Ürün Kümeleme ve Ürün Analizi

Rastgele Ürün Verisi Oluşturma

Ürün Adı, Fiyat, Ortalama Puan, Mensei

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

from sklearn.manifold import TSNE
from sklearn.cluster import KMeans
from scipy.cluster.hierarchy import dendrogram
from scipy.cluster.hierarchy import linkage
```

```
np.random.seed(42)
num_samples = 100
fiyat = np.random.uniform(10,100, num_samples)
ortalama_puan=np.random.uniform(1,5,num_samples)
mensei= np.random.choice(["Ulke_A","Ulke_B","Ulke_C","Ulke_D"],num_samples)
urun_adi = [f"Urun_{i}" for i in range(num_samples)]

data = pd.DataFrame({
    "urun_adi": urun_adi,
    "fiyat": fiyat,
    "ortalama_puan": ortalama_puan,
    "mensei": mensei
})
```

```
data.head(10)
```

	urun_adi	fiyat	ortalama_puan	mensei
0	Urun_0	43.708611	1.125717	Ulke_D
1	Urun_1	95.564288	3.545642	Ulke_D
2	Urun_2	75.879455	2.257424	Ulke_C
3	Urun_3	63.879264	3.034283	Ulke_A
4	Urun_4	24.041678	4.630266	Ulke_D
5	Urun_5	24.039507	1.997169	Ulke_D
6	Urun_6	15.227525	2.641532	Ulke_B
7	Urun_7	87.955853	4.022205	Ulke_D
8	Urun_8	64.100351	1.915193	Ulke_D
9	Urun_9	73.726532	1.307920	Ulke_B

Temel Veri Analizi

```
data.describe().T
```

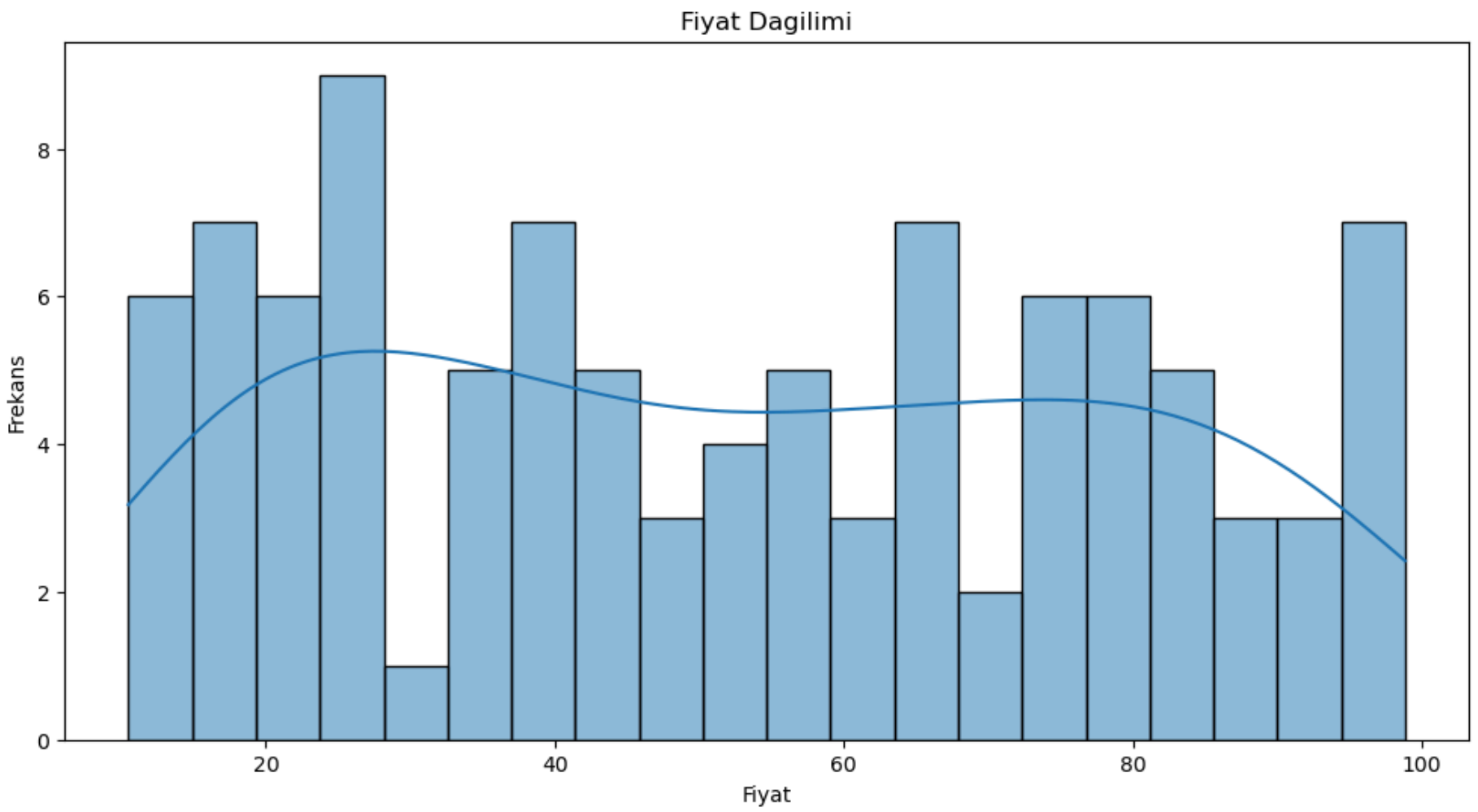
	count	mean	std	min	25%	50%	75%	max
fiyat	100.0	52.316267	26.774047	10.496991	27.388068	51.772821	75.718281	98.819824
ortalama_puan	100.0	2.991327	1.172445	1.027809	1.968018	3.022499	4.064734	4.942602

