In [12]:

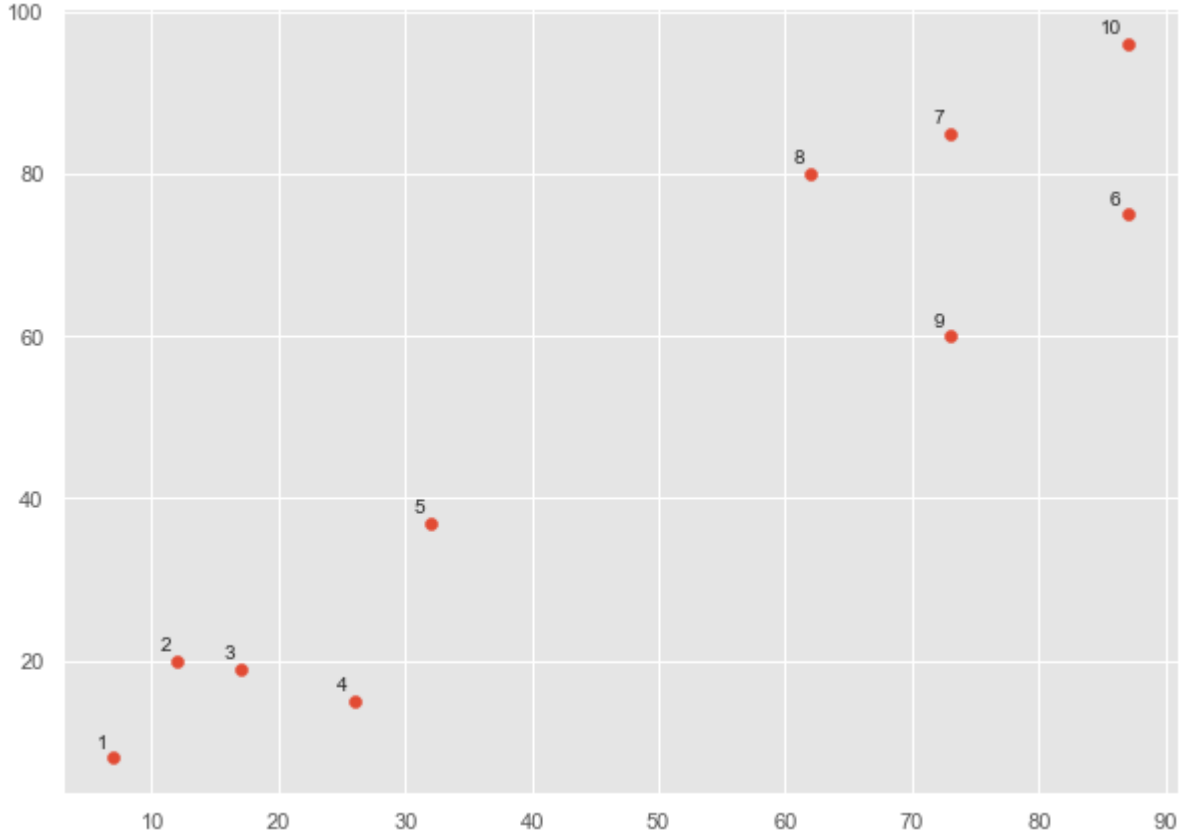
```
import matplotlib.pyplot as plt
import numpy as np

X = np.array(
   [[7,8],[12,20],[17,19],[26,15],[32,37],[87,75],[73,85], [62,80],[73,60],[87,96],])
labels = range(1, 11)
plt.figure(figsize = (10, 7))
plt.subplots_adjust(bottom = 0.1)
plt.scatter(X[:,0],X[:,1], label = 'True Position')
for label, x, y in zip(labels, X[:, 0], X[:, 1]):
   plt.annotate(
      label,xy = (x, y), xytext = (-3, 3),textcoords = 'offset points', ha = 'right', va =
'bottom')
plt.show()

from scipy.cluster.hierarchy import dendrogram, linkage
from matplotlib import pyplot as plt
linked = linkage(X, 'single')
labelList = range(1, 11)
plt.figure(figsize = (10, 7))
dendrogram(linked, orientation = 'top',labels = labelList,
   distance_sort ='descending',show_leaf_counts = True)
plt.show()

from sklearn.cluster import AgglomerativeClustering
cluster = AgglomerativeClustering(n_clusters = 2, affinity = 'euclidean', linkage = 'ward'
)
cluster.fit_predict(X)

plt.scatter(X[:,0],X[:,1], c = cluster.labels_, cmap = 'rainbow')
```


100
80
60
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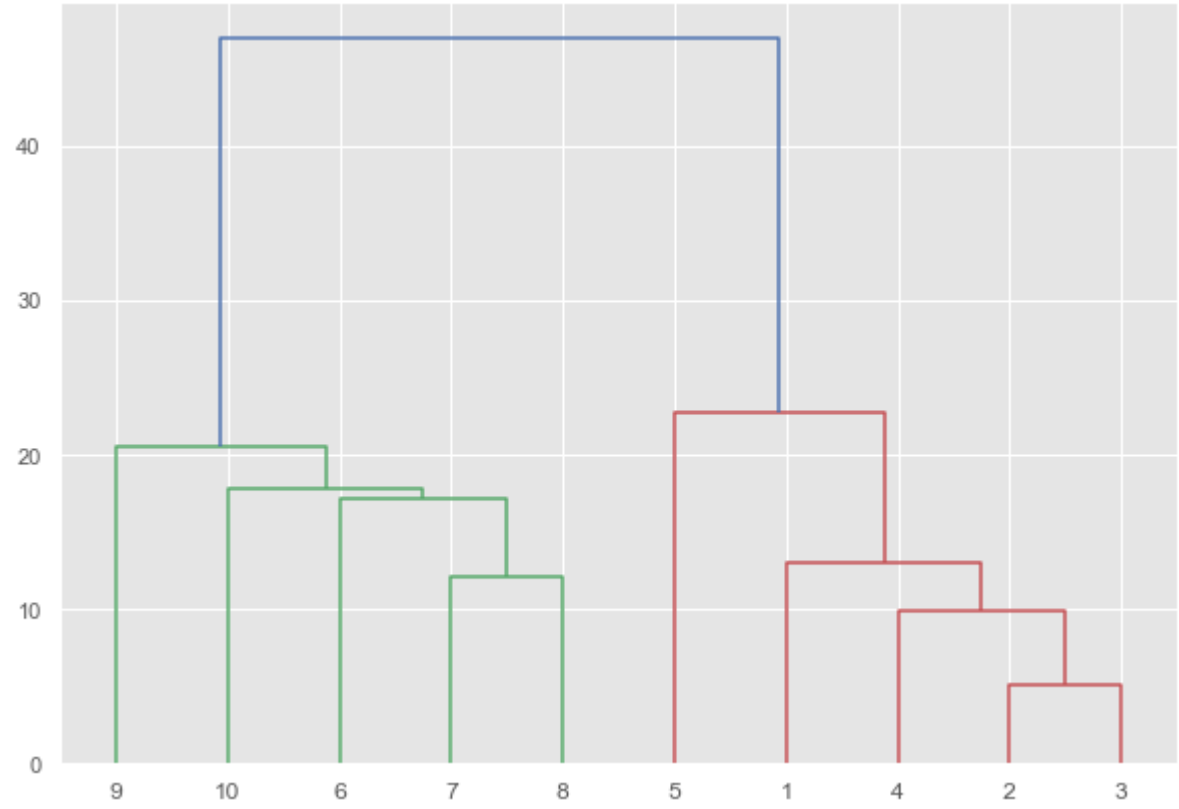
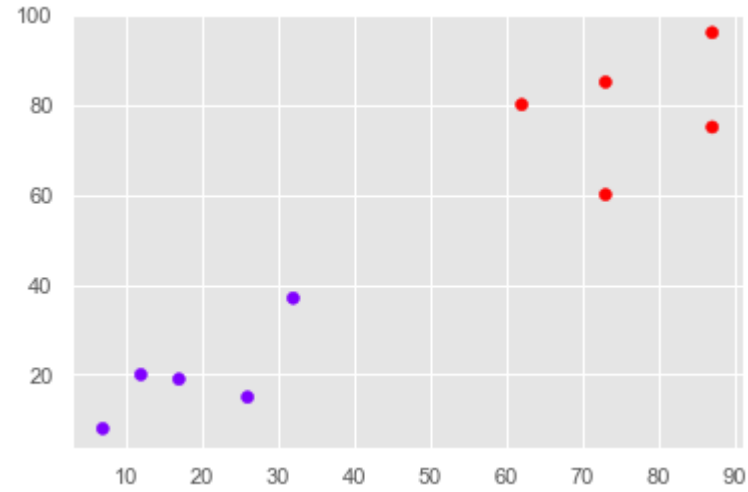
10



Out[12]:

```
<matplotlib.collections.PathCollection at 0x18477566088>
```



In [ ]:

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