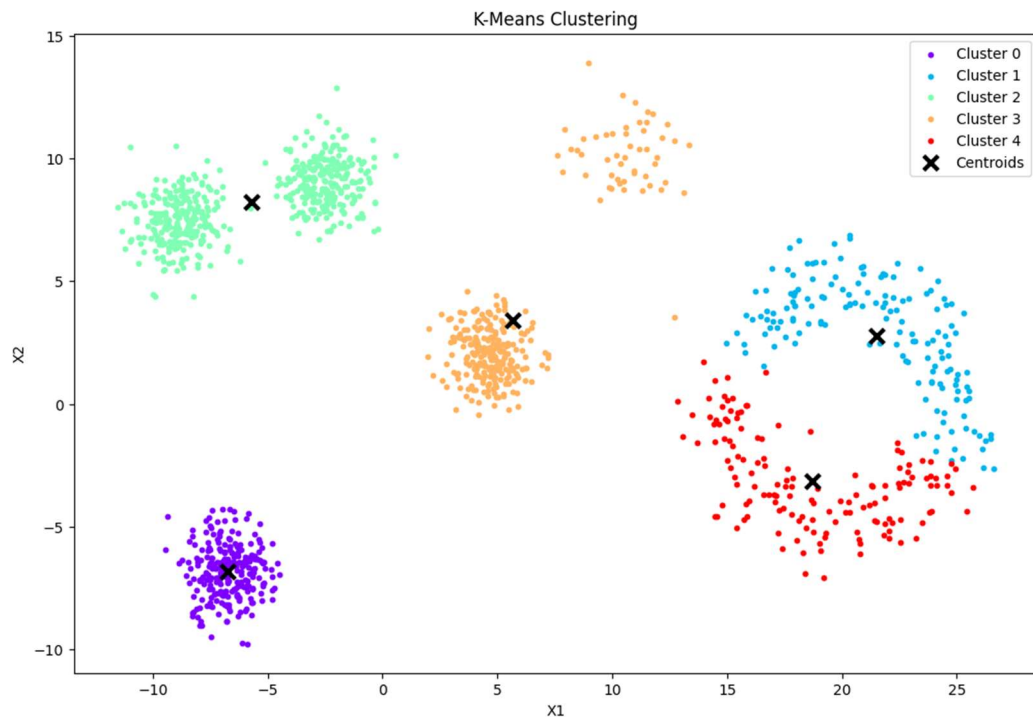# תרגיל 3

K-Means
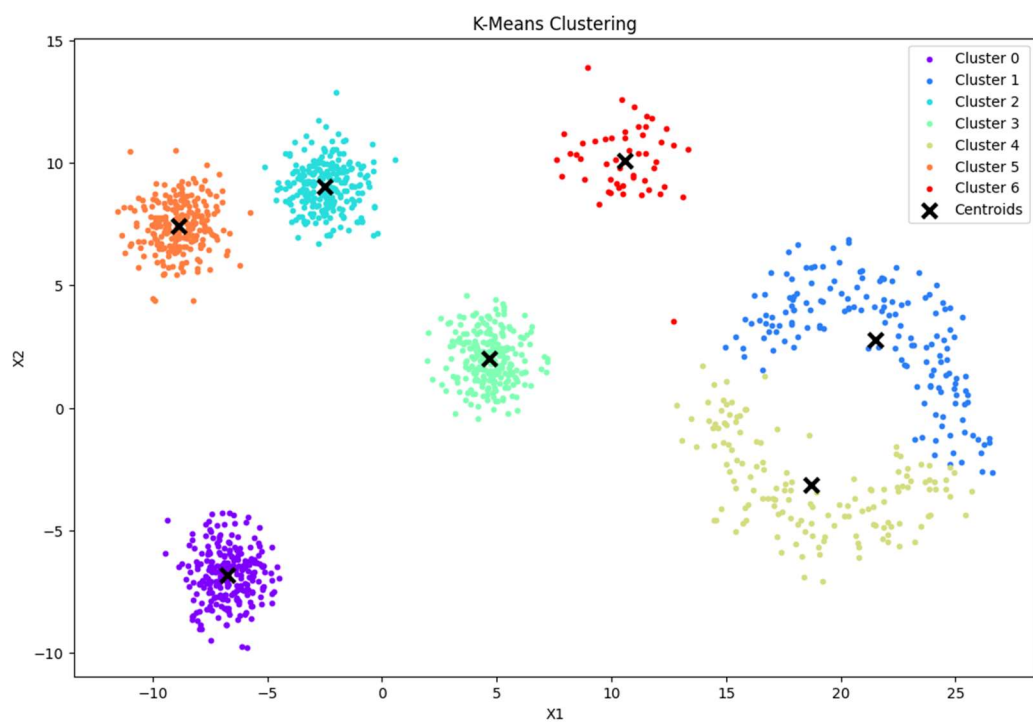
1. kmeans = KMeans(n_clusters=5, random_state=42)
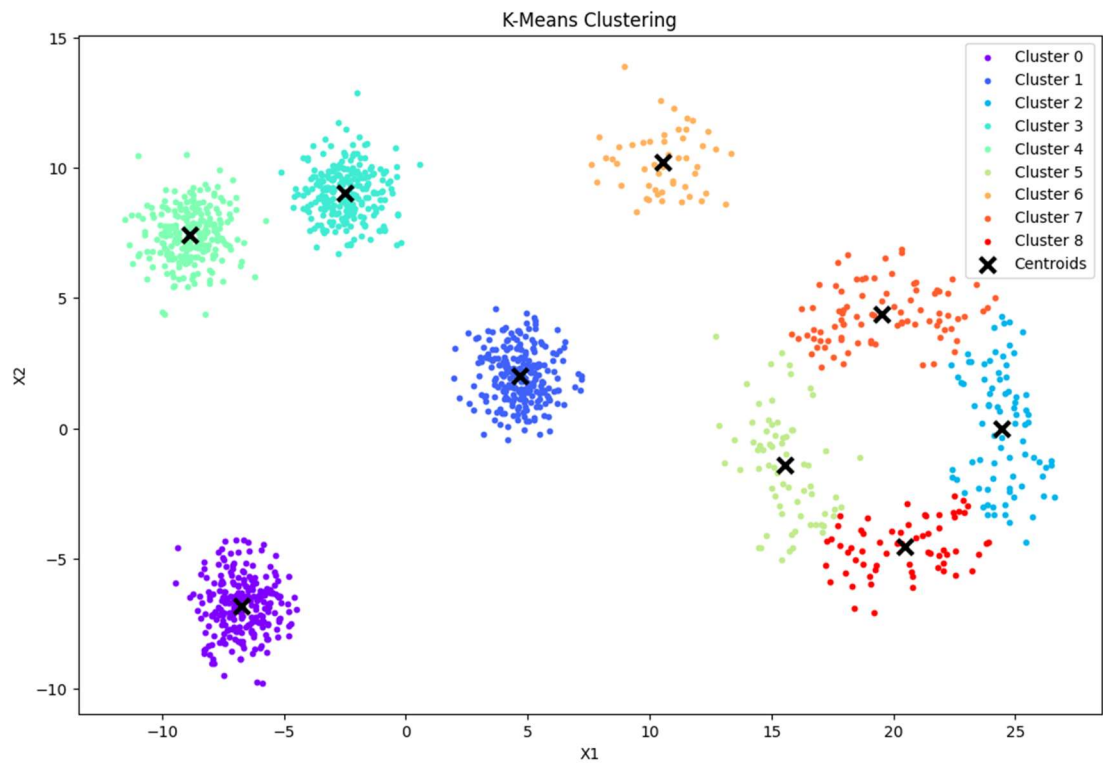   The average Silhouette score is : 0.6432758294253328
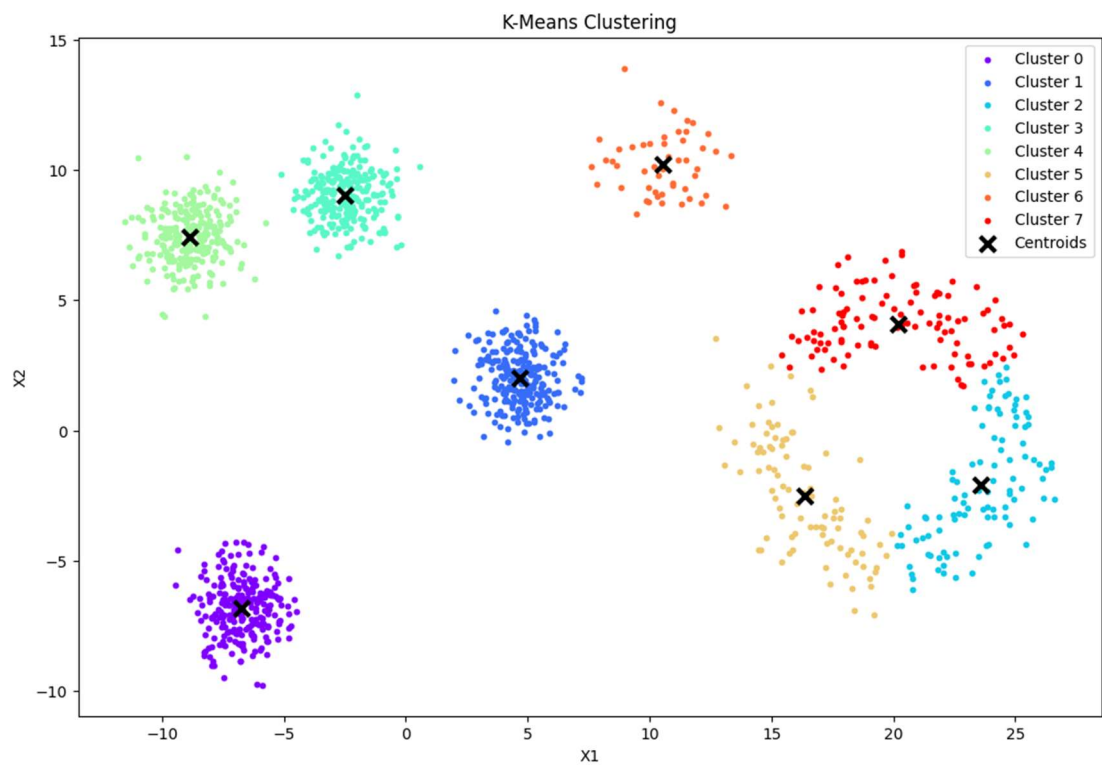

