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

df = pd.read_csv(r"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
```

```
df.drop(['Status','unnamed1'],axis = 1 ,inplace = True)
print(df.columns)
```

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

```
pd.isnull(df)
```

```
       User_ID  Cust_name  Product_ID  Gender  Age Group    Age  \
0        False      False       False   False      False  False   
1        False      False       False   False      False  False   
2        False      False       False   False      False  False   
3        False      False       False   False      False  False   
4        False      False       False   False      False  False   
...        ...        ...         ...     ...        ...    ...   
11246    False      False       False   False      False  False   
11247    False      False       False   False      False  False   
11248    False      False       False   False      False  False   
11249    False      False       False   False      False  False   
11250    False      False       False   False      False  False   

       Marital_Status  State   Zone  Occupation  Product_Category
Orders  \
0               False  False  False       False             False
False
1               False  False  False       False             False
```

```
False
2               False  False  False       False              False
False
3               False  False  False       False              False
False
4               False  False  False       False              False
False
...               ...    ...    ...         ...                ...
...
11246           False  False  False       False              False
False
11247           False  False  False       False              False
False
11248           False  False  False       False              False
False
11249           False  False  False       False              False
False
11250           False  False  False       False              False
False

       Amount
0       False
1       False
2       False
3       False
4       False
...       ...
11246   False
11247   False
11248   False
11249   False
11250   False

[11251 rows x 13 columns]
```

```
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
```

```
df.shape
```

```
(11251, 13)
```

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

```
df.shape
```

```
(11239, 13)
```

```
data_test = [['Madhav',11],['Gopi',15],['Keshav',],['Lalita',16]]
df_test = pd.DataFrame(data_test , columns = ['Name','Age'])
df_test
```

```
     Name   Age
0  Madhav  11.0
1    Gopi  15.0
2  Keshav   NaN
3  Lalita  16.0
```

```
df_test.dropna(inplace=True)
```

```
df_test
```

```
     Name   Age
0  Madhav  11.0
1    Gopi  15.0
3  Lalita  16.0
```

```
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')
```

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

```
       User_ID    Cust_name Product_ID Gender Age Group  Age  Shadi  \
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]
```

```
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
```

```
df[['Age','Orders','Amount']].describe()
```

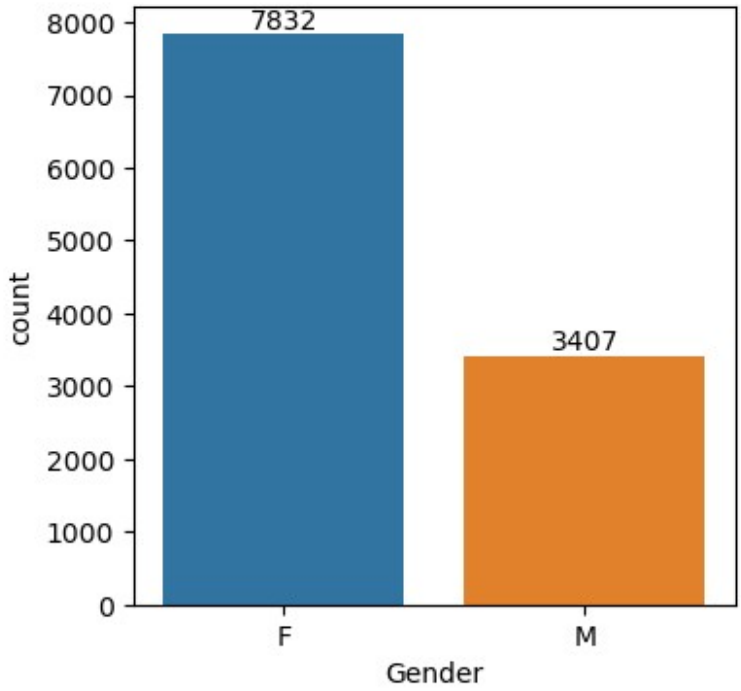
```
                Age        Orders        Amount
count  11239.000000  11239.000000  11239.000000
mean      35.410357      2.489634   9453.610553
std       12.753866      1.114967   5222.355168
min       12.000000      1.000000    188.000000
25%       27.000000      2.000000   5443.000000
50%     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

