Churn?

before we start with the problem itself there are some questions we need to answer:

1. What is the business question?

- Givin some information about the customer can you predict if he is going to churn?

1. What each row represent?

- Customer

1. What is the evaluation method?

- Accuracy

Answer these questions:

- Please note that in is assignment specifically we will not split the data

1. How many columns in the dataset?
2. How many numerical columns in the dataset?
3. How many columns with "null" values in the dataset?
4. What is the column with the biggest number of categories in the data?
5. Show the distribution graph of "MonthlyCharges" using bin size 10, and state what is the most common values?
6. Who is most likely to churn in terms of "SeniorCitizen" column (which value)?
7. What is the most correlated to columns? (you can use function .corr())
8. Show the correlation graph between these two columns.
9. Are the label balanced?

In [52]:

```
import pandas as pd
import numpy as py
import matplotlib.pyplot as plt
```

In [ ]:

```

```

In [12]:

```
df = pd.read_csv('dataset.csv')
df.head(500)
```

Out[12]:

	customerID	gender	SeniorCitizen	Partner	Dependents	tenure	PhoneService	MultipleLines
0	7590-VHVEG	Female	NaN	Yes	No	NaN	No	No phone service

	customerID	gender	SeniorCitizen	Partner	Dependents	tenure	PhoneService	MultipleLines
1	5575-GNVDE	Male	NaN	No	No	34.0	Yes	No
2	3668-QPYBK	Male	NaN	No	No	2.0	Yes	No
3	7795-CFOCW	Male	NaN	No	No	45.0	No	No phone service
4	9237-HQITU	Female	NaN	No	No	2.0	Yes	No
...	...	...	...	...	...	...	...	...
495	8205-OTCHB	Male	0.0	No	No	22.0	No	No phone service
496	4134-BSXLX	Male	0.0	Yes	No	28.0	Yes	No
497	0505-SPOOW	Female	0.0	Yes	No	70.0	Yes	No
498	6235-VDHOM	Female	1.0	No	No	5.0	No	No phone service
499	7783-YKGDV	Female	0.0	No	No	12.0	Yes	Yes

500 rows × 21 columns

How many columns in the dataset?

In [5]:

```
df.shape
```

Out[5]:

```
(7043, 21)
```

In [17]:

```
print ("number of columns is 21")
```

```
number of columns is 21
```

In [ ]:

```

```

How many numerical columns in the dataset?

In [8]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 7043 entries, 0 to 7042
Data columns (total 21 columns):
 #   Column            Non-Null Count  Dtype
---  ------            --------------  -----
```

```
 0   customerID        7043 non-null   object 
 1   gender            7043 non-null   object 
 2   SeniorCitizen     7000 non-null   float64
 3   Partner           7043 non-null   object 
 4   Dependents        7043 non-null   object 
 5   tenure            6896 non-null   float64
 6   PhoneService      7043 non-null   object 
 7   MultipleLines     7043 non-null   object 
 8   InternetService   7043 non-null   object 
 9   OnlineSecurity    7043 non-null   object 
 10  OnlineBackup      7043 non-null   object 
 11  DeviceProtection  7043 non-null   object 
 12  TechSupport       7043 non-null   object 
 13  StreamingTV       7043 non-null   object 
 14  StreamingMovies   7043 non-null   object 
 15  Contract          7043 non-null   object 
 16  PaperlessBilling  7043 non-null   object 
 17  PaymentMethod     7043 non-null   object 
 18  MonthlyCharges    7043 non-null   float64
 19  TotalCharges      7043 non-null   float64
 20  Churn             7043 non-null   object 
dtypes: float64(4), object(17)
memory usage: 1.1+ MB
```

In [13]:

```
df.describe()
```

Out[13]:

	SeniorCitizen	tenure	MonthlyCharges	TotalCharges
count	7000.000000	6896.000000	7043.000000	7043.000000
mean	0.163143	33.041473	64.761692	2283.300440
std	0.369522	24.382260	30.090047	2265.000258
min	0.000000	1.000000	18.250000	18.800000
25%	0.000000	10.000000	35.500000	402.225000
50%	0.000000	30.000000	70.350000	1400.550000
75%	0.000000	56.000000	89.850000	3786.600000
max	1.000000	72.000000	118.750000	8684.800000

In [16]:

```
print("number of numerical columns in the dataset = 3 ")
```

```
number of numerical columns in the dataset = 3
```

How many columns with "null" values in the dataset

In [32]:

```
df["SeniorCitizen"].value_counts()
```

Out[32]:

```
0.0    5858
1.0    1142
Name: SeniorCitizen, dtype: int64
```

In [41]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 7043 entries, 0 to 7042
Data columns (total 21 columns):
 #   Column            Non-Null Count  Dtype  
---  ------            --------------  -----  
 0   customerID        7043 non-null   object 
 1   gender            7043 non-null   object 
 2   SeniorCitizen     7000 non-null   float64
 3   Partner           7043 non-null   object 
 4   Dependents        7043 non-null   object 
 5   tenure            6896 non-null   float64
 6   PhoneService      7043 non-null   object 
 7   MultipleLines     7043 non-null   object 
 8   InternetService   7043 non-null   object 
 9   OnlineSecurity    7043 non-null   object 
 10  OnlineBackup      7043 non-null   object 
 11  DeviceProtection  7043 non-null   object 
 12  TechSupport       7043 non-null   object 
 13  StreamingTV       7043 non-null   object 
 14  StreamingMovies   7043 non-null   object 
 15  Contract          7043 non-null   object 
 16  PaperlessBilling  7043 non-null   object 
 17  PaymentMethod     7043 non-null   object 
 18  MonthlyCharges    7043 non-null   float64
 19  TotalCharges      7043 non-null   float64
 20  Churn             7043 non-null   object 
dtypes: float64(4), object(17)
memory usage: 1.1+ MB
```

In [42]:

```python
print(' number of columns with "null" values = 2 ')
```

```
 number of columns with "null" values = 2 
```

What is the column with the biggest number of categories in the data?