2. kmeans = KMeans(n_clusters=7, random_state=42)
   The average Silhouette score is : 0.7026041646015059

3. kmeans = KMeans(n_clusters=9, random_state=42)
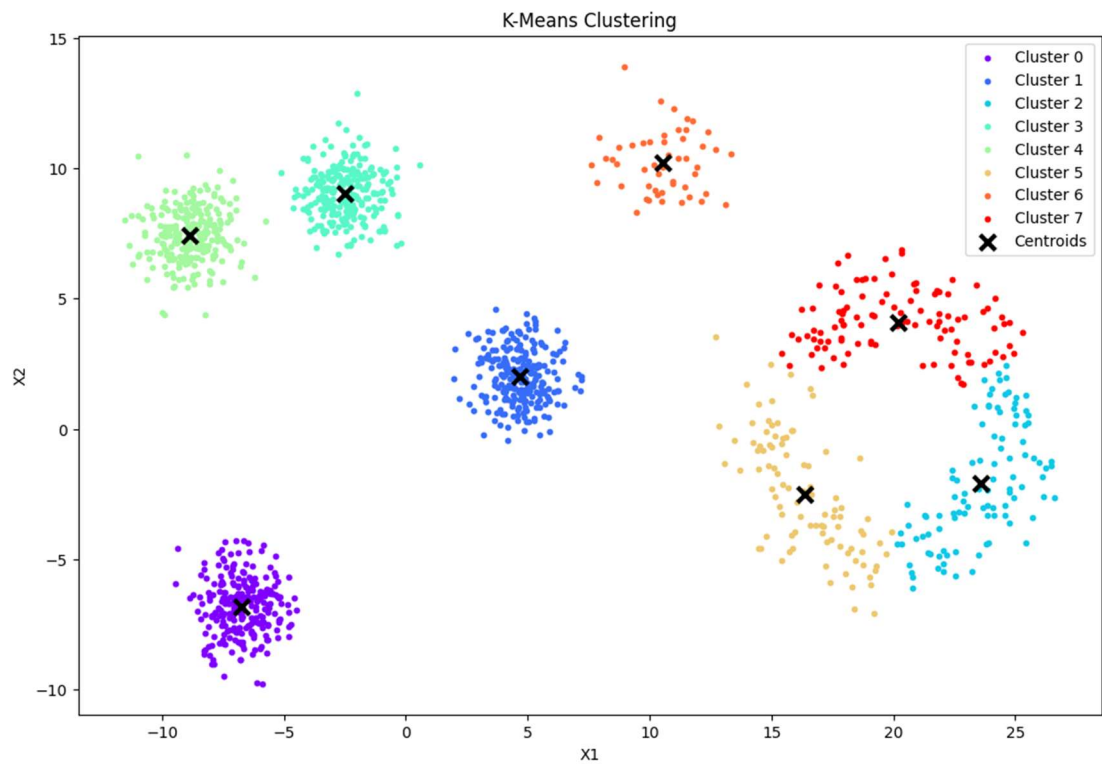   The average Silhouette score is : 0.7117502750033986

4. kmeans = KMeans(n_clusters=8, random_state=42)
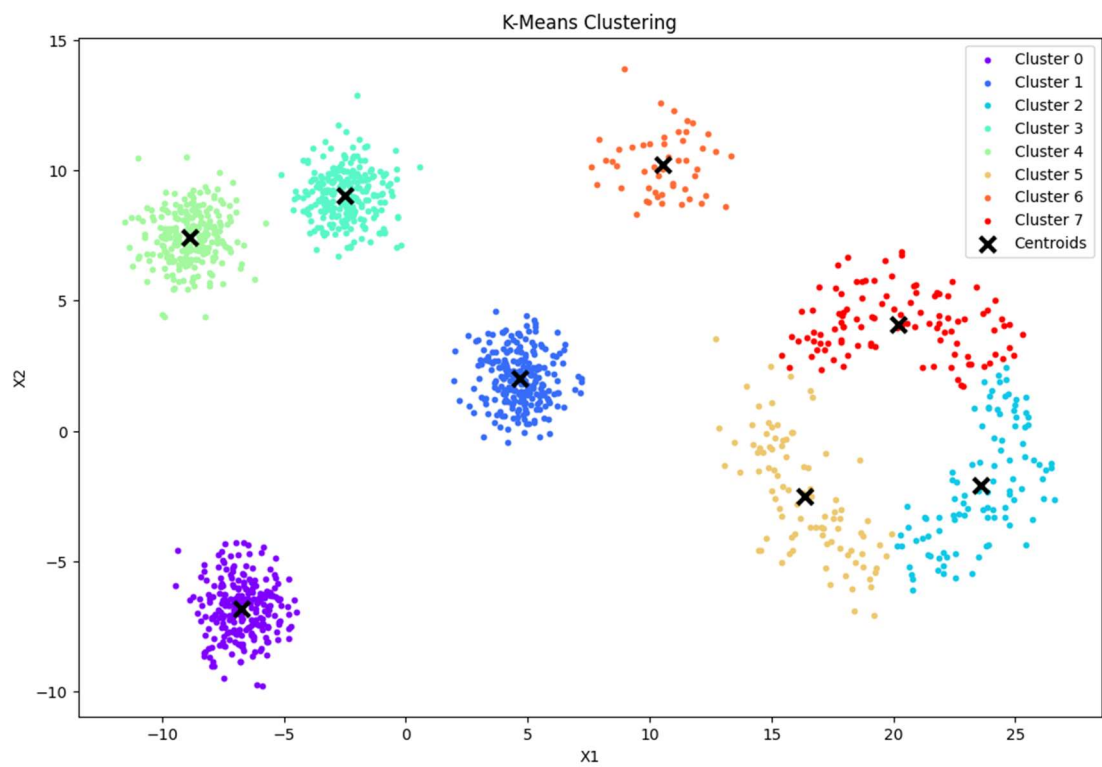   The average Silhouette score is : 0.716259254869025

5. kmeans = KMeans(n_clusters=8, random_state=42, max_iter=400)
    The average Silhouette score is : 0.716259254869025
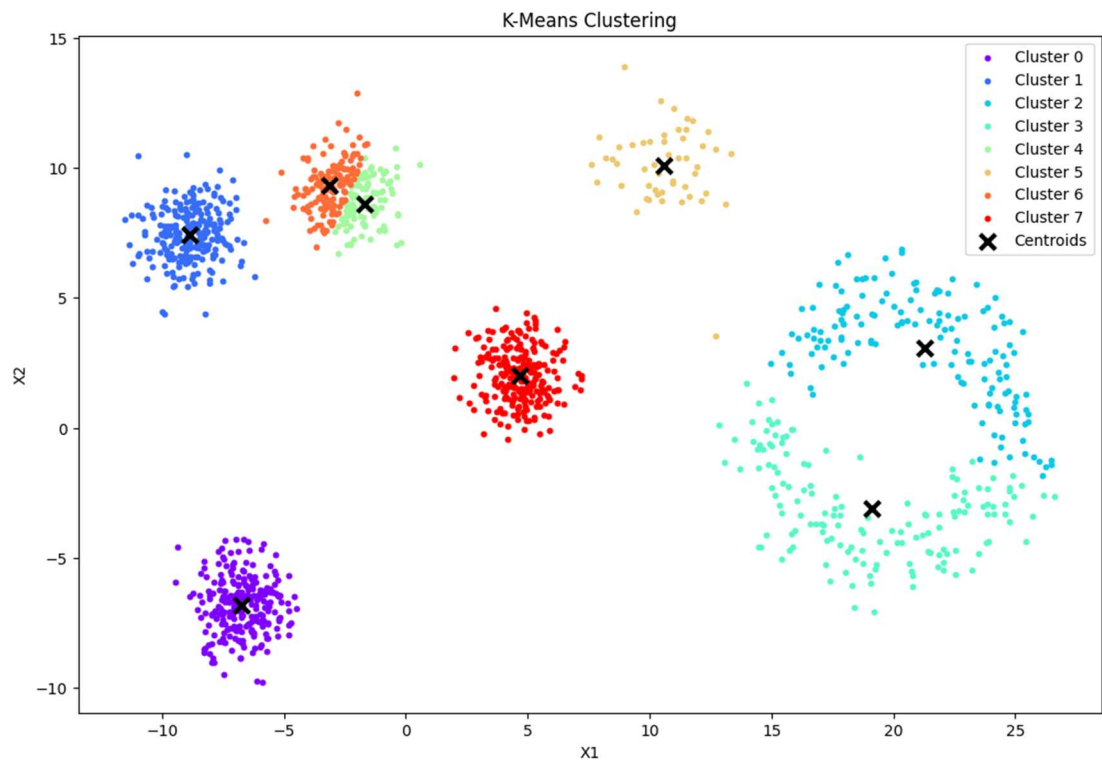

