```python
In [2]: #import necessary libraries
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
%matplotlib inline
import seaborn as sns
```

```python
In [4]: #read the dataset
df = pd.read_csv('C:/Users/Nadim/Downloads/Diwali Sales Data.csv', encoding = 'unicode_escape')
df.shape
```

Out[4]: (11251, 15)

```python
In [6]: df
```

Out[6]:

	User_ID	Cust_name	Product_ID	Gender	Age_Group	Age	Marital_Status	State	Zone	Occupation	Product_Category	Orders	Amount	Sta
0	1002903	Sanskriti	P00125942	F	26-35	28	0	Maharashtra	Western	Healthcare	Auto	1	23952.0	N
1	1000732	Kartik	P00110942	F	26-35	35	1	Andhra Pradesh	Southern	Govt	Auto	3	23934.0	N
2	1001990	Bindu	P00118542	F	26-35	35	1	Uttar Pradesh	Central	Automobile	Auto	3	23924.0	N
3	1001425	Sudevi	P00237842	M	0-17	16	0	Karnataka	Southern	Construction	Auto	2	23912.0	N
4	1000588	Joni	P00057942	M	26-35	28	1	Gujarat	Western	Food Processing	Auto	2	23877.0	N
...	...	...	...	...	...	...	...	...	...	...	...	...	...	
11246	1000695	Manning	P00296942	M	18-25	19	1	Maharashtra	Western	Chemical	Office	4	370.0	N
11247	1004089	Reichenbach	P00171342	M	26-35	33	0	Haryana	Northern	Healthcare	Veterinary	3	367.0	N
11248	1001209	Oshin	P00201342	F	36-45	40	0	Madhya Pradesh	Central	Textile	Office	4	213.0	N
11249	1004023	Noonan	P00059442	M	36-45	37	0	Karnataka	Southern	Agriculture	Office	3	206.0	N
11250	1002744	Brumley	P00281742	F	18-25	19	0	Maharashtra	Western	Healthcare	Office	3	188.0	N

11251 rows × 15 columns

```python
In [8]: #check data types
df.dtypes
```

```
Out[8]: User_ID              int64
Cust_name           object
Product_ID          object
Gender              object
Age_Group           object
Age                  int64
Marital_Status       int64
State               object
Zone                object
Occupation          object
Product_Category    object
Orders               int64
Amount             float64
Status             float64
unnamed1           float64
dtype: object
```

```python
In [10]: 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
```

```python
In [12]: #see statistical measures
df.describe()
```

Out[12]:

	User_ID	Age	Marital_Status	Orders	Amount	Status	unnamed1
count	1.125100e+04	11251.000000	11251.000000	11251.000000	11239.000000	0.0	0.0
mean	1.003004e+06	35.421207	0.420318	2.489290	9453.610858	NaN	NaN
std	1.716125e+03	12.754122	0.493632	1.115047	5222.355869	NaN	NaN
min	1.000001e+06	12.000000	0.000000	1.000000	188.000000	NaN	NaN
25%	1.001492e+06	27.000000	0.000000	1.500000	5443.000000	NaN	NaN
50%	1.003065e+06	33.000000	0.000000	2.000000	8109.000000	NaN	NaN
75%	1.004430e+06	43.000000	1.000000	3.000000	12675.000000	NaN	NaN
max	1.006040e+06	92.000000	1.000000	4.000000	23952.000000	NaN	NaN

```python
In [14]: #check null values
df.isnull().sum()
```

```
Out[14]: 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
Status              11251
unnamed1            11251
dtype: int64
```

```python
In [16]: df.columns
```

```
Out[16]: Index(['User_ID', 'Cust_name', 'Product_ID', 'Gender', 'Age_Group', 'Age',
       'Marital_Status', 'State', 'Zone', 'Occupation', 'Product_Category',
       'Orders', 'Amount', 'Status', 'unnamed1'],
      dtype='object')
```

```python
In [18]: df.drop(['Status', 'unnamed1'], axis=1, inplace=True)
```

```python
In [20]: df.shape
```

Out[20]: (11251, 13)

```python
In [22]: df.isnull().sum()
```

```
Out[22]: 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
In [24]: df.dropna(inplace=True)
```

```python
In [26]: df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Index: 11239 entries, 0 to 11250
Data columns (total 13 columns):
 #   Column            Non-Null Count  Dtype
---  ------            --------------  -----
 0   User_ID           11239 non-null  int64
 1   Cust_name         11239 non-null  object
 2   Product_ID        11239 non-null  object
 3   Gender            11239 non-null  object
 4   Age_Group         11239 non-null  object
 5   Age               11239 non-null  int64
 6   Marital_Status    11239 non-null  int64
 7   State             11239 non-null  object
 8   Zone              11239 non-null  object
 9   Occupation        11239 non-null  object
 10  Product_Category  11239 non-null  object
 11  Orders            11239 non-null  int64
 12  Amount            11239 non-null  float64
dtypes: float64(1), int64(4), object(8)
memory usage: 1.2+ MB
```

```python
In [28]: #change data type
df['Amount'] = df['Amount'].astype('int')
```