Exploratory Data Analysis

```
df.columns
```

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

```
plt.figure(figsize = (4,4))
ax = sns.countplot(x = 'Gender',data = df,hue = "Gender")

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

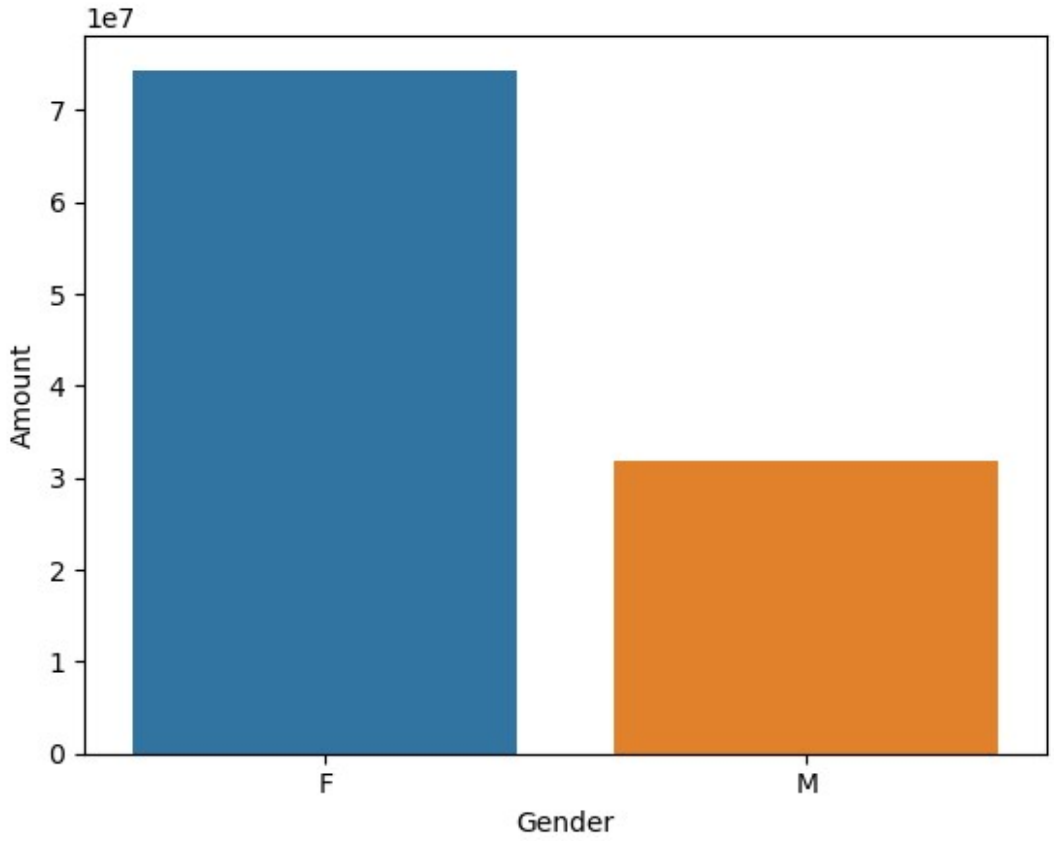



```
df.groupby(['Gender'],as_index=False)
['Amount'].sum().sort_values(by='Amount',ascending = False)
```

	Gender	Amount
0	F	74335853
1	M	31913276

