Project 2

import python Libraries and load and read csv file

```
# 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')
```

Explore the Data

```
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
Amount  \
0    Maharashtra   Western       Healthcare             Auto       1
23952.0
1  Andhra?radesh  Southern             Govt             Auto       3
23934.0
2  Uttar Pradesh   Central       Automobile             Auto       3
23924.0
3      Karnataka  Southern     Construction             Auto       2
23912.0
4        Gujarat   Western  Food Processing             Auto       2
23877.0
```

```
   Status  unnamed1
0     NaN       NaN
1     NaN       NaN
2     NaN       NaN
3     NaN       NaN
4     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
```

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

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

```python
df['Amount'].dtypes
```

```
dtype('int32')
```

```python
df.columns
```

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

```python
#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?radesh  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
11239.000000
mean   1.003004e+06     35.410357        0.420055      2.489634
9453.610553
std    1.716039e+03     12.753866        0.493589      1.114967
```

```
5222.355168
min    1.000001e+06     12.000000        0.000000       1.000000
188.000000
25%    1.001492e+06     27.000000        0.000000       2.000000
5443.000000
50%    1.003064e+06     33.000000        0.000000       2.000000
8109.000000
75%    1.004426e+06     43.000000        1.000000       3.000000
12675.000000
max    1.006040e+06     92.000000        1.000000       4.000000
23952.000000
```

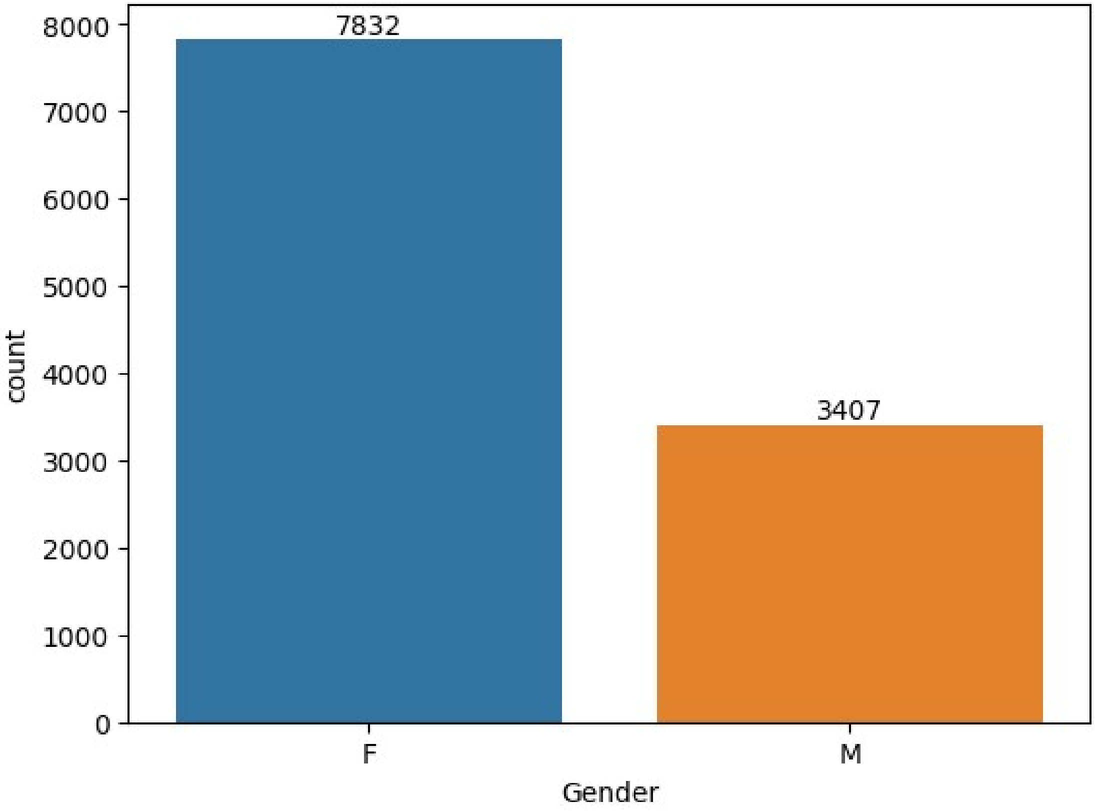
```
# use describe() for specific columns
df[['Age', 'Orders', 'Amount']].describe()
```

```
                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