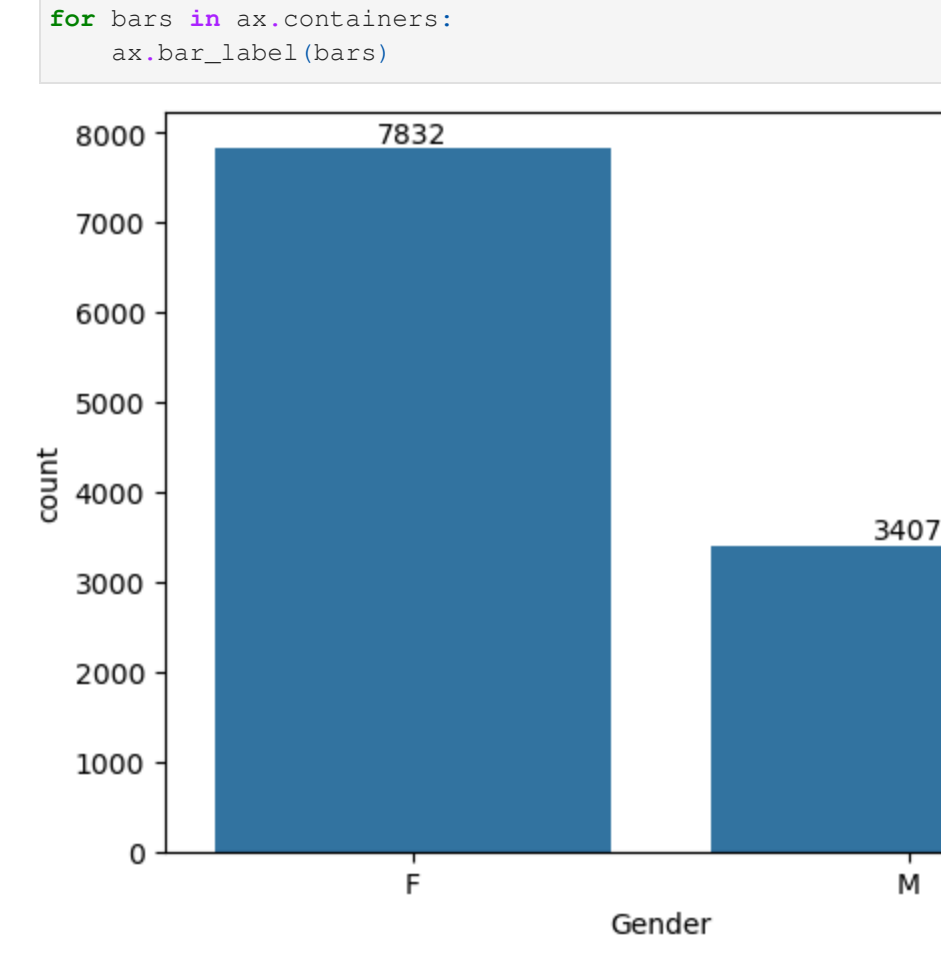
```python
In [30]: df['Amount'].dtypes
```

Out[30]: dtype('int32')