6. kmeans = KMeans(n_clusters=8, random_state=42, max_iter=1000)
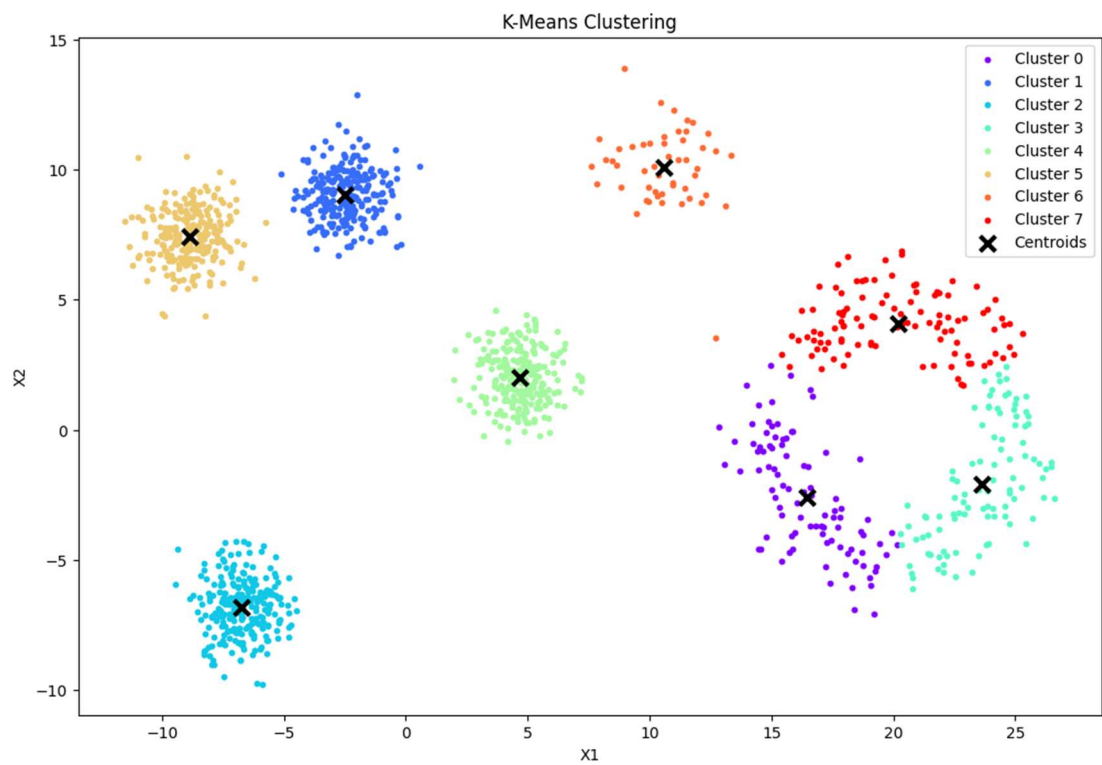   The average Silhouette score is : 0.716259254869025

7. kmeans = KMeans(n_clusters=8, random_state=42, init='random')
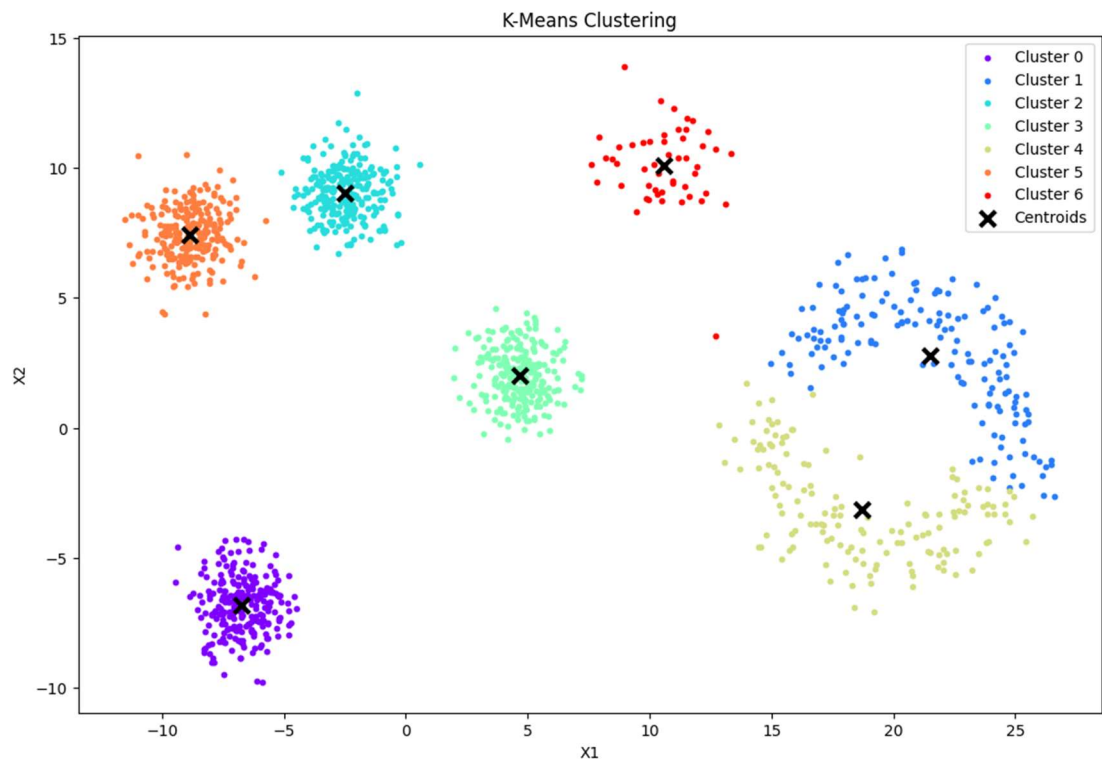   The average Silhouette score is : 0.6178145880678158

8. kmeans = KMeans(n_clusters=8, random_state=42, n_init=10)
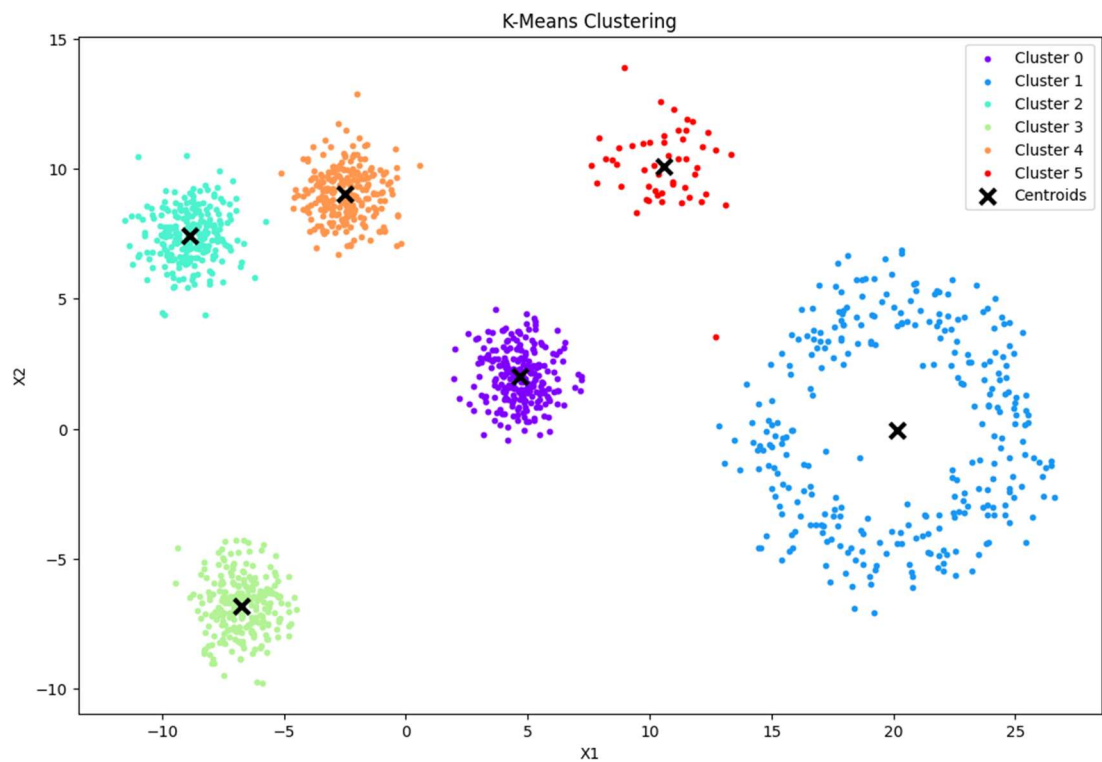   The average Silhouette score is : 0.7160120743931654

