Problem : Please Clustering Below Data with Hierarchical Algorithms
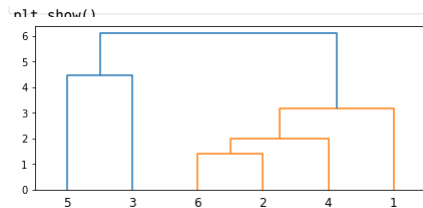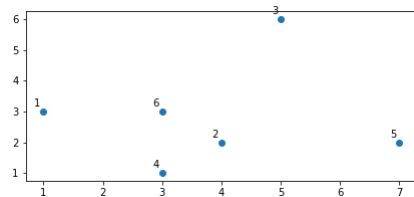
(1,3)-(4,2)-(5,6)-(3,1)-(7,2)-(3,3)

```
In [1]: import numpy as np
        X = np.array([[1,3],[4,2],[5,6],[3,1],[7,2],[3,3],])
```

Plotting Data

```
In [11]: import matplotlib.pyplot as plt
         labels = range(1, 7)
         plt.figure(figsize=(7, 3))
         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()
```

```
         plt.show()
```
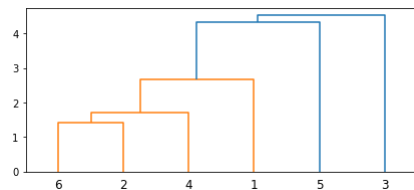
Use Hierarchical Algorithm Average Method

```
In [14]: from scipy.cluster.hierarchy import dendrogram, linkage
         from matplotlib import pyplot as plt

         linked = linkage(X, 'average')

         labelList = range(1, 7)

         plt.figure(figsize=(7, 3))
         dendrogram(linked,orientation='top',labels=labelList,distance_sort='descending',show_leaf_counts=True)
         plt.show()
```
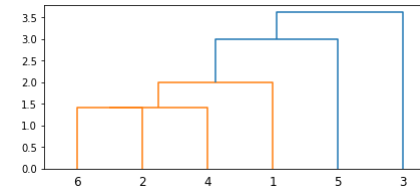
Use Hierarchical Algorithm Single Method

```
In [12]: from scipy.cluster.hierarchy import dendrogram, linkage
         from matplotlib import pyplot as plt

         linked = linkage(X, 'single')

         labelList = range(1, 7)

         plt.figure(figsize=(7, 3))
         dendrogram(linked,orientation='top',labels=labelList,distance_sort='descending',show_leaf_counts=True)
         plt.show()
```

Use Hierarchical Algorithm Complete Method

```
In [13]: from scipy.cluster.hierarchy import dendrogram, linkage
         from matplotlib import pyplot as plt

         linked = linkage(X, 'complete')

         labelList = range(1, 7)

         plt.figure(figsize=(7, 3))
         dendrogram(linked,orientation='top',labels=labelList,distance_sort='descending',show_leaf_counts=True)
         plt.show()
```