Exploratory Data Analysis

Gender

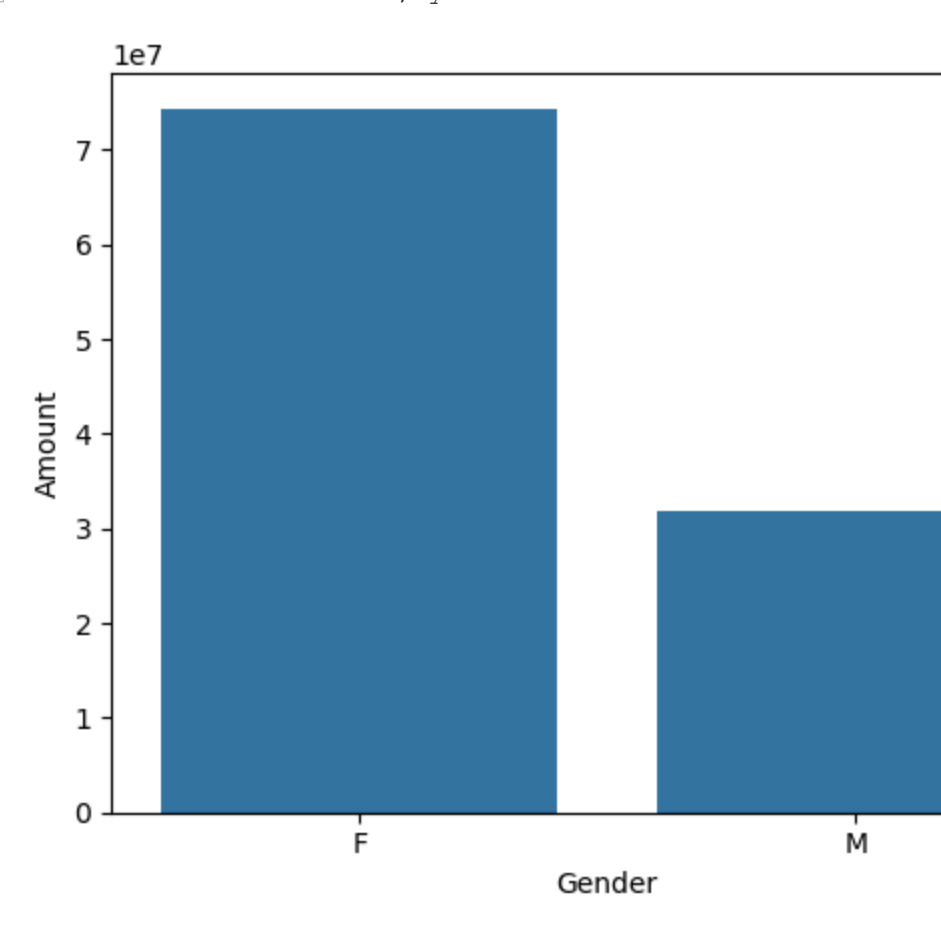
```python
In [36]: ax = sns.countplot(x = 'Gender', data = df)

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




```python
In [38]: sales_gen=df.groupby(['Gender'], as_index=False)['Amount'].sum().sort_values(by='Amount', ascending=False)
```

```python
In [40]: sns.barplot(x = 'Gender', y= 'Amount', data = sales_gen)
```

Out[40]: <Axes: xlabel='Gender', ylabel='Amount'>

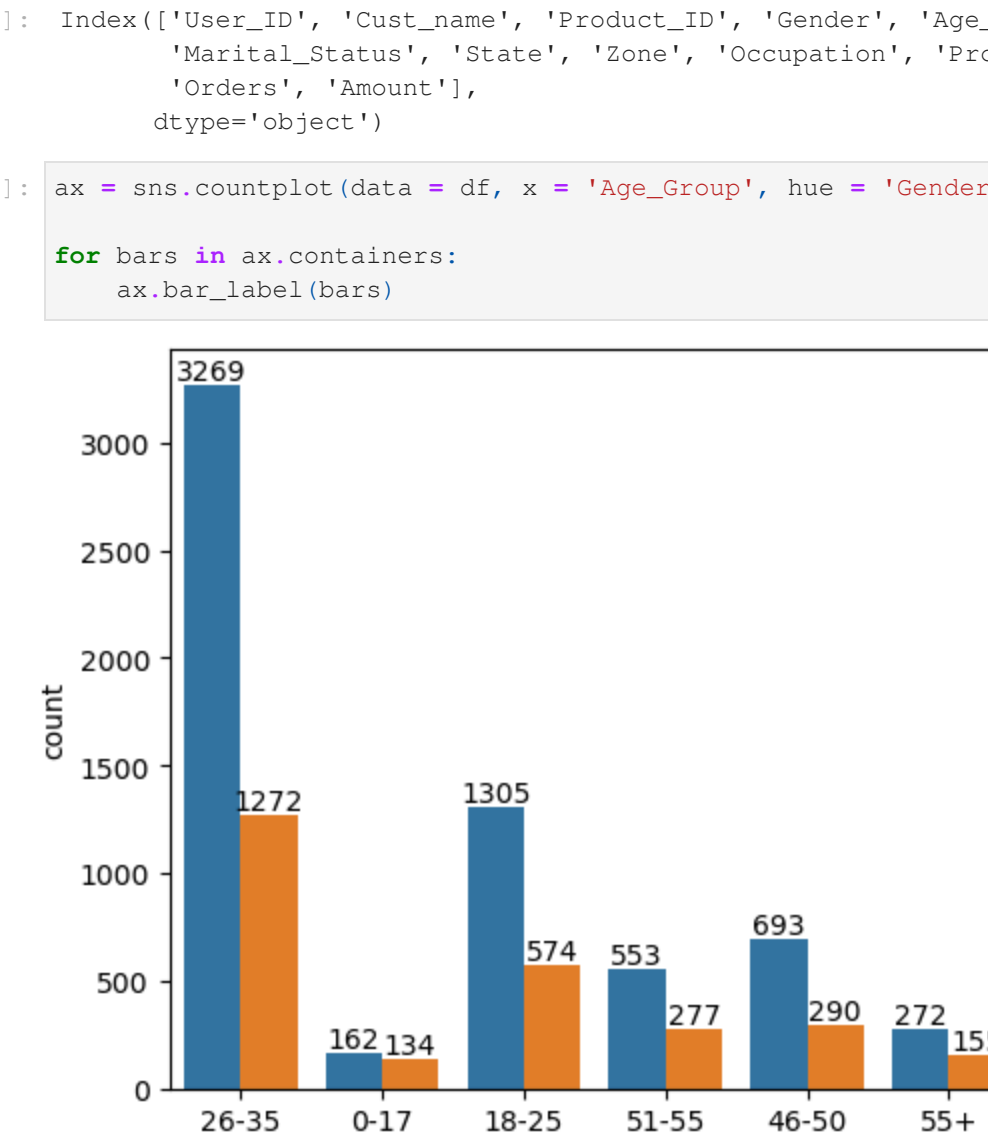


Age