9. kmeans = KMeans(n_clusters=7, random_state=42, n_init=10)
   The average Silhouette score is : 0.7026041646015059

10. kmeans = KMeans(n_clusters=6, random_state=42, n_init=10)
    The average Silhouette score is : 0.7251181630059241
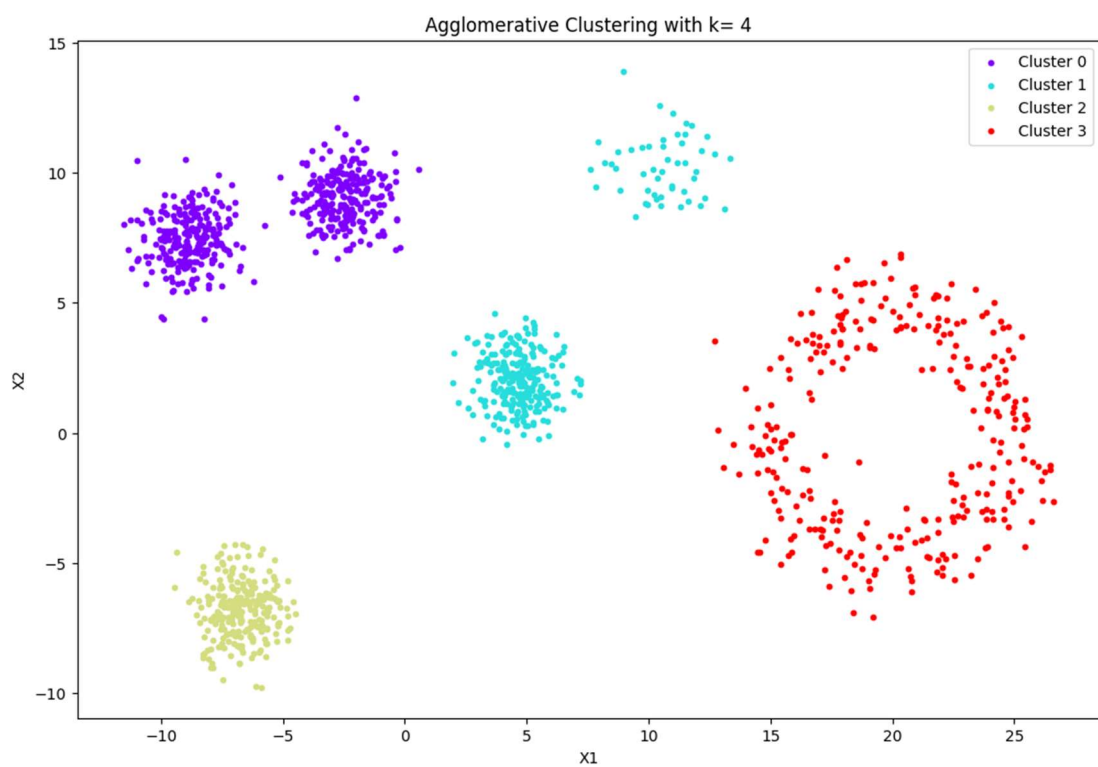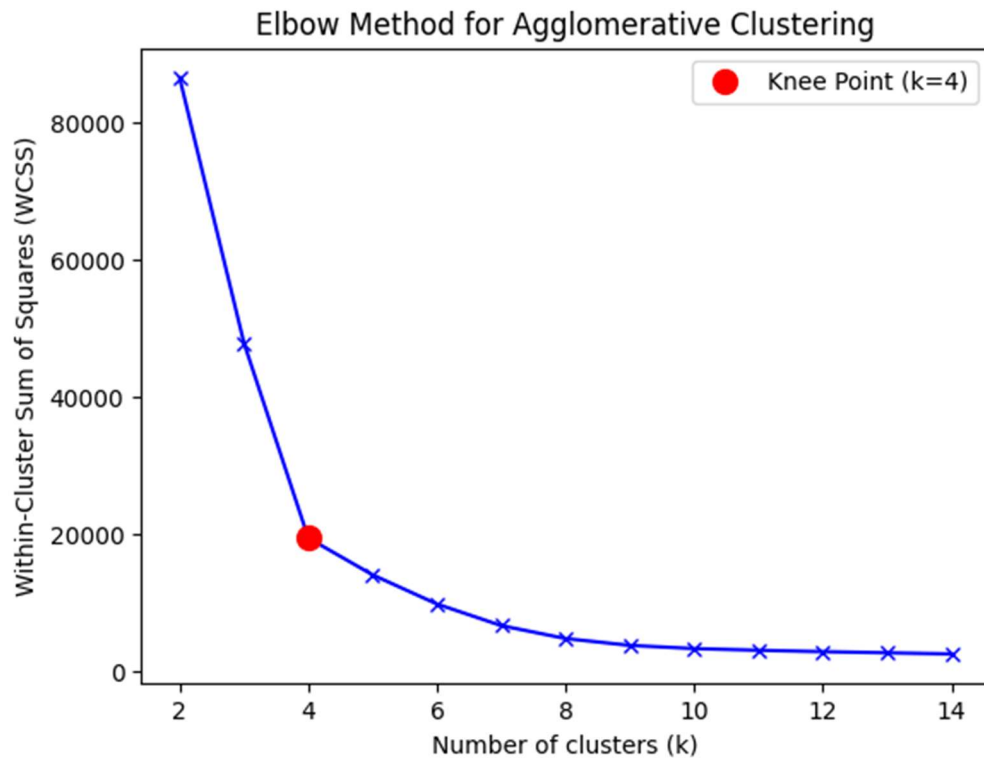
Agglomerative Clustering

