```
import pandas as pd

car = pd.read_csv

car = pd.read_csv('/content/Car Price.csv')

car.head()
```

```
     Brand                     Model  Year  Selling_Price  KM_Driven
Fuel  \
0   Maruti             Maruti 800 AC  2007          60000      70000
Petrol
1   Maruti  Maruti Wagon R LXI Minor  2007         135000      50000
Petrol
2  Hyundai      Hyundai Verna 1.6 SX  2012         600000     100000
Diesel
3   Datsun    Datsun RediGO T Option  2017         250000      46000
Petrol
4    Honda     Honda Amaze VX i-DTEC  2014         450000     141000
Diesel

  Seller_Type Transmission         Owner
0  Individual       Manual   First Owner
1  Individual       Manual   First Owner
2  Individual       Manual   First Owner
3  Individual       Manual   First Owner
4  Individual       Manual  Second Owner
```

```
car
```

```
        Brand                                Model  Year
Selling_Price  \
0      Maruti                          Maruti 800 AC  2007
60000
1      Maruti              Maruti Wagon R LXI Minor  2007
135000
2     Hyundai                  Hyundai Verna 1.6 SX  2012
600000
3      Datsun                Datsun RediGO T Option  2017
250000
4       Honda                 Honda Amaze VX i-DTEC  2014
450000
...       ...                                   ...   ...            ..
.
4335  Hyundai  Hyundai i20 Magna 1.4 CRDi (Diesel)  2014
409999
