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

```
df = pd.read_csv("C:\Users\Sushma\Downloads\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	State	Zone	Occupation	Product_Category	Orders	Amount	Status	unnamed1
0	1002903	Sanskriti	P00125942	F	26-35	28	0	Maharashtra	Western	Healthcare	Auto	1	23952.0	NaN	NaN
1	1003078	Kartik	P00110942	F	26-35	35	1	Andhra Pradesh	Southern	Govt	Auto	3	23934.0	NaN	NaN
2	1003008	Bindu	P00118042	F	26-35	35	1	Uttar Pradesh	Central	Automobile	Auto	3	23924.0	NaN	NaN
3	1004023	Sudevi	P00237842	M	36-45	45	0	Karnataka	Southern	Construction	Auto	2	23912.0	NaN	NaN
4	1000942	Joni	P00057942	M	26-35	25	1	Gujarat	Western	Food Processing	Auto	2	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)
```

```
df.isnull()
```

	User_ID	Cust_name	Product_ID	Gender	Age Group	Age	Marital_Status	State	Zone	Occupation	Product_Category	Orders	Amount
0	False	False	False	False	False	False	False	False	False	False	False	False	False
1	False	False	False	False	False	False	False	False	False	False	False	False	False
2	False	False	False	False	False	False	False	False	False	False	False	False	False
3	False	False	False	False	False	False	False	False	False	False	False	False	False
4	False	False	False	False	False	False	False	False	False	False	False	False	False
...	...	...	...	...	...	...	...	...	...	...	...	...	...
11246	False	False	False	False	False	False	False	False	False	False	False	False	False
11247	False	False	False	False	False	False	False	False	False	False	False	False	False
11248	False	False	False	False	False	False	False	False	False	False	False	False	False
11249	False	False	False	False	False	False	False	False	False	False	False	False	False
11250	False	False	False	False	False	False	False	False	False	False	False	False	False

11251 rows × 13 columns

```
df.isnull().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 null values
df.dropna(inplace=True)
```

```
df.shape
```

```
(11239, 13)
```

```
# 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')
```

```
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%	1.004430e+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

Gender

```
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(x = 'Gender', data = df)

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


```
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)

show(output_label='Gender', ylabel='Amount')
```

From above graphs it can be seen that most of the buyers are females and even the females are purchasing more than the males.

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)

show(output_label='Age Group', ylabel='Amount')
```

From above graph it can be seen that most of the buyers are between the age group between 26-35 yrs female.

State

```
df.columns
```

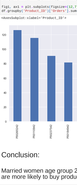
```
Index(['User_ID', 'Cust_name', 'Product_ID', 'Gender', 'Age Group', 'Age',
       'Marital_Status', 'State', 'Zone', 'Occupation', 'Product_Category',
       'Orders', 'Amount'],
      dtype='object')
```

```
# total 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':(20,5)})
sns.barplot(data=sales_state, x= 'State', y= 'Orders')

show(output_label='State', ylabel='Orders')
```

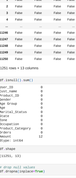



```
# total amount/sales from top 10 states

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

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

show(output_label='State', ylabel='Amount')
```



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

Marital Status

```
ax = sns.countplot(data=df, x= '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).head(10)

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

show(output_label='Marital_Status', ylabel='Amount')
```


From the above graph it can be seen that married women have the 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).head(10)

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

show(output_label='Occupation', ylabel='Amount')
```

From above graphs it can be seen that most of the buyers are from IT, Aviation and Heathcare 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')

show(output_label='Product_Category', ylabel='Amount')
```


From the above graphs we can say that most of the sold products are from Food, Footwear 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')

show(output_label='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().sort_values(ascending=False).plot.bar(ax=ax1)
ax1.set_xlabel('Product_ID')
```


Conclusion:

Married women age group 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.