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```
import numpy as np          #importing python libraries
import pandas as pd
import matplotlib.pyplot as plt
```

```
[ ] car=pd.read_csv("/content/car economy price.csv") #importing dataset
car
```

Unnamed: 0		Name	Location	Year	Kilometers_Driven	Fuel_Type	Transmission	Owner_Type	Mileage	Engine	Power	Seats	New_Price	Price
0	0	Maruti Wagon R LXI CNG	Mumbai	2010	72000	CNG	Manual	First	26.6 km/kg	998 CC	58.16 bhp	5.0	NaN	1.75
1	1	Hyundai Creta 1.6 CRDi SX Option	Pune	2015	41000	Diesel	Manual	First	19.67 kmpl	1582 CC	126.2 bhp	5.0	NaN	12.50
2	2	Honda Jazz V	Chennai	2011	46000	Petrol	Manual	First	18.2 kmpl	1199 CC	88.7 bhp	5.0	8.61 Lakh	4.50
3	3	Maruti Ertiga VDI	Chennai	2012	87000	Diesel	Manual	First	20.77 kmpl	1248 CC	88.76 bhp	7.0	NaN	6.00
4	4	Audi A4 New 2.0 TDI Multitronic	Coimbatore	2013	40670	Diesel	Automatic	Second	15.2 kmpl	1968 CC	140.8 bhp	5.0	NaN	17.74
...



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car.head()

	Unnamed: 0	Name	Location	Year	Kilometers_Driven	Fuel_Type	Transmission	Owner_Type	Mileage	Engine	Power	Seats	New_Price	Price
0	0	Maruti Wagon R LXI CNG	Mumbai	2010	72000	CNG	Manual	First	26.6 km/kg	998 CC	58.16 bhp	5.0	NaN	1.75
1	1	Hyundai Creta 1.6 CRDi SX Option	Pune	2015	41000	Diesel	Manual	First	19.67 kmpl	1582 CC	126.2 bhp	5.0	NaN	12.50
2	2	Honda Jazz V	Chennai	2011	46000	Petrol	Manual	First	18.2 kmpl	1199 CC	88.7 bhp	5.0	8.61 Lakh	4.50
3	3	Maruti Ertiga VDI	Chennai	2012	87000	Diesel	Manual	First	20.77 kmpl	1248 CC	88.76 bhp	7.0	NaN	6.00
4	4	Audi A4 New 2.0 TDI Multitronic	Coimbatore	2013	40670	Diesel	Automatic	Second	15.2 kmpl	1968 CC	140.8 bhp	5.0	NaN	17.74

[] car.tail()

	Unnamed: 0	Name	Location	Year	Kilometers_Driven	Fuel_Type	Transmission	Owner_Type	Mileage	Engine	Power	Seats	New_Price	Price
6014	6014	Maruti Swift VDI	Delhi	2014	27365	Diesel	Manual	First	28.4 kmpl	1248 CC	74 bhp	5.0	7.88 Lakh	4.75
6015	6015	Hyundai Xcent 1.1	Delhi	2015	40000	Diesel	Manual	First	24.4 kmpl	1120 CC	74 bhp	5.0	NaN	4.00



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car.tail()

Unnamed: 0	Name	Location	Year	Kilometers_Driven	Fuel_Type	Transmission	Owner_Type	Mileage	Engine	Power	Seats	New_Price	Price
6014	Maruti Swift VDI	Delhi	2014	27365	Diesel	Manual	First	28.4 kmpl	1248 CC	74 bhp	5.0	7.88 Lakh	4.75
6015	Hyundai Xcent 1.1 CRDi S	Jaipur	2015	100000	Diesel	Manual	First	24.4 kmpl	1120 CC	71 bhp	5.0	NaN	4.00
6016	Mahindra Xylo D4 BSIV	Jaipur	2012	55000	Diesel	Manual	Second	14.0 kmpl	2498 CC	112 bhp	8.0	NaN	2.90
6017	Maruti Wagon R VXI	Kolkata	2013	46000	Petrol	Manual	First	18.9 kmpl	998 CC	67.1 bhp	5.0	NaN	2.65
6018	Chevrolet Beat Diesel	Hyderabad	2011	47000	Diesel	Manual	First	25.44 kmpl	936 CC	57.6 bhp	5.0	NaN	2.50

[] car.columns

```
Index(['Unnamed: 0', 'Name', 'Location', 'Year', 'Kilometers_Driven',  
      'Fuel_Type', 'Transmission', 'Owner_Type', 'Mileage', 'Engine', 'Power',  
      'Seats', 'New_Price', 'Price'],  
      dtype='object')
```

[] car.shape

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[] car.columns

Index(['Unnamed: 0', 'Name', 'Location', 'Year', 'Kilometers_Driven',
'Fuel_Type', 'Transmission', 'Owner_Type', 'Mileage', 'Engine', 'Power',
'Seats', 'New_Price', 'Price'],
dtype='object')

[] car.shape

(6019, 14)

car.isna().sum()

Unnamed: 0 0
Name 0
Location 0
Year 0
Kilometers_Driven 0
Fuel_Type 0
Transmission 0
Owner_Type 0
Mileage 2
Engine 36
Power 36
Seats 42
New_Price 5195
Price 0
dtype: int64

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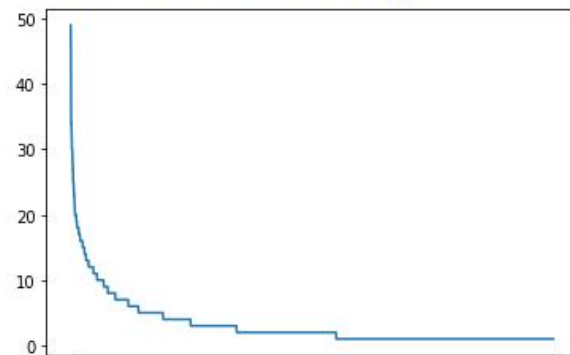


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```
[ ] name=car['Name'].value_counts()  
plt.plot(name)
```

[<matplotlib.lines.Line2D at 0x7fc086e2d7f0>]



Mercedes-Benz, Tata Nano, Maruti Suzuki Swift, Hyundai i10, Mahindra XUV300, etc.

```
[ ] car['Location'].value_counts()
```

Mumbai	790
Hyderabad	742
Kochi	651
Coimbatore	636
Pune	622
Delhi	554
Kolkata	535
Chennai	494

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A line graph showing the decline in the number of people in the 15-24 age group from 1990 to 2010. The vertical axis represents the number of people in millions, ranging from 400 to 800. The horizontal axis represents the year, from 1990 to 2010. The line starts at approximately 790 million in 1990 and ends at approximately 350 million in 2010, showing a consistent downward trend with some fluctuations.

Year	Number of people (millions)
1990	790
1995	740
2000	650
2005	620
2010	350

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[] loc=car['Location'].value_counts()
plt.plot(loc)

[<matplotlib.lines.Line2D at 0x7fc085c994f0>]



Location	Count
Mumbai	800
Hyderabad	750
Bangalore	650
Pune	620
Delhi	550
Kolkata	520
Chennai	480
Jaipur	420
Gang	380
Alwar	350
Agra	220

[] car['Fuel_Type'].value_counts()

Diesel	3205
Petrol	2746
CNG	56
LPG	10
Electric	2

Name: Fuel_Type, dtype: int64

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[] car['Fuel_Type'].value_counts()

Diesel	3205
Petrol	2746
CNG	56
LPG	10
Electric	2

Name: Fuel_Type, dtype: int64

fuel=car['Fuel_Type'].value_counts()
plt.plot(fuel)

[<matplotlib.lines.Line2D at 0x7fc086388130>]

Fuel_Type	Count
Diesel	3205
Petrol	2746
CNG	56
LPG	10
Electric	2

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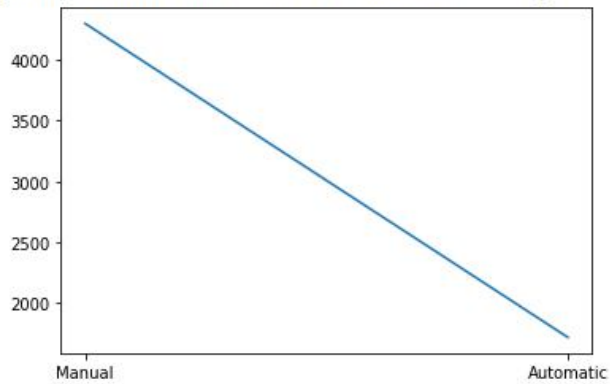
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```
[ ] car['Transmission'].value_counts()
```

```
Manual      4299
Automatic   1720
Name: Transmission, dtype: int64
```

```
trans=car['Transmission'].value_counts()
plt.plot(trans)
```

[<matplotlib.lines.Line2D at 0x7fc085ca5820>]



```
[ ] car['Owner Type'].value_counts()
```



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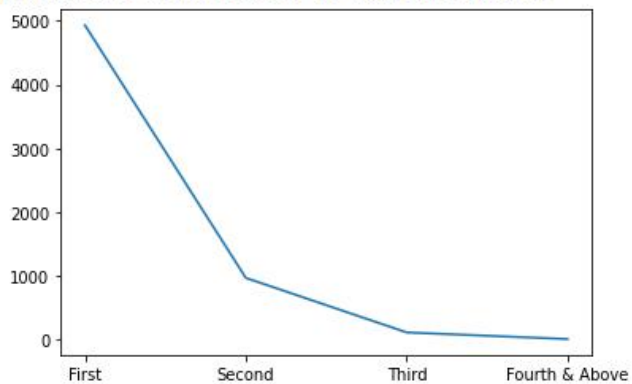
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```
[ ] car['Owner_Type'].value_counts()
```

```
First      4929
Second     968
Third      113
Fourth & Above    9
Name: Owner_Type, dtype: int64
```

```
own=car['Owner_Type'].value_counts()
plt.plot(own)
```

```
[<matplotlib.lines.Line2D at 0x7fc085d1dd00>]
```



```
[ ] dummy=sm.get_dummies(car[['Location','Fuel_Type','Transmission','Owner_Type']],drop_first=True)
```

	Location_Bangalore	Location_Chennai	Location_Coimbatore	Location_Delhi	Location_Hyderabad	Location_Jaipur	Location_Kochi	Location_Kolkata	Location_Mumbai
0	0	0	0	0	0	0	0	0	
1	0	0	0	0	0	0	0	0	
2	0	1	0	0	0	0	0	0	
3	0	1	0	0	0	0	0	0	
4	0	0	1	0	0	0	0	0	
...	
6014	0	0	0	1	0	0	0	0	
6015	0	0	0	0	0	1	0	0	
6016	0	0	0	0	0	1	0	0	
6017	0	0	0	0	0	0	0	1	
6018	0	0	0	0	1	0	0	0	

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```
dff=pd.concat([car,dummy],axis=1)
dff
```

	Unnamed: 0	Name	Location	Year	Kilometers_Driven	Fuel_Type	Transmission	Owner_Type	Mileage	Engine	...	Location_Mumbai	Location_Pune	Fuel_Type_
0	0	Maruti Wagon R LXI CNG	Mumbai	2010	72000	CNG	Manual	First	26.6 km/kg	998 CC	...	1	0	
1	1	Hyundai Creta 1.6 CRDi SX Option	Pune	2015	41000	Diesel	Manual	First	19.67 kmpl	1582 CC	...	0	1	
2	2	Honda Jazz V	Chennai	2011	46000	Petrol	Manual	First	18.2 kmpl	1199 CC	...	0	0	
3	3	Maruti Ertiga VDI	Chennai	2012	87000	Diesel	Manual	First	20.77 kmpl	1248 CC	...	0	0	
4	4	Audi A4 New 2.0 TDI Multitronic	Coimbatore	2013	40670	Diesel	Automatic	Second	15.2 kmpl	1968 CC	...	0	0	
...	
6014	6014	Maruti Swift VDI	Delhi	2014	27365	Diesel	Manual	First	28.4 kmpl	1248 CC	...	0	0	



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```
[ ] dff.columns
```

```
Index(['Unnamed: 0', 'Name', 'Location', 'Year', 'Kilometers_Driven',  
      'Fuel_Type', 'Transmission', 'Owner_Type', 'Mileage', 'Engine', 'Power',  
      'Seats', 'New_Price', 'Price', 'Location_Bangalore', 'Location_Chennai',  
      'Location_Coimbatore', 'Location_Delhi', 'Location_Hyderabad',  
      'Location_Jaipur', 'Location_Kochi', 'Location_Kolkata',  
      'Location_Mumbai', 'Location_Pune', 'Fuel_Type_Diesel',  
      'Fuel_Type_Electric', 'Fuel_Type_LPG', 'Fuel_Type_Petrol',  
      'Transmission_Manual', 'Owner_Type_Fourth & Above', 'Owner_Type_Second',  
      'Owner_Type_Third'],  
      dtype='object')
```

```
dff1=dff.drop(['Unnamed: 0', 'Name', 'Location', 'Fuel_Type', 'Transmission', 'Owner_Type', 'New_Price', 'Fuel_Type_Electric'],axis=1)  
dff1
```



	Year	Kilometers_Driven	Mileage	Engine	Power	Seats	Price	Location_Bangalore	Location_Chennai	Location_Coimbatore	...	Location_Kolkata	Location_Mum
--	------	-------------------	---------	--------	-------	-------	-------	--------------------	------------------	---------------------	-----	------------------	--------------

0	2010	72000	26.6 km/kg	998 CC	58.16 bhp	5.0	1.75	0	0	0	...	0
1	2015	41000	19.67 kmpl	1582 CC	126.2 bhp	5.0	12.50	0	0	0	...	0
2	2011	46000	18.2 kmpl	1199 CC	88.7 bhp	5.0	4.50	0	1	0	...	0
3	2012	87000	20.77 kmpl	1248 CC	88.76 bhp	7.0	6.00	0	1	0	...	0

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```
[ ] #replace unwanted strings in columns like units
dff1['Mileage']=dff1['Mileage'].str.replace('km/kg','')
dff1['Mileage']=dff1['Mileage'].str.replace('kmpl','')
dff1['Power']=dff1['Power'].str.replace('bhp','')
dff1['Engine']=dff1['Engine'].str.replace('CC','')

[ ] #milege,power,engine null ==>0
dff1['Mileage']=dff1['Mileage'].str.replace('null','0')
dff1['Power']=dff1['Power'].str.replace('null','0')
dff1['Engine']=dff1['Engine'].str.replace('null','0')

dff1.isna().sum()
```

Year

Kilometers_Driven

Mileage

Engine

Power

Seats

Price

Location_Bangalore

Location_Chennai

Location_Coimbatore

Location_Delhi

Location_Hyderabad

Location_Jaipur

Location_Kochi

0

0

2

36

36

42

0

0

0

0

0

0

0

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[] dff1.dtypes

Year	int64
Kilometers_Driven	int64
Mileage	object
Engine	object
Power	object
Seats	float64
Price	float64
Location_Bangalore	uint8
Location_Chennai	uint8
Location_Coimbatore	uint8
Location_Delhi	uint8
Location_Hyderabad	uint8
Location_Jaipur	uint8
Location_Kochi	uint8
Location_Kolkata	uint8
Location_Mumbai	uint8
Location_Pune	uint8
Fuel_Type_Diesel	uint8
Fuel_Type_LPG	uint8
Fuel_Type_Petrol	uint8
Transmission_Manual	uint8
Owner_Type_Fourth & Above	uint8
Owner_Type_Second	uint8
Owner_Type_Third	uint8
dtype:	object

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[] dff1.columns

Index(['Year', 'Kilometers_Driven', 'Mileage', 'Engine', 'Power', 'Seats',
'Price', 'Location_Bangalore', 'Location_Chennai',
'Location_Coimbatore', 'Location_Delhi', 'Location_Hyderabad',
'Location_Jaipur', 'Location_Kochi', 'Location_Kolkata',
'Location_Mumbai', 'Location_Pune', 'Fuel_Type_Diesel', 'Fuel_Type_LPG',
'Fuel_Type_Petrol', 'Transmission_Manual', 'Owner_Type_Fourth & Above',
'Owner_Type_Second', 'Owner_Type_Third'],
dtype='object')

#Some values are Object type.So we convert it ito int or float type.

dff1['Mileage']=dff1['Mileage'].astype(float)
dff1['Power']=dff1['Power'].astype(float)
dff1['Engine']=dff1['Engine'].astype(float)

[] dff1.dtypes

Year int64
Kilometers_Driven int64
Mileage float64
Engine float64
Power float64
Seats float64
Price float64
Location_Bangalore uint8
Location_Chennai uint8

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```
[ ] dff1.isna().sum()
```

Year	0
Kilometers_Driven	0
Mileage	70
Engine	36
Power	143
Seats	42
Price	0
Location_Bangalore	0
Location_Chennai	0
Location_Coimbatore	0
Location_Delhi	0
Location_Hyderabad	0
Location_Jaipur	0
Location_Kochi	0
Location_Kolkata	0
Location_Mumbai	0
Location_Pune	0
Fuel_Type_Diesel	0
Fuel_Type_LPG	0
Fuel_Type_Petrol	0
Transmission_Manual	0
Owner_Type_Fourth & Above	0
Owner_Type_Second	0



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```
[ ] dff1['Engine']=dff1['Engine'].fillna(dff1['Engine'].mean())
dff1['Power']=dff1['Power'].fillna(dff1['Power'].mean())
dff1['Mileage']=dff1['Mileage'].fillna(dff1['Mileage'].mean())
dff1['Seats']=dff1['Seats'].fillna(dff1['Seats'].mode()[0])
dff1
```

	Year	Kilometers_Driven	Mileage	Engine	Power	Seats	Price	Location_Bangalore	Location_Chennai	Location_Coimbatore	...	Location_Kolkata	Location_Mur
0	2010	72000	26.60	998.0	58.16	5.0	1.75	0	0	0	...	0	
1	2015	41000	19.67	1582.0	126.20	5.0	12.50	0	0	0	...	0	
2	2011	46000	18.20	1199.0	88.70	5.0	4.50	0	1	0	...	0	
3	2012	87000	20.77	1248.0	88.76	7.0	6.00	0	1	0	...	0	
4	2013	40670	15.20	1968.0	140.80	5.0	17.74	0	0	1	...	0	
...	
6014	2014	27365	28.40	1248.0	74.00	5.0	4.75	0	0	0	...	0	
6015	2015	100000	24.40	1120.0	71.00	5.0	4.00	0	0	0	...	0	
6016	2012	55000	14.00	2498.0	112.00	8.0	2.90	0	0	0	...	0	
6017	2013	46000	18.90	998.0	67.10	5.0	2.65	0	0	0	...	1	
6018	2011	47000	25.44	936.0	57.60	5.0	2.50	0	0	0	...	0	

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▶ dff1.isna().sum()

Year0

Kilometers_Driven0

Mileage0

Engine0

Power0

Seats0

Price0

Location_Bangalore0

Location_Chennai0

Location_Coimbatore0

Location_Delhi0

Location_Hyderabad0

Location_Jaipur0

Location_Kochi0

Location_Kolkata0

Location_Mumbai0

Location_Pune0

Fuel_Type_Diesel0

Fuel_Type_LPG0

Fuel_Type_Petrol0

Transmission_Manual0

Owner_Type_Fourth & Above0

Owner_Type_Second0

Owner_Type_Third0

dtype: int64

[] x=dff1.drop(['Price'],axis=1)

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ENG

11:14

04-02-2023

6019 rows x 23 columns

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[] x.columns

Index(['Year', 'Kilometers_Driven', 'Mileage', 'Engine', 'Power', 'Seats',
'Location_Bangalore', 'Location_Chennai', 'Location_Coimbatore',
'Location_Delhi', 'Location_Hyderabad', 'Location_Jaipur',
'Location_Kochi', 'Location_Kolkata', 'Location_Mumbai',
'Location_Pune', 'Fuel_Type_Diesel', 'Fuel_Type_LPG',
'Fuel_Type_Petrol', 'Transmission_Manual', 'Owner_Type_Fourth & Above',
'Owner_Type_Second', 'Owner_Type_Third'],
dtype='object')

▶ y=df1['Price']

y

0 1.75

1 12.50

2 4.50

3 6.00

4 17.74

...

6014 4.75

6015 4.00

6016 2.90

6017 2.65

6018 2.50

Name: Price, Length: 6019, dtype: float64

[] td=pd.read_csv("/content/test-data.csv")

Windows

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```
[ ] td=pd.read_csv("/content/test-data.csv")
td
```

Unnamed: 0		Name	Location	Year	Kilometers_Driven	Fuel_Type	Transmission	Owner_Type	Mileage	Engine	Power	Seats	New_Price
0	0	Maruti Alto K10 LXI CNG	Delhi	2014	40929	CNG	Manual	First	32.26 km/kg	998 CC	58.2 bhp	4.0	NaN
1	1	Maruti Alto 800 2016-2019 LXI	Coimbatore	2013	54493	Petrol	Manual	Second	24.7 kmpl	796 CC	47.3 bhp	5.0	NaN
2	2	Toyota Innova Crysta Touring Sport 2.4 MT	Mumbai	2017	34000	Diesel	Manual	First	13.68 kmpl	2393 CC	147.8 bhp	7.0	25.27 Lakh
3	3	Toyota Etios Liva GD	Hyderabad	2012	139000	Diesel	Manual	First	23.59 kmpl	1364 CC	null bhp	5.0	NaN
4	4	Hyundai i20 Magna	Mumbai	2014	29000	Petrol	Manual	First	18.5 kmpl	1197 CC	82.85 bhp	5.0	NaN
...
1229	1229	Volkswagen Vento Diesel Trendline	Hyderabad	2011	89411	Diesel	Manual	First	20.54 kmpl	1598 CC	103.6 bhp	5.0	NaN
1230	1230	Volkswagen Polo GT TSI	Mumbai	2015	59000	Petrol	Automatic	First	17.21 kmpl	1197 CC	103.6 bhp	5.0	NaN
...	23.08	1461	63.1



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td.head()

Unnamed: 0		Name	Location	Year	Kilometers_Driven	Fuel_Type	Transmission	Owner_Type	Mileage	Engine	Power	Seats	New_Price
0	0	Maruti Alto K10 LXI CNG	Delhi	2014	40929	CNG	Manual	First	32.26 km/kg	998 CC	58.2 bhp	4.0	NaN
1	1	Maruti Alto 800 2016-2019 LXI	Coimbatore	2013	54493	Petrol	Manual	Second	24.7 kmpl	796 CC	47.3 bhp	5.0	NaN
2	2	Toyota Innova Crysta Touring Sport 2.4 MT	Mumbai	2017	34000	Diesel	Manual	First	13.68 kmpl	2393 CC	147.8 bhp	7.0	25.27 Lakh
3	3	Toyota Etios Liva GD	Hyderabad	2012	139000	Diesel	Manual	First	23.59 kmpl	1364 CC	null bhp	5.0	NaN
4	4	Hyundai i20 Magna	Mumbai	2014	29000	Petrol	Manual	First	18.5 kmpl	1197 CC	82.85 bhp	5.0	NaN

[] td.tail()

Unnamed: 0		Name	Location	Year	Kilometers_Driven	Fuel_Type	Transmission	Owner_Type	Mileage	Engine	Power	Seats	New_Price
1229	1229	Volkswagen Vento Diesel Trendline	Hyderabad	2011	89411	Diesel	Manual	First	20.54 kmpl	1598 CC	103.6 bhp	5.0	NaN
1230	1230	Volkswagen Polo GT TSI	Mumbai	2015	59000	Petrol	Automatic	First	17.21 kmpl	1197 CC	103.6 bhp	5.0	NaN

+ Code + Text

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- ▶ `td.tail()`

	Unnamed: 0	Name	Location	Year	Kilometers_Driven	Fuel_Type	Transmission	Owner_Type	Mileage	Engine	Power	Seats	New_Price
1229	1229	Volkswagen Vento Diesel Trendline	Hyderabad	2011	89411	Diesel	Manual	First	20.54 kmpl	1598 CC	103.6 bhp	5.0	NaN
1230	1230	Volkswagen Polo GT TSI	Mumbai	2015	59000	Petrol	Automatic	First	17.21 kmpl	1197 CC	103.6 bhp	5.0	NaN
1231	1231	Nissan Micra Diesel XV	Kolkata	2012	28000	Diesel	Manual	First	23.08 kmpl	1461 CC	63.1 bhp	5.0	NaN
1232	1232	Volkswagen Polo GT TSI	Pune	2013	52262	Petrol	Automatic	Third	17.2 kmpl	1197 CC	103.6 bhp	5.0	NaN
1233	1233	Mercedes-Benz E-Class 2009-2013 E 220 CDI Avan...	Kochi	2014	72443	Diesel	Automatic	First	10.0 kmpl	2148 CC	170 bhp	5.0	NaN

```
[ ] td.shape
```

 $(1234, 13)$

```
[ ] td.isna().sum()
```

Unnamed: 0 0

Connect Editing

```
[ ] td.shape
```

(1234, 13)

▶ `td.isna().sum()`

```

↳ Unnamed: 0      0
   Name           0
   Location       0
   Year           0
   Kilometers_Driven 0
   Fuel_Type      0
   Transmission   0
   Owner_Type     0
   Mileage        0
   Engine         10
   Power          10
   Seats         11
   New_Price     1052
   dtype: int64

```

```
[ ] td.columns
```

```
Index(['Unnamed: 0', 'Name', 'Location', 'Year', 'Kilometers_Driven',
       'Fuel_Type', 'Transmission', 'Owner_Type', 'Mileage', 'Engine', 'Power',
       'Seats', 'New_Price'],
      dtype='object')
```



+ Code + Text

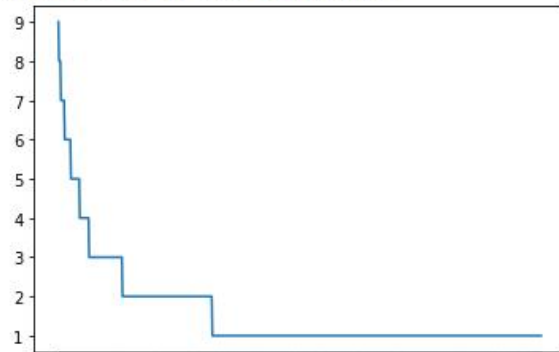
Connect Editing ^

```
[ ] td.columns
```

```
Index(['Unnamed: 0', 'Name', 'Location', 'Year', 'Kilometers_Driven',  
      'Fuel_Type', 'Transmission', 'Owner_Type', 'Mileage', 'Engine', 'Power',  
      'Seats', 'New_Price'],  
      dtype='object')
```

```
[ ] name1=td['Name'].value_counts()  
plt.plot(name1)
```

```
[<matplotlib.lines.Line2D at 0x7fc0861642e0>]
```



Microcar

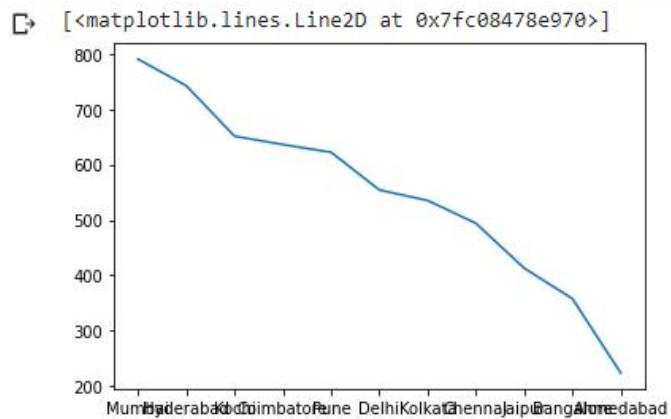
```
[ ] loc1=td['Location'].value_counts()
```



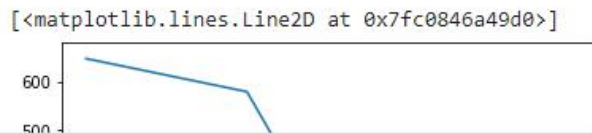

+ Code + Text

Connect Editing ^

```
loc1=td['Location'].value_counts()  
plt.plot(loc)
```



```
[ ] fuel1=td['Fuel_Type'].value_counts()  
plt.plot(fuel1)
```



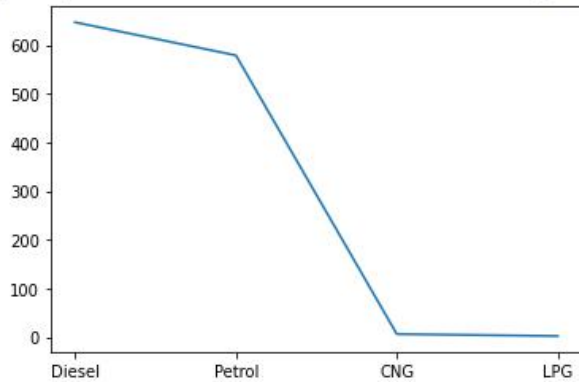


+ Code + Text

Connect Editing ^

```
fuel1=td['Fuel_Type'].value_counts()  
plt.plot(fuel1)
```

[<matplotlib.lines.Line2D at 0x7fc0846a49d0>]



```
[ ] trans1=td['Transmission'].value_counts()  
plt.plot(trans1)
```

[<matplotlib.lines.Line2D at 0x7fc08464d8e0>]



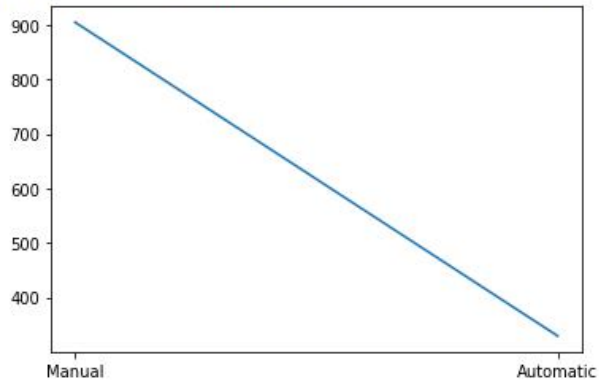


+ Code + Text

Connect Editing ^

```
trans1=td['Transmission'].value_counts()  
plt.plot(trans1)
```

[<matplotlib.lines.Line2D at 0x7fc08464d8e0>]



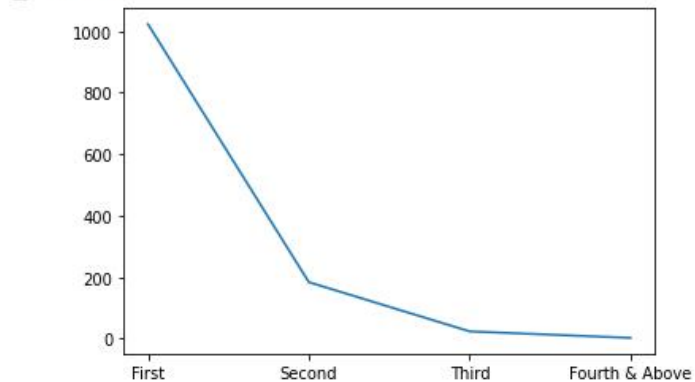
```
[ ] own1=td['Owner_Type'].value_counts()  
plt.plot(own1)
```

[<matplotlib.lines.Line2D at 0x7fc08456d730>]



Connect  Editing 

```
↳ [matplotlib.lines.Line2D at 0x7fc08456d730]
```



```
[ ] dummy1=pd.get_dummies(td[['Location','Fuel_Type','Transmission','Owner_Type']],drop_first=True)
dummy1
```

	Location_Bangalore	Location_Chennai	Location_Coimbatore	Location_Delhi	Location_Hyderabad	Location_Jaipur	Location_Kochi	Location_Kolkata	Location_Mumbai
0	0	0	0	1	0	0	0	0	0
1	0	0	1	0	0	0	0	0	0

Connect Editing

1234 rows x 17 columns



+ Code + Text

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```
dfff=pd.concat([td,dummy1],axis=1)
dfff
```

	Unnamed: 0	Name	Location	Year	Kilometers_Driven	Fuel_Type	Transmission	Owner_Type	Mileage	Engine	...	Location_Kolkata	Location_Mumbai	Locat
0	0	Maruti Alto K10 LXI CNG	Delhi	2014	40929	CNG	Manual	First	32.26 km/kg	998 CC	...	0	0	
1	1	Maruti Alto 800 2016-2019 LXI	Coimbatore	2013	54493	Petrol	Manual	Second	24.7 kmpl	796 CC	...	0	0	
2	2	Toyota Innova Crysta Touring Sport 2.4 MT	Mumbai	2017	34000	Diesel	Manual	First	13.68 kmpl	2393 CC	...	0	1	
3	3	Toyota Etios Liva GD	Hyderabad	2012	139000	Diesel	Manual	First	23.59 kmpl	1364 CC	...	0	0	
4	4	Hyundai i20 Magna	Mumbai	2014	29000	Petrol	Manual	First	18.5 kmpl	1197 CC	...	0	1	
...
		Volkswagen												



+ Code + Text

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```
[ ] dfff.columns
```

```
Index(['Unnamed: 0', 'Name', 'Location', 'Year', 'Kilometers_Driven',  
      'Fuel_Type', 'Transmission', 'Owner_Type', 'Mileage', 'Engine', 'Power',  
      'Seats', 'New_Price', 'Location_Bangalore', 'Location_Chennai',  
      'Location_Coimbatore', 'Location_Delhi', 'Location_Hyderabad',  
      'Location_Jaipur', 'Location_Kochi', 'Location_Kolkata',  
      'Location_Mumbai', 'Location_Pune', 'Fuel_Type_Diesel', 'Fuel_Type_LPG',  
      'Fuel_Type_Petrol', 'Transmission_Manual', 'Owner_Type_Fourth & Above',  
      'Owner_Type_Second', 'Owner_Type_Third'],  
      dtype='object')
```

```
dff2=dfff.drop(['Unnamed: 0', 'Name', 'Location', 'Fuel_Type', 'Transmission', 'Owner_Type', 'New_Price'], axis=1)  
dff2
```

	Year	Kilometers_Driven	Mileage	Engine	Power	Seats	Location_Bangalore	Location_Chennai	Location_Coimbatore	Location_Delhi	...	Location_Kolkata	Loc
0	2014	40929	32.26 km/kg	998 CC	58.2 bhp	4.0	0	0	0	1	...	0	
1	2013	54493	24.7 kmpl	796 CC	47.3 bhp	5.0	0	0	1	0	...	0	
2	2017	34000	13.68 kmpl	2393 CC	147.8 bhp	7.0	0	0	0	0	...	0	
3	2012	139000	23.59	1364	null	5.0	0	0	0	0	...	0	

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```
[ ] #replace unwanted strings in columns like units
dff2['Mileage']=dff2['Mileage'].str.replace('km/kg','')
dff2['Mileage']=dff2['Mileage'].str.replace('kmpl','')
dff2['Power']=dff2['Power'].str.replace('bhp','')
dff2['Engine']=dff2['Engine'].str.replace('CC','')

[ ] dff2['Mileage']=dff2['Mileage'].str.replace('null','0')
dff2['Power']=dff2['Power'].str.replace('null','0')
dff2['Engine']=dff2['Engine'].str.replace('null','0')

dff2.isna().sum()
```

Year

Kilometers_Driven

Mileage

Engine

Power

Seats

Location_Bangalore

Location_Chennai

Location_Coimbatore

Location_Delhi

Location_Hyderabad

Location_Jaipur

Location_Kochi

0

0

0

10

10

11

0

0

0

0

0

0

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Visual Studio Code

Chrome

ENG

11:15

04-02-2023

```
Year 0
Kilometers_Driven 0
Mileage 0
Engine 10
Power 10
Seats 11
Location_Bangalore 0
Location_Chennai 0
Location_Coimbatore 0
Location_Delhi 0
Location_Hyderabad 0
Location_Jaipur 0
Location_Kochi 0
Location_Kolkata 0
Location_Mumbai 0
Location_Pune 0
Fuel_Type_Diesel 0
Fuel_Type_LPG 0
Fuel_Type_Petrol 0
Transmission_Manual 0
Owner_Type_Fourth & Above 0
Owner_Type_Second 0
Owner_Type_Third 0
dtype: int64
```

```
[ ] dff2.dtypes
```

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[] dff2.dtypes

Year	int64
Kilometers_Driven	int64
Mileage	object
Engine	object
Power	object
Seats	float64
Location_Bangalore	uint8
Location_Chennai	uint8
Location_Coimbatore	uint8
Location_Delhi	uint8
Location_Hyderabad	uint8
Location_Jaipur	uint8
Location_Kochi	uint8
Location_Kolkata	uint8
Location_Mumbai	uint8
Location_Pune	uint8
Fuel_Type_Diesel	uint8
Fuel_Type_LPG	uint8
Fuel_Type_Petrol	uint8
Transmission_Manual	uint8
Owner_Type_Fourth & Above	uint8
Owner_Type_Second	uint8
Owner_Type_Third	uint8
dtype:	object

[] dff2.columns

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[] dff2.columns

Index(['Year', 'Kilometers_Driven', 'Mileage', 'Engine', 'Power', 'Seats',
'Location_Bangalore', 'Location_Chennai', 'Location_Coimbatore',
'Location_Delhi', 'Location_Hyderabad', 'Location_Jaipur',
'Location_Kochi', 'Location_Kolkata', 'Location_Mumbai',
'Location_Pune', 'Fuel_Type_Diesel', 'Fuel_Type_LPG',
'Fuel_Type_Petrol', 'Transmission_Manual', 'Owner_Type_Fourth & Above',
'Owner_Type_Second', 'Owner_Type_Third'],
dtype='object')

[] dff2['Mileage']=dff2['Mileage'].astype(float)
dff2['Power']=dff2['Power'].astype(float)
dff2['Engine']=dff2['Engine'].astype(float)

[] dff2.dtypes

Year	int64
Kilometers_Driven	int64
Mileage	float64
Engine	float64
Power	float64
Seats	float64
Location_Bangalore	uint8
Location_Chennai	uint8
Location_Coimbatore	uint8

Windows

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```
Year                                int64
Kilometers_Driven                  int64
Mileage                            float64
Engine                             float64
Power                              float64
Seats                              float64
Location_Bangalore                 uint8
Location_Chennai                  uint8
Location_Coimbatore               uint8
Location_Delhi                    uint8
Location_Hyderabad                uint8
Location_Jaipur                   uint8
Location_Kochi                    uint8
Location_Kolkata                  uint8
Location_Mumbai                   uint8
Location_Pune                     uint8
Fuel_Type_Diesel                  uint8
Fuel_Type_LPG                    uint8
Fuel_Type_Petrol                  uint8
Transmission_Manual               uint8
Owner_Type_Fourth & Above         uint8
Owner_Type_Second                 uint8
Owner_Type_Third                  uint8
dtype: object
```

● >

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```
[ ] dff2.loc[dff2.Engine==0, 'Engine']=np.NaN
dff2.loc[dff2.Power==0, 'Power']=np.NaN
dff2.loc[dff2.Mileage==0, 'Mileage']=np.NaN

[ ] dff2.isna().sum()
```

Year	0
Kilometers_Driven	0
Mileage	13
Engine	10
Power	32
Seats	11
Location_Bangalore	0
Location_Chennai	0
Location_Coimbatore	0
Location_Delhi	0
Location_Hyderabad	0
Location_Jaipur	0
Location_Kochi	0
Location_Kolkata	0
Location_Mumbai	0
Location_Pune	0
Fuel_Type_Diesel	0
Fuel_Type_LPG	0
Fuel_Type_Petrol	0
Transmission_Manual	0
Owner_Type_Fourth & Above	0
Owner_Type_Second	0
Owner_Type_Third	0

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```
[ ] dff2['Engine']=dff2['Engine'].fillna(dff2['Engine'].mean())
dff2['Power']=dff2['Power'].fillna(dff2['Power'].mean())
dff2['Mileage']=dff2['Mileage'].fillna(dff2['Mileage'].mean())
dff2['Seats']=dff2['Seats'].fillna(dff2['Seats'].mode()[0])
dff2
```

	Year	Kilometers_Driven	Mileage	Engine	Power	Seats	Location_Bangalore	Location_Chennai	Location_Coimbatore	Location_Delhi	...	Location_Kolkata
0	2014	40929	32.26	998.0	58.20000	4.0	0	0	0	1	...	0
1	2013	54493	24.70	796.0	47.30000	5.0	0	0	1	0	...	0
2	2017	34000	13.68	2393.0	147.80000	7.0	0	0	0	0	...	0
3	2012	139000	23.59	1364.0	110.38042	5.0	0	0	0	0	...	0
4	2014	29000	18.50	1197.0	82.85000	5.0	0	0	0	0	...	0
...
1229	2011	89411	20.54	1598.0	103.60000	5.0	0	0	0	0	...	0
1230	2015	59000	17.21	1197.0	103.60000	5.0	0	0	0	0	...	0
1231	2012	28000	23.08	1461.0	63.10000	5.0	0	0	0	0	...	1
1232	2013	52262	17.20	1197.0	103.60000	5.0	0	0	0	0	...	0
1233	2014	72443	10.00	2148.0	170.00000	5.0	0	0	0	0	...	0

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▶ dff2.isna().sum()

Year0

Kilometers_Driven0

Mileage0

Engine0

Power0

Seats0

Location_Bangalore0

Location_Chennai0

Location_Coimbatore0

Location_Delhi0

Location_Hyderabad0

Location_Jaipur0

Location_Kochi0

Location_Kolkata0

Location_Mumbai0

Location_Pune0

Fuel_Type_Diesel0

Fuel_Type_LPG0

Fuel_Type_Petrol0

Transmission_Manual0

Owner_Type_Fourth & Above0

Owner_Type_Second0

Owner_Type_Third0

dtype: int64

[] from sklearn.linear_model import LinearRegression

model=LinearRegression()

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```
[ ] from sklearn.linear_model import LinearRegression
    model=LinearRegression()
    model.fit(x,y)

LinearRegression()

[ ] w=dff2
    y_pred=model.predict(w)
    y_pred

array([ 2.87588492, -1.29344912, 16.1069494 , ...,  0.1378514 ,
        9.27293255, 21.48043251])
```

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