In [46]:

```python
df["MultipleLines"].value_counts()
```

Out[46]:

```
No                  3390
Yes                 2971
No phone service     682
Name: MultipleLines, dtype: int64
```

In [47]:

```python
df["PaymentMethod"].value_counts()
```

Out[47]:

```
Electronic check             2365
Mailed check                 1612
Bank transfer (automatic)    1544
Credit card (automatic)      1522
Name: PaymentMethod, dtype: int64
```

In [50]:

```python
df["Contract"].value_counts()
```

Out[50]:

```
Month-to-month    3875
Two year          1695
```

```
One year          1473
Name: Contract, dtype: int64
```

In [51]:

```
print(" the column with the biggest number of categories in the data is PaymentMethod ")
```

```
 the column with the biggest number of categories in the data is PaymentMethod
```

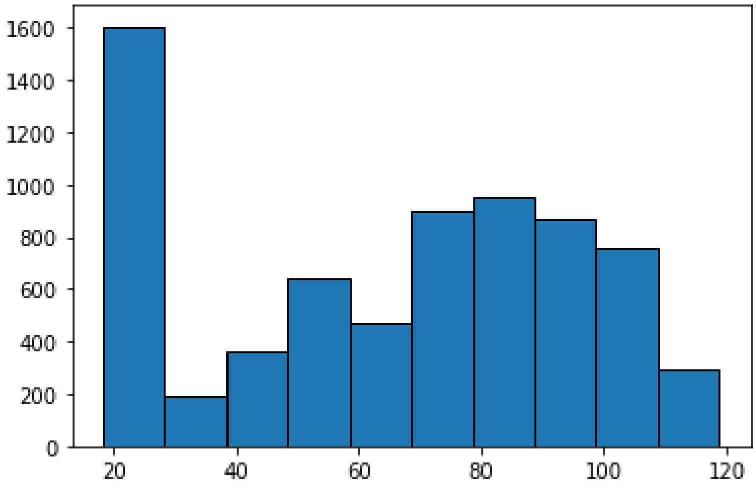
Show the distribution graph of "MonthlyCharges" using bin size 10, and state what is the most common values?

In [78]:

```
plt.xlabel=('MonthlyCharges')
plt.ylabel=('people')
plt.hist(df['MonthlyCharges'] ,bins= 10 , edgecolor='black' )



plt.show()
```



In [ ]:

```

```

In [73]:

```
df['MonthlyCharges'].mode()[0]
```

Out[73]:

```
20.05
```

In [76]:

```
print('the most common values = 20.05')
```

```
the most common values = 20.05
```

What is the most correlated to columns

In [75]:

```
df.corr()
```

Out[75]:

	SeniorCitizen	tenure	MonthlyCharges	TotalCharges
SeniorCitizen	1.000000	0.013521	0.221101	0.102831
tenure	0.013521	1.000000	0.238635	0.822171

	SeniorCitizen	tenure	MonthlyCharges	TotalCharges
MonthlyCharges	0.221101	0.238635	1.000000	0.650468
TotalCharges	0.102831	0.822171	0.650468	1.000000

In [77]:

```
print (' the most correlated = TotalCharges&tenure')
```

```
the most correlated = TotalCharges&tenure
```

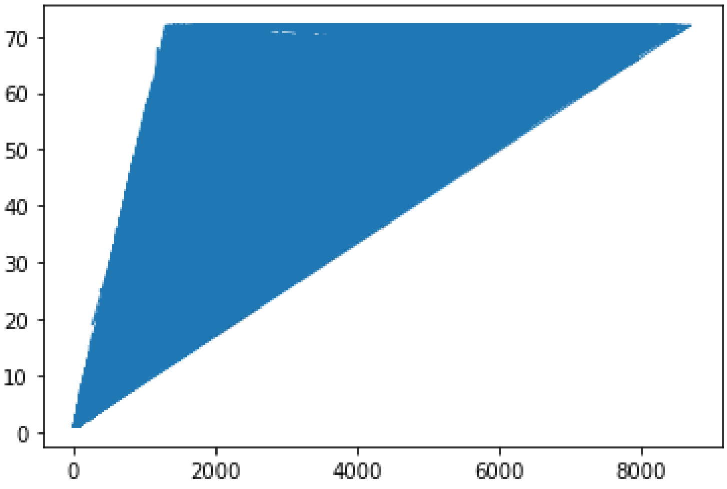
Show the correlation graph between these two columns

In [86]:

```
plt.plot(df['TotalCharges'],df['tenure']  ,linewidth=1)
```

Out[86]:

```
[<matplotlib.lines.Line2D at 0x12f90fedc70>]
```



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