```python
In [45]: df.columns
```

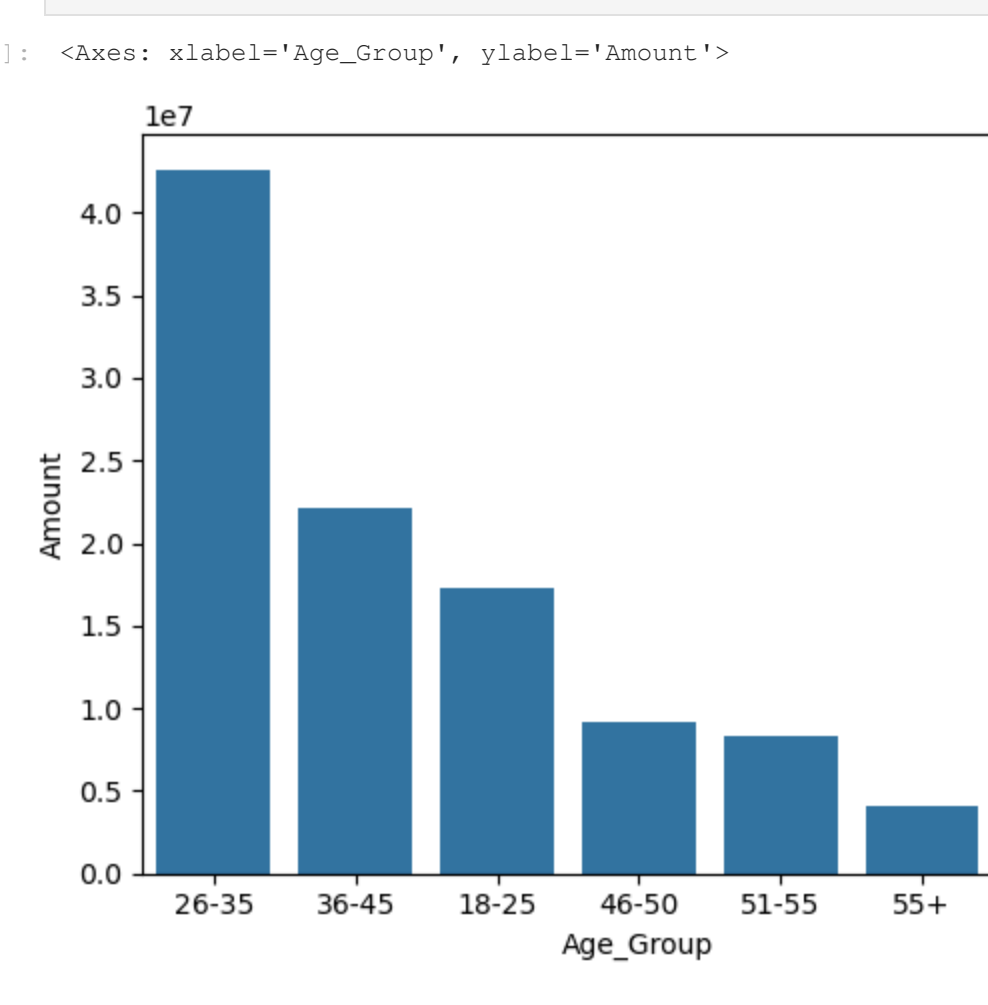
```
Out[45]: Index(['User_ID', 'Cust_name', 'Product_ID', 'Gender', 'Age_Group', 'Age',
       'Marital_Status', 'State', 'Zone', 'Occupation', 'Product_Category',
       'Orders', 'Amount'],
      dtype='object')
```

