales Data.csv', encoding= 'unicode_escape')
```

```
df.shape
```

```
(11251, 15)
```

```
df.head()
```

	User_ID	Cust_name	Product_ID	Gender	Age Group	Age	Marital_Status
0	1002903	Sanskriti	P00125942	F	26-35	28	0
1	1000732	Kartik	P00110942	F	26-35	35	1
2	1001990	Bindu	P00118542	F	26-35	35	1
3	1001425	Sudevi	P00237842	M	0-17	16	0
4	1000588	Joni	P00057942	M	26-35	28	1

	State	Zone	Occupation	Product_Category	Orders
0	Maharashtra	Western	Healthcare	Auto	1
1	Andhra Pradesh	Southern	Govt	Auto	3
2	Uttar Pradesh	Central	Automobile	Auto	3
3	Karnataka	Southern	Construction	Auto	2
4	Gujarat	Western	Food Processing	Auto	2

	Amount	Status	unnamed1
0	23952.0	NaN	NaN
1	23934.0	NaN	NaN
2	23924.0	NaN	NaN
3	23912.0	NaN	NaN
4	23877.0	NaN	NaN

```
df.info()
```

```

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 11251 entries, 0 to 11250
Data columns (total 15 columns):
#   Column                Non-Null Count  Dtype
---  -
0   User_ID                11251 non-null  int64
1   Cust_name              11251 non-null  object
2   Product_ID            11251 non-null  object
3   Gender                 11251 non-null  object
4   Age Group              11251 non-null  object
5   Age                    11251 non-null  int64
6   Marital_Status         11251 non-null  int64
7   State                  11251 non-null  object
8   Zone                   11251 non-null  object
9   Occupation             11251 non-null  object
10  Product_Category       11251 non-null  object
11  Orders                 11251 non-null  int64
12  Amount                 11239 non-null  float64
13  Status                  0 non-null      float64
14  unnamed1                0 non-null      float64
dtypes: float64(3), int64(4), object(8)
memory usage: 1.3+ MB

#drop unrelated/blank columns
df.drop(['Status', 'unnamed1'], axis=1, inplace=True)

#check for null values
pd.isnull(df).sum()

User_ID                0
Cust_name              0
Product_ID            0
Gender                 0
Age Group              0
Age                    0
Marital_Status         0
State                  0
Zone                   0
Occupation             0
Product_Category       0
Orders                 0
Amount                 12
dtype: int64

# drop null values
df.dropna(inplace=True)

# change data type
df['Amount'] = df['Amount'].astype('int')

df['Amount'].dtypes

```

```
dtype('int32')
df.columns
Index(['User_ID', 'Cust_name', 'Product_ID', 'Gender', 'Age Group',
      'Age',
      'Marital_Status', 'State', 'Zone', 'Occupation',
      'Product_Category',
      'Orders', 'Amount'],
      dtype='object')
```

```
#rename column
```

```
df.rename(columns= {'Marital_Status':'Shaadi'})
```

	User_ID	Cust_name	Product_ID	Gender	Age Group	Age	
Shaadi \							
0	1002903	Sanskriti	P00125942	F	26-35	28	0
1	1000732	Kartik	P00110942	F	26-35	35	1
2	1001990	Bindu	P00118542	F	26-35	35	1
3	1001425	Sudevi	P00237842	M	0-17	16	0
4	1000588	Joni	P00057942	M	26-35	28	1
...
11246	1000695	Manning	P00296942	M	18-25	19	1
11247	1004089	Reichenbach	P00171342	M	26-35	33	0
11248	1001209	Oshin	P00201342	F	36-45	40	0
11249	1004023	Noonan	P00059442	M	36-45	37	0
11250	1002744	Brumley	P00281742	F	18-25	19	0

	State	Zone	Occupation	Product_Category
Orders \				
0	Maharashtra	Western	Healthcare	Auto
1				
1	Andhra Pradesh	Southern	Govt	Auto
3				
2	Uttar Pradesh	Central	Automobile	Auto
3				
3	Karnataka	Southern	Construction	Auto
2				
4	Gujarat	Western	Food Processing	Auto
2				

```

...
...
11246      Maharashtra      Western      Chemical      Office
4
11247      Haryana      Northern      Healthcare      Veterinary
3
11248      Madhya Pradesh      Central      Textile      Office
4
11249      Karnataka      Southern      Agriculture      Office
3
11250      Maharashtra      Western      Healthcare      Office
3

```

```

Amount
0      23952
1      23934
2      23924
3      23912
4      23877

```

```

...
11246      370
11247      367
11248      213
11249      206
11250      188

```

```
[11239 rows x 13 columns]
```

describe() method returns description of the data in the DataFrame (i.e. count, mean, std, etc)