1. hierarchialClustering = AgglomerativeClustering(n_clusters=knee_k)
   Optimal number of clusters (Knee Method): 4
   The average BSS score is : 191572.84749365167
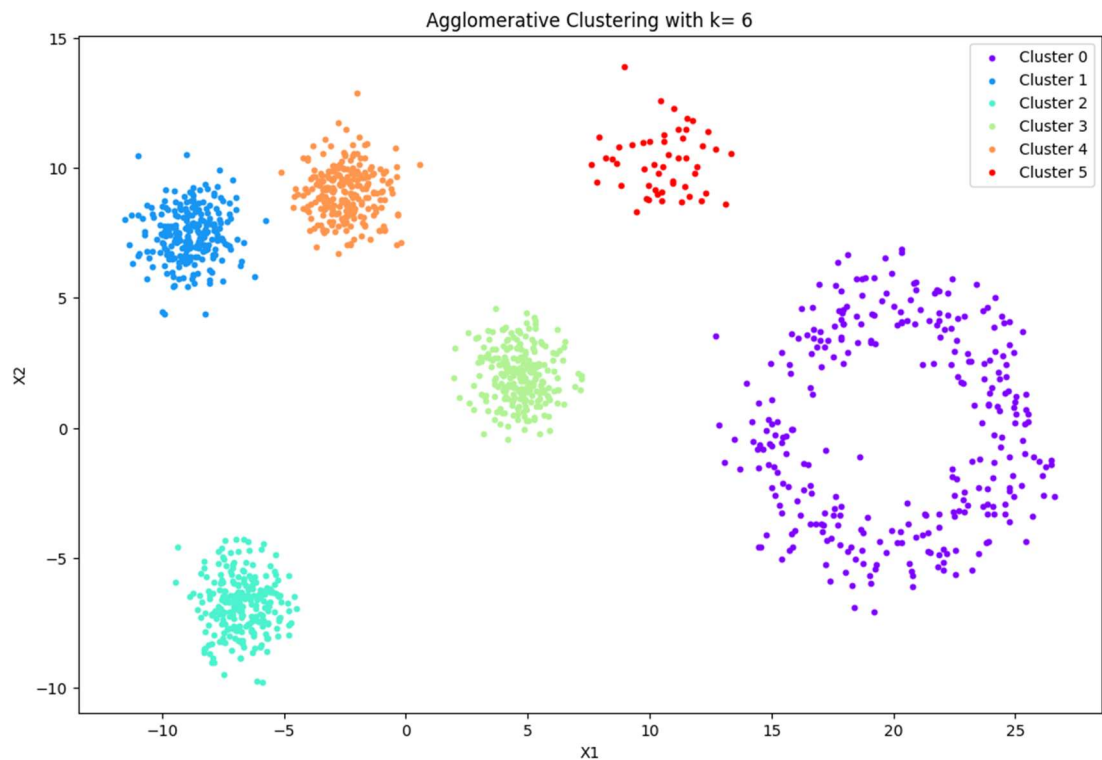   The average WCSS score is : 19483.46301152582
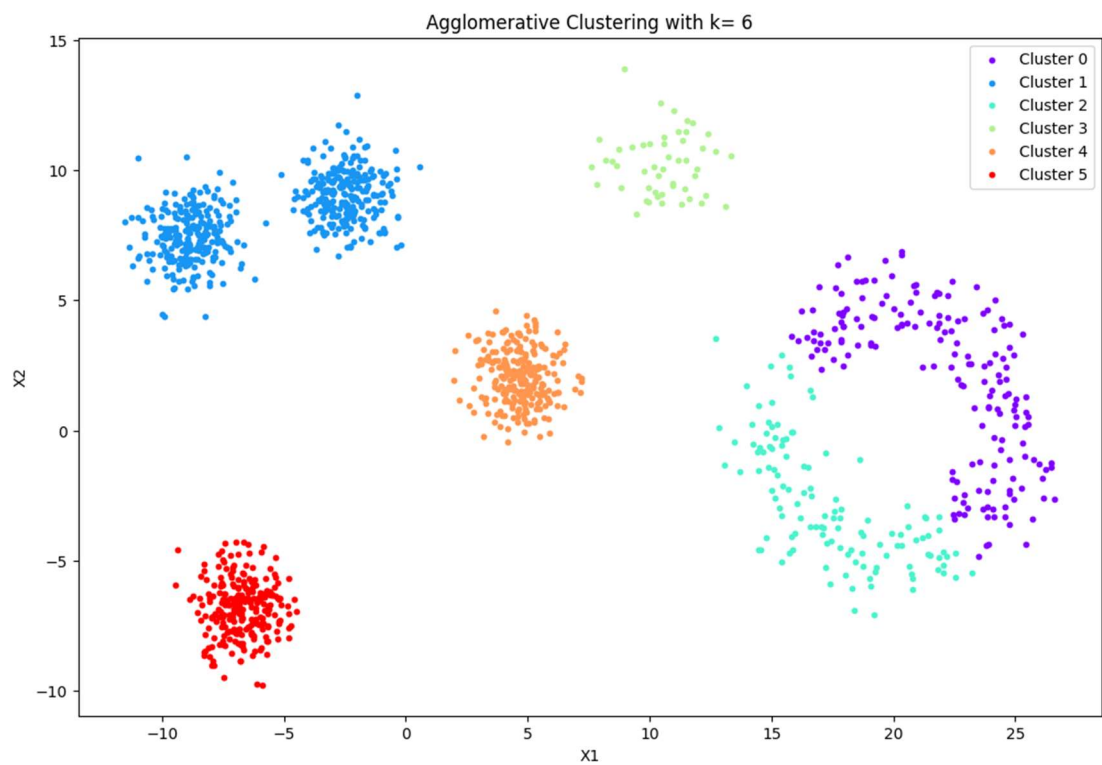   The average Silhouette score is : 0.6812638781424561

2. hierarchialClustering = AgglomerativeClustering(n_clusters=6)
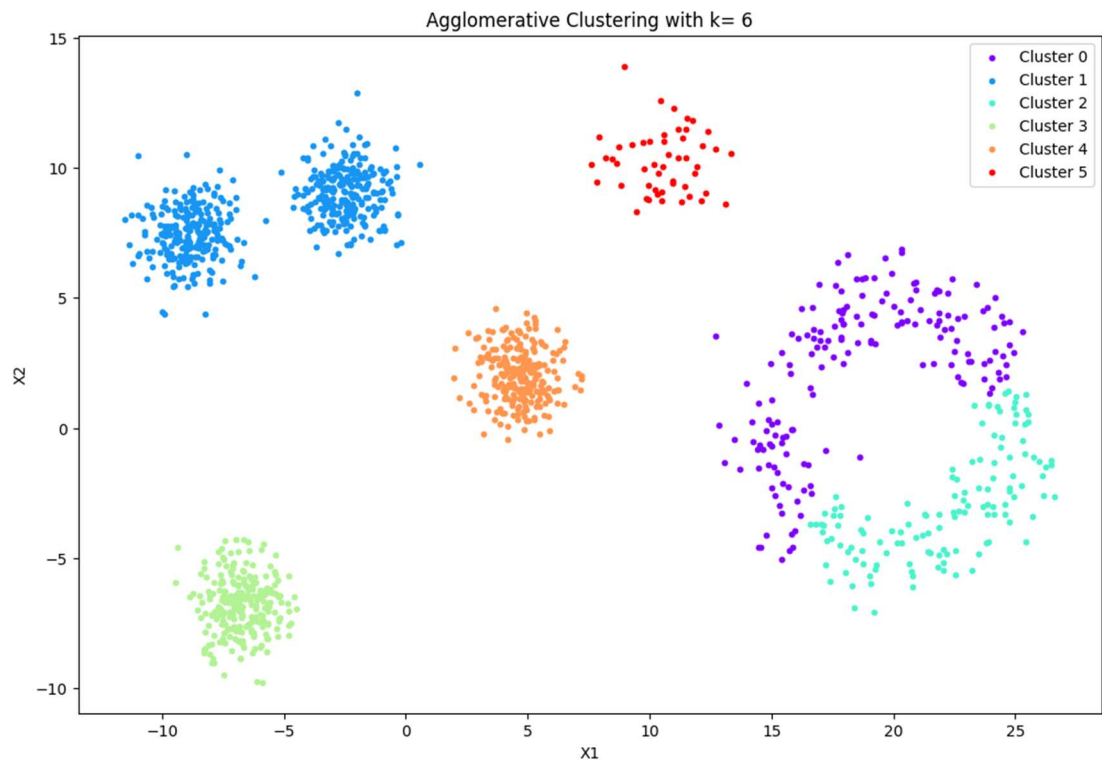   The average Silhouette score is : 0.7256900714288006

3. hierarchialClustering = AgglomerativeClustering(n_clusters=6, linkage='average')
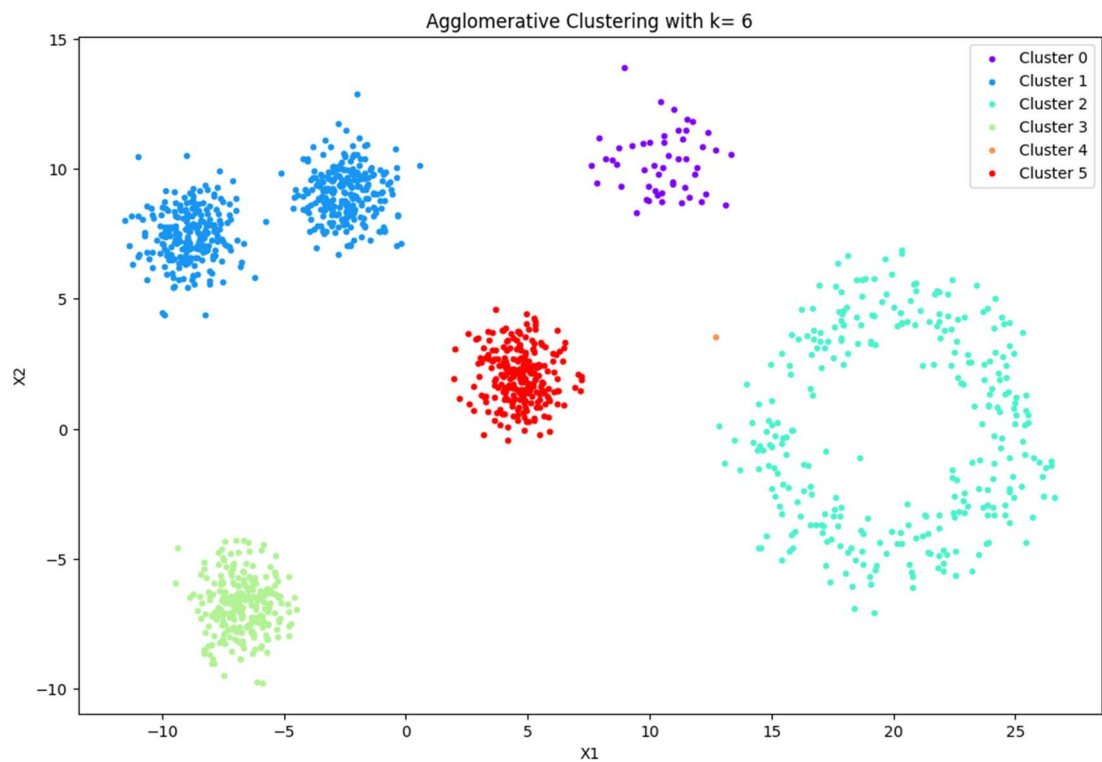   The average Silhouette score is : 0.6680458764033119