```python
In [49]: ax = sns.countplot(data = df, x = 'Age_Group', hue = 'Gender')

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




```python
In [55]: 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)
```

Out[55]: <Axes: xlabel='Age_Group', ylabel='Amount'>



State

```python
In [58]: df.columns
```

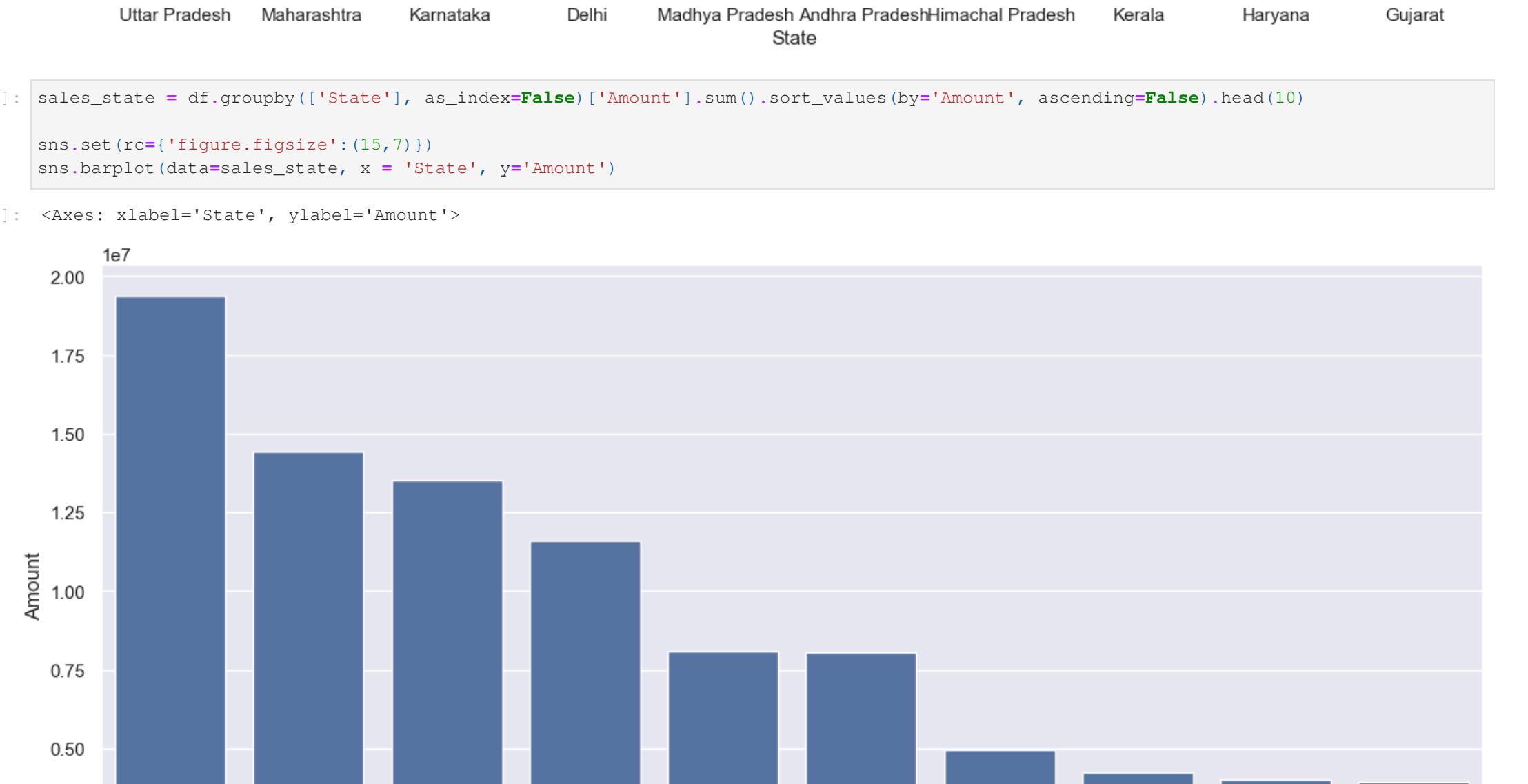
```
Out[58]: Index(['User_ID', 'Cust_name', 'Product_ID', 'Gender', 'Age_Group', 'Age',
       'Marital_Status', 'State', 'Zone', 'Occupation', 'Product_Category',
       'Orders', 'Amount'],
      dtype='object')
```

```python
In [60]: sales_state = df.groupby(['State'], as_index=False)['Orders'].sum().sort_values(by='Orders', ascending=False).head(10)

sns.set(rc={'figure.figsize':(15,7)})
sns.barplot(data=sales_state, x = 'State', y='Orders')
```