```
data.info()
```

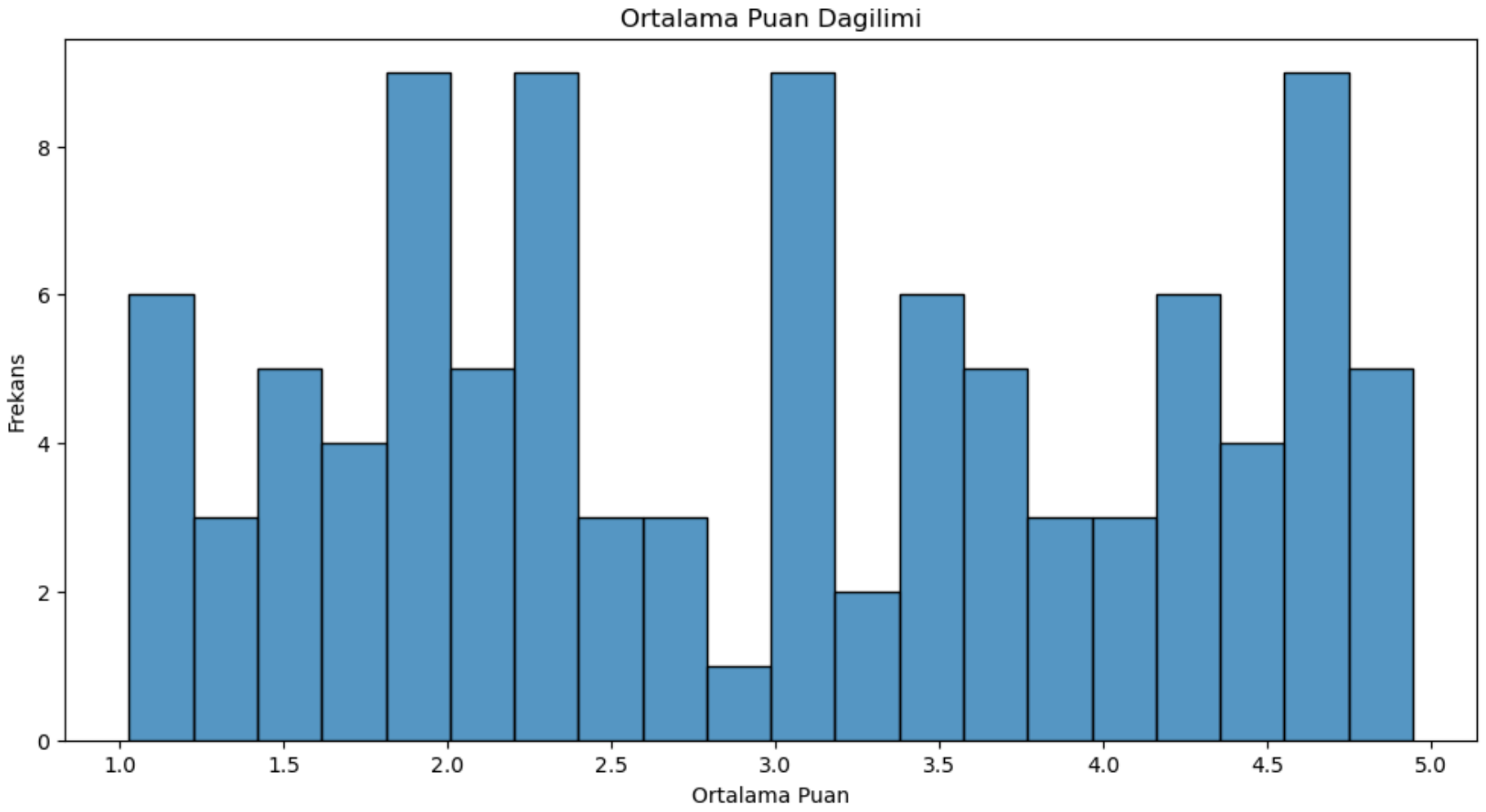
```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 100 entries, 0 to 99
Data columns (total 4 columns):
 #   Column         Non-Null Count  Dtype
---  ------         --------------  -----
 0   urun_adi       100 non-null    object
 1   fiyat          100 non-null    float64
 2   ortalama_puan  100 non-null    float64
 3   mensei         100 non-null    object
dtypes: float64(2), object(2)
memory usage: 3.3+ KB
```

Fiyat ve Ortalama Puan Dağılımı