```
df.describe()
```

	User_ID	Age	Marital_Status	Orders
Amount				
count	1.123900e+04	11239.000000	11239.000000	11239.000000
mean	1.003004e+06	35.410357	0.420055	2.489634
std	1.716039e+03	12.753866	0.493589	1.114967
min	1.000001e+06	12.000000	0.000000	1.000000
25%	1.001492e+06	27.000000	0.000000	2.000000
50%	1.003064e+06	33.000000	0.000000	2.000000
75%	1.004426e+06	43.000000	1.000000	3.000000
max	1.006040e+06	92.000000	1.000000	4.000000

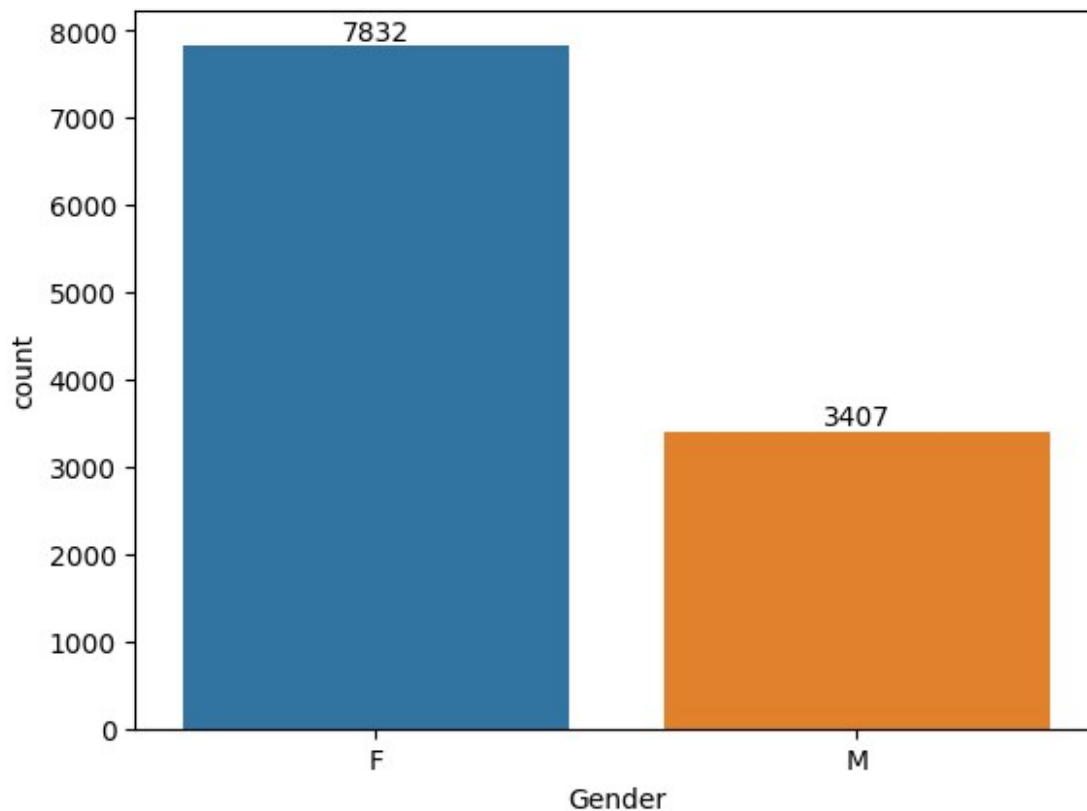
```
# use describe() for specific columns  
df[['Age', 'Orders', 'Amount']].describe()
```

	Age	Orders	Amount
count	11239.000000	11239.000000	11239.000000
mean	35.410357	2.489634	9453.610553
std	12.753866	1.114967	5222.355168
min	12.000000	1.000000	188.000000
25%	27.000000	2.000000	5443.000000
50%	33.000000	2.000000	8109.000000
75%	43.000000	3.000000	12675.000000
max	92.000000	4.000000	23952.000000

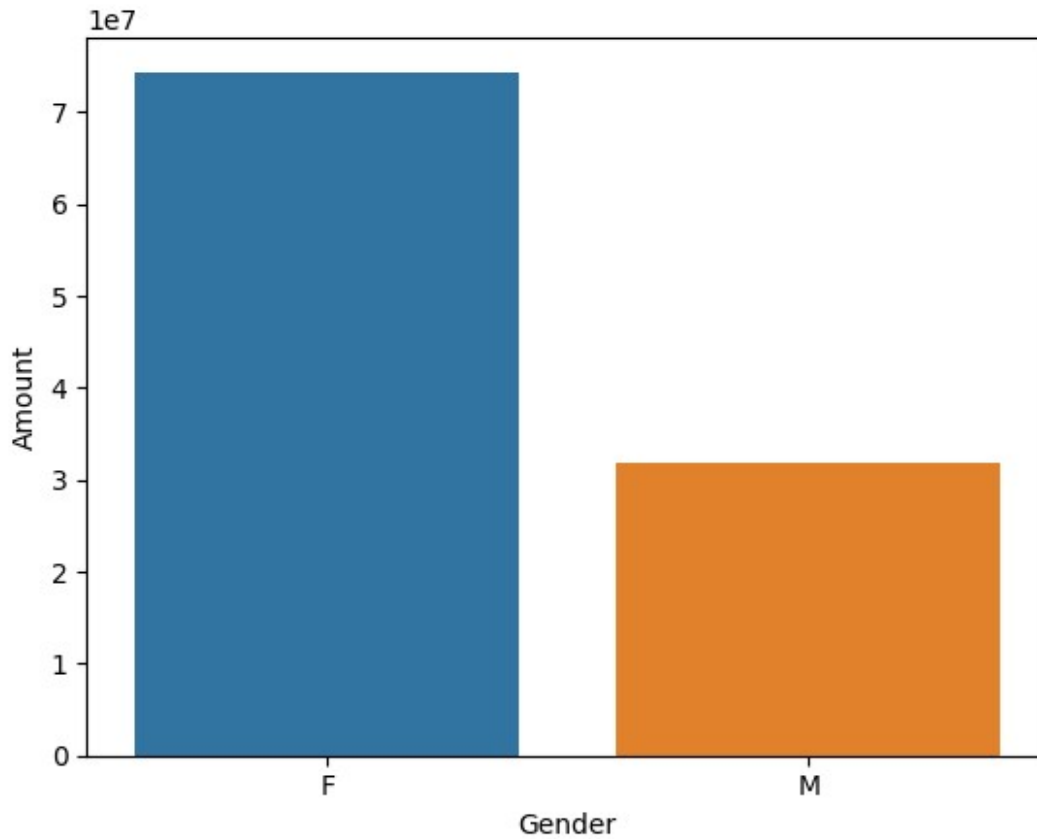
Exploratory Data Analysis

Gender