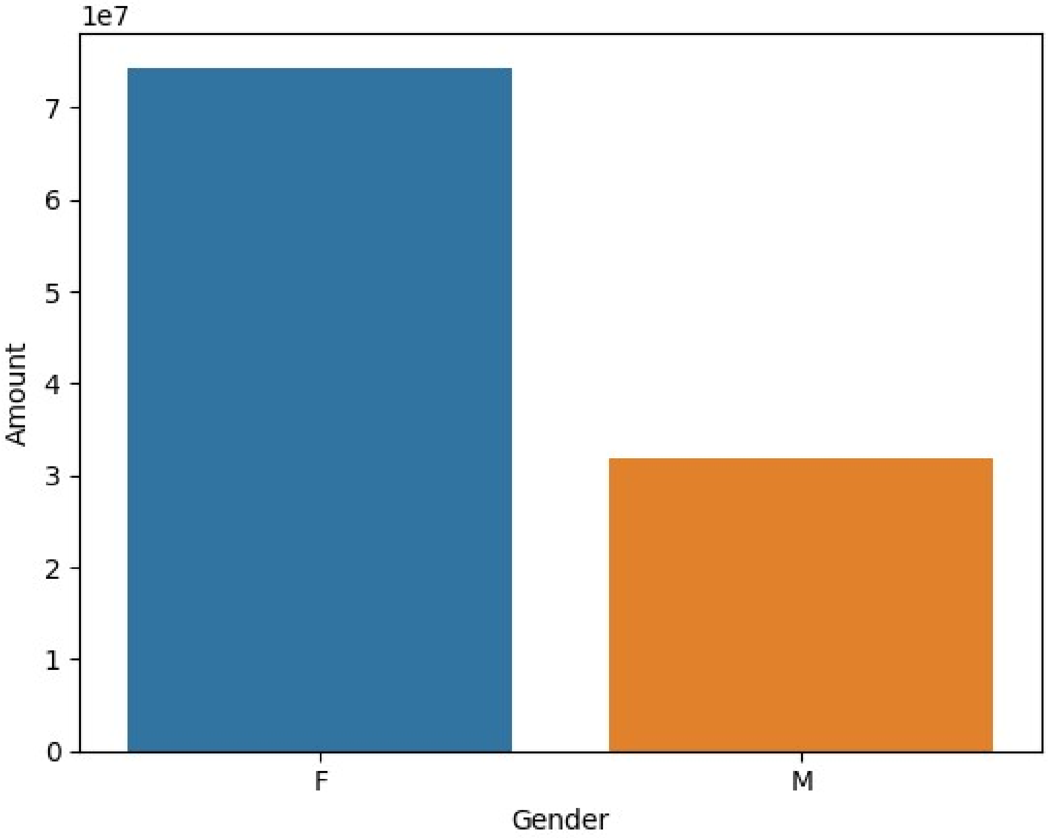
Gender

```
# 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)
```

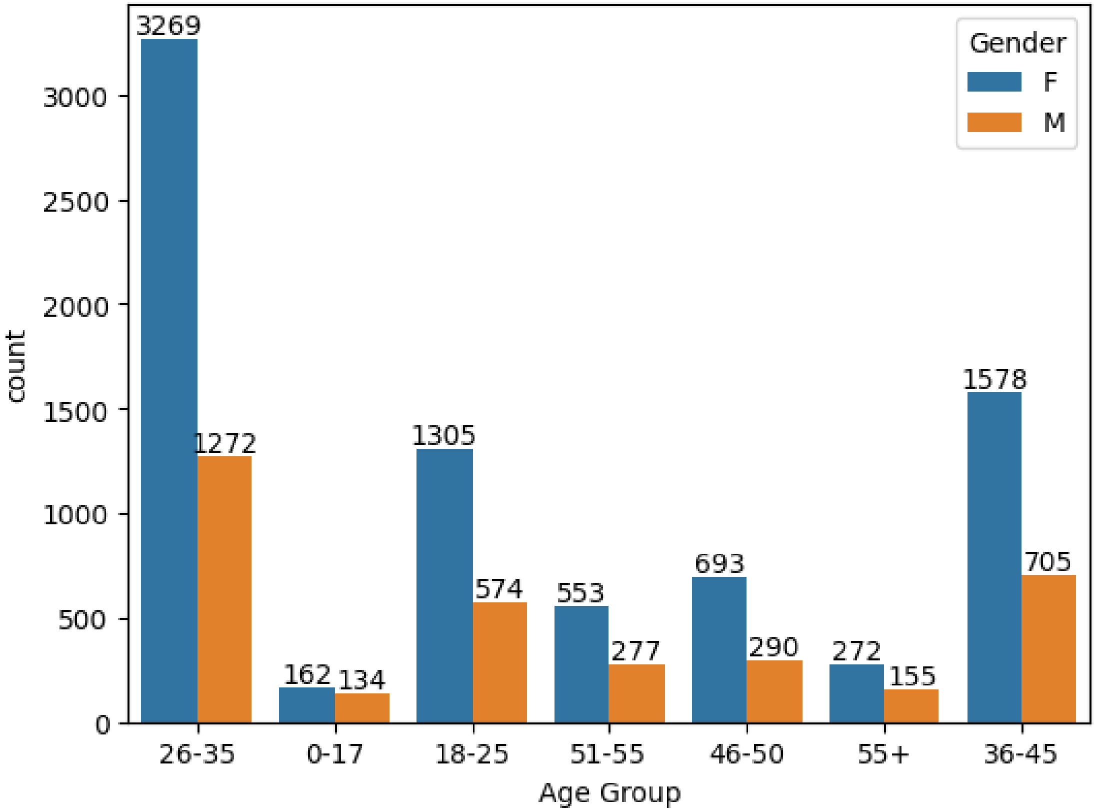
```
<Axes: xlabel='Gender', ylabel='Amount'>
```



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

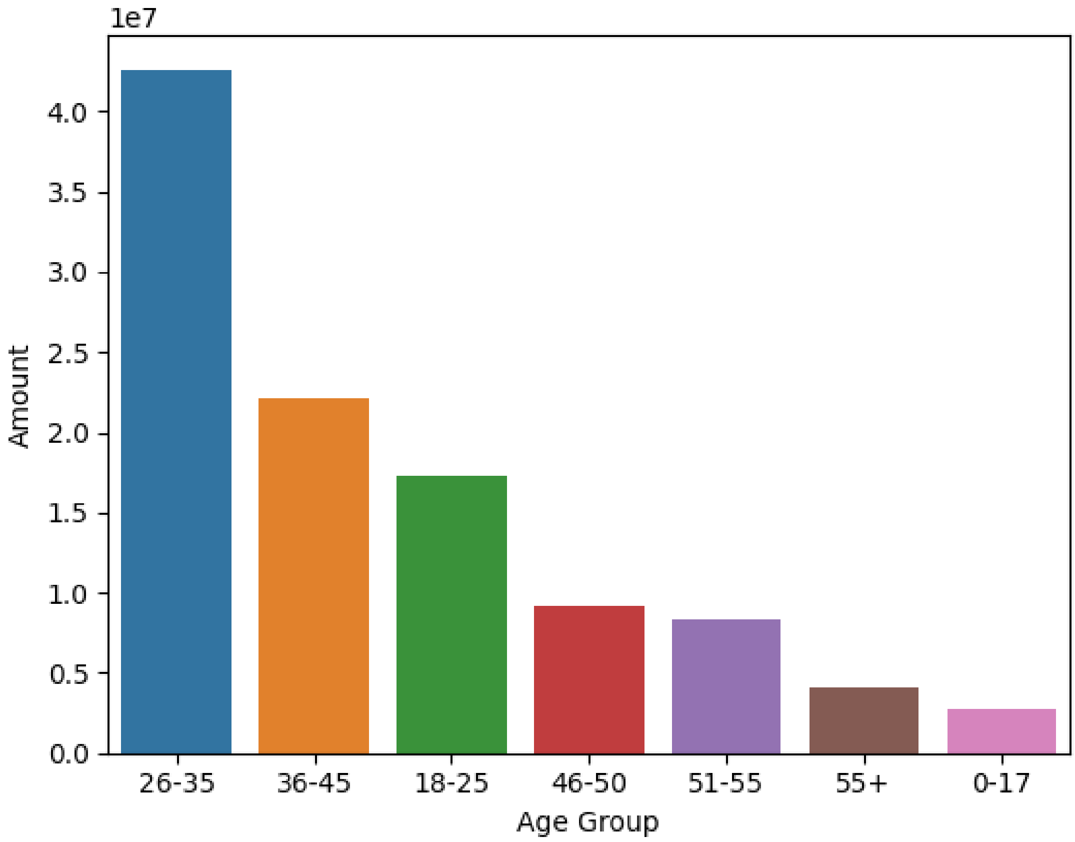
Age

```
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)
```

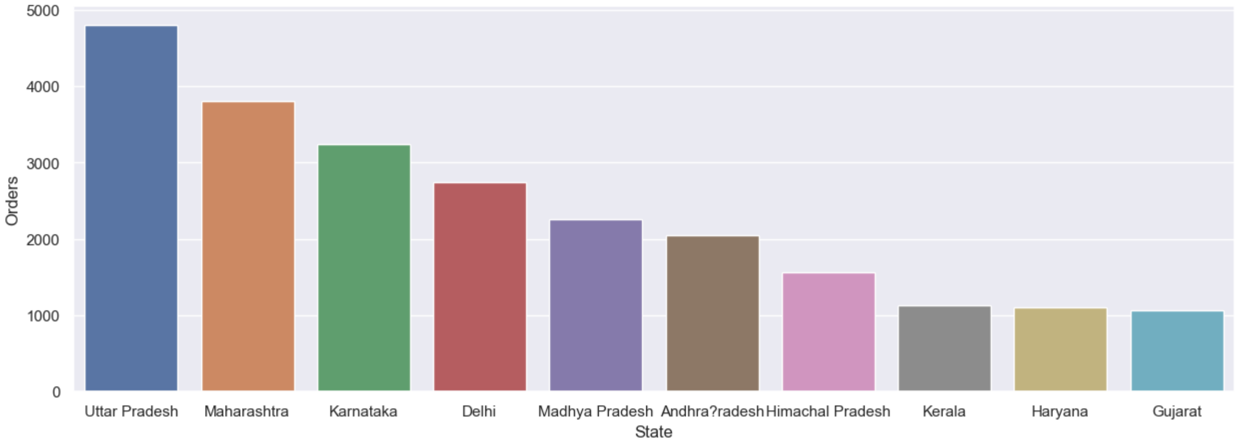
```
<Axes: xlabel='Age Group', ylabel='Amount'>
```



State