4. hierarchialClustering = AgglomerativeClustering(n_clusters=6, linkage='complete')

    The average Silhouette score is : 0.6594689980695821

Agglomerative Clustering with k= 6

5. hierarchialClustering = AgglomerativeClustering(n_clusters=6, linkage='single')

    The average Silhouette score is : 0.613327782899459

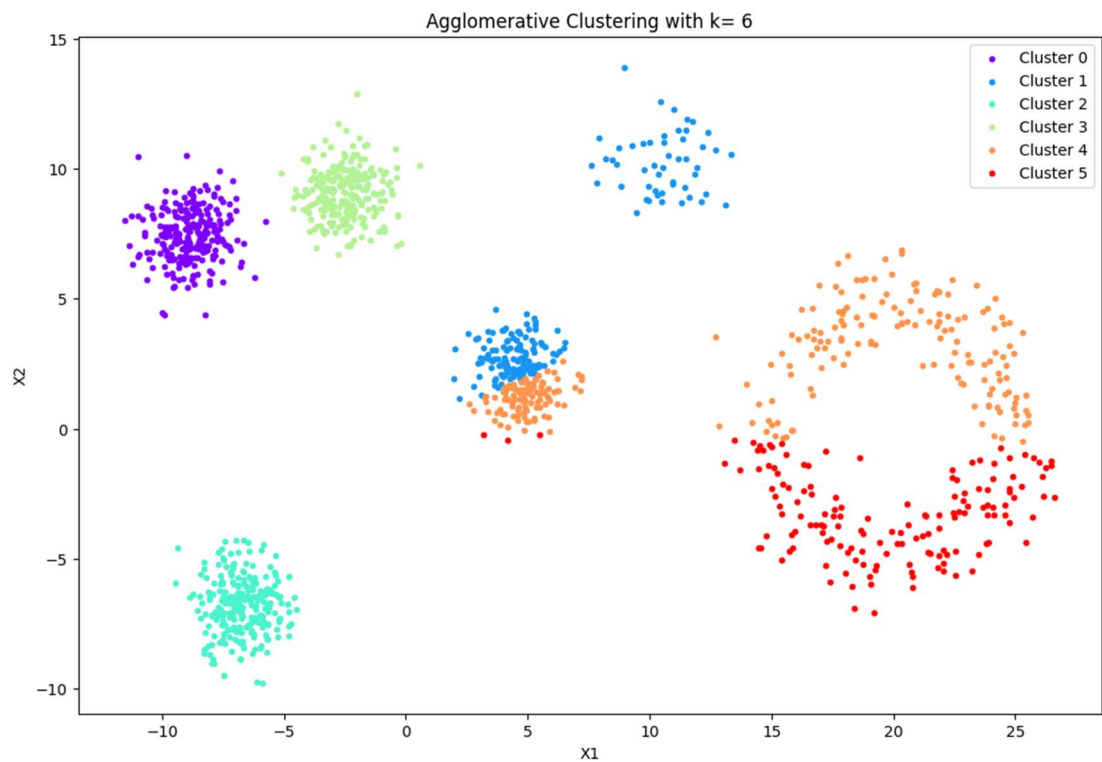Agglomerative Clustering with k= 6

6. hierarchialClustering = AgglomerativeClustering(n_clusters=7, linkage='single')
   The average Silhouette score is : 0.604522825115808
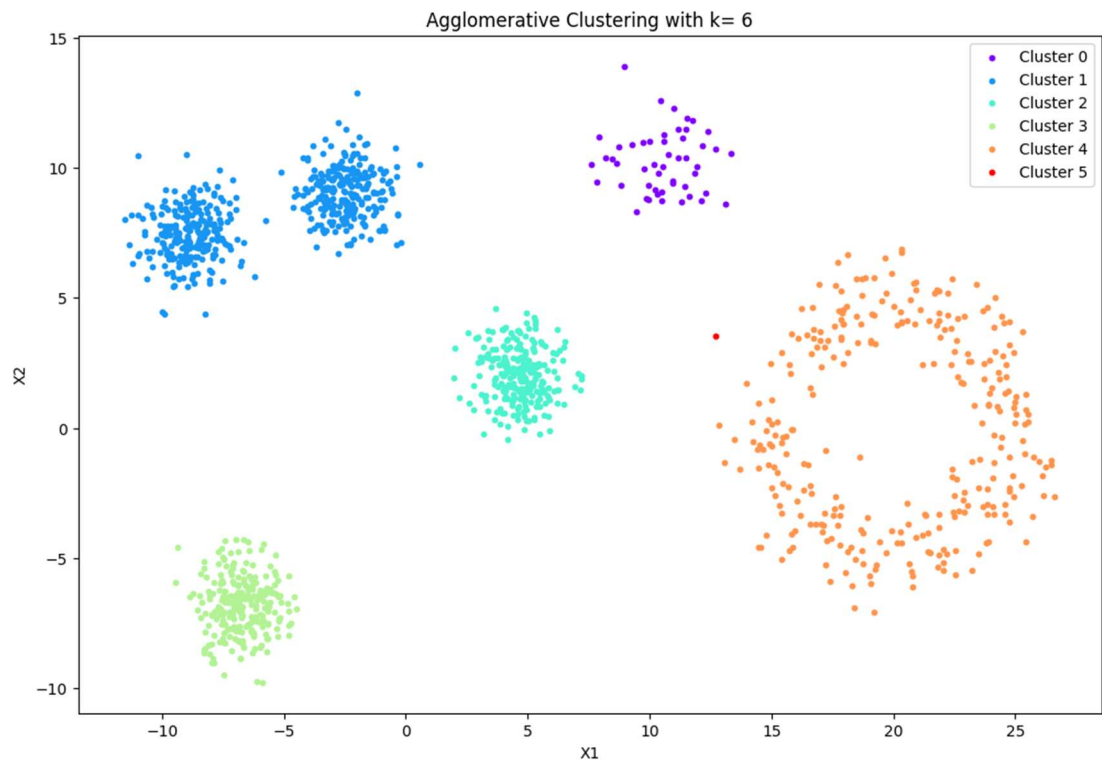