```
# plotting a bar chart for Gender and it's count  
  
ax = sns.countplot(x = 'Gender', data = df)  
  
for bars in ax.containers:  
    ax.bar_label(bars)
```



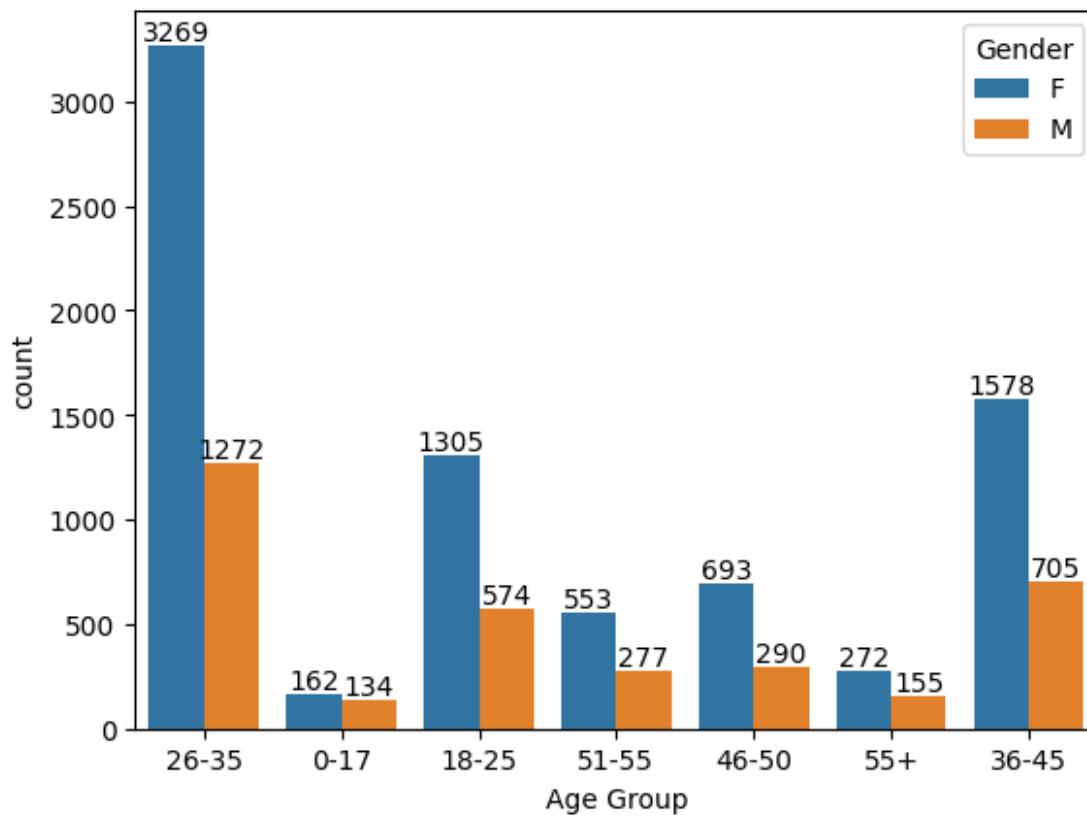
```
# plotting a bar chart for gender vs total amount  
sales_gen = df.groupby(['Gender'], as_index=False)  
['Amount'].sum().sort_values(by='Amount', ascending=False)  
  