```
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 ,hue = 'Gender')
```

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



from above graphs we can see that most of the buyers are female and eve purchasing power of females are greater than man

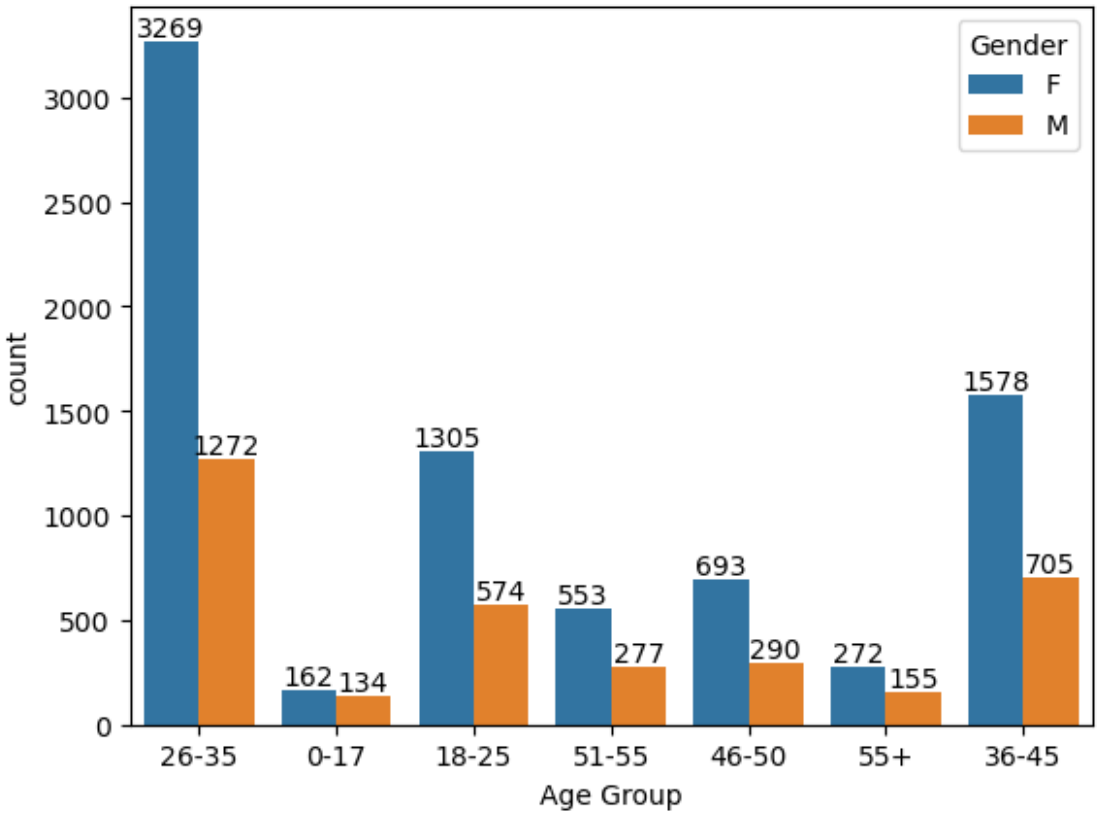
Age

```
df.columns
```

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

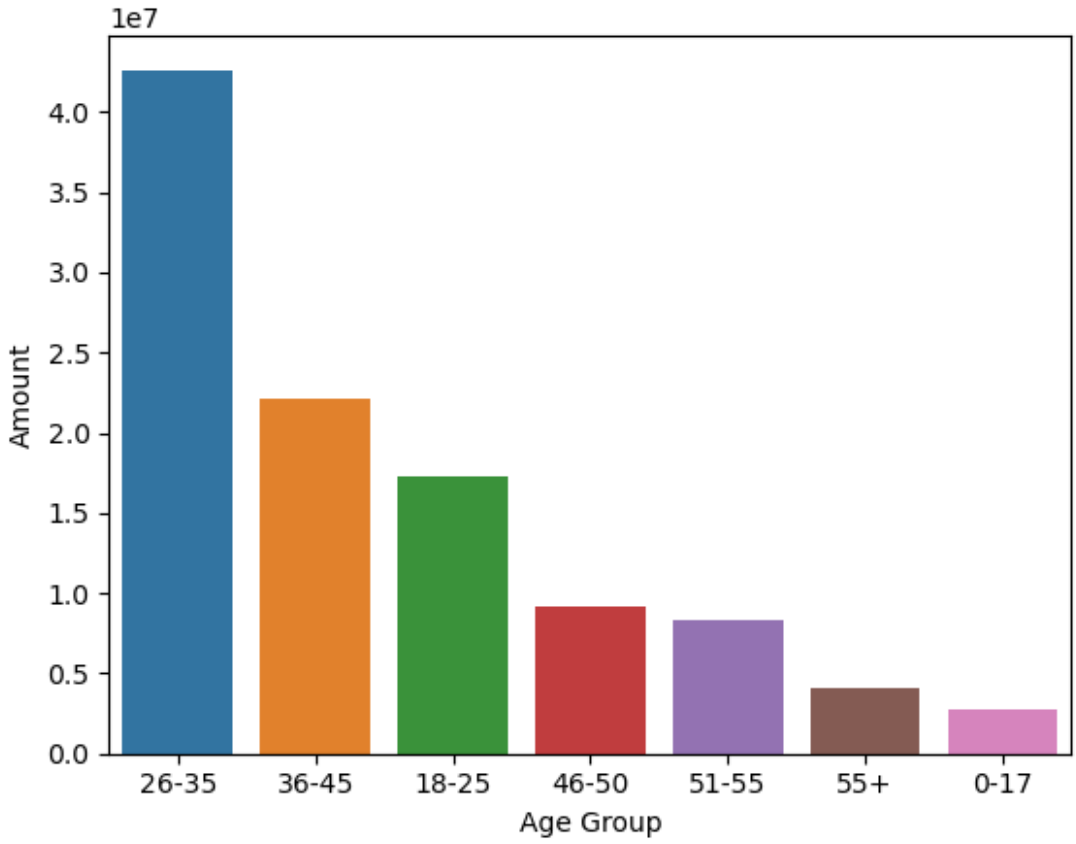
```
ax = sns.countplot(data = df, x = 'Age Group' , hue = 'Gender')
```