```
plt.figure(figsize=(12,6))
sns.histplot(data.fiyat,bins=20,kde=True)
plt.title("Fiyat Dagilimi")
plt.xlabel("Fiyat")
plt.ylabel("Frekans")
plt.show()
```

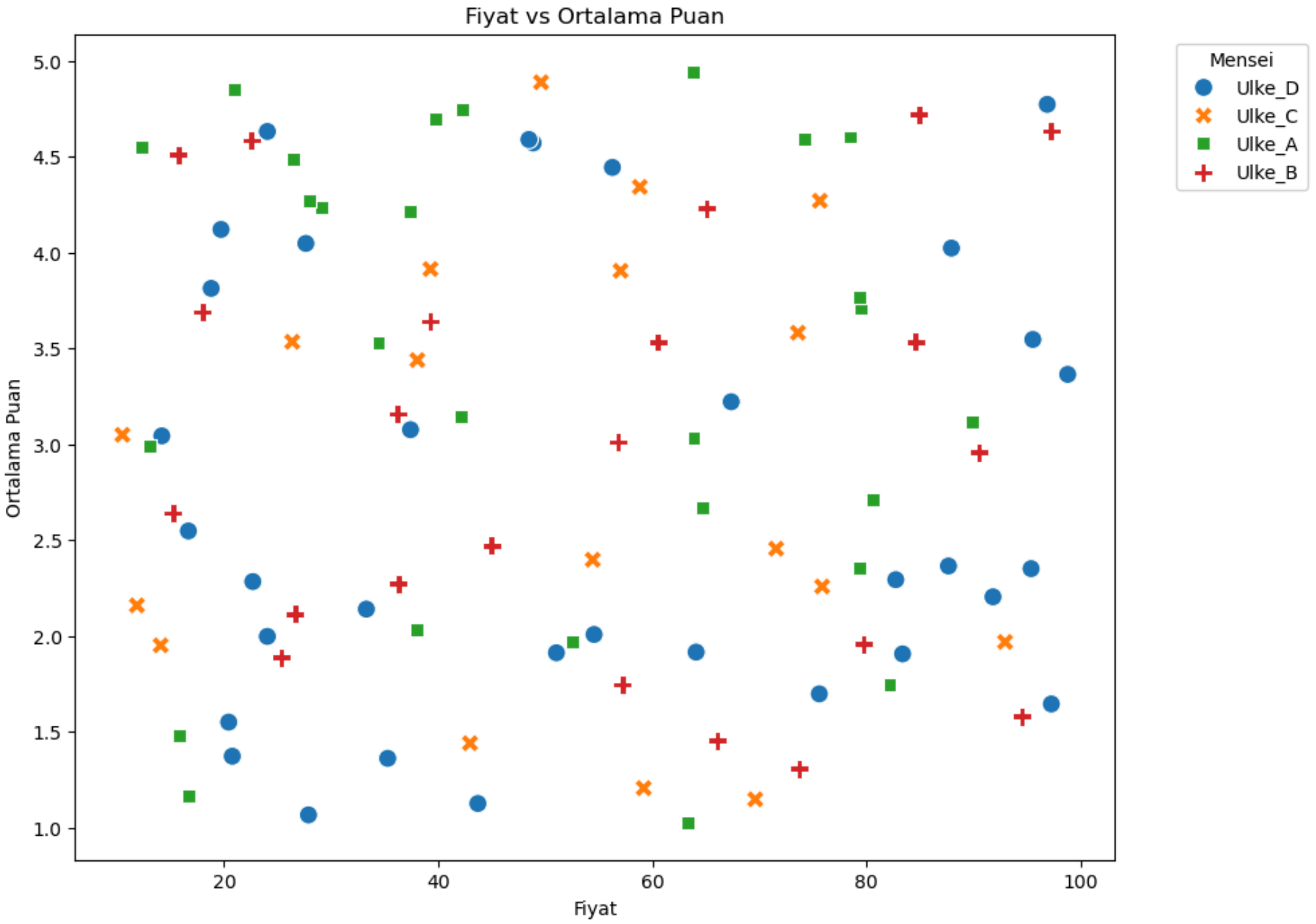