sns.barplot(x = 'Gender', y= 'Amount' ,data = sales_gen)  
<Axes: xlabel='Gender', ylabel='Amount'>
```



From above graphs we can see that most of the buyers are females and even the purchasing power of females are greater than men

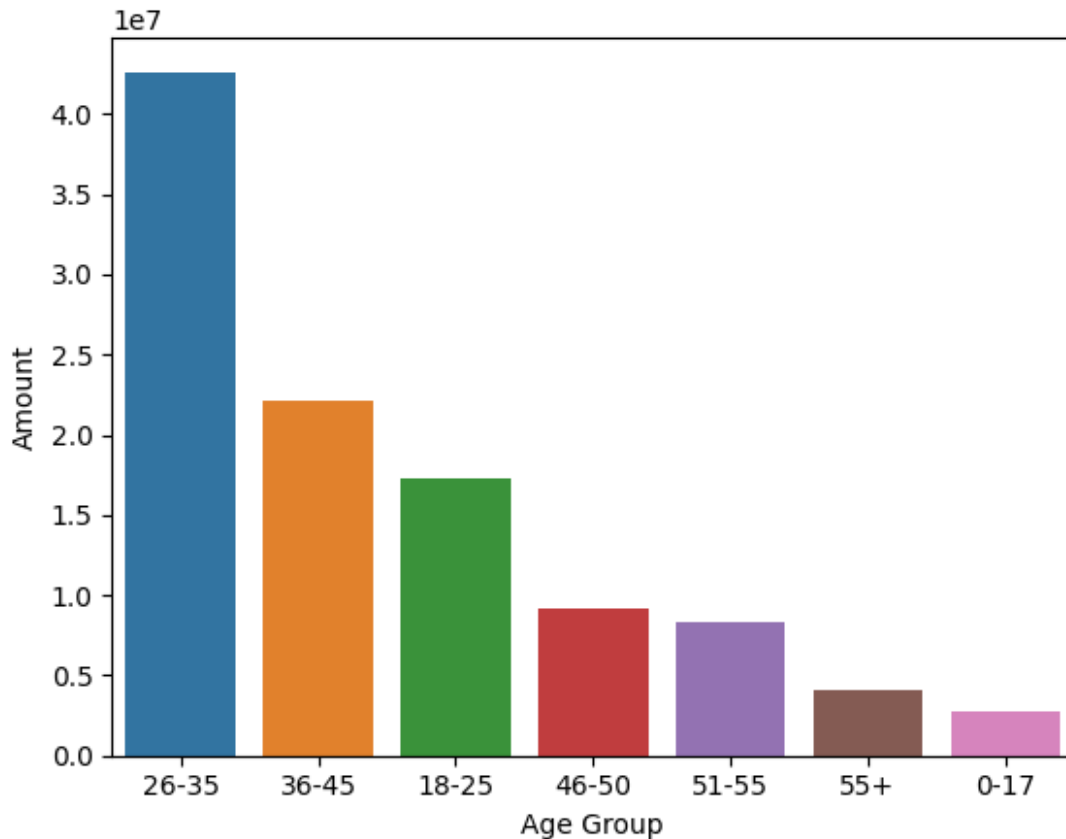
Age

```
ax = sns.countplot(data = df, x = 'Age Group', hue = 'Gender')  
for bars in ax.containers:  
    ax.bar_label(bars)
```



```
# Total Amount vs Age Group
sales_age = df.groupby(['Age Group'], as_index=False)
['Amount'].sum().sort_values(by='Amount', ascending=False)

sns.barplot(x = 'Age Group', y= 'Amount' ,data = sales_age)
<Axes: xlabel='Age Group', ylabel='Amount'>
```

From above graphs we can see that most of the buyers are of age group between 26-35 yrs female

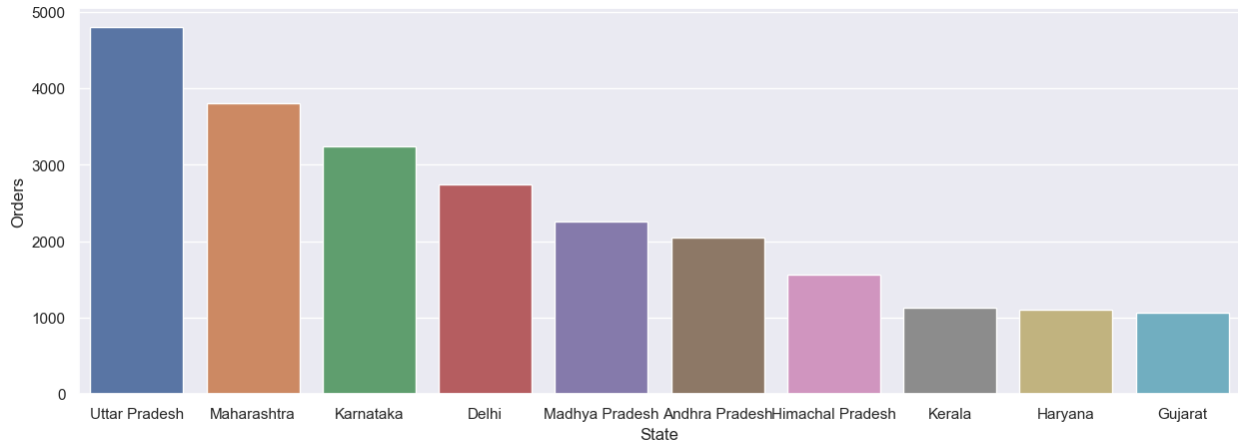
State

```
# total number of orders from top 10 states
```

```
sales_state = df.groupby(['State'], as_index=False)  
['Orders'].sum().sort_values(by='Orders', ascending=False).head(10)
```

```
sns.set(rc={'figure.figsize':(15,5)})  
sns.barplot(data = sales_state, x = 'State', y= 'Orders')
```