```
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 , hue = 'Age
Group')
```

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



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

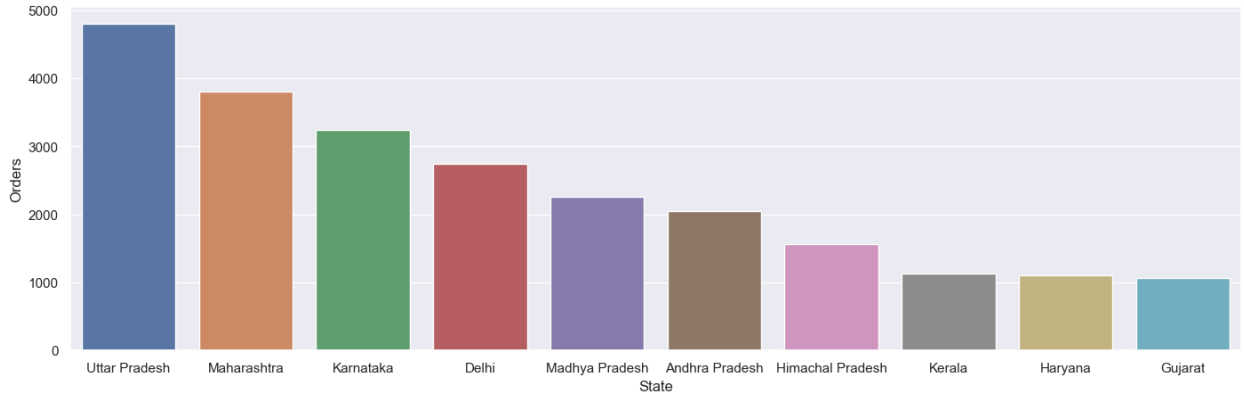
State

```
df.columns
```

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

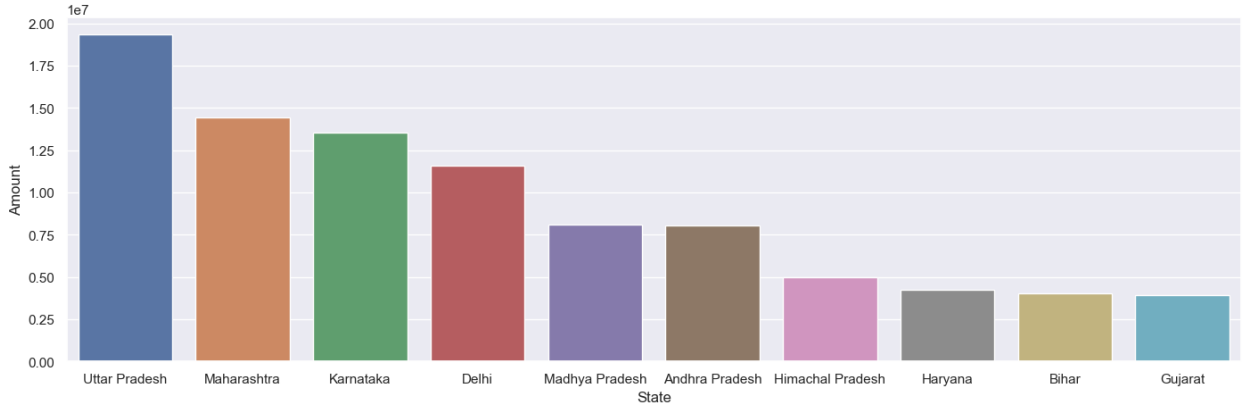
```
#total numbers of orders from 10 top states
sns.set(rc={'figure.figsize' : (17,5)})
sales_age = df.groupby(['State'],as_index=False)
['Orders'].sum().sort_values(by='Orders',ascending = False).head(10)
sns.barplot(x='State',y = 'Orders',data = sales_age , hue = 'State')
```

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




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

sales_age = df.groupby(['State'],as_index=False)
['Amount'].sum().sort_values(by='Amount',ascending = False).head(10)
sns.barplot(x='State',y = 'Amount',data = sales_age , hue = 'State')
```