Out[60]: <Axes: xlabel='State', ylabel='Orders'>

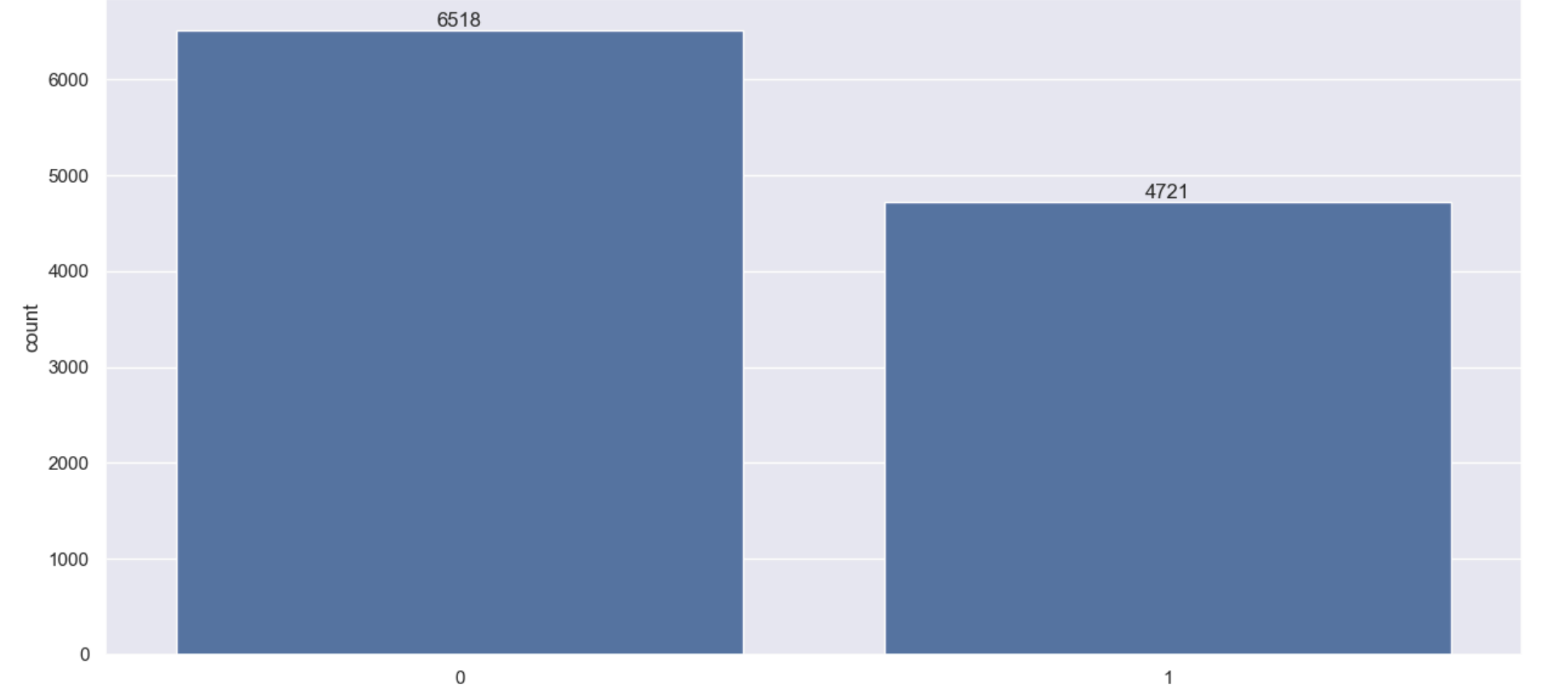

```python
In [62]: sales_state = df.groupby(['State'], as_index=False)['Amount'].sum().sort_values(by='Amount', ascending=False).head(10)

sns.set(rc={'figure.figsize':(15,7)})
sns.barplot(data=sales_state, x = 'State', y='Amount')
```