4336  Hyundai           Hyundai i20 Magna 1.4 CRDi  2014
409999
4337   Maruti                   Maruti 800 AC BSIII  2009
110000
4338  Hyundai     Hyundai Creta 1.6 CRDi SX Option  2016
```

```
865000
4339  Renault                     Renault KWID RXT  2016
225000

      KM_Driven    Fuel Seller_Type Transmission         Owner
0         70000  Petrol  Individual       Manual   First Owner
1         50000  Petrol  Individual       Manual   First Owner
2        100000  Diesel  Individual       Manual   First Owner
3         46000  Petrol  Individual       Manual   First Owner
4        141000  Diesel  Individual       Manual  Second Owner
...         ...     ...         ...          ...           ...
4335      80000  Diesel  Individual       Manual  Second Owner
4336      80000  Diesel  Individual       Manual  Second Owner
4337      83000  Petrol  Individual       Manual  Second Owner
4338      90000  Diesel  Individual       Manual   First Owner
4339      40000  Petrol  Individual       Manual   First Owner

[4340 rows x 9 columns]
```

```
car.head(15)
```

```
        Brand                             Model  Year  Selling_Price  \
0      Maruti                       Maruti 800 AC  2007          60000
1      Maruti           Maruti Wagon R LXI Minor  2007         135000
2     Hyundai               Hyundai Verna 1.6 SX  2012         600000
3      Datsun             Datsun RediGO T Option  2017         250000