Agglomerative Clustering with k= 7
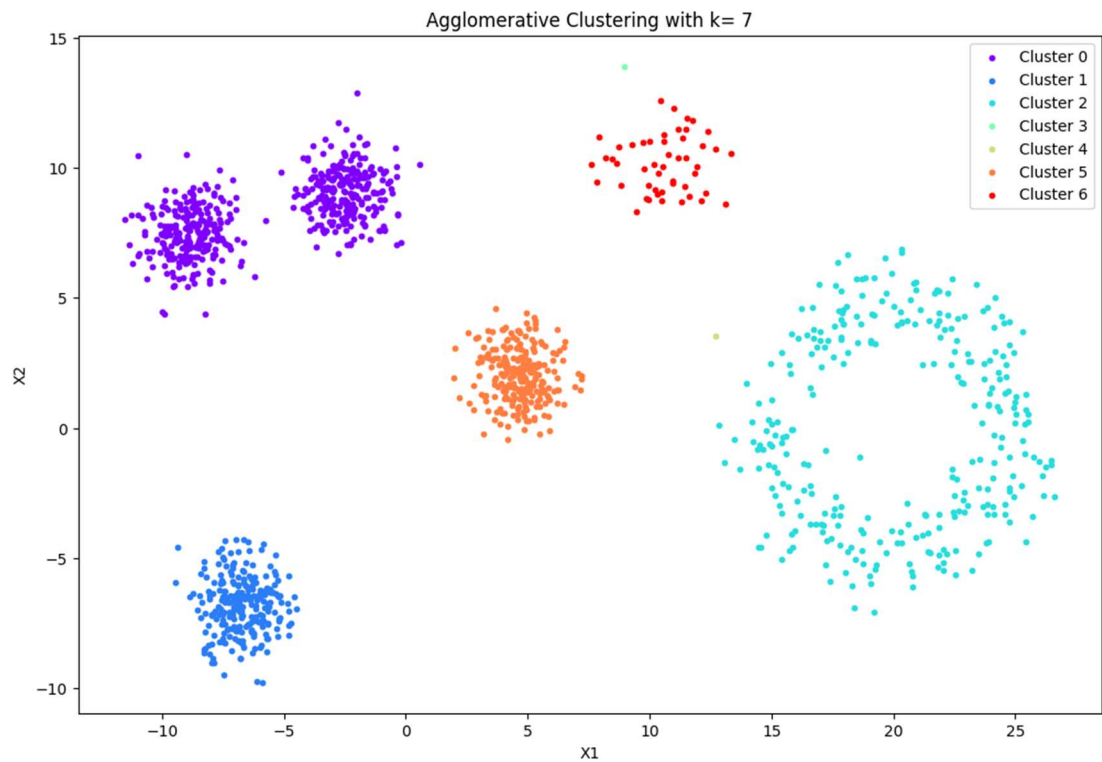
7. hierarchialClustering = AgglomerativeClustering(n_clusters=6, metric='cosine', linkage='average')
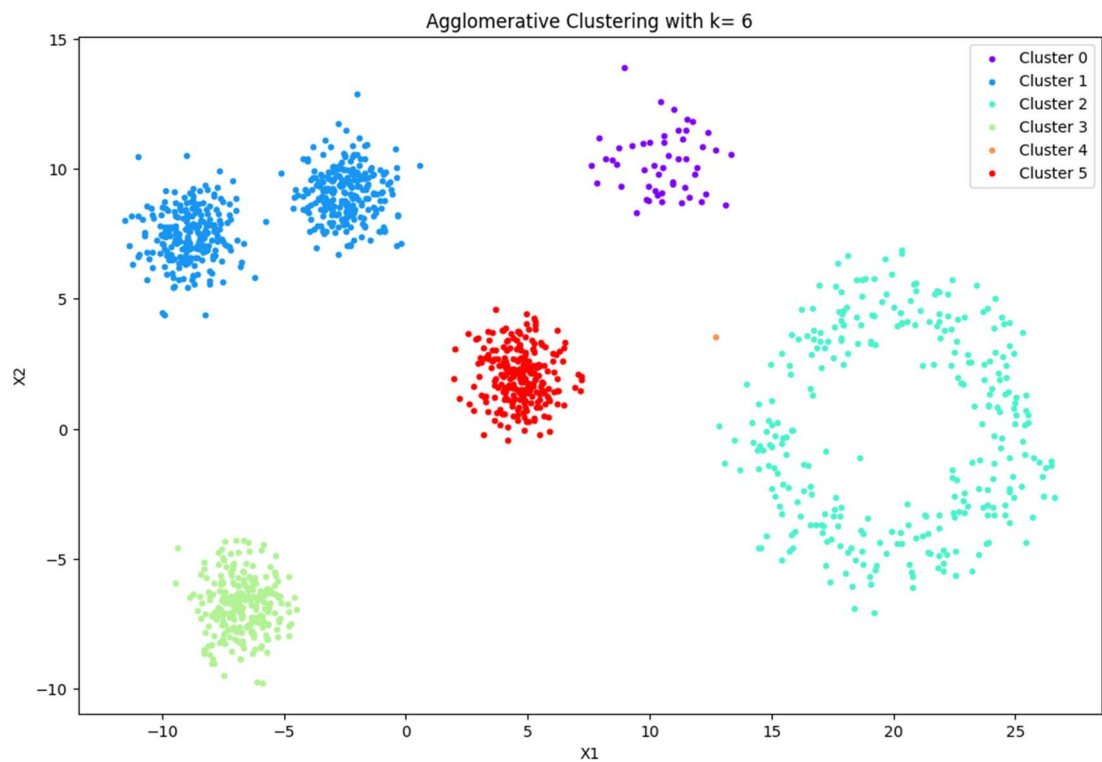   The average Silhouette score is : 0.504273692078222

Agglomerative Clustering with k= 6

8. hierarchialClustering = AgglomerativeClustering(n_clusters=6, metric='manhattan', linkage='single')
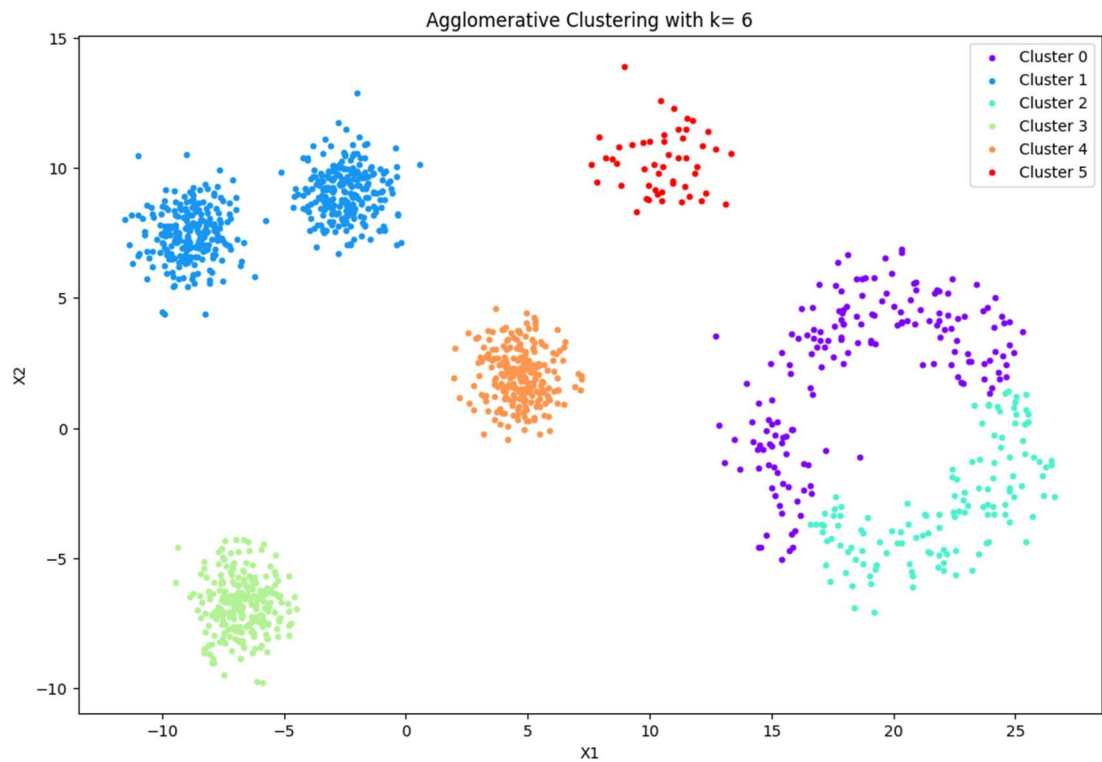The average Silhouette score is : 0.613327782899459

Agglomerative Clustering with k= 6

9. hierarchialClustering = AgglomerativeClustering(n_clusters=6, metric='l2', linkage='single')
The average Silhouette score is : 0.613327782899459
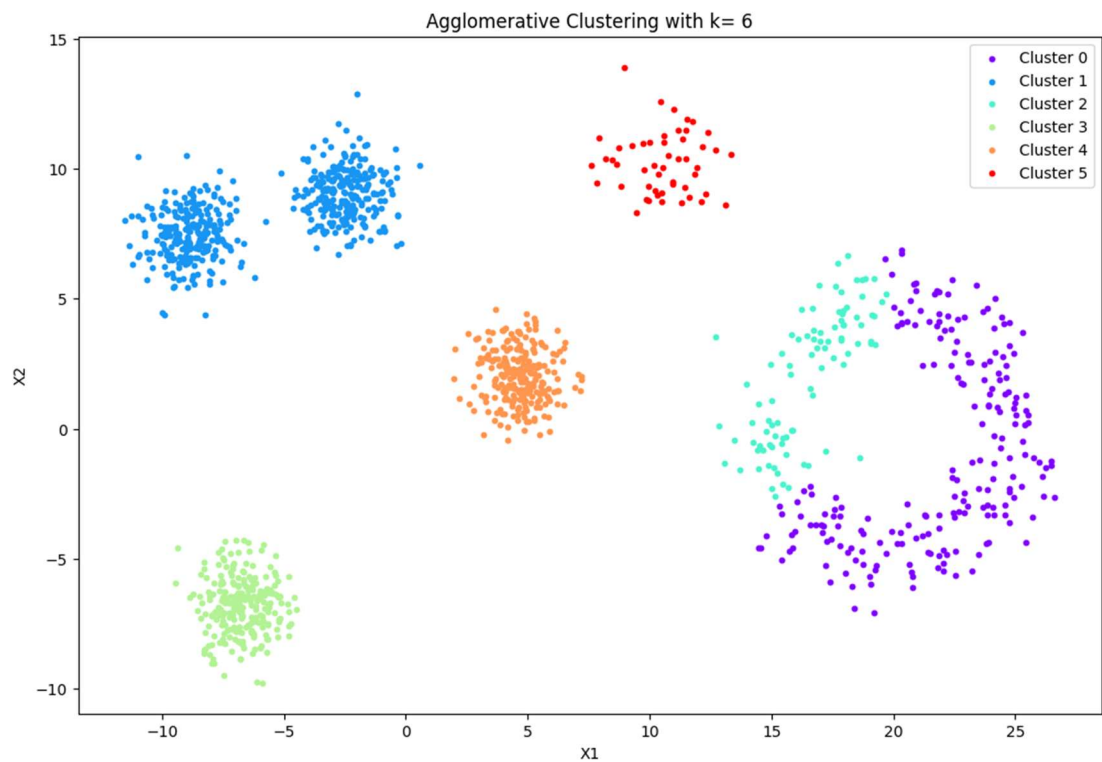