```
plt.figure(figsize=(12,6))
sns.histplot(data.ortalama_puan, bins=20, kde=False)
plt.title("Ortalama Puan Dagilimi")
plt.xlabel("Ortalama Puan")
plt.ylabel("Frekans")
plt.show()
```



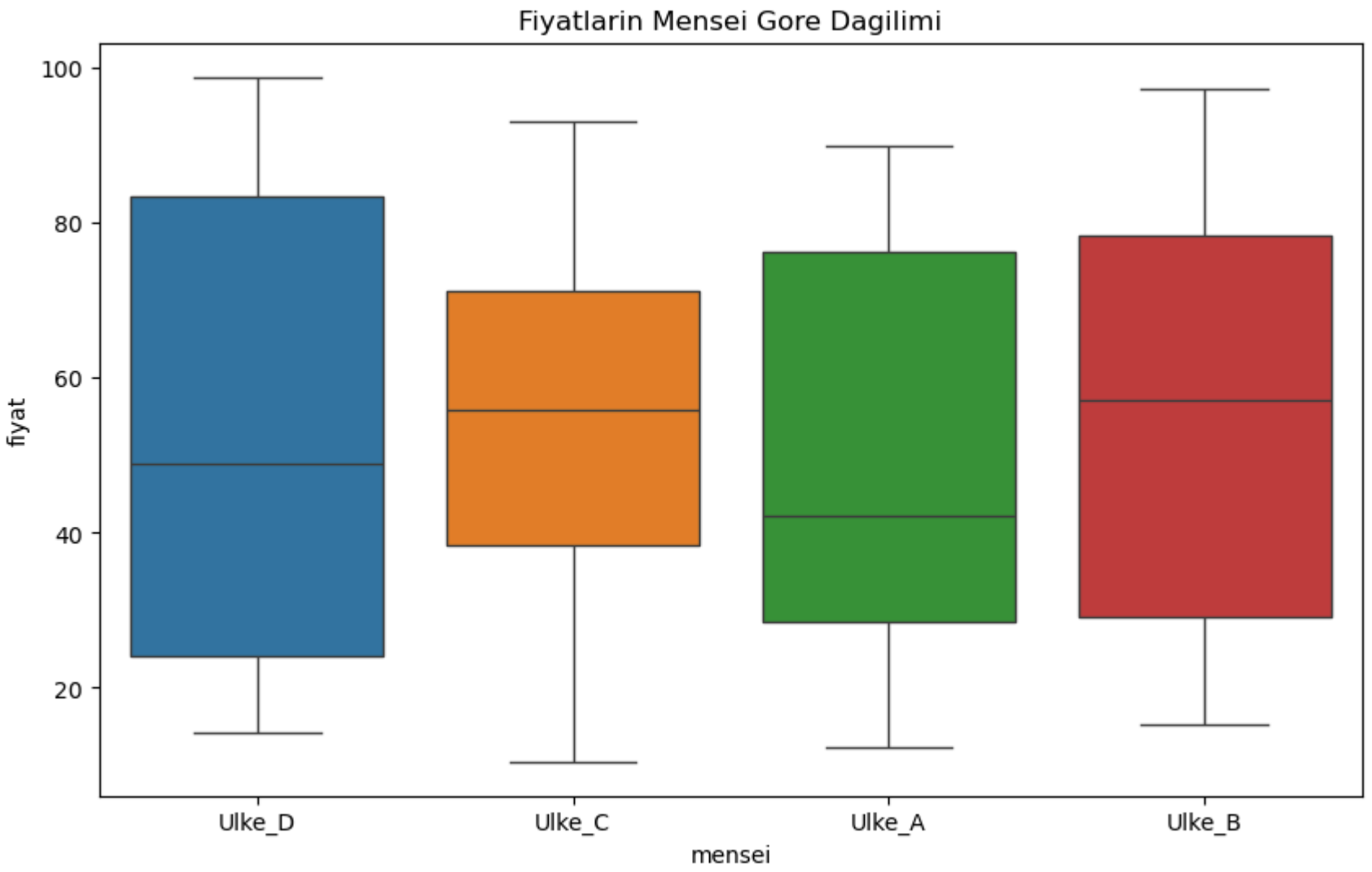
Fiyat ve Ortalama Puan Arasındaki İlişki

```
plt.figure(figsize=(10,8))
sns.scatterplot(x= "fiyat", y="ortalama_puan", data=data, hue="mensei", style="mensei", s=100)
plt.title("Fiyat vs Ortalama Puan")
plt.xlabel("Fiyat")
plt.ylabel("Ortalama Puan")
plt.legend(title="Mensei", loc="upper left", bbox_to_anchor=(1.05, 1))
plt.show()
```



Fiyatların Mensei Göre Dağılımı

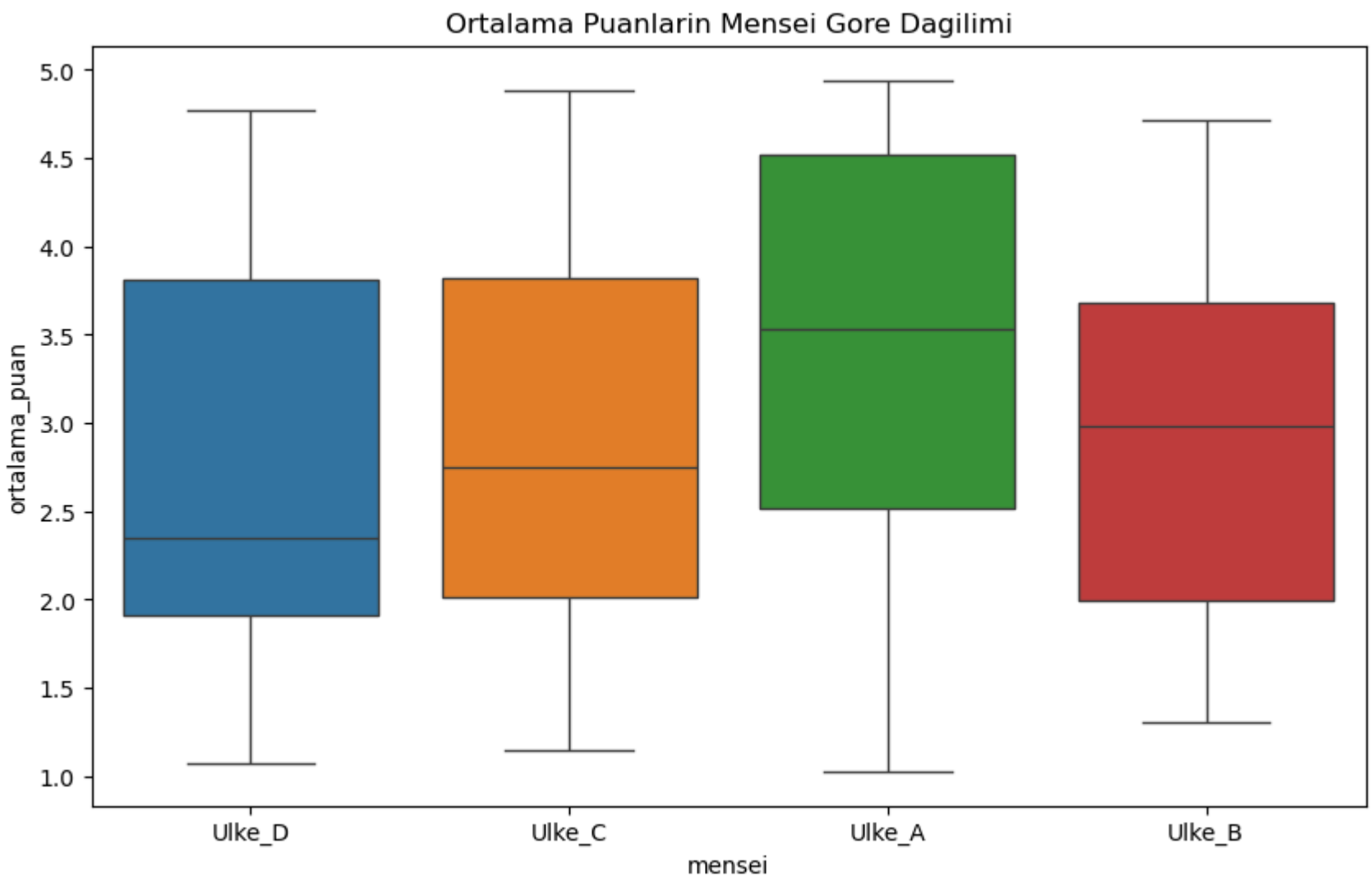
```
plt.figure(figsize=(10,6))
sns.boxplot(x="mensei", y="fiyat", data=data, hue="mensei")
plt.title("Fiyatlarin Mensei Gore Dagilimi")
plt.xlabel("mensei")
plt.ylabel("fiyat")
plt.show()
```



Ortalama Puanların Mensei Göre Dağılımı

```
plt.figure(figsize=(10,6))
sns.boxplot(x = "mensei" ,y="ortalama_puan", data=data, hue="mensei")
plt.title("Ortalama Puanlarin Mensei Gore Dagilimi")
plt.xlabel("mensei")
```

```
plt.ylabel("ortalama_puan")
plt.show()
```



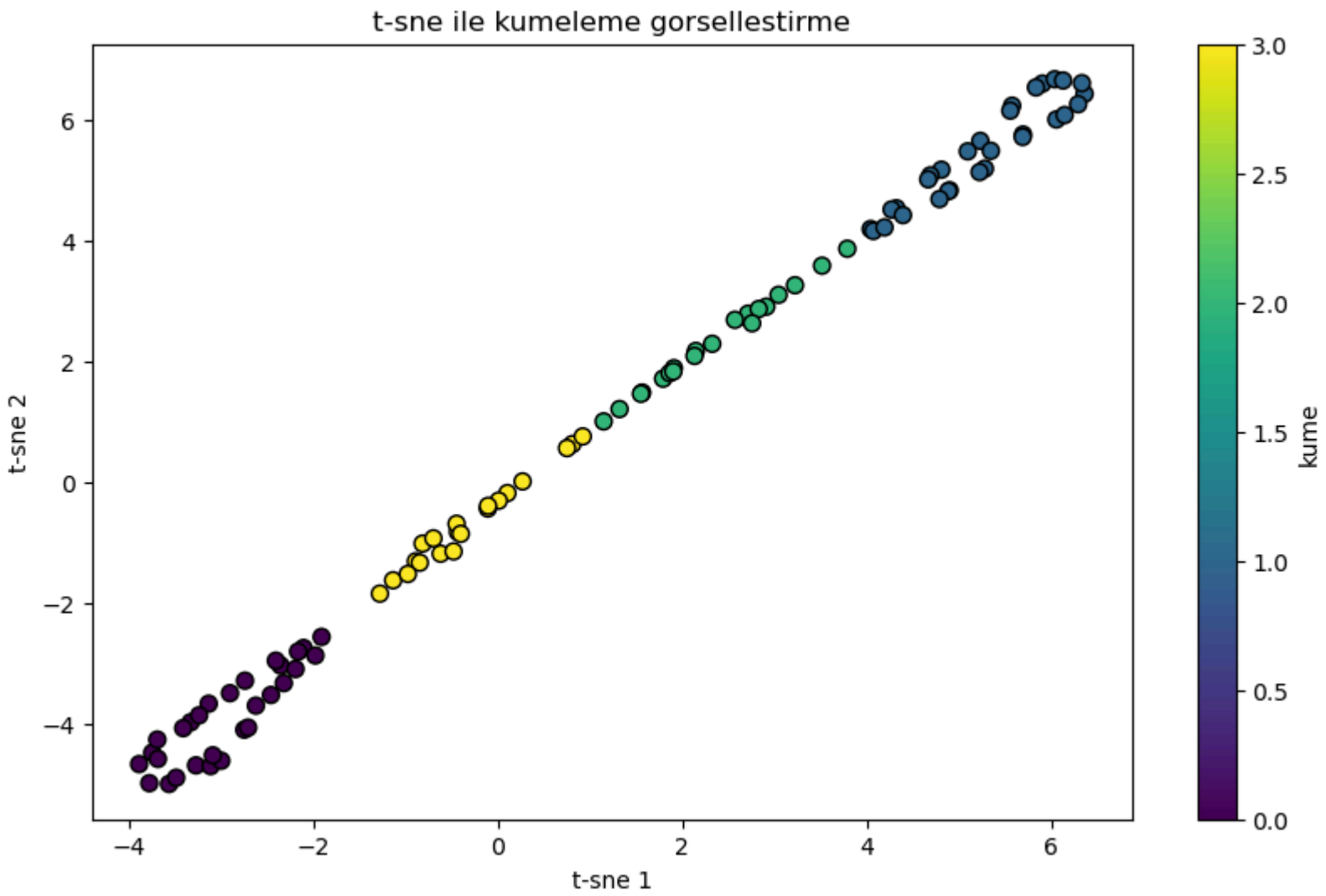
Kmeans Kümeleme ve t-SNE Görselleştirme

```
X = data[["fiyat","ortalama_puan"]].values
kmeans = KMeans(n_clusters =4, random_state=42)
data["kume"]=kmeans.fit_predict(X)
```

```
C:\Users\saygi\anaconda3\Lib\site-packages\sklearn\cluster\_kmeans.py:1429: UserWarning: KMeans is known to have a memory leak on Windows with MKL, when there are less chunks than available threads. You can avoid it by setting the environment variable OMP_NUM_THREADS=1.
  warnings.warn(
```

T-SNE Görselleştirme

```
tsne = TSNE(n_components=2, random_state=42)
X_tsne = tsne.fit_transform(X)
plt.figure(figsize=(10,6))
plt.scatter(X_tsne[:,0],X_tsne[:,1], c=data["kume"], cmap="viridis", marker="o", edgecolor="black", s=50)
plt.title("t-sne ile kumeleme gorsellestirme")
plt.xlabel("t-sne 1")
plt.ylabel("t-sne 2")
plt.colorbar(label="kume")
plt.show()
```



Dendrogram ile Görselleştirme

```
linkage_matrix = linkage(X, method="ward")
plt.figure()
dendrogram(linkage_matrix)
plt.title("Dendrogram")
plt.xlabel("Veri Noktalari")
plt.ylabel("Uzaklik")
plt.show()
```