4       Honda              Honda Amaze VX i-DTEC  2014         450000
5      Maruti               Maruti Alto LX BSIII  2007         140000
6     Hyundai          Hyundai Xcent 1.2 Kappa S  2016         550000
7        Tata           Tata Indigo Grand Petrol  2014         240000
8     Hyundai           Hyundai Creta 1.6 VTVT S  2015         850000
9      Maruti           Maruti Celerio Green VXI  2017         365000
10  Chevrolet            Chevrolet Sail 1.2 Base  2015         260000
11       Tata           Tata Indigo Grand Petrol  2014         250000
12     Toyota  Toyota Corolla Altis 1.8 VL CVT  2018        1650000
13     Maruti                       Maruti 800 AC  2007          60000
14     Maruti           Maruti Wagon R LXI Minor  2007         135000

    KM_Driven    Fuel Seller_Type Transmission         Owner
0       70000  Petrol  Individual       Manual   First Owner
1       50000  Petrol  Individual       Manual   First Owner
2      100000  Diesel  Individual       Manual   First Owner
3       46000  Petrol  Individual       Manual   First Owner
4      141000  Diesel  Individual       Manual  Second Owner
5      125000  Petrol  Individual       Manual   First Owner
6       25000  Petrol  Individual       Manual   First Owner
7       60000  Petrol  Individual       Manual  Second Owner
8       25000  Petrol  Individual       Manual   First Owner
9       78000     CNG  Individual       Manual   First Owner
10      35000  Petrol  Individual       Manual   First Owner
```

```
11     100000  Petrol  Individual       Manual   First Owner
12      25000  Petrol      Dealer    Automatic   First Owner
13      70000  Petrol  Individual       Manual   First Owner
14      50000  Petrol  Individual       Manual   First Owner
```

```
car.info()
```

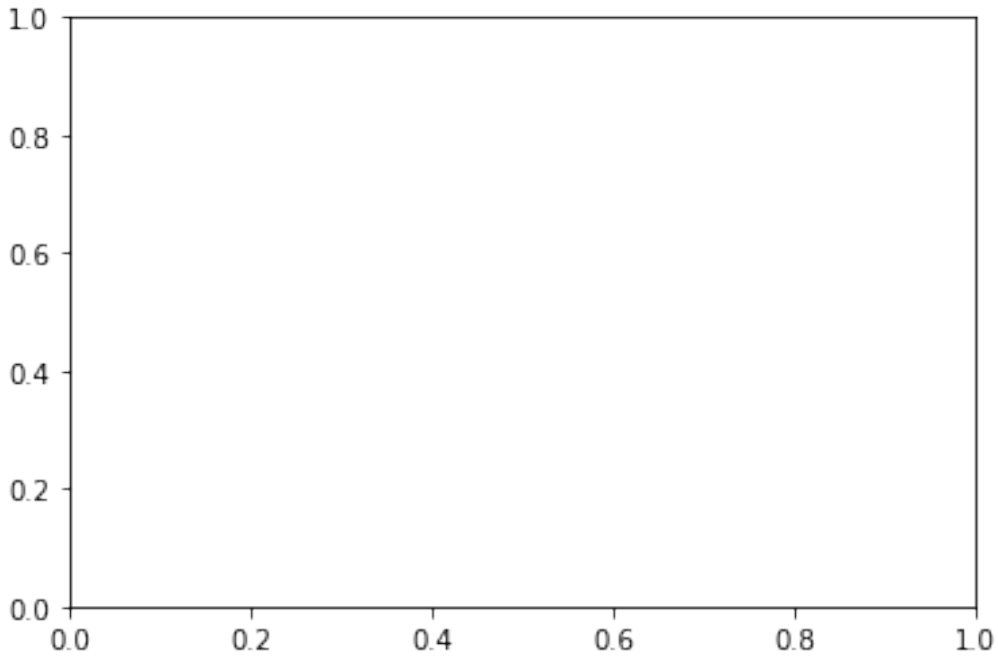
```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 4340 entries, 0 to 4339
Data columns (total 9 columns):
 #   Column         Non-Null Count  Dtype 
---  ------         --------------  ----- 
 0   Brand          4340 non-null   object
 1   Model          4340 non-null   object
 2   Year           4340 non-null   int64 
 3   Selling_Price  4340 non-null   int64 
 4   KM_Driven      4340 non-null   int64 
 5   Fuel           4340 non-null   object
 6   Seller_Type    4340 non-null   object
 7   Transmission   4340 non-null   object
 8   Owner          4340 non-null   object
dtypes: int64(3), object(6)
memory usage: 305.3+ KB
```

```
car.describe()
```

```
              Year  Selling_Price      KM_Driven
count  4340.000000   4.340000e+03    4340.000000
mean   2013.090783   5.041273e+05   66215.777419
std       4.215344   5.785487e+05   46644.102194
min    1992.000000   2.000000e+04       1.000000
25%    2011.000000   2.087498e+05   35000.000000
50%    2014.000000   3.500000e+05   60000.000000
75%    2016.000000   6.000000e+05   90000.000000
max    2020.000000   8.900000e+06  806599.000000
```

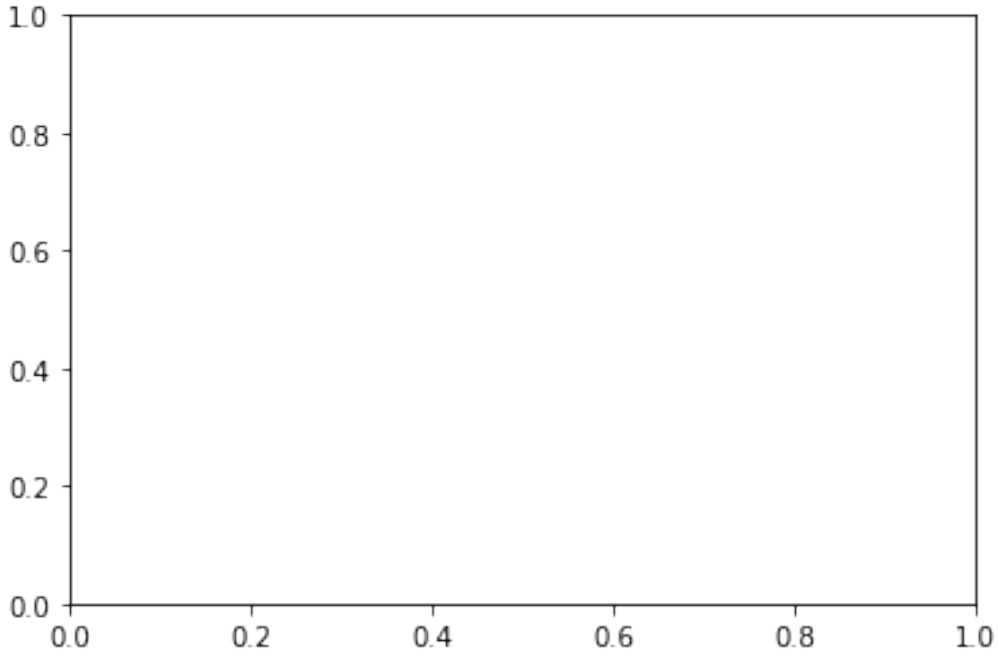
```
import matplotlib.pyplot as plt
```

```
fig , x = plt.subplots()
```

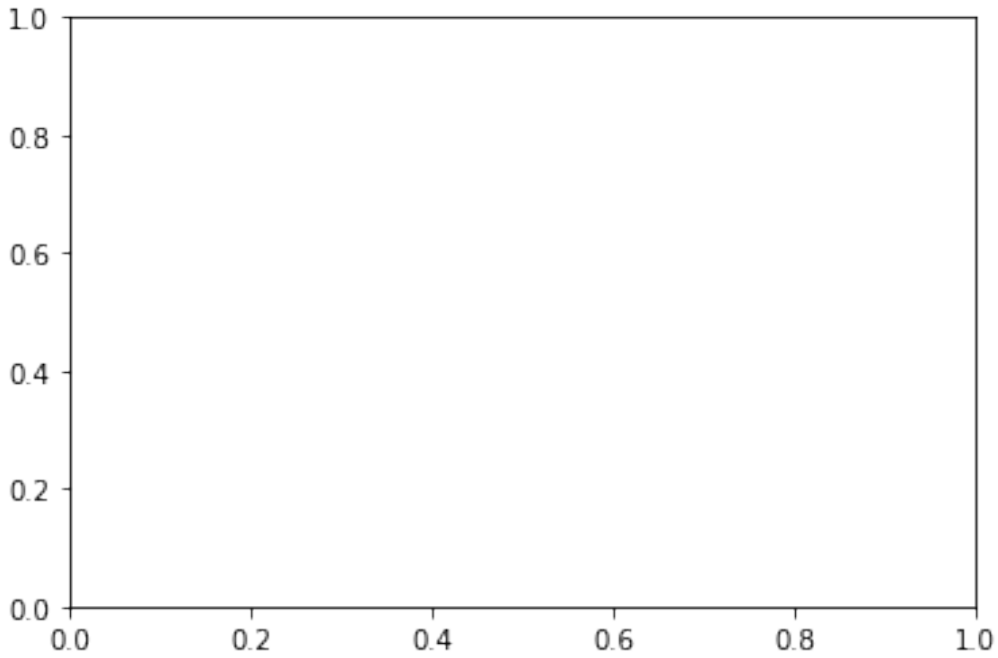



```
plt.subplots()
```

```
(<Figure size 432x288 with 1 Axes>,
 <matplotlib.axes._subplots.AxesSubplot at 0x7f290dcf8ad0>)
```



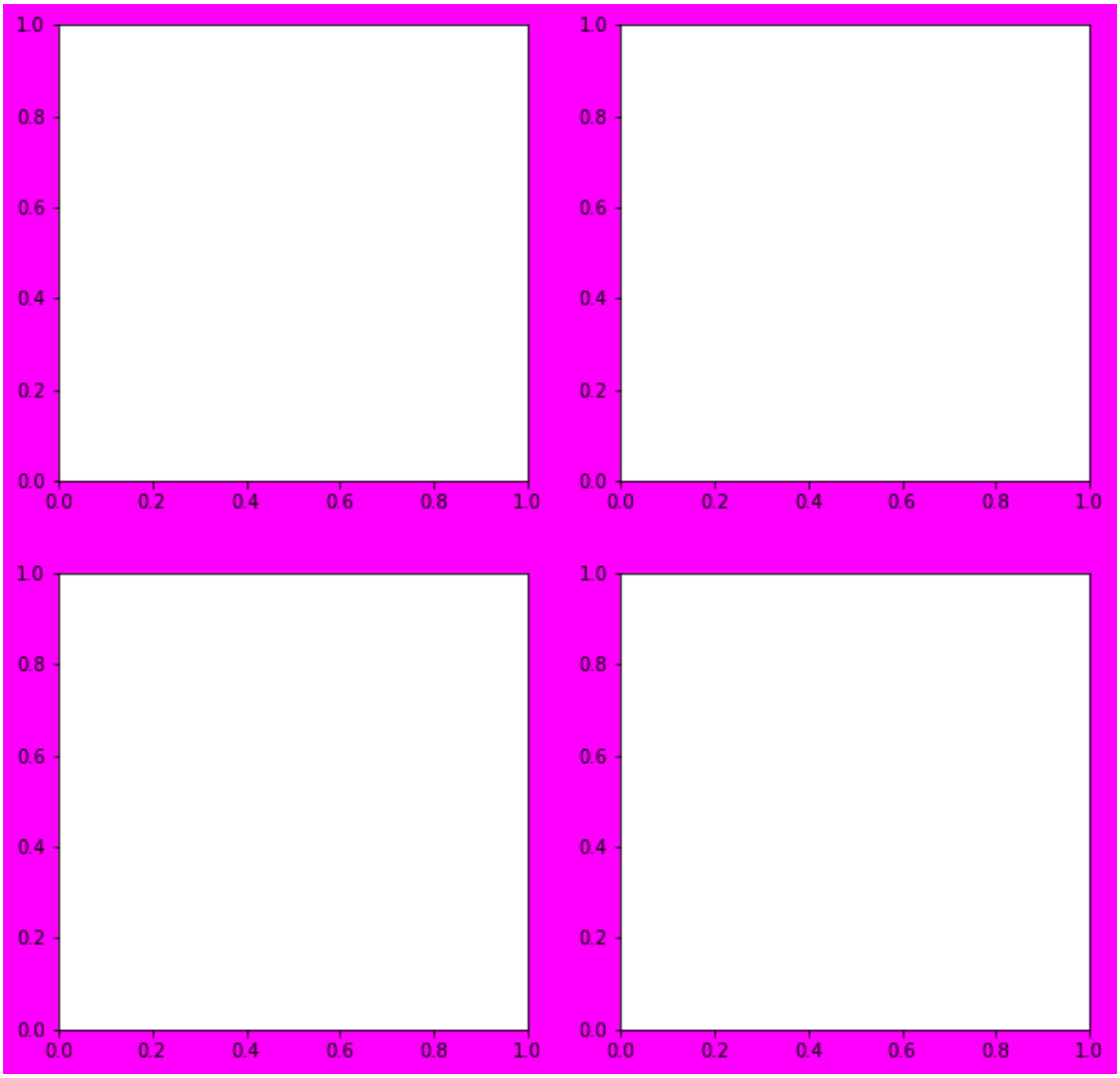

```
car = plt.subplots()
```




```
import matplotlib.pyplot as plt

import numpy as np

fig , x = plt.subplots(nrows = 2 , ncols=2 , figsize =(10,10) ,
facecolor = [1,0,1] )
```


1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0

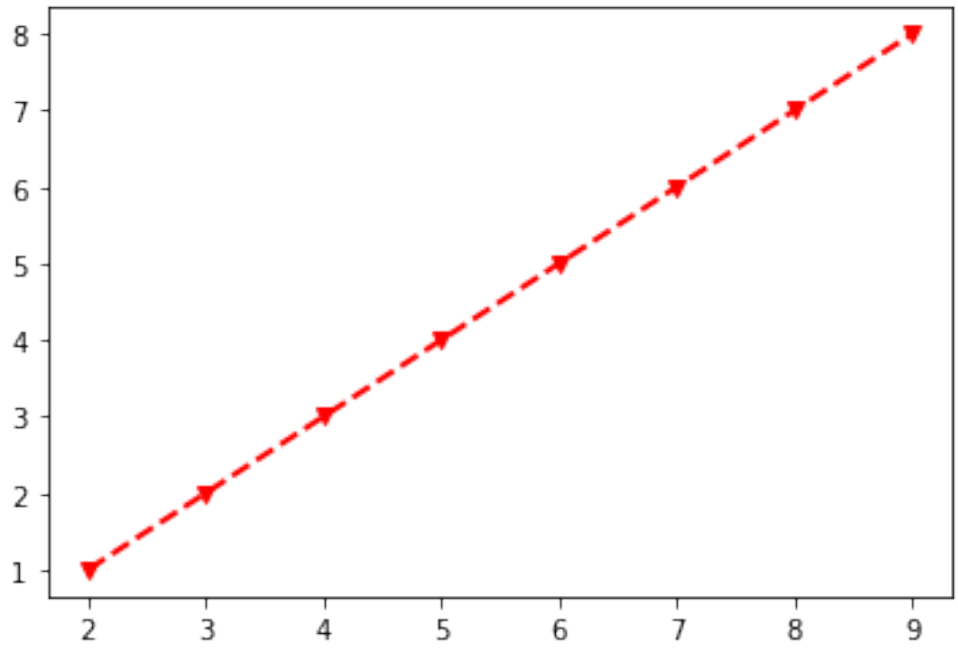
1. ax.plot(x ,y) gives line chart
2. ax.bar(x,y) bar plot
3. ax.barh(x,y) bar height graph
4. ax.scatter(x , y) scatter graphs
5. ax.hist(x) histogram
6. ax.pie(x) pie chart

```
x = [ 2,3,4,5,6,7,8,9]

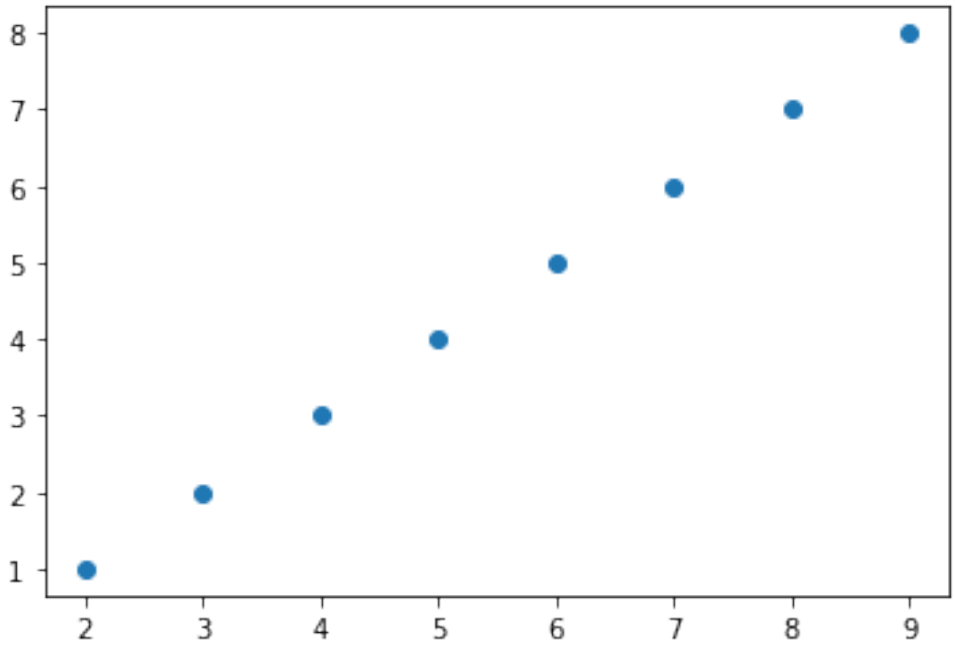
z = [1,1,2,3,4,5,6,6,7,7,8,9,9]

y = [1,2,3,4,5,6,7,8]

import matplotlib.pyplot as plt
fig ,  ax = plt.subplots()
ax.plot(x,y , color = 'red' , linestyle = '--', linewidth = 2 , marker
= 'v')
plt.show()
```



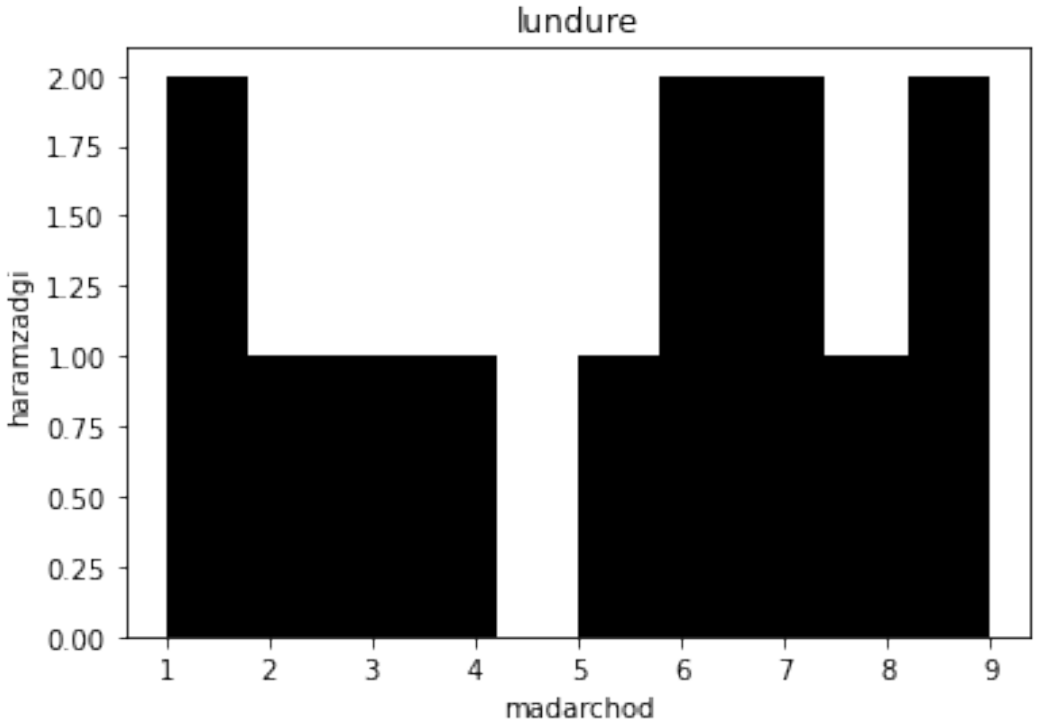
```
fig , ax = plt.subplots()
ax.scatter(x ,y)
plt.show()
```




```
fig , ax = plt.subplots()
ax.pie(x)
plt.show()
```

```
fig , ax = plt.subplots()
ax.set_title('lundure')
ax.set_xlabel('madarchod')
```

```
ax.set_ylabel('haramzadgi')
ax.hist(z , color = 'black')
plt.show()
```




```
import seaborn as sns

sns.pairplot

<function seaborn.axisgrid.pairplot>

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

salary = pd.read_csv('/content/Car Price.csv')
salary.head()

     Brand                     Model  Year  Selling_Price  KM_Driven
Fuel  \
0   Maruti             Maruti 800 AC  2007          60000      70000
Petrol
1   Maruti  Maruti Wagon R LXI Minor  2007         135000      50000
Petrol
2  Hyundai      Hyundai Verna 1.6 SX  2012         600000     100000
Diesel
3   Datsun    Datsun RediGO T Option  2017         250000      46000
Petrol
4    Honda     Honda Amaze VX i-DTEC  2014         450000     141000
```

```
Diesel
```

```
  Seller_Type Transmission         Owner
0  Individual       Manual   First Owner
1  Individual       Manual   First Owner
2  Individual       Manual   First Owner
3  Individual       Manual   First Owner
4  Individual       Manual  Second Owner
```

```
salary.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 4340 entries, 0 to 4339
Data columns (total 9 columns):
 #   Column         Non-Null Count  Dtype 
---  ------         --------------  ----- 
 0   Brand          4340 non-null   object
 1   Model          4340 non-null   object
 2   Year           4340 non-null   int64 
 3   Selling_Price  4340 non-null   int64 
 4   KM_Driven      4340 non-null   int64 
 5   Fuel           4340 non-null   object
 6   Seller_Type    4340 non-null   object
 7   Transmission   4340 non-null   object
 8   Owner          4340 non-null   object
dtypes: int64(3), object(6)
memory usage: 305.3+ KB
```

```
salary.describe()
```

```
              Year  Selling_Price      KM_Driven
count  4340.000000   4.340000e+03    4340.000000
mean   2013.090783   5.041273e+05   66215.777419
std       4.215344   5.785487e+05   46644.102194
min    1992.000000   2.000000e+04       1.000000
25%    2011.000000   2.087498e+05   35000.000000
50%    2014.000000   3.500000e+05   60000.000000
75%    2016.000000   6.000000e+05   90000.000000
max    2020.000000   8.900000e+06  806599.000000
```

```
y = salary['Selling_Price'] #it has only rows : it is flat that s why single bracket
y.shape
```

```
(4340,)
```

```
x = salary[['Year']] #double bracket cuz it has rows and columns both
x.shape
```

```
(4340, 1)
```

```
 x
```

```
      Year
0     2007
1     2007
2     2012
3     2017
4     2014
...    ...
4335  2014
4336  2014
4337  2009
4338  2016
4339  2016

[4340 rows x 1 columns]
```

```
y
```

```
0        60000
1       135000
2       600000
3       250000
4       450000
         ...
4335    409999
4336    409999
4337    110000
4338    865000
4339    225000
Name: Selling_Price, Length: 4340, dtype: int64
```

```
# **splitting data
```

```
from sklearn.model_selection import train_test_split
```

```
x_train, x_test , y_train ,y_test=train_test_split(x, y, train_size =
0.8 , random_state = 2829)
```

```
x_train.shape, x_test.shape , y_train.shape ,y_test.shape
```

```
((3472, 1), (868, 1), (3472,), (868,))
```

creating a mode

```
from sklearn.linear_model import LinearRegression
```

```
model = LinearRegression()
```

```
model.fit(x_train ,y_train)
```

```
LinearRegression()
```

```
model.coef_
model.intercept_
```

```
-119354298.52186507
```

```
model.coef_
```

```
array([59543.45131179])
```

```
model.intercept_
```

```
-119354298.52186507
```

```
y_pred = model.predict(x_test)
```

```
y_pred
```

```
array([ 804386.22533205,  566212.42008488,  268495.16352592,
        685299.32270847,  447125.5174613 ,  447125.5174613 ,
        625755.87139668,  923473.12795563,  447125.5174613 ,
        625755.87139668,  208951.71221413, -565113.15483917,
        804386.22533205, -446026.25221559,  447125.5174613 ,
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        506668.9687731 ,  506668.9687731 ,   30321.35827875,
        328038.61483771,  149408.26090233,  447125.5174613 ,
        268495.16352592,  506668.9687731 ,  744842.77402025,
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        566212.42008488,  566212.42008488,  744842.77402025,
        566212.42008488,  804386.22533205,  744842.77402025,
        804386.22533205,  744842.77402025,  268495.16352592,
        268495.16352592,  447125.5174613 ,  566212.42008488,
        863929.67664385,  328038.61483771,  744842.77402025,
        685299.32270847,  268495.16352592,  804386.22533205,
        566212.42008488,  625755.87139668,  685299.32270847,
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        625755.87139668,  744842.77402025,  744842.77402025,
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        804386.22533205,  506668.9687731 ,  447125.5174613 ,
        328038.61483771,  506668.9687731 ,  208951.71221413,
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        744842.77402025,  625755.87139668,  863929.67664385,
         30321.35827875,  804386.22533205,  685299.32270847,
        447125.5174613 ,  744842.77402025,  268495.16352592,
        625755.87139668,  506668.9687731 ,  566212.42008488,
```

 268495.16352592, 744842.77402025, 447125.5174613 ,
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 208951.71221413, 625755.87139668, 863929.67664385,
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 744842.77402025, 447125.5174613 , 268495.16352592,
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149408.26090233, 149408.26090233, 506668.9687731 ,
328038.61483771, 506668.9687731 , 447125.5174613 ,
804386.22533205, 566212.42008488, 447125.5174613 ,
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506668.9687731 , 268495.16352592, 685299.32270847,
685299.32270847,   89864.80959055, 506668.9687731 ,
566212.42008488, 744842.77402025, 208951.71221413,
625755.87139668, 208951.71221413, 804386.22533205,
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```

```
from sklearn.metrics import mean_absolute_percentage_error
```

```
mean_absolute_percentage_error(y_test , y_pred)
```

```
0.8815038722879809
```

```
import pandas  as pd
import seaborn as sns
```

```
car = pd.read_csv('/content/Car Price.csv')
```

```
car.describe()
```

```
              Year  Selling_Price      KM_Driven
count  4340.000000   4.340000e+03    4340.000000
mean   2013.090783   5.041273e+05   66215.777419
std       4.215344   5.785487e+05   46644.102194
min    1992.000000   2.000000e+04       1.000000
25%    2011.000000   2.087498e+05   35000.000000
50%    2014.000000   3.500000e+05   60000.000000
75%    2016.000000   6.000000e+05   90000.000000
max    2020.000000   8.900000e+06  806599.000000
```