In [219…

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

In [220…

```
data = pd.read_csv("musteriler.csv")
data
```

Out[220…

	No	Cinsiyet	Yas	Hacim	Maas
0	1	K	60	69900	6325
1	2	K	30	79000	5200
2	3	E	52	85500	7825
3	4	E	57	17100	8375
4	5	E	55	5500	5450
...	...	...	...	...	...
195	196	E	22	96600	7900
196	197	E	39	83700	7675
197	198	K	25	34000	4000
198	199	K	30	42000	5500
199	200	K	23	47600	4150

200 rows × 5 columns

In [221…

```
data = data.drop("No",axis=1)
cinsiyet_kolonu = data["Cinsiyet"].values
data = data.drop("Cinsiyet",axis=1)
```

In [222…

```
from sklearn import preprocessing
encoder = preprocessing.LabelEncoder()
encoder.fit(cinsiyet_kolonu)
cinsiyet_encoded = encoder.transform(cinsiyet_kolonu)
cinsiyet_encoded   # K=1 , E=0
```

Out[222…

```
array([1, 1, 0, 0, 0, 0, 0, 0, 1, 0, 1, 0, 0, 0, 1, 1, 0, 1, 1, 0, 1, 1,
       0, 1, 0, 1, 0, 1, 0, 0, 1, 0, 1, 1, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0,
       0, 0, 0, 0, 0, 0, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 1, 1, 0, 0, 1, 1,
       0, 0, 1, 0, 1, 0, 0, 0, 1, 1, 0, 1, 0, 0, 1, 1, 1, 0, 0, 1, 0, 0,
       0, 0, 0, 1, 1, 0, 0, 1, 0, 0, 1, 1, 0, 0, 1, 1, 1, 0, 0, 1, 1, 1,
       1, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 1, 0, 0, 1, 1, 1, 1, 1, 1,
       0, 0, 1, 0, 0, 1, 1, 0, 0, 1, 0, 0, 1, 1, 1, 0, 0, 1, 1, 1, 0, 0,
       0, 0, 1, 0, 1, 0, 0, 0, 1, 0, 1, 0, 1, 0, 0, 1, 1, 1, 1, 1, 0, 0,
       1, 1, 1, 1, 0, 0, 1, 0, 0, 1, 0, 1, 0, 0, 0, 0, 1, 0, 0, 0, 0, 1,
       1, 1])
```

In [223…

```
cinsiyet_serisi = pd.Series(cinsiyet_encoded, name="Cinsiyet")
dataframe = pd.concat([data,cinsiyet_serisi],axis=1)
dataframe
```

Out[223…

	Yas	Hacim	Maas	Cinsiyet
0	60	69900	6325	1

	Yas	Hacim	Maas	Cinsiyet
1	30	79000	5200	1
2	52	85500	7825	0
3	57	17100	8375	0
4	55	5500	5450	0
...	...	...	...	...
195	22	96600	7900	0
196	39	83700	7675	0
197	25	34000	4000	1
198	30	42000	5500	1
199	23	47600	4150	1

200 rows × 4 columns

In [224...]
```
X_23 = data[["Hacim","Maas"]].values
```

In [225...]
```
from sklearn.cluster import KMeans
k_means = KMeans(n_clusters=3, init="k-means++")
k_means.fit(X_23)
```

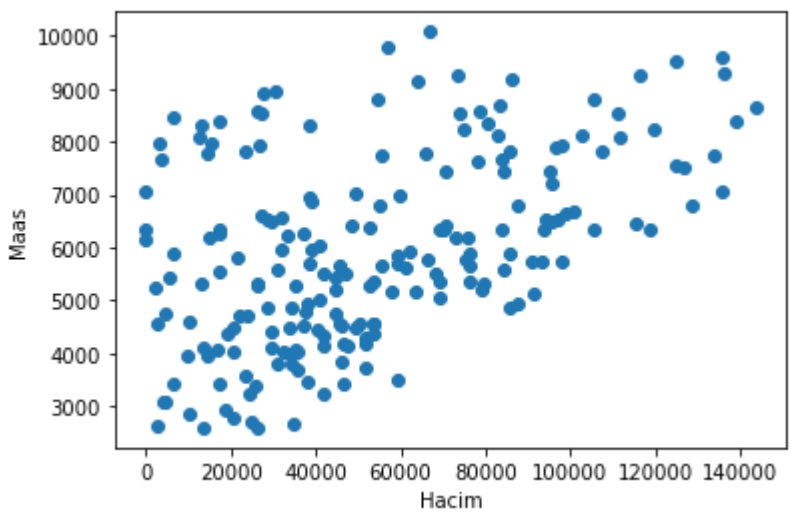
Out[225...]
```
KMeans(n_clusters=3)
```

In [226...]
```
k_means.cluster_centers_    # 3 tane küme merkez koordinatı
```

Out[226...]
```
array([[ 58911.76470588,   5865.44117647],
       [104386.95652174,   7289.13043478],
       [ 22282.55813953,   5310.75581395]])
```

In [227...]
```
plt.scatter(data["Hacim"],data["Maas"])
plt.xlabel("Hacim")
plt.ylabel("Maas")
```