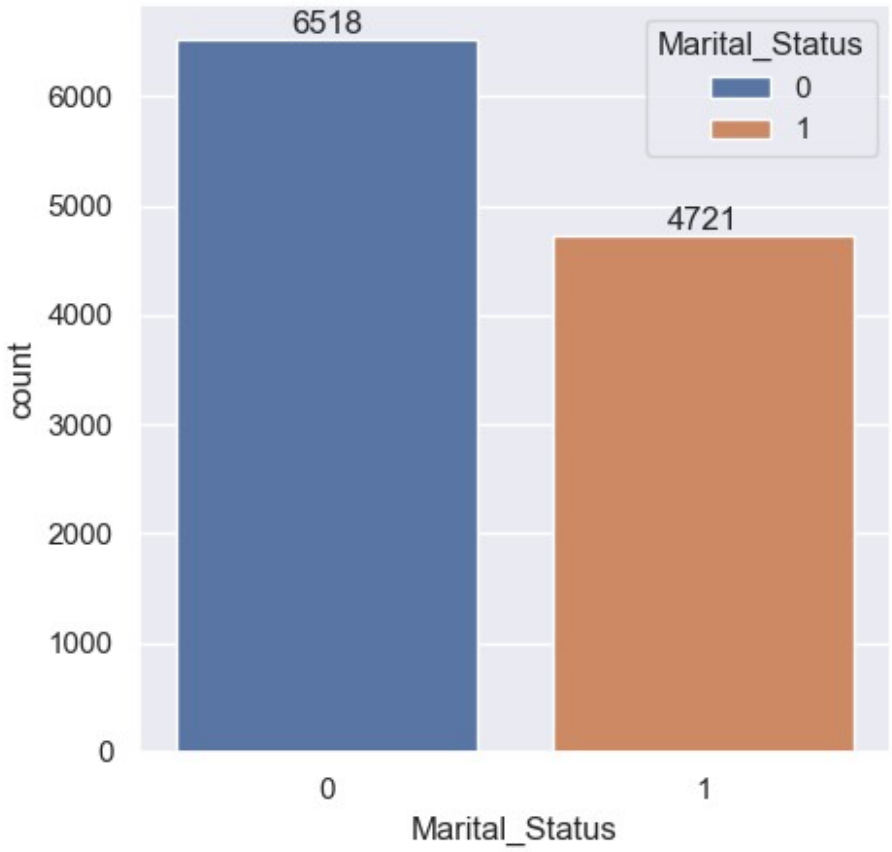
```
<Axes: xlabel='State', ylabel='Amount'>
```



from above graphs we ca see that most of the orders & total sales/amount are from Uttar Pradesh, Maharashtra, Karnataka respectivaly

