Re-eval 1 13th May 2023

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1) Import the necessary packages /modules and read the data set

In [105]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

In [106]:
```
df=pd.read_csv('data.csv')
```

In [107]:
```
df
```

Out[107]:

	Unnamed: 0	ride.alc.driver	female	grade	age4	smoke	DriverLicense	In_Month
0	1	1	1.0	10.0	15.0	1.0	0.0	39343.0
1	2	1	1.0	10.0	18.0	1.0	1.0	46205.0
2	3	1	NaN	NaN	NaN	NaN	NaN	NaN
3	4	0	0.0	11.0	17.0	0.0	1.0	43525.0
4	5	0	0.0	11.0	17.0	0.0	1.0	39891.0
...	...	...	...	...	...	...	...	...
13382	13383	0	NaN	9.0	15.0	0.0	0.0	216303.0
13383	13384	0	NaN	9.0	15.0	0.0	0.0	216379.0
13384	13385	0	NaN	9.0	15.0	0.0	0.0	216455.0
13385	13386	0	NaN	9.0	15.0	0.0	0.0	216530.0
13386	13387	0	NaN	9.0	15.0	0.0	0.0	216606.0

13387 rows × 8 columns

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2) Drop the column 'Unnamed: 0' and rename the columns as given below [hint: rename] (2 Marks).

In [108]:
```
df.columns
```

Out[108]:
```
Index(['Unnamed: 0', 'ride.alc.driver', 'female', 'grade', 'age4',
'smoke',
       'DriverLicense', 'In_Month'],
      dtype='object')
```

In [109]:
```
df=df.drop(['Unnamed: 0'],axis=1)
df=df.rename(columns={'ride.alc.driver':'drunken','age4':'age','smo
```

In [110]:
```
df
```

Out[110]:

	drunken	female	grade	age	smoked	driver_license	Income
0	1	1.0	10.0	15.0	1.0	0.0	39343.0
1	1	1.0	10.0	18.0	1.0	1.0	46205.0
2	1	NaN	NaN	NaN	NaN	NaN	NaN
3	0	0.0	11.0	17.0	0.0	1.0	43525.0
4	0	0.0	11.0	17.0	0.0	1.0	39891.0
...	...	...	...	...	...	...	...
13382	0	NaN	9.0	15.0	0.0	0.0	216303.0
13383	0	NaN	9.0	15.0	0.0	0.0	216379.0
13384	0	NaN	9.0	15.0	0.0	0.0	216455.0
13385	0	NaN	9.0	15.0	0.0	0.0	216530.0
13386	0	NaN	9.0	15.0	0.0	0.0	216606.0

13387 rows × 7 columns

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3) Fill in the missing values using the proper strategy for the columns identified from question number 2. (2 Marks)

In [111]:
```
df.columns
```

Out[111]:
```
Index(['drunken', 'female', 'grade', 'age', 'smoked', 'driver_lice
nse',
       'Income'],
      dtype='object')
```

In [112]:
```
df.dtypes
```

Out[112]:
```
drunken            int64
female           float64
grade            float64
age              float64
smoked           float64
driver_license   float64
Income           float64
dtype: object
```

In [113]:
```
df['female'].isnull().values.sum()
```

Out[113]:
```
755
```

In [114]:
```
df['drunken'].isnull().values.sum()
```

Out[114]:
```
0
```

In [115]:
```
df['grade'].isnull().values.sum()
```

Out[115]:
```
67
```

In [116]:
```
df['age'].isnull().values.sum()
```

Out[116]:
```
54
```

In [117]:
```
df['smoked'].isnull().values.sum()
```

Out[117]:
```
388
```

In [118]:
```
df['driver_license'].isnull().values.sum()
```

Out[118]:
```
54
```

In [119]:
```
df['Income'].isnull().values.sum()
```

Out[119]:
```
8
```

In [120]:
```
from sklearn.impute import SimpleImputer
imp=SimpleImputer(missing_values=np.NaN,strategy='most_frequent')
```

In [121]:
```
df[['female','grade','age','smoked','driver_license','Income']]=imp
```