Out[227...]
```
Text(0, 0.5, 'Maas')
```



In [228...]
```
data["Kume_Tahmin1"] = k_means.predict(X_23)
```

```
data
```

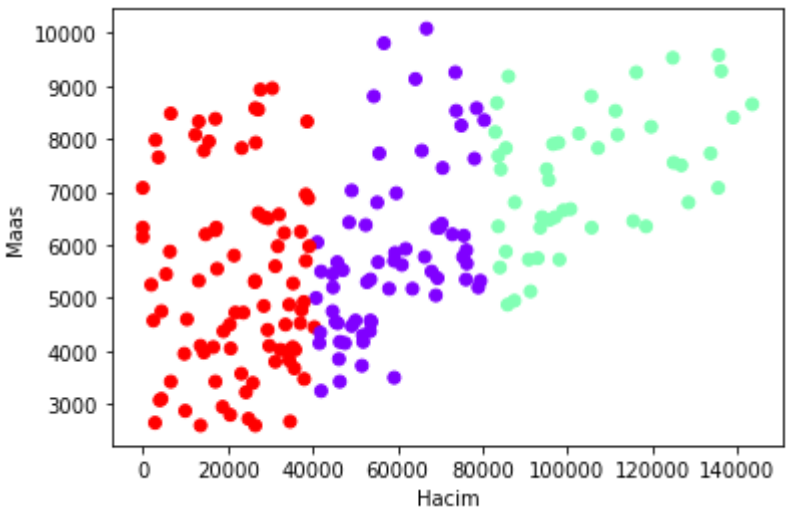
Out[228…

	Yas	Hacim	Maas	Kume_Tahmin1
0	60	69900	6325	0
1	30	79000	5200	0
2	52	85500	7825	1
3	57	17100	8375	2
4	55	5500	5450	2
...	...	...	...	...
195	22	96600	7900	1
196	39	83700	7675	1
197	25	34000	4000	2
198	30	42000	5500	0
199	23	47600	4150	0

200 rows × 4 columns

In [229…

```
plt.scatter(data["Hacim"],data["Maas"],c=data["Kume_Tahmin1"],cmap="rainbow")
plt.xlabel("Hacim")
plt.ylabel("Maas")
plt.show()
```



In [230…

```
k_means.inertia_   # WCSS değeri ne kadar yüksek olursa model o kadar başarılıdır
```

Out[230… 37357508127.21184

In [231…

```
from sklearn import preprocessing
x_scaled = preprocessing.scale(X_23)
```

In [232…

```
from sklearn.cluster import KMeans
k_means2 = KMeans(n_clusters=2, init="k-means++")
data["Kume_Tahmin2"] = k_means2.fit_predict(x_scaled)
data
```

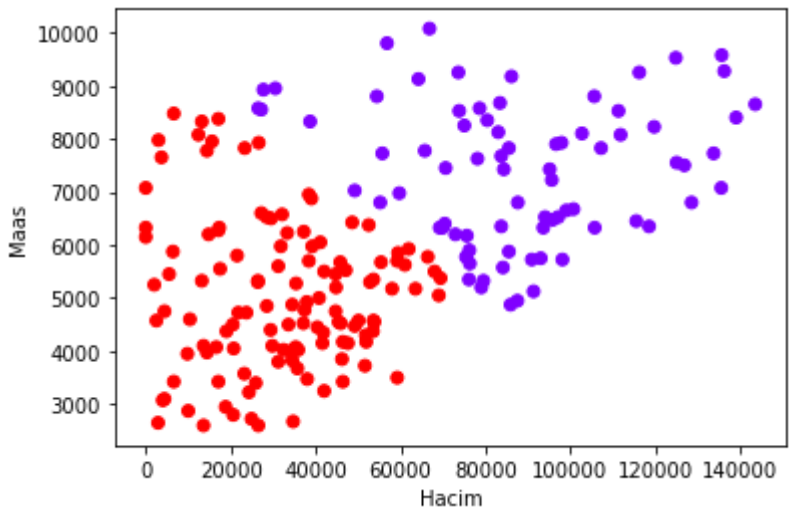
Out[232...

	Yas	Hacim	Maas	Kume_Tahmin1	Kume_Tahmin2
0	60	69900	6325	0	0
1	30	79000	5200	0	0
2	52	85500	7825	1	0
3	57	17100	8375	2	1
4	55	5500	5450	2	1
...	...	...	...	...	...
195	22	96600	7900	1	0
196	39	83700	7675	1	0
197	25	34000	4000	2	1
198	30	42000	5500	0	1
199	23	47600	4150	0	1

200 rows × 5 columns

In [233...

```
plt.scatter(data["Hacim"],data["Maas"],c=data["Kume_Tahmin2"],cmap="rainbow")
plt.xlabel("Hacim")
plt.ylabel("Maas")
plt.show()
```



In [234...

```
k_means2.cluster_centers_
```

Out[234...

```
array([[ 0.97654956,  0.80226664],
       [-0.62435136, -0.51292458]])
```

In [235...

```
k_means2.inertia_
```

Out[235...

```
195.7575354926614
```