Out[62]: <Axes: xlabel='State', ylabel='Amount'>



Marital Status

```python
In [65]: ax = sns.countplot(data = df, x = 'Marital_Status')

sns.set(rc={'figure.figsize':(7,5)})
for bars in ax.containers:
    ax.bar_label(bars)
```

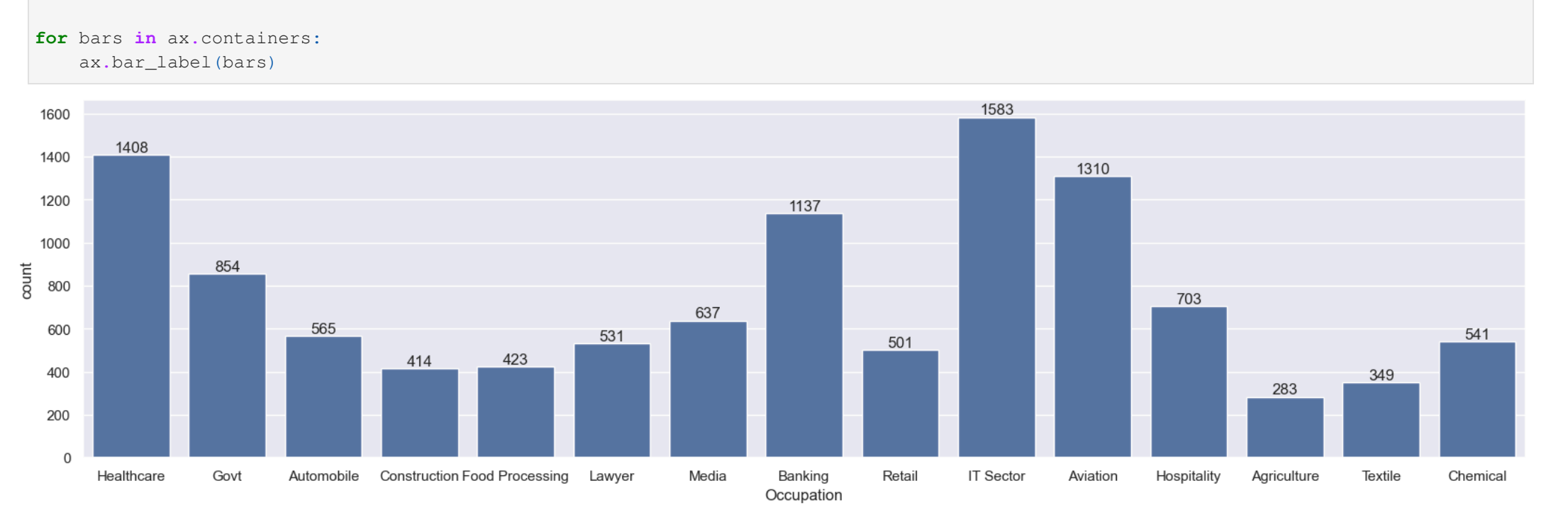



```python
In [67]: sales_state = df.groupby(['Marital_Status', 'Gender'], as_index=False)['Amount'].sum().sort_values(by='Amount', ascending=False)

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

Out[67]: <Axes: xlabel='Marital_Status', ylabel='Amount'>

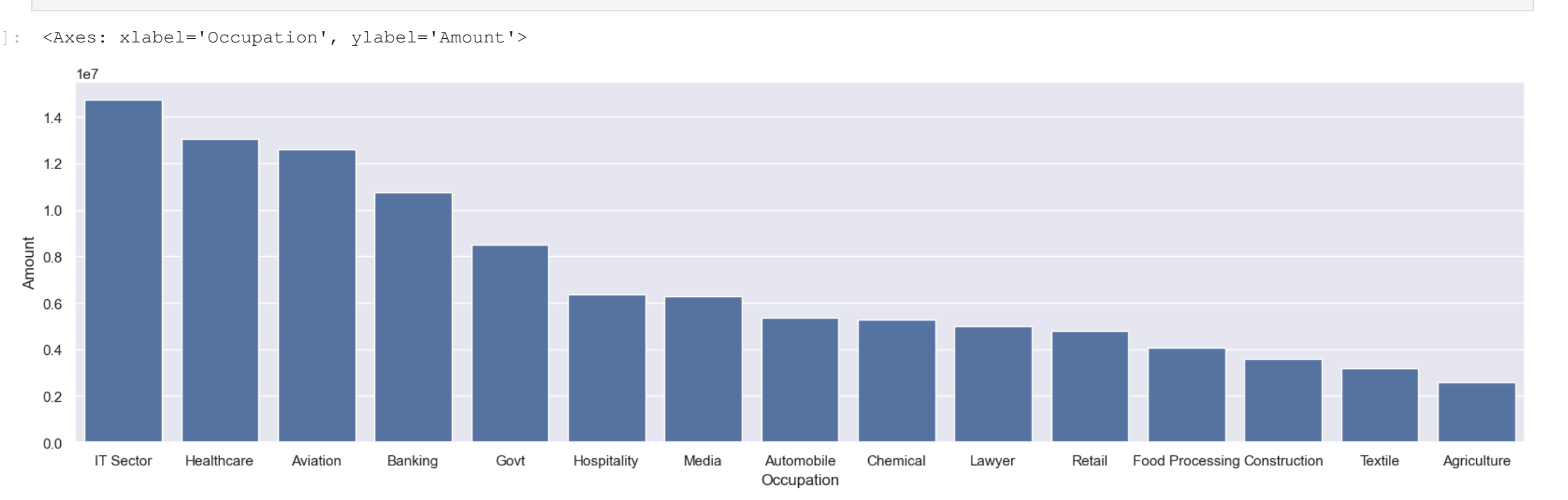
Occupation