Agglomerative Clustering with k= 6

10. hierarchialClustering = AgglomerativeClustering(n_clusters=6, metric='l2', linkage='complete')

The average Silhouette score is : 0.6594689980695821

11. hierarchialClustering = AgglomerativeClustering(n_clusters=6, metric='manhattan', linkage='complete')
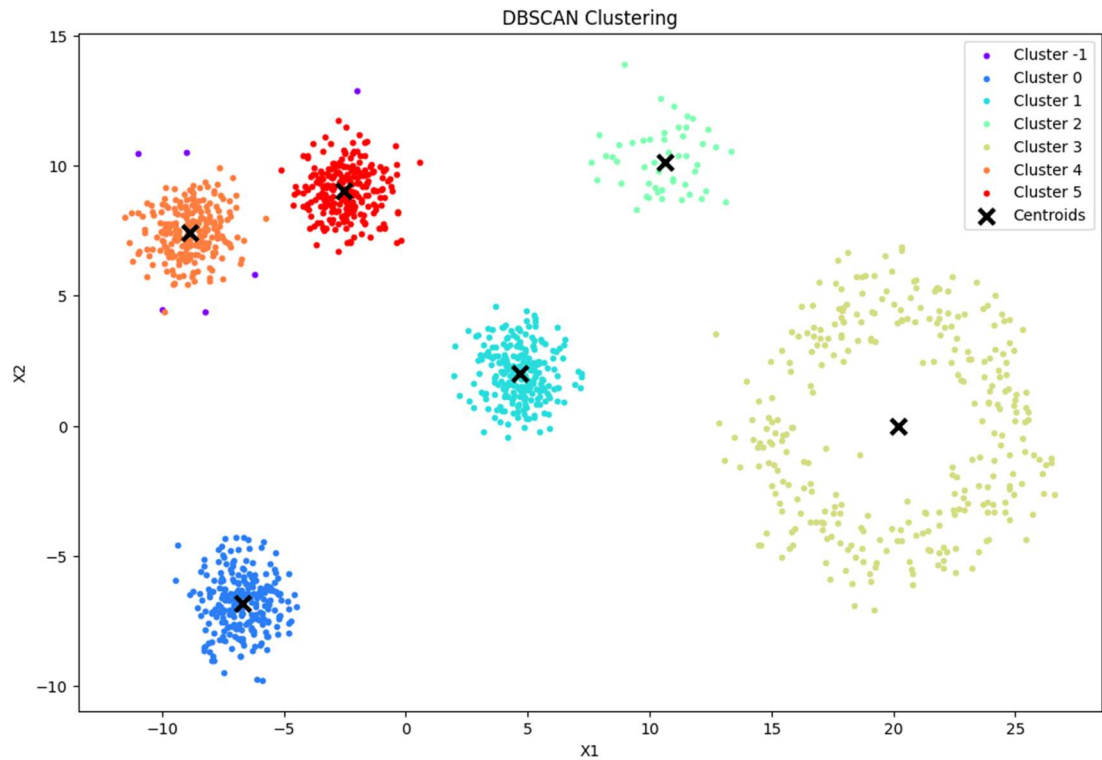
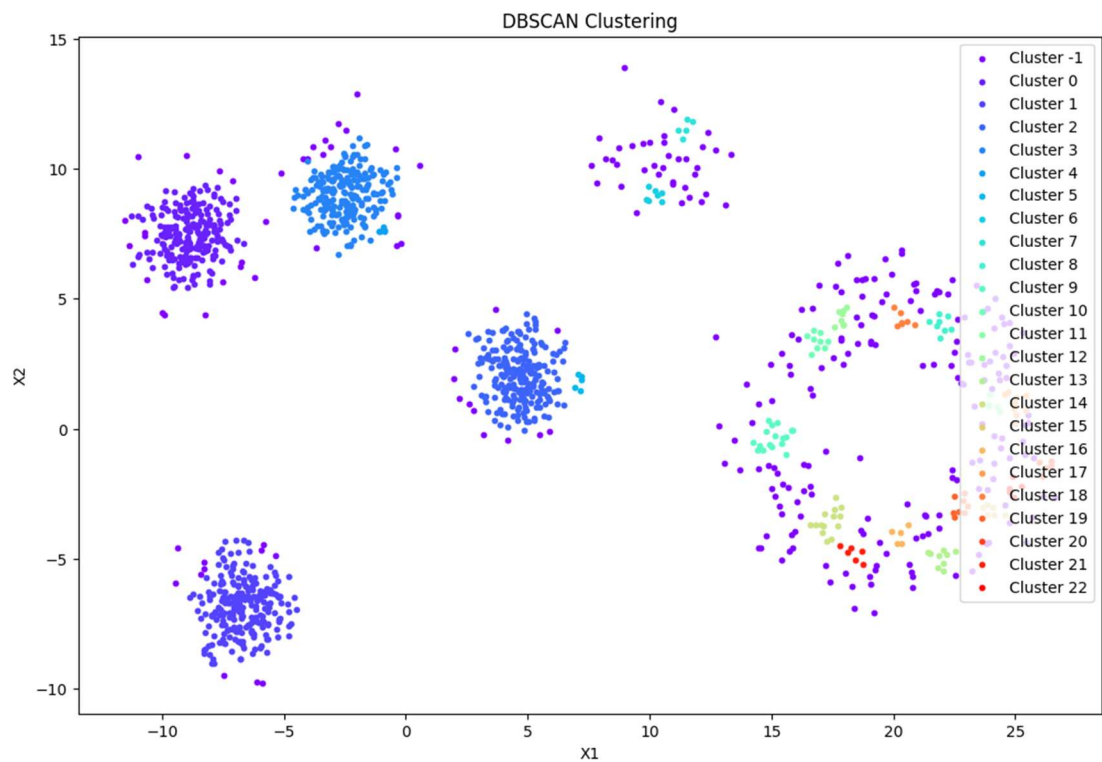The average Silhouette score is : 0.6478605803923654

DBSCAN

1. DBSCANClustering = HDBSCAN(min_cluster_size=10, store_centers= 'centroid')
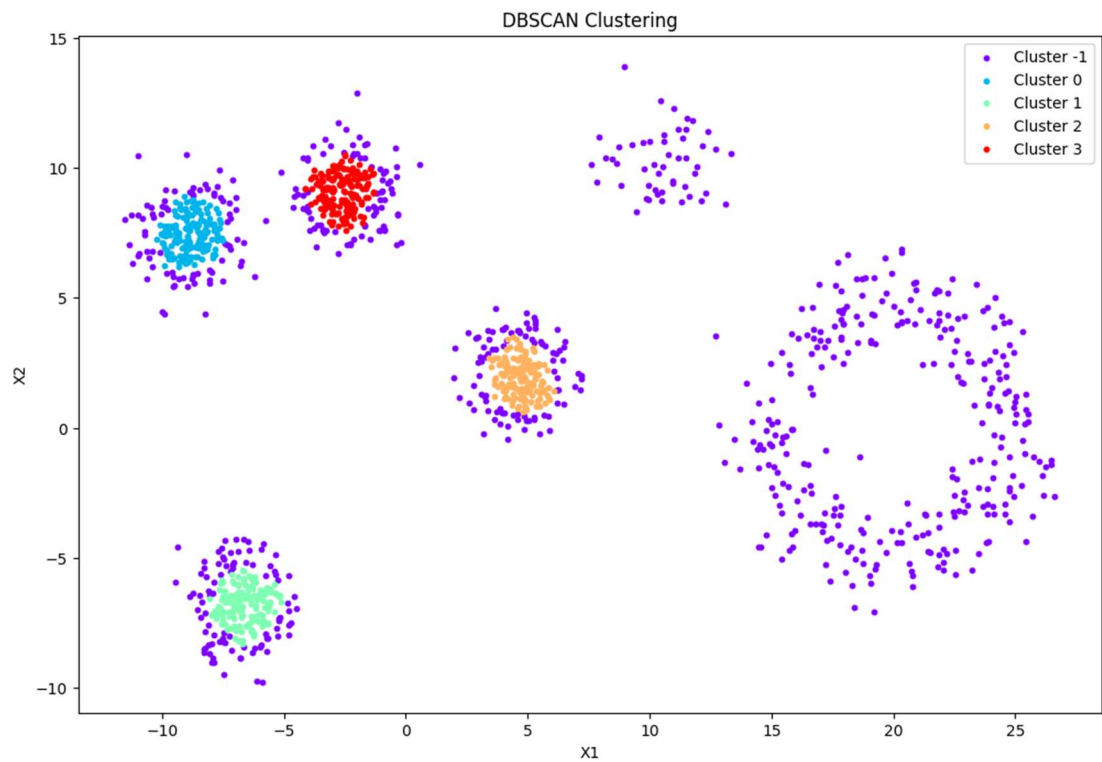
The average Silhouette score is : 0.697875193442288

2. DBSCANClustering = DBSCAN()