```
<Axes: xlabel='State', ylabel='Orders'>
```

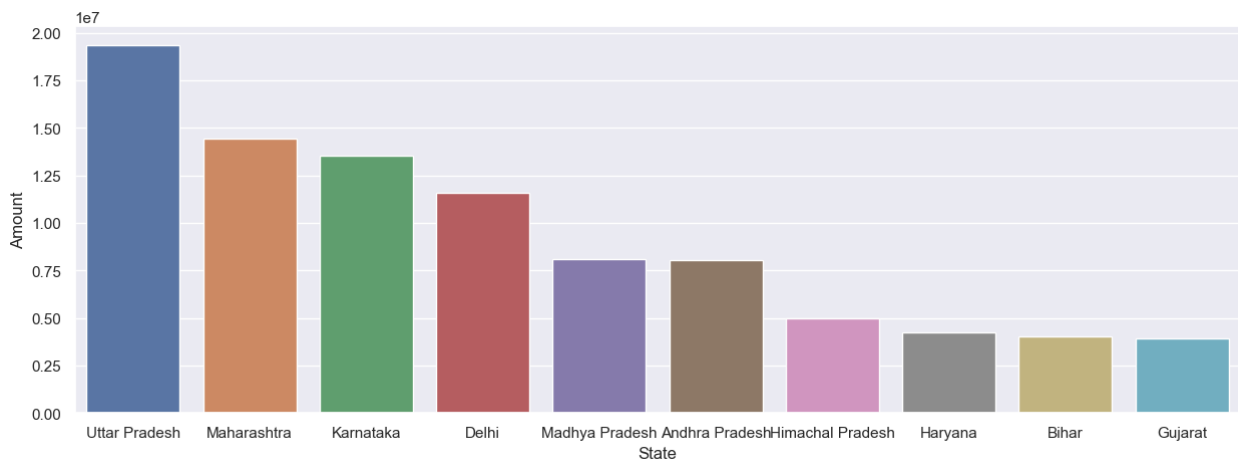


```
# total amount/sales from top 10 states
```

```
sales_state = df.groupby(['State'], as_index=False)
['Amount'].sum().sort_values(by='Amount', ascending=False).head(10)
```

```
sns.set(rc={'figure.figsize':(15,5)})
sns.barplot(data = sales_state, x = 'State', y= 'Amount')
```

```
<Axes: xlabel='State', ylabel='Amount'>
```



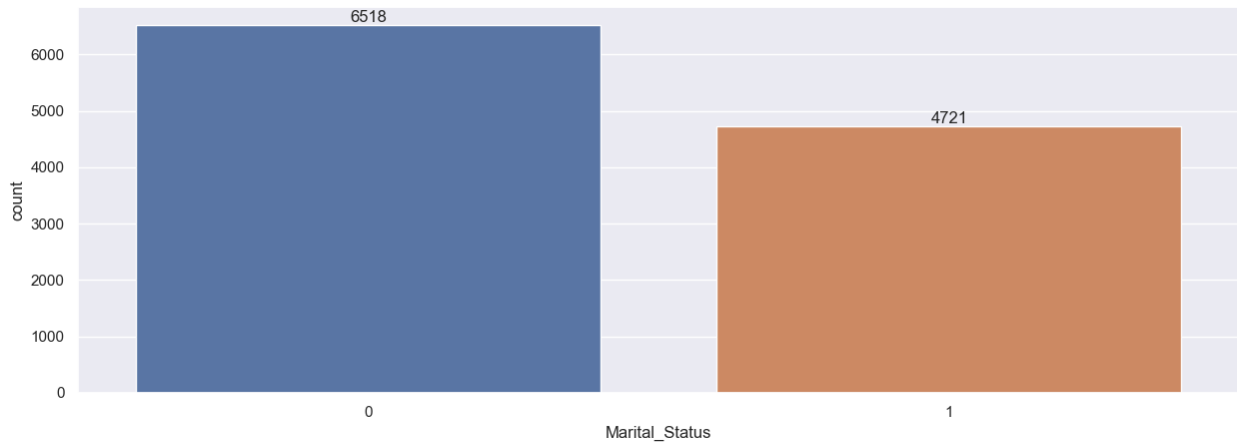
From above graphs we can see that most of the orders & total sales/amount are from Uttar Pradesh, Maharashtra and Karnataka respectively

Marital Status

```
ax = sns.countplot(data = df, x = 'Marital_Status')
```

```
sns.set(rc={'figure.figsize':(7,5)})
```

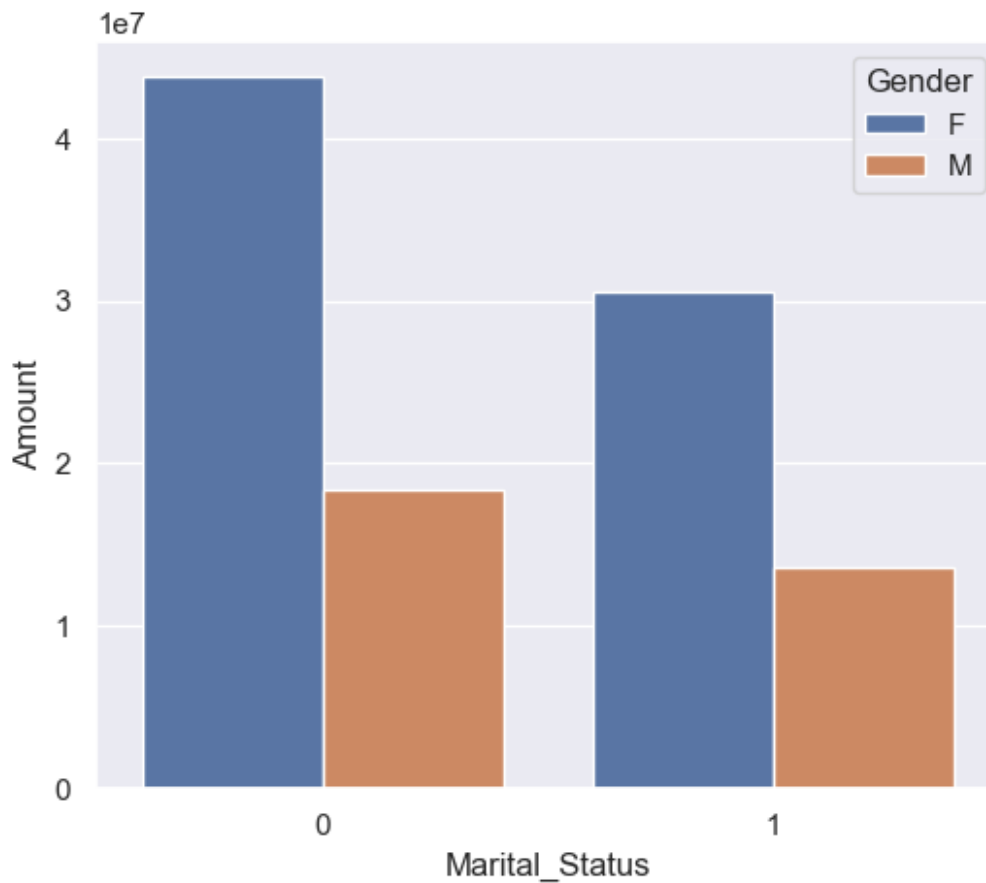
```
for bars in ax.containers:
    ax.bar_label(bars)
```



```
sales_state = df.groupby(['Marital_Status', 'Gender'], as_index=False)
['Amount'].sum().sort_values(by='Amount', ascending=False)
```

```
sns.set(rc={'figure.figsize':(6,5)})
sns.barplot(data = sales_state, x = 'Marital_Status', y= 'Amount',
hue='Gender')
```

```
<Axes: xlabel='Marital_Status', ylabel='Amount'>
```

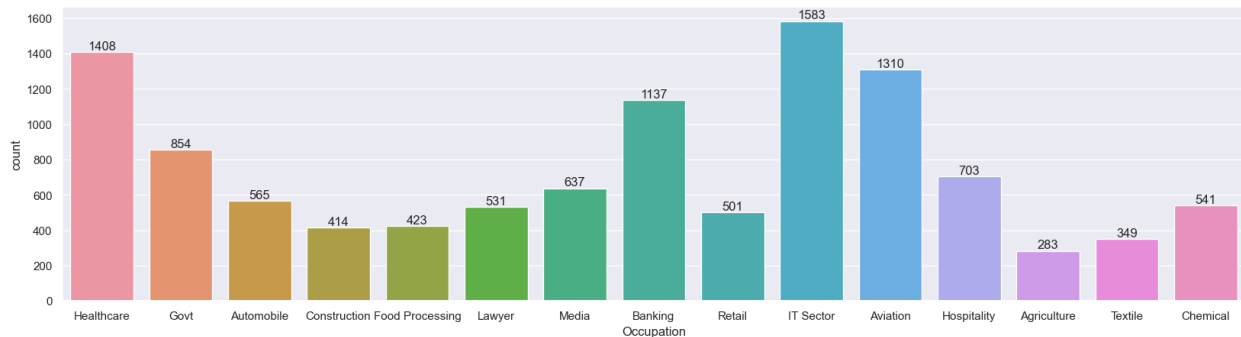


From above graphs we can see that most of the buyers are married (women) and they have high purchasing power

Occupation

```
sns.set(rc={'figure.figsize':(20,5)})
ax = sns.countplot(data = df, x = 'Occupation')

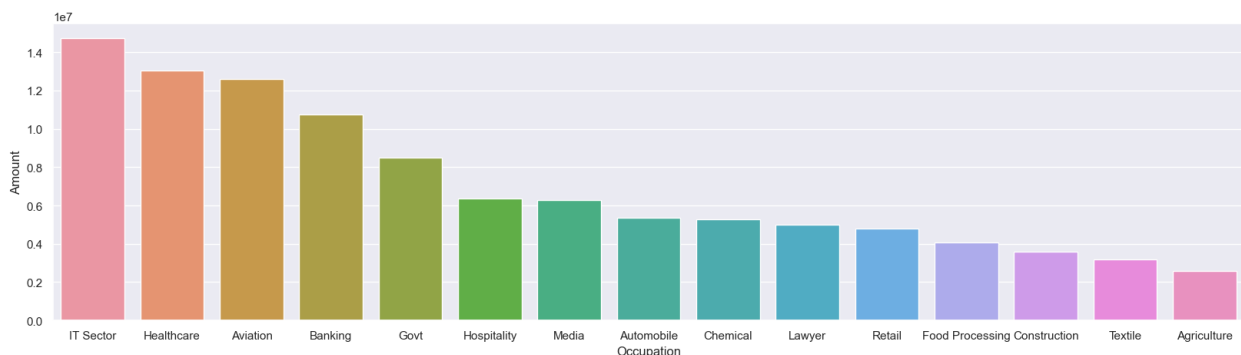
for bars in ax.containers:
    ax.bar_label(bars)
```



```
sales_state = df.groupby(['Occupation'], as_index=False)
['Amount'].sum().sort_values(by='Amount', ascending=False)

sns.set(rc={'figure.figsize':(20,5)})
sns.barplot(data = sales_state, x = 'Occupation', y= 'Amount')

<Axes: xlabel='Occupation', ylabel='Amount'>
```

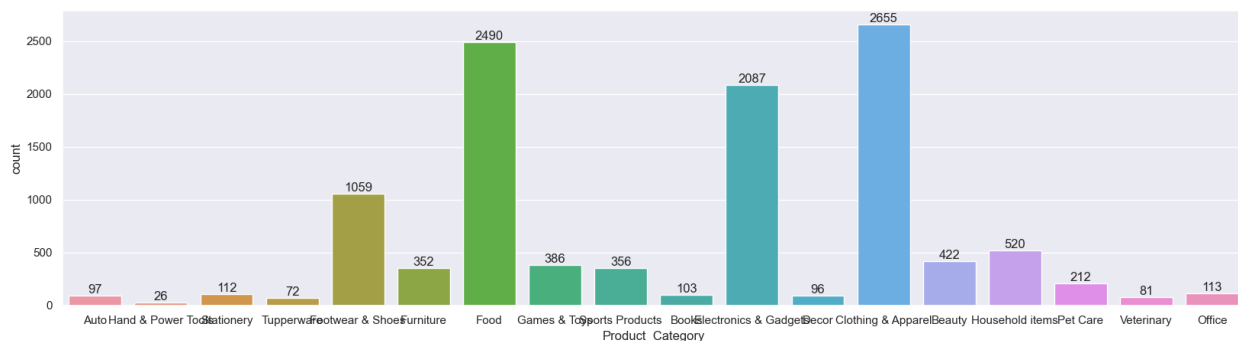


From above graphs we can see that most of the buyers are working in IT, Healthcare and Aviation sector

Product Category

```
sns.set(rc={'figure.figsize':(20,5)})
ax = sns.countplot(data = df, x = 'Product_Category')
```

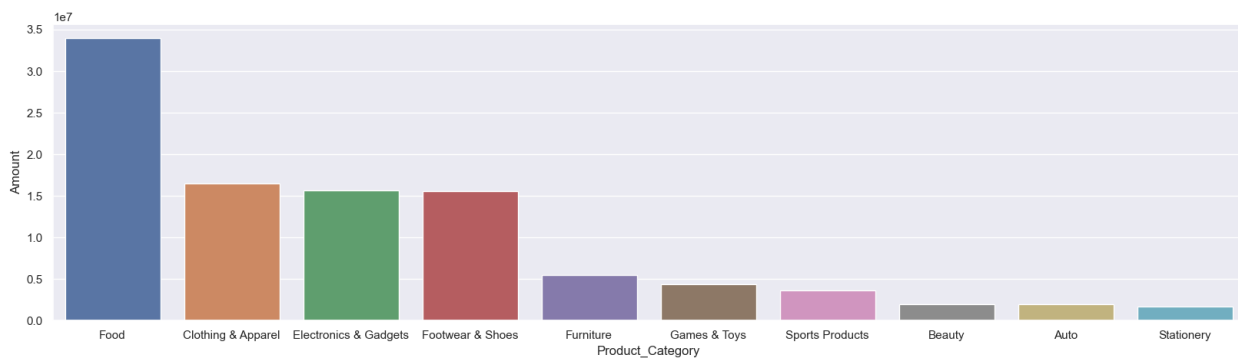
```
for bars in ax.containers:
    ax.bar_label(bars)
```



```
sales_state = df.groupby(['Product_Category'], as_index=False)
['Amount'].sum().sort_values(by='Amount', ascending=False).head(10)

sns.set(rc={'figure.figsize':(20,5)})
sns.barplot(data = sales_state, x = 'Product_Category',y= 'Amount')

<Axes: xlabel='Product_Category', ylabel='Amount'>
```

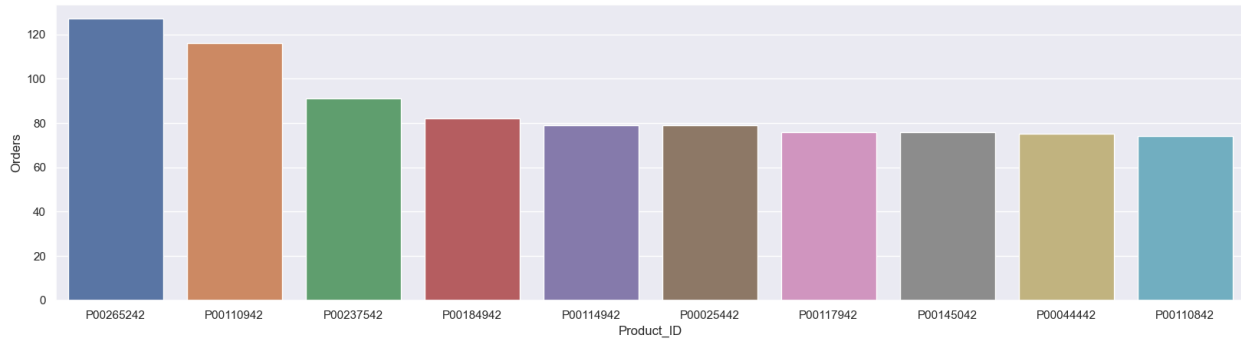


From above graphs we can see that most of the sold products are from Food, Clothing and Electronics category

```
sales_state = df.groupby(['Product_ID'], as_index=False)
['Orders'].sum().sort_values(by='Orders', ascending=False).head(10)

sns.set(rc={'figure.figsize':(20,5)})
sns.barplot(data = sales_state, x = 'Product_ID',y= 'Orders')

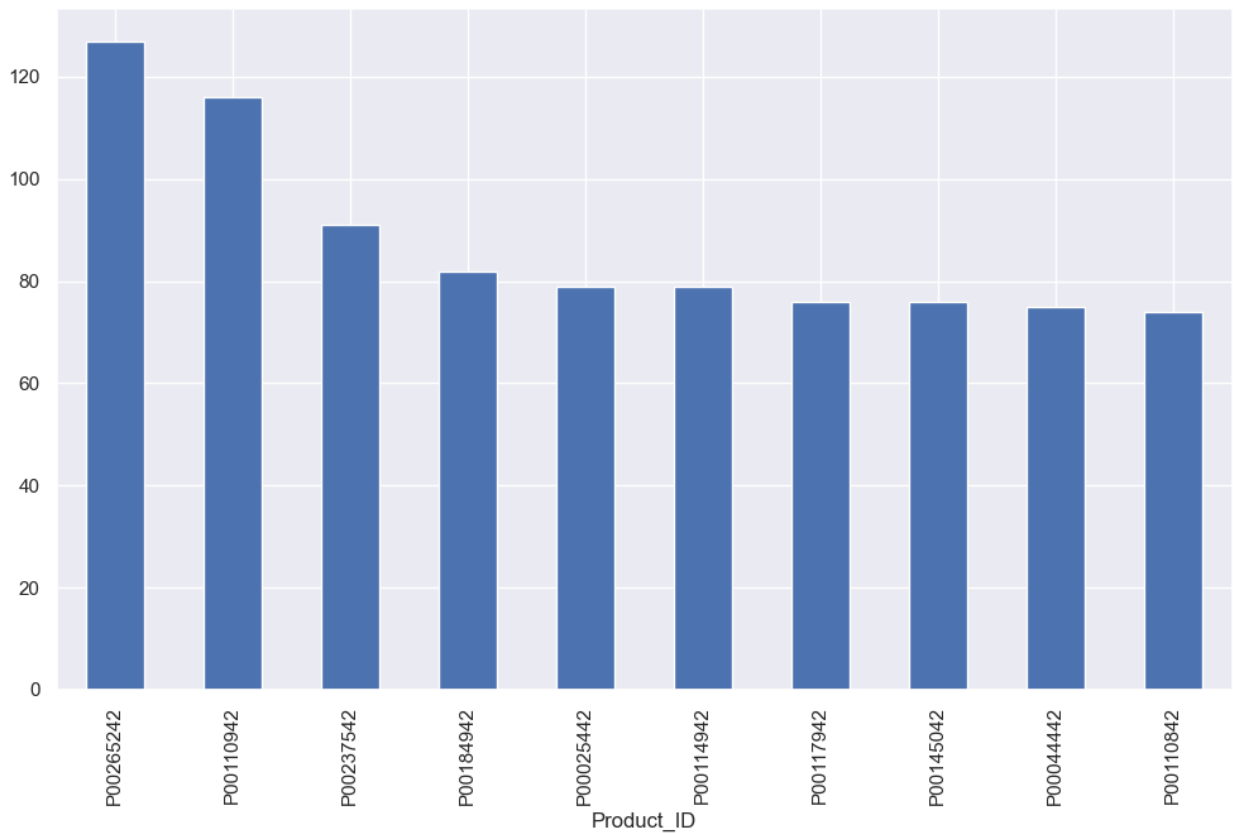
<Axes: xlabel='Product_ID', ylabel='Orders'>
```



top 10 most sold products (same thing as above)

```
fig1, ax1 = plt.subplots(figsize=(12,7))
df.groupby('Product_ID')
['Orders'].sum().nlargest(10).sort_values(ascending=False).plot(kind='
bar')
```

<Axes: xlabel='Product_ID'>



Conclusion:

Married women age group 26-35 yrs from UP, Maharastra and Karnataka working in IT, Healthcare and Aviation are more likely to buy products from Food, Clothing and Electronics category