```python
In [70]: sns.set(rc={'figure.figsize':(20,5)})
ax = sns.countplot(data = df, x = 'Occupation')

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



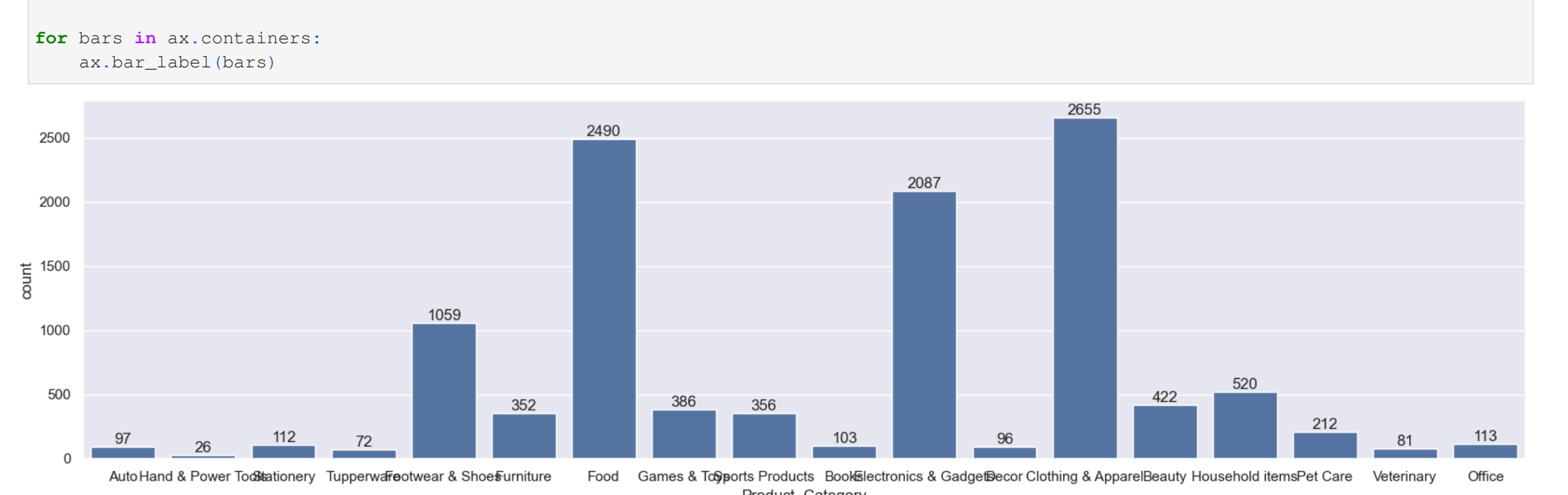

```python
In [72]: sales_state = df.groupby(['Occupation'], as_index=False)['Amount'].sum().sort_values(by='Amount', ascending=False)

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

Out[72]: <Axes: xlabel='Occupation', ylabel='Amount'>



Product Category

```python
In [75]: sns.set(rc={'figure.figsize':(20,5)})
ax = sns.countplot(data = df, x = 'Product_Category')

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




```python
In [77]: 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')
```

Out[77]: <Axes: xlabel='Product_Category', ylabel='Amount'>

Conclusion:

Age group of 26-35 yrs from UP, Maharashtra and Karnataka working in IT, Healthcare and Aviation are more likely to buy products from Food, Clothing and Electronics category.

In [ ]: