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

Importing Data.

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

In [ ]:
```
df.head()
```

Out[ ]:

	Brand	Model	Submodel	Tyre Brand	Serial No.	Type	Load Index	Size	Selling Price	Original Price
0	Maruti	Swift Dzire	LDI (Diesel)	JKTyre	Taximaxx	Tubeless	85	165/80 R 14	3,255	3,255
1	Maruti	Swift Dzire	LDI (Diesel)	CEAT	Milage X3	Tubeless	85	165/80 R 14	3,406	3,406
2	Maruti	Swift Dzire	LDI (Diesel)	Apollo	Amazer 4G Life	Tubeless	85	165/80 R 14	3,490	4,319
3	Maruti	Swift Dzire	LDI (Diesel)	Continental	Comfort Contact CC6	Tubeless	85	165/80 R 14	4,484	4,244
4	Maruti	Swift Dzire	LDI (Diesel)	GoodYear	Assurance Duraplus 2	Tubeless	85	165/80 R 14	3,025	3,025

Gathering information about data.

In [ ]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 4350 entries, 0 to 4349
Data columns (total 11 columns):
 #   Column          Non-Null Count  Dtype  
---  ------          --------------  -----  
 0   Brand           4350 non-null   object 
 1   Model           4350 non-null   object 
 2   Submodel        4350 non-null   object 
 3   Tyre Brand      4350 non-null   object 
 4   Serial No.      4350 non-null   object 
 5   Type            4350 non-null   object 
 6   Load Index      4350 non-null   int64  
 7   Size            4350 non-null   object 
 8   Selling Price   4350 non-null   object 
 9   Original Price  4350 non-null   object 
 10  Rating          2248 non-null   float64
dtypes: float64(1), int64(1), object(9)
memory usage: 374.0+ KB
```

Selling Prince and Original Price is in object form, but it should be in int64. So, we need to convert datatype of these 2 columns.

In [ ]:
```
df['Selling Price'] = df['Selling Price'].str.replace(',','').astype(int)
df['Original Price'] = df['Original Price'].str.replace(',','').astype(int)
```

In [ ]:
```
# Now again checking the Dtype of all columns.
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 4350 entries, 0 to 4349
Data columns (total 11 columns):
 #   Column          Non-Null Count  Dtype
---  ------          --------------  -----
 0   Brand           4350 non-null   object
 1   Model           4350 non-null   object
 2   Submodel        4350 non-null   object
 3   Tyre Brand      4350 non-null   object
 4   Serial No.      4350 non-null   object
 5   Type            4350 non-null   object
 6   Load Index      4350 non-null   int64
 7   Size            4350 non-null   object
 8   Selling Price   4350 non-null   int32
 9   Original Price  4350 non-null   int32
 10  Rating          2248 non-null   float64
dtypes: float64(1), int32(2), int64(1), object(7)
memory usage: 340.0+ KB
```

Checking the statistical information of the data set for numerical columns.

In [ ]:
```
df.describe()
```

Out[ ]:

	Load Index	Selling Price	Original Price	Rating
count	4350.000000	4350.000000	4350.000000	2248.000000
mean	84.101609	4724.982989	4762.234943	4.297598
std	6.716769	1848.303937	1869.111942	0.698433
min	69.000000	2248.000000	2248.000000	1.900000
25%	79.000000	3400.000000	3401.250000	4.000000
50%	86.000000	4300.000000	4319.000000	4.300000
75%	88.000000	5594.000000	5594.000000	5.000000
max	106.000000	20257.000000	20257.000000	5.000000

Checking for duplicate values in the data set.

In [ ]:
```
df.duplicated().sum()
```

Out[ ]: 134

In [ ]:
```
# Droping all duplicate values.
df.drop_duplicates(inplace=True)
```

In [ ]:
```
df.duplicated().sum()
```

Out[ ]: 0

Checking for null values.

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

Out[ ]:
```
Brand               0
Model               0
Submodel            0
Tyre Brand          0
Serial No.          0
Type                0
Load Index          0
Size                0
Selling Price       0
Original Price      0
Rating           2032
dtype: int64
```

There are 2032 null values in 'Rating' column. Either we can remove these values, but removing such huge amount of rows is not good for analysis part. We can fill these null values with 0 or mean value of column. So, for better analysis I am going to fill these null values with mean value.

In [ ]:
```
mean_value = round(df['Rating'].mean())
mean_value
```

Out[ ]: 4

In [ ]:
```
df['Rating'] = df['Rating'].fillna(value=mean_value)
```

In [ ]:
```
# After filling null values with mean value, lets check data info again.
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 4216 entries, 0 to 4349
Data columns (total 11 columns):
 #   Column          Non-Null Count  Dtype  
---  ------          --------------  -----  
 0   Brand           4216 non-null   object 
 1   Model           4216 non-null   object 
 2   Submodel        4216 non-null   object 
 3   Tyre Brand      4216 non-null   object 
 4   Serial No.      4216 non-null   object 
 5   Type            4216 non-null   object 
 6   Load Index      4216 non-null   int64  
 7   Size            4216 non-null   object 
 8   Selling Price   4216 non-null   int32  
 9   Original Price  4216 non-null   int32  
 10  Rating          4216 non-null   float64
dtypes: float64(1), int32(2), int64(1), object(7)
memory usage: 362.3+ KB
```

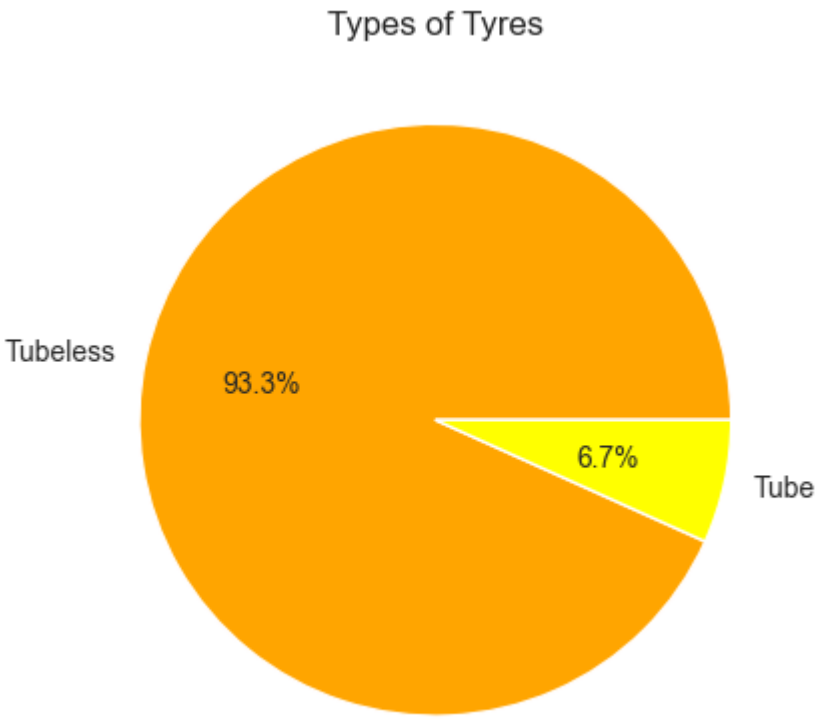
Product count on the basis of Type.

In [ ]:
```
tyre_type = df['Type'].value_counts().reset_index()
tyre_type.columns = ('Type','Count')
tyre_type
```

Out[ ]:

	Type	Count
0	Tubeless	3932
1	Tube	284

In [ ]:
```
# Visulaising the Tyre Type.
x = tyre_type['Type']
y = tyre_type['Count']
plt.pie(y,labels=x,autopct='%1.1f%%',colors=('orange','yellow'))
plt.title('Types of Tyres')
plt.show()
```



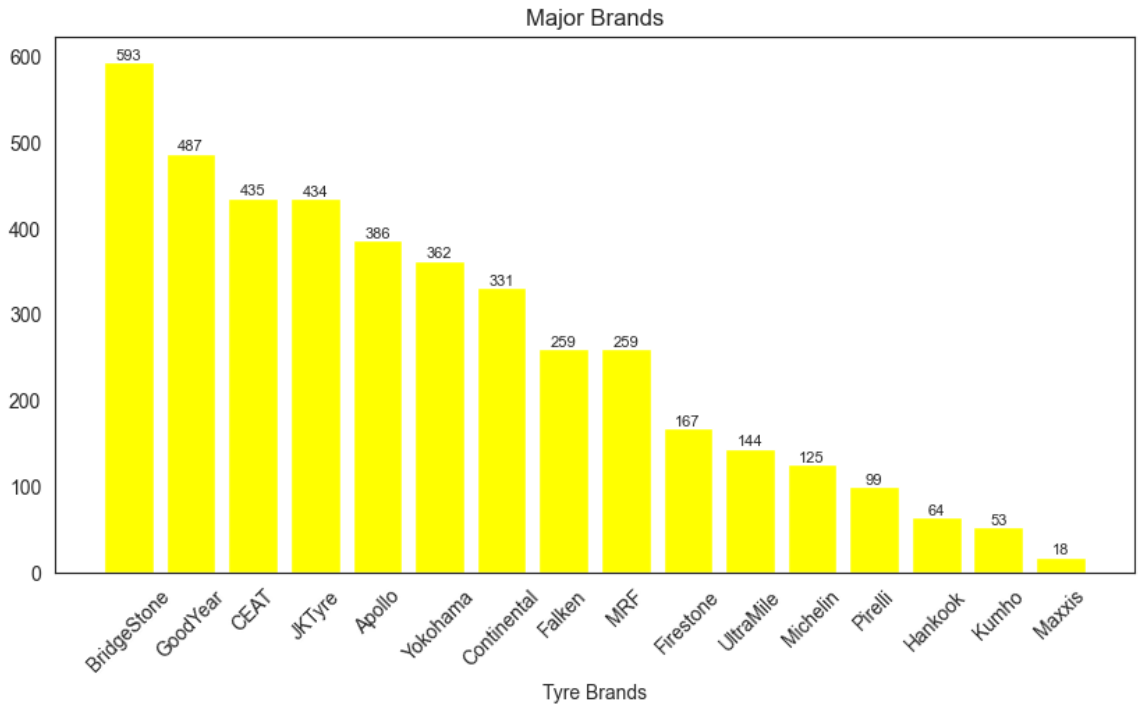
Major brands in the market.

In [ ]:
```
brands = df['Tyre Brand'].value_counts().reset_index()
brands.columns = ('Tyre Brand','Count')
brands
```

Out[ ]:

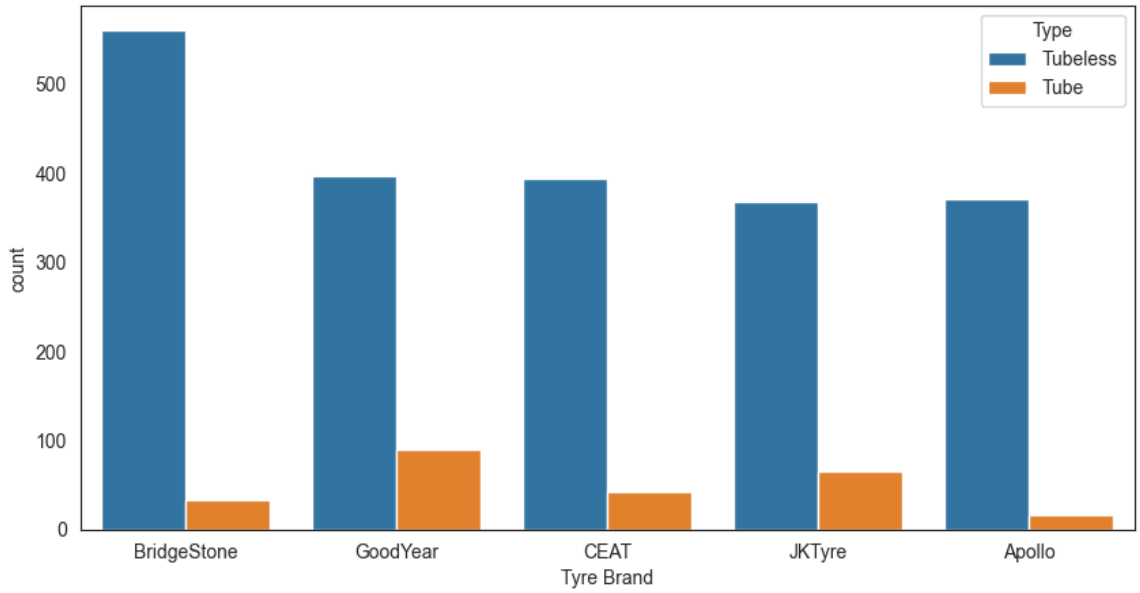
	Tyre Brand	Count
0	BridgeStone	593
1	GoodYear	487
2	CEAT	435
3	JKTyre	434
4	Apollo	386
5	Yokohama	362
6	Continental	331
7	Falken	259
8	MRF	259
9	Firestone	167
10	UltraMile	144
11	Michelin	125
12	Pirelli	99
13	Hankook	64
14	Kumho	53
15	Maxxis	18

In [ ]:
```
x = brands['Tyre Brand']
y = brands['Count']
plt.figure(figsize=(10,5))
plt.title('Major Brands')
plt.bar(x,y,color='yellow')
plt.xlabel('Tyre Brands')
plt.xticks(rotation=45)
for i in range(len(x)):
    plt.text(x[i],y[i],f'{y[i]}',ha='center',va='bottom',fontsize=8)
plt.show()
```



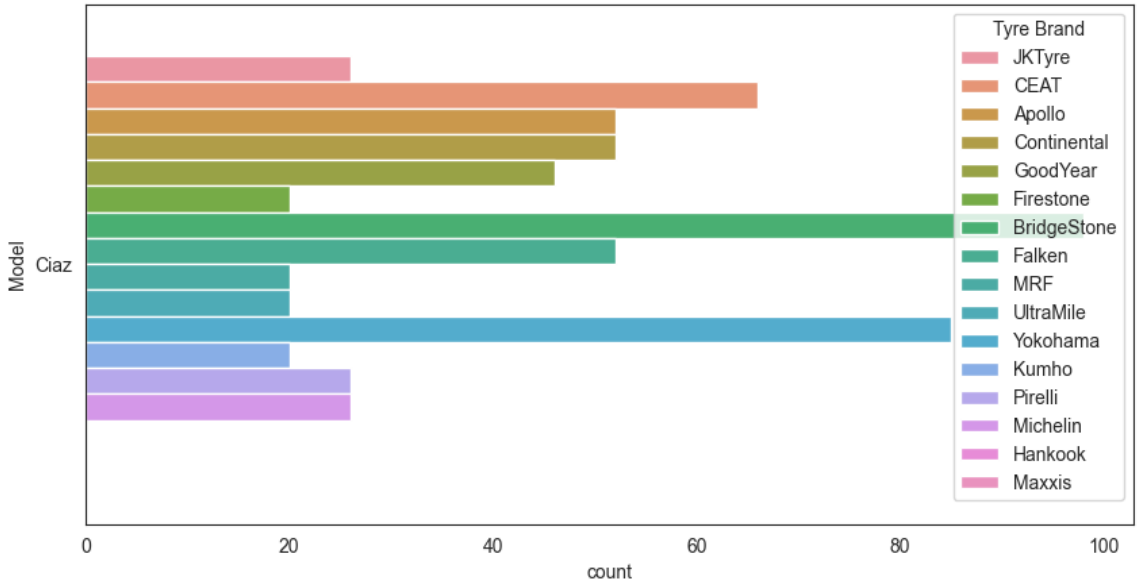
Top 5 brands with most tyre model with tyre types.

In [ ]:
```
sns.set_style('white')
plt.figure(figsize=(10,5))
sns.countplot(x='Tyre Brand',hue='Type',data=df,order=df['Tyre Brand'].value_cou
plt.show()
```



Car model has the highest number of typre models.

In [ ]:
```
plt.figure(figsize=(10,5))
sns.countplot(y='Model',hue='Tyre Brand',data=df,order=df['Model'].value_counts(
plt.show()
```



Tyre Brands with maximum ratings.

In [ ]:
```
ratings = df.groupby('Tyre Brand')['Rating'].mean().sort_values(ascending=False)
ratings = round(ratings,2)
ratings
```

Out[ ]:
```
Tyre Brand
Pirelli        4.55
CEAT           4.33
Apollo         4.21
JKTyre         4.20
BridgeStone    4.19
GoodYear       4.16
Yokohama       4.12
Falken         4.10
Michelin       4.06
Firestone      4.04
MRF            4.02
Hankook        4.00
Kumho          4.00
Maxxis         4.00
Continental    4.00
UltraMile      3.97
Name: Rating, dtype: float64
```

Average Selling Price of Tyre Brands.

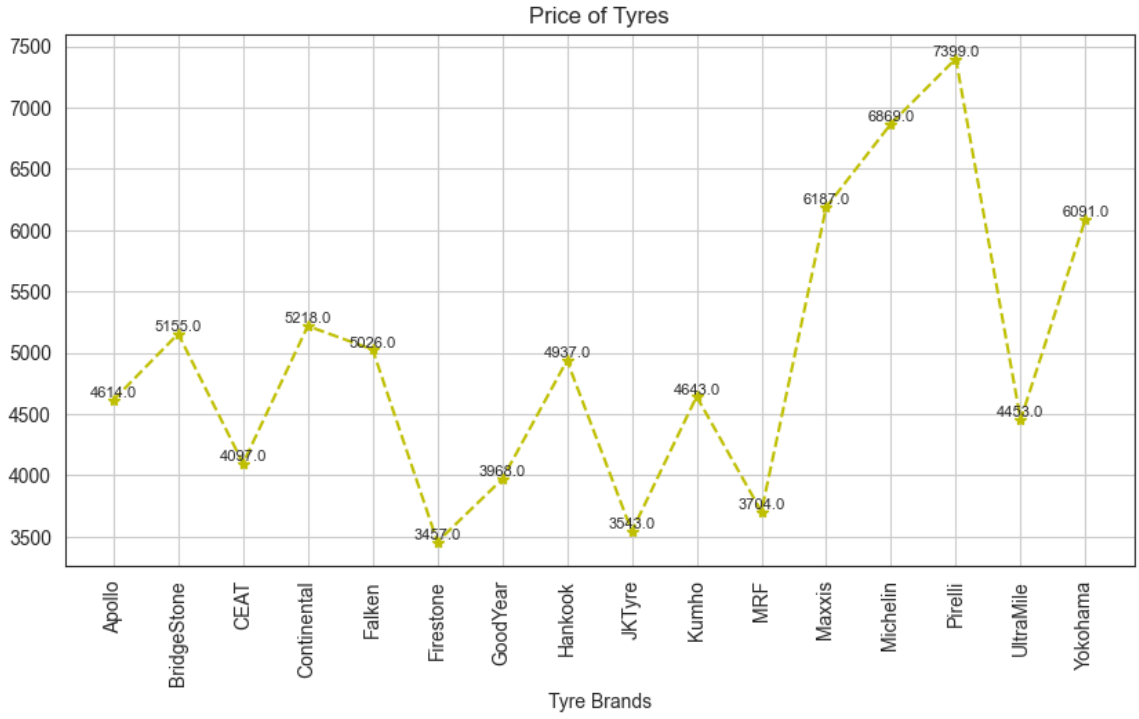
In [ ]:
```
avg_sp = df.groupby('Tyre Brand')['Selling Price'].mean().apply(np.ceil)
avg_sp = avg_sp.to_frame().reset_index()
avg_sp
```

Out[ ]:

	Tyre Brand	Selling Price
0	Apollo	4614.0
1	BridgeStone	5155.0
2	CEAT	4097.0
3	Continental	5218.0
4	Falken	5026.0
5	Firestone	3457.0
6	GoodYear	3968.0
7	Hankook	4937.0
8	JKTyre	3543.0
9	Kumho	4643.0
10	MRF	3704.0
11	Maxxis	6187.0
12	Michelin	6869.0
13	Pirelli	7399.0
14	UltraMile	4453.0
15	Yokohama	6091.0

In [ ]:

```
x = avg_sp['Tyre Brand']
y = avg_sp['Selling Price']
plt.figure(figsize=(10,5))
plt.plot(x,y,'*y--')
plt.title('Price of Tyres')
plt.xlabel('Tyre Brands')
plt.grid()
plt.xticks(rotation=90)
for i in range(len(x)):
    plt.text(x[i],y[i],f'{y[i]}',ha='center',va='bottom',fontsize=8)
plt.show()
```



Different Sizes of tyres.

In [ ]:
```
tyre_size = df['Size'].value_counts().reset_index()
tyre_size.columns = ('Size','Count')
tyre_size
```

Out[ ]:

	Size	Count
0	185/65 R 15	1167
1	165/80 R 14	633
2	145/80 R 12	408
3	155/80 R 13	274
4	165/70 R 14	234
5	155/65 R 13	190
6	205/60 R 16	177
7	195/55 R 16	162
8	215/60 R 16	149
9	145/70 R 13	141
10	185/70 R 14	127
11	155/65 R 14	105
12	175/70 R 13	95
13	155 R 13	80
14	195/65 R 15	75
15	145/80 R 13	63
16	185/65 R 14	37
17	225/65 R 17	24
18	185/70 R14	20
19	215/55 R 17	14
20	205/70 R 15	3
21	205/70 R 16	3
22	205/70 R 17	3
23	185/70 R 20	3
24	185/70 R 19	3
25	225/70 R 16	3
26	205/70 R 18	3
27	145/70 R 19	1
28	145/70 R 20	1
29	185/70 R 23	1
30	185/70 R 15	1
31	145/70 R 17	1
32	145/70 R 18	1
33	145/70 R 12	1
34	145/70 R 16	1

	Size	Count
35	145/70 R 15	1
36	145/70 R 14	1
37	185/70 R 24	1
38	185/70 R 16	1
39	185/70 R 21	1
40	185/70 R 22	1
41	185/70 R 29	1
42	185/70 R 28	1
43	185/70 R 27	1
44	185/70 R 26	1
45	185/70 R 25	1
46	225/70 R 17	1

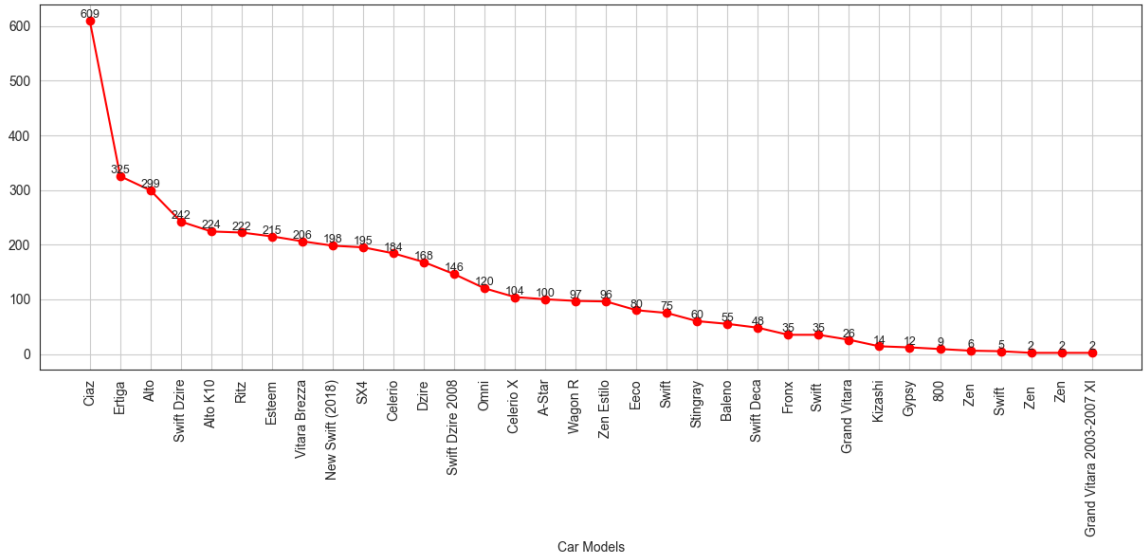
Different Car models in Maruti.

In [ ]:
```
car_models = df['Model'].value_counts().reset_index()
car_models.columns = ('Model','Count')
car_models
```

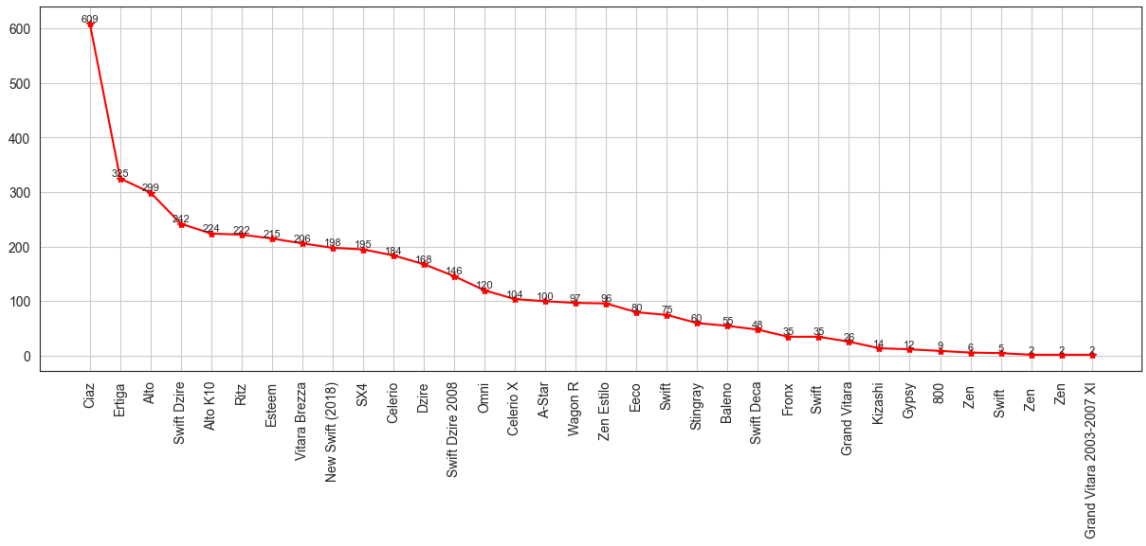
Out[ ]:

	Model	Count
0	Ciaz	609
1	Ertiga	325
2	Alto	299
3	Swift Dzire	242
4	Alto K10	224
5	Ritz	222
6	Esteem	215
7	Vitara Brezza	206
8	New Swift (2018)	198
9	SX4	195
10	Celerio	184
11	Dzire	168
12	Swift Dzire 2008	146
13	Omni	120
14	Celerio X	104
15	A-Star	100
16	Wagon R	97
17	Zen Estilo	96
18	Eeco	80
19	Swift	75
20	Stingray	60
21	Baleno	55
22	Swift Deca	48
23	Fronx	35
24	Swift	35
25	Grand Vitara	26
26	Kizashi	14
27	Gypsy	12
28	800	9
29	Zen	6
30	Swift	5
31	Zen	2
32	Zen	2
33	Grand Vitara 2003-2007 XI	2

In [ ]:
```
x = car_models['Model']
y = car_models['Count']
plt.figure(figsize=(15,5))
plt.plot(x,y,'or-')
plt.xlabel('Car Models')
plt.xticks(rotation=90)
for i in range(len(x)):
    plt.text(x[i],y[i],f'{y[i]}',ha='center',va='bottom',fontsize=9)
plt.grid()
plt.show()
```



In [ ]:
```
x = car_models['Model']
y = car_models['Count']
plt.figure(figsize=(15,5))
plt.plot(x,y,'*r-')
plt.xticks(rotation='vertical')
for i in range(len(x)):
    plt.text(x[i],y[i],f'{y[i]}',ha='center',va='bottom',fontsize=8)
plt.grid()
plt.show()
```



Top 10 Tyre Models Used by Maruti Suzuki.

In [ ]:
```
tyre_model = df['Serial No.'].value_counts().reset_index().head(10)
tyre_model.columns = ('Tyre Model','Quantity')
tyre_model
```

Out[ ]:

	Tyre Model	Quantity
0	Milage X3	192
1	Amazer 4G Life	177
2	B-Series B290	176
3	Earth-1 E400	164
4	FR500	163
5	UM 551	136
6	FuelSmart	135
7	Comfort Contact CC6	127
8	Ecopia EP150	115
9	Assurance Duraplus 2	109

In [ ]:
```
x = tyre_model['Tyre Model']
y = tyre_model['Quantity']
plt.figure(figsize=(10,5))
plt.xlabel('Tyre Models')
plt.plot(x,y,'o-')
plt.xticks(rotation=45)
for i in range(len(x)):
    plt.text(x[i],y[i],f'{y[i]}',ha='center',va='bottom',fontsize=8)
plt.grid()
plt.show()
```