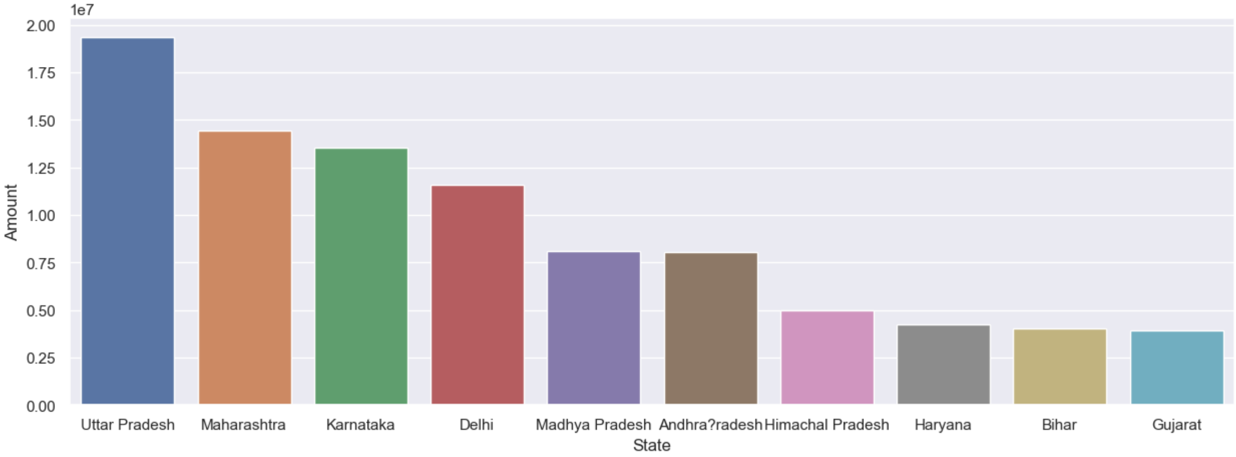
```
# total number of orders from top 10 states

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')
```

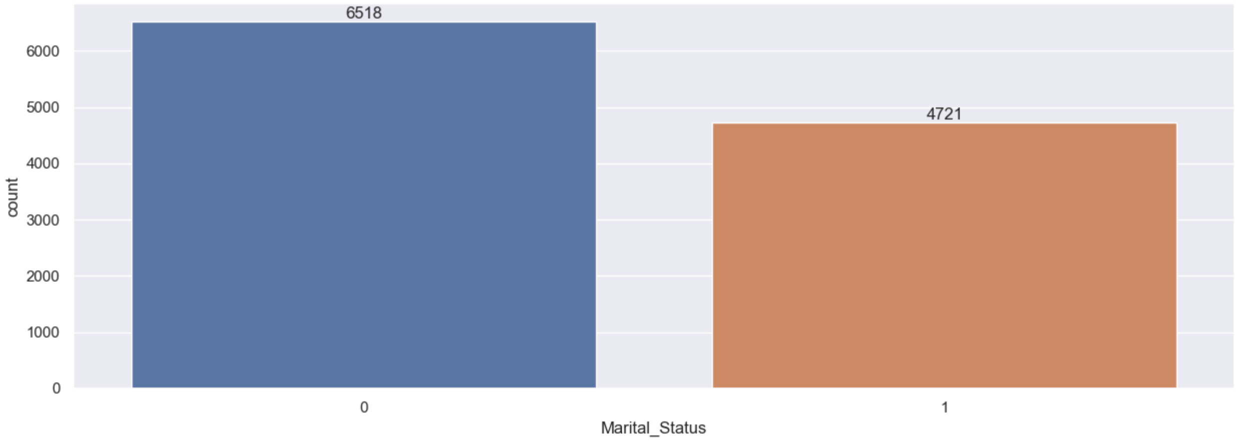
```
<Axes: xlabel='State', ylabel='Amount'>
```



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

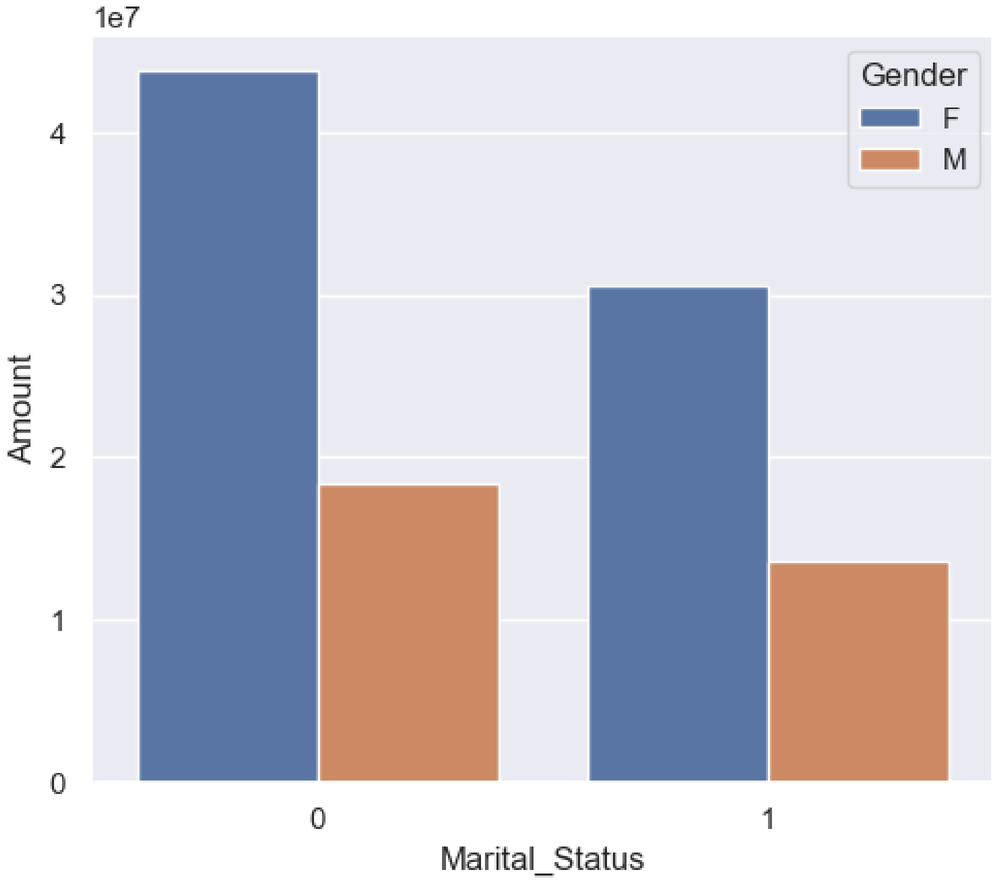
Marital Status

```
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')
```

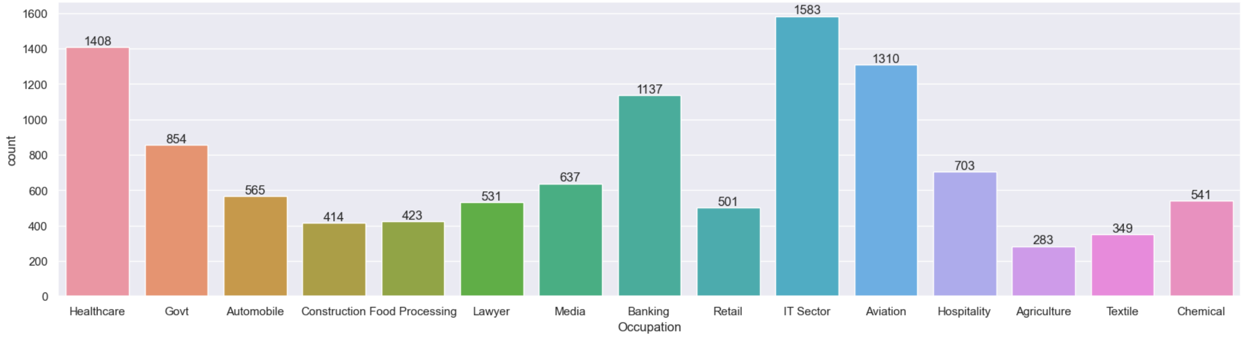
```
<Axes: xlabel='Marital_Status', ylabel='Amount'>
```



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

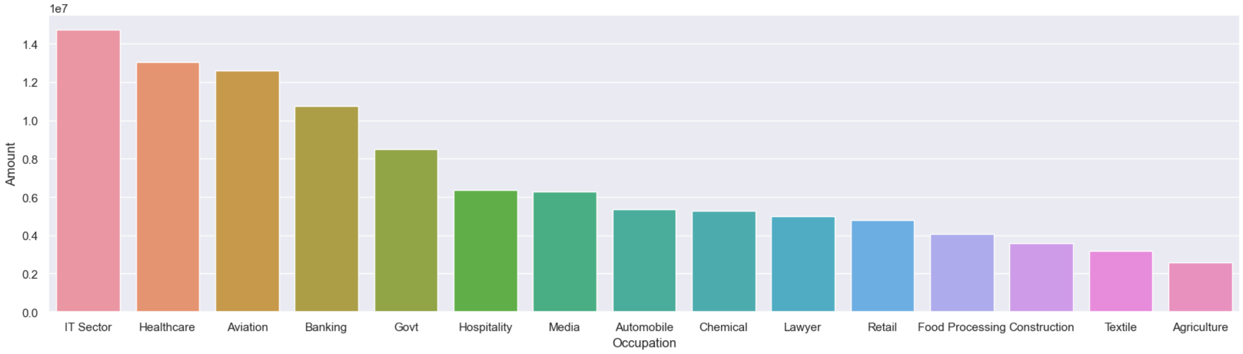
Occupation

```
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'>
```

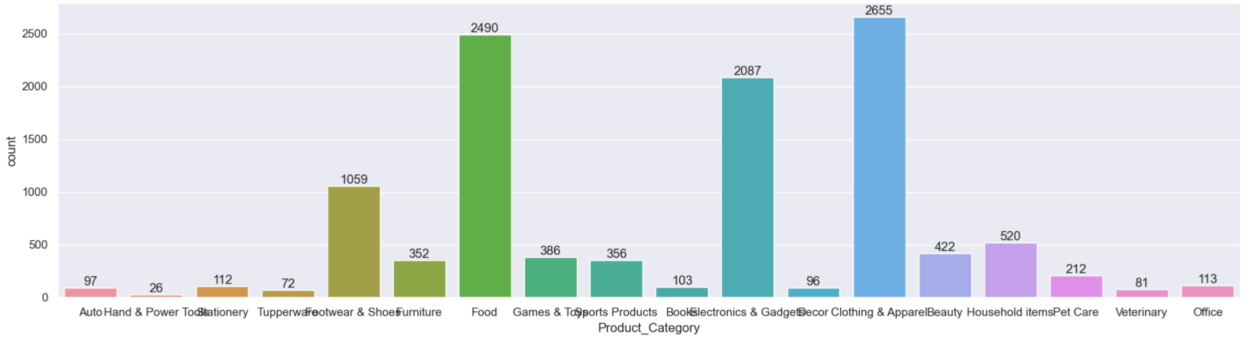


result:From above graphs we can see that most of the buyers are working in IT, Healthcare and Aviation sector

Product Category

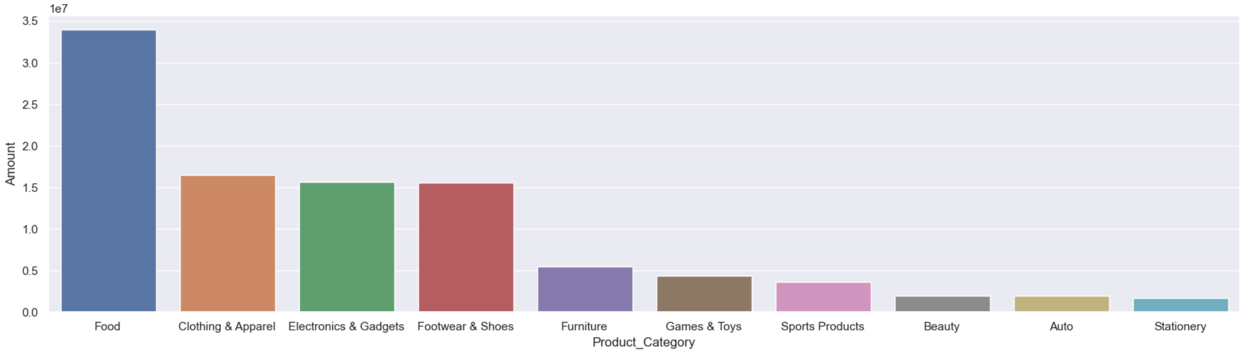
```
sns.set(rc={'figure.figsize':(20,5)})
ax = sns.countplot(data = df, x = 'Product_Category')
```

```
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')
```

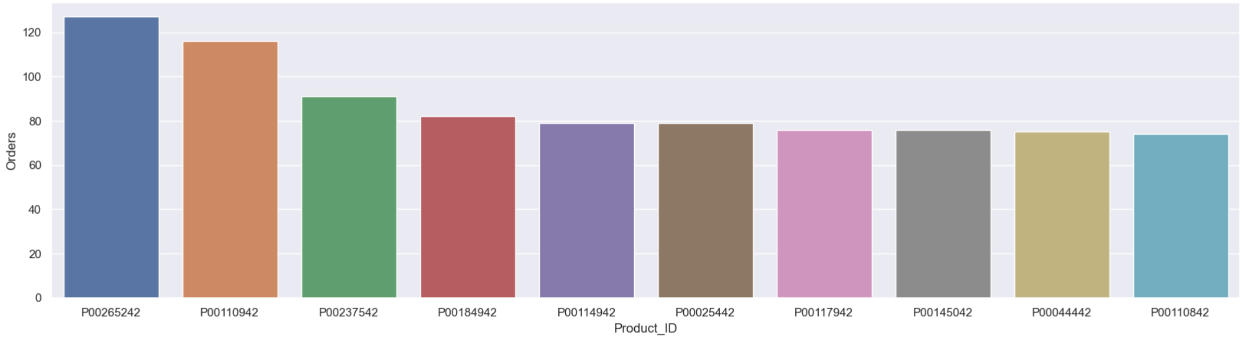
```
<Axes: xlabel='Product_Category', ylabel='Amount'>
```



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

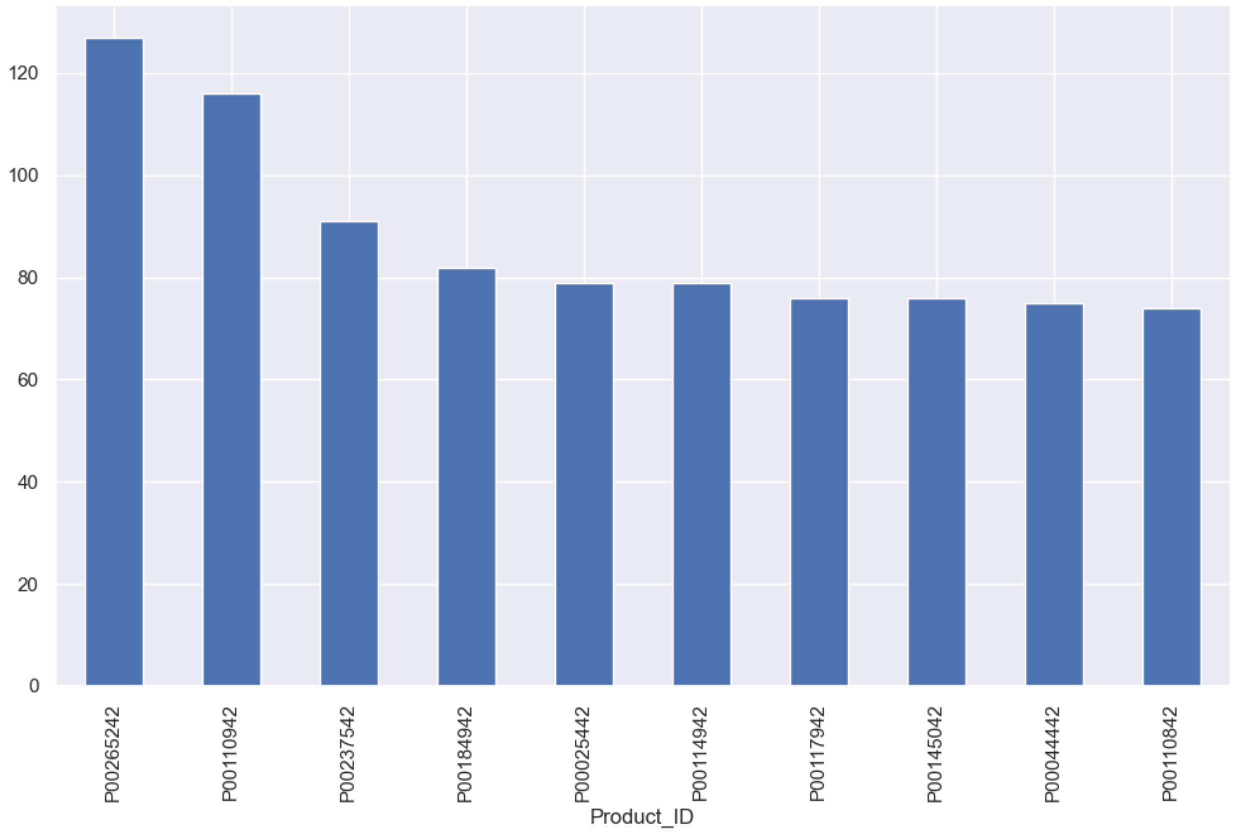
```
sales_state = df.groupby(['Product_ID'], as_index=False)
['Orders'].sum().sort_values(by='Orders', ascending=False).head(10)

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