In [122]:
```
df
```

Out[122]:

	drunken	female	grade	age	smoked	driver_license	Income
0	1	1.0	10.0	15.0	1.0	0.0	39343.0
1	1	1.0	10.0	18.0	1.0	1.0	46205.0
2	1	1.0	12.0	16.0	1.0	1.0	39343.0
3	0	0.0	11.0	17.0	0.0	1.0	43525.0
4	0	0.0	11.0	17.0	0.0	1.0	39891.0
...	...	...	...	...	...	...	...
13382	0	1.0	9.0	15.0	0.0	0.0	216303.0
13383	0	1.0	9.0	15.0	0.0	0.0	216379.0
13384	0	1.0	9.0	15.0	0.0	0.0	216455.0
13385	0	1.0	9.0	15.0	0.0	0.0	216530.0
13386	0	1.0	9.0	15.0	0.0	0.0	216606.0

13387 rows × 7 columns

In [123]:
```
df.isnull().values.sum()
```

Out[123]:
```
0
```

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4) Visualize the “female” using pie chart with labels. (2 Marks)

In [124]:
```
x=df['female'].value_counts()
label=['female','not female']
plt.pie(x,labels=label)
plt.show()
```

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5) Draw the drunken driver details in bar chart [x axis: No and Yes & Y axis: Count]. (2 Marks)

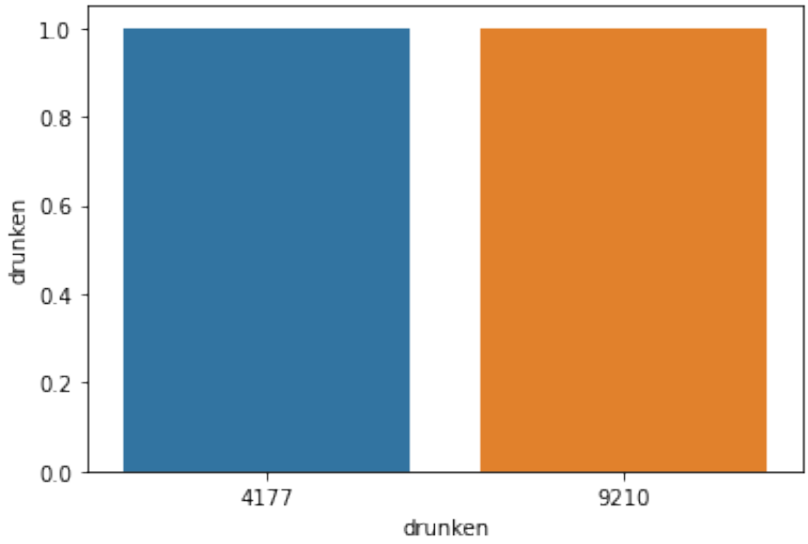
In [133]:
```
x=df['drunken'].value_counts()
x
```

Out[133]:
```
0    9210
1    4177
Name: drunken, dtype: int64
```

In [126]:
```
y=df['drunken']
```

In [127]:
```
sns.barplot(x=x,y=y,data=df)
```

Out[127]: <AxesSubplot:xlabel='drunken', ylabel='drunken'>



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6) Apply normalization on the column “Income” and add the normalized values into the new column called “IncomeV1” (2 Marks).

In [128]:
```
df['Income']=df['Income'].astype(int)
```

In [129]:
```
mi=df['Income'].min()
ma=df['Income'].max()
```

In [130]:
```
p=df['Income']-mi
q=ma-mi
```

In [131]:
```
df['IncomeV1']=p/q
```

In [132]:
```
df
```

Out[132]:

	drunken	female	grade	age	smoked	driver_license	Income	IncomeV1
0	1	1.0	10.0	15.0	1.0	0.0	39343	0.005092
1	1	1.0	10.0	18.0	1.0	1.0	46205	0.026767
2	1	1.0	12.0	16.0	1.0	1.0	39343	0.005092
3	0	0.0	11.0	17.0	0.0	1.0	43525	0.018302
4	0	0.0	11.0	17.0	0.0	1.0	39891	0.006823
...	...	...	...	...	...	...	...	...
13382	0	1.0	9.0	15.0	0.0	0.0	216303	0.564068
13383	0	1.0	9.0	15.0	0.0	0.0	216379	0.564308
13384	0	1.0	9.0	15.0	0.0	0.0	216455	0.564548
13385	0	1.0	9.0	15.0	0.0	0.0	216530	0.564785
13386	0	1.0	9.0	15.0	0.0	0.0	216606	0.565025

13387 rows × 8 columns

In [ ]:
```

```