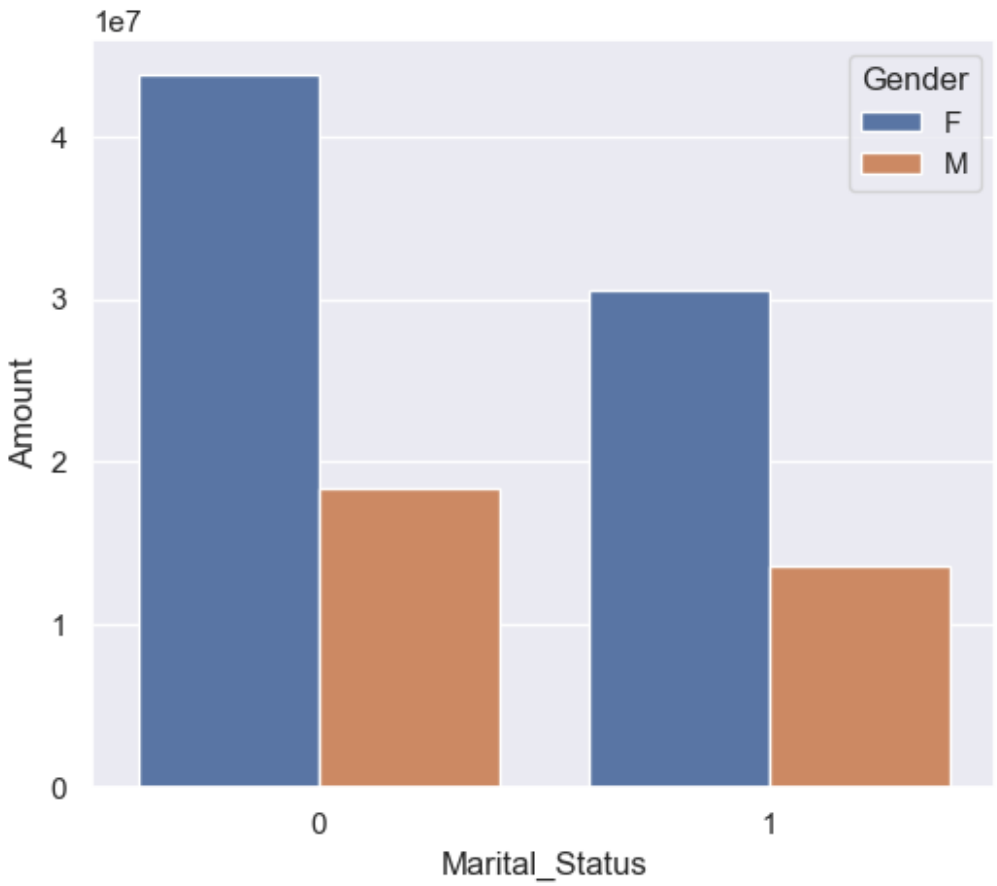
Marital Status

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

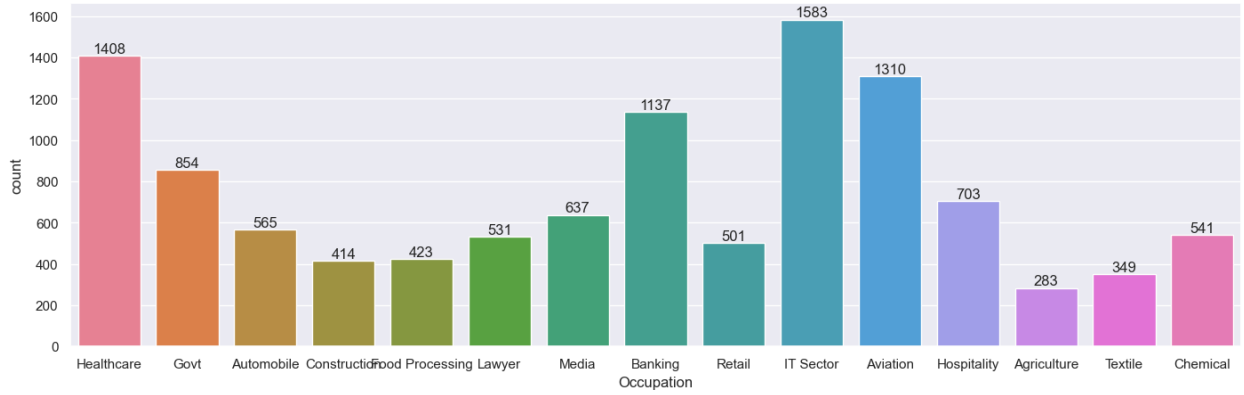
```
<Axes: xlabel='Marital_Status', ylabel='Amount'>
```



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

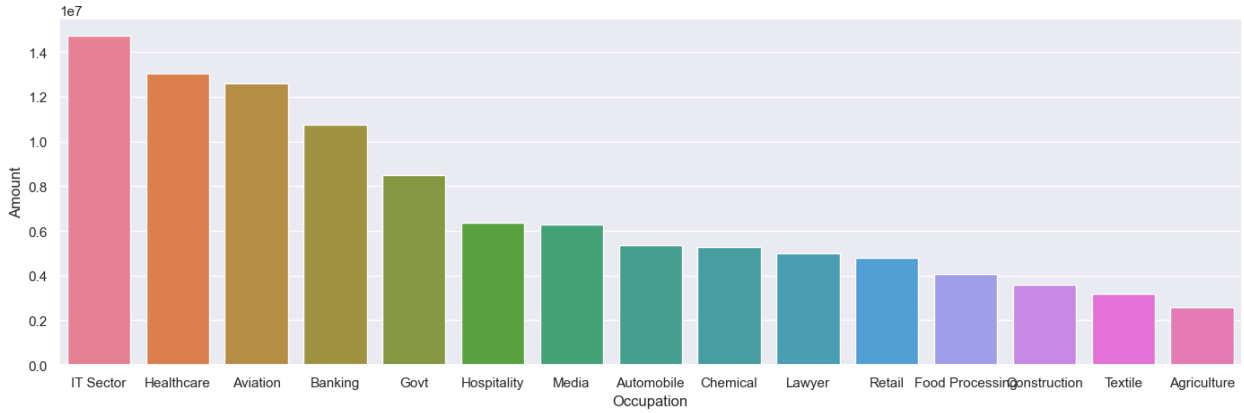
Occupation

```
sns.set(rc={'figure.figsize' : (17,5)})
ax = sns.countplot(data = df, x = 'Occupation', hue = 'Occupation' )
for bars in  ax.containers:
    ax.bar_label(bars)
```



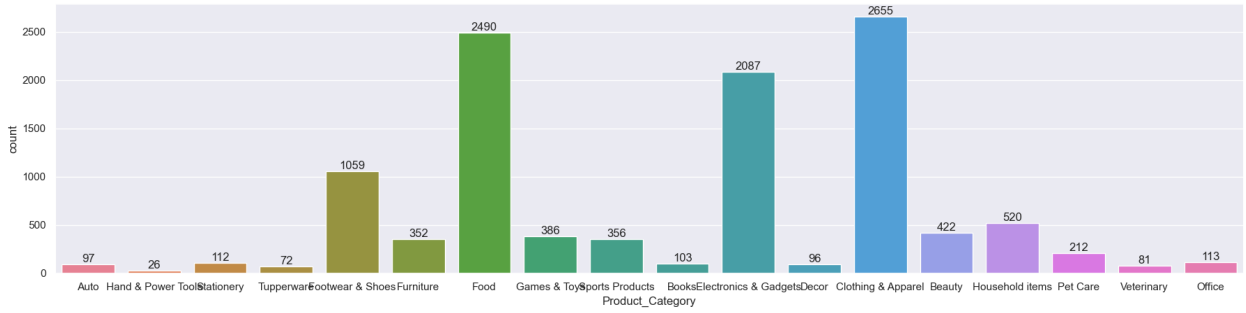

```
sales_state = df.groupby(['Occupation'],as_index=False)
['Amount'].sum().sort_values(by='Amount',ascending = False)
sns.set(rc={'figure.figsize' : (17,5)})
sns.barplot(x='Occupation',y = 'Amount',data = sales_state , hue =
'Occupation')
```

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

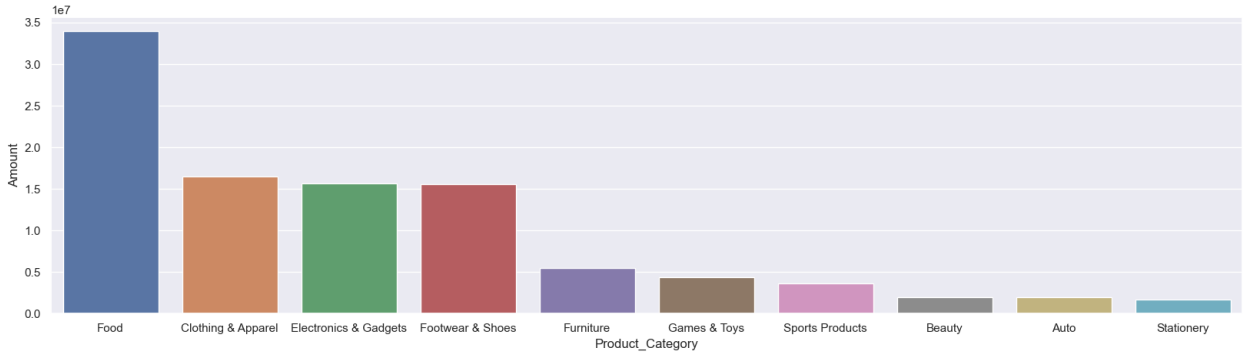


fromabove graphs we can see that the most of the buyers are working in IT,Healthcare ,Aviation sector

```
sns.set(rc={'figure.figsize' : (22,5)})
ax = sns.countplot(data = df, x = 'Product_Category', hue =
'Product_Category' )
for bars in  ax.containers:
    ax.bar_label(bars)
```

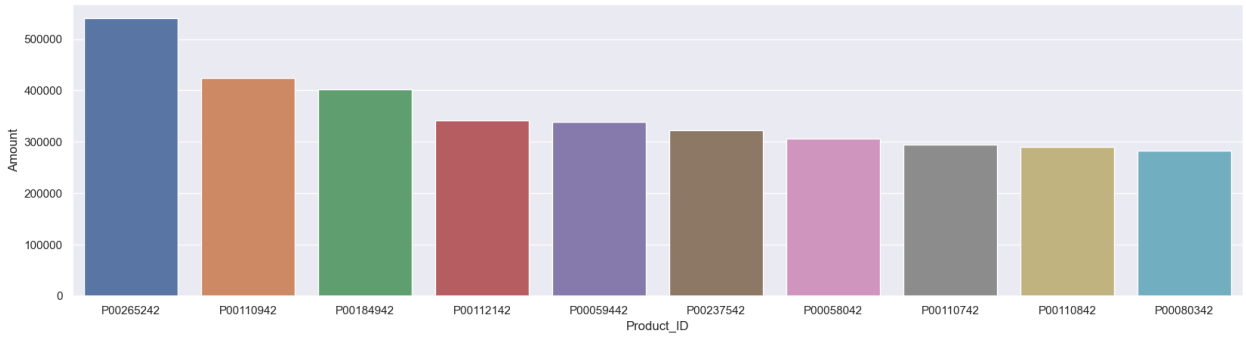



```
sales_state = df.groupby(['Product_Category'],as_index=False)
['Amount'].sum().sort_values(by='Amount',ascending = False).head(10)
sns.set(rc={'figure.figsize' : (20,5)})
sns.barplot(x='Product_Category',y = 'Amount',data = sales_state , hue
= 'Product_Category')

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

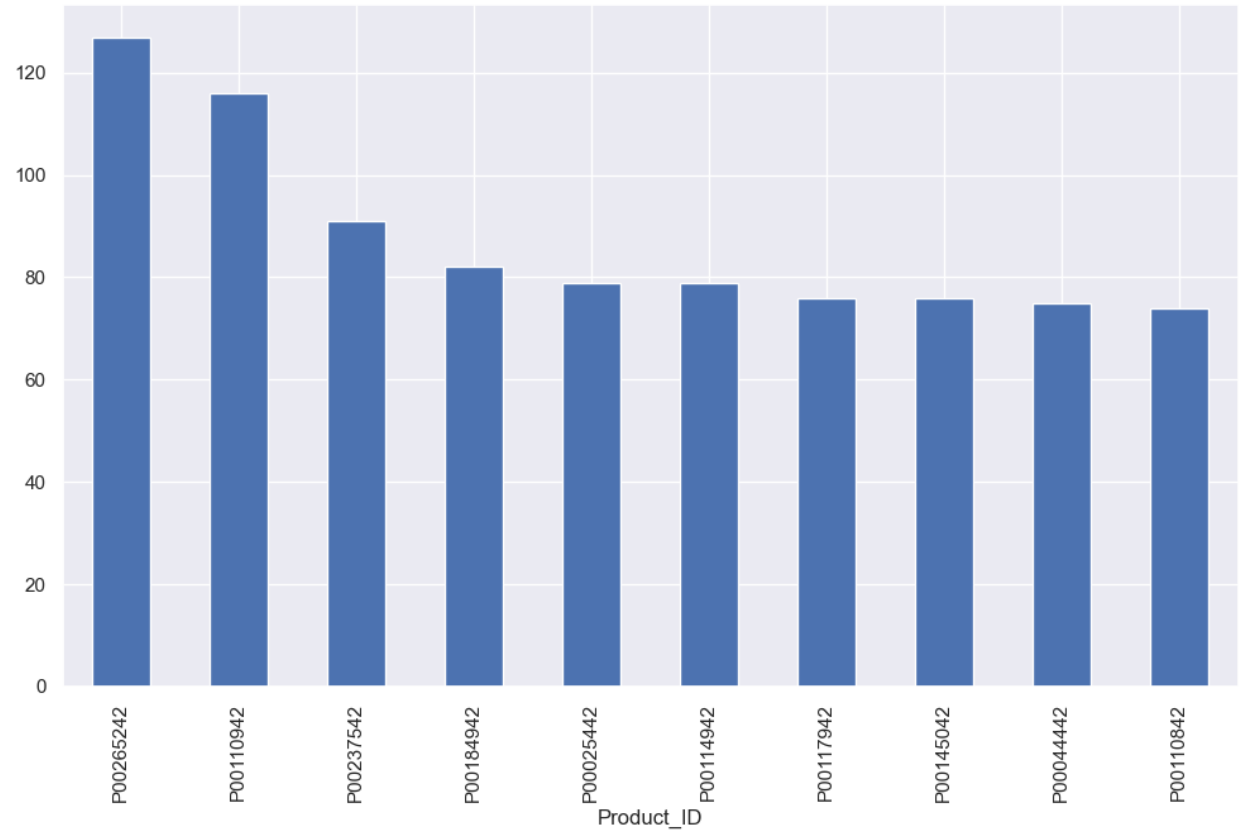


from above graphs we can see that most of the sold products are from Food , Footwear , Electronic category

```
df.columns

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

sales_state = df.groupby(['Product_ID'],as_index=False)
['Amount'].sum().sort_values(by='Amount',ascending = False).head(10)
sns.set(rc={'figure.figsize' : (20,5)})
sns.barplot(x='Product_ID',y = 'Amount',data = sales_state , hue =
'Product_ID')

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




```
#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 yrsfrom UP, Maharashtra and Karnataka working in IT , Healthcare , Aviation are more likely buy product from Food , Clothing and Electronics category