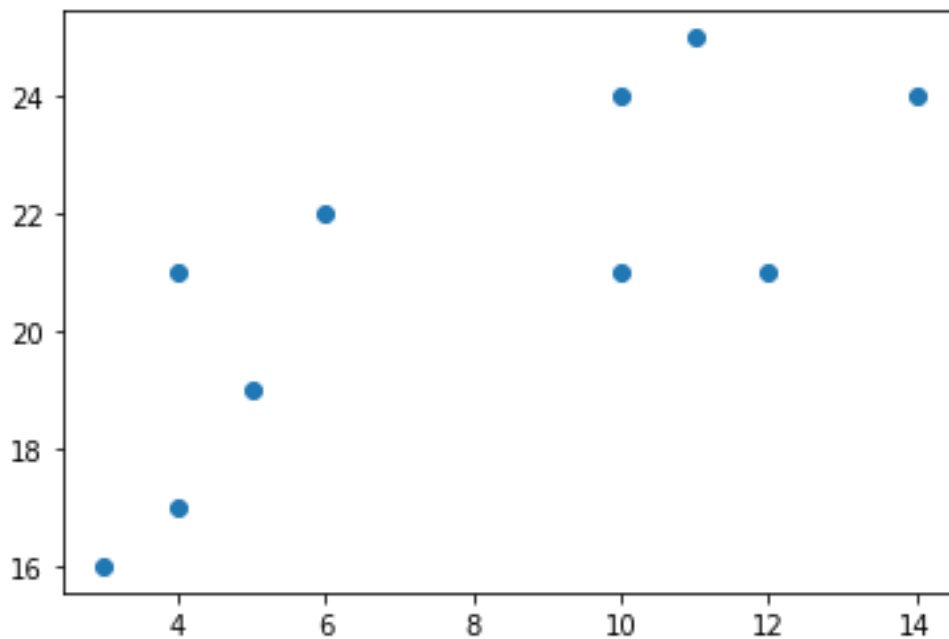


Program 12:Develop a program to implement Hierarchical clustering model for the given value of N, where N is number of clusters

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

x = [4, 5, 10, 4, 3, 11, 14, 6, 10, 12]
y = [21, 19, 24, 17, 16, 25, 24, 22, 21, 21]

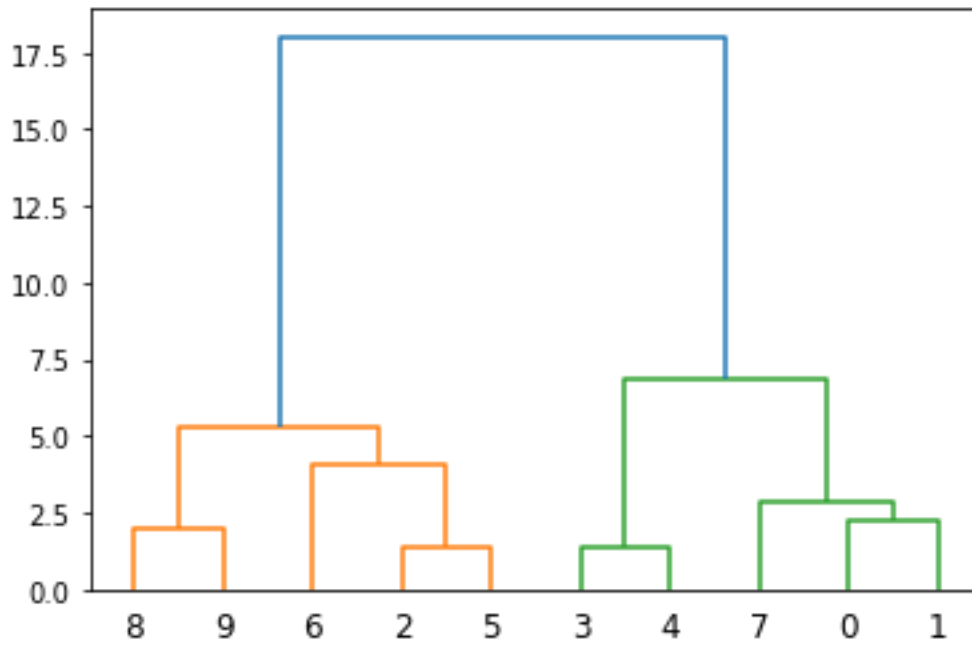
plt.scatter(x, y)
plt.show()
```



```
from scipy.cluster.hierarchy import dendrogram, linkage
data = list(zip(x, y))

linkage_data = linkage(data, method='ward', metric='euclidean')
dendrogram(linkage_data)

plt.show()
```



```
from sklearn.cluster import AgglomerativeClustering
hierarchical_cluster = AgglomerativeClustering(n_clusters=2,
affinity='euclidean', linkage='ward')
labels = hierarchical_cluster.fit_predict(data)

plt.scatter(x, y, c=labels)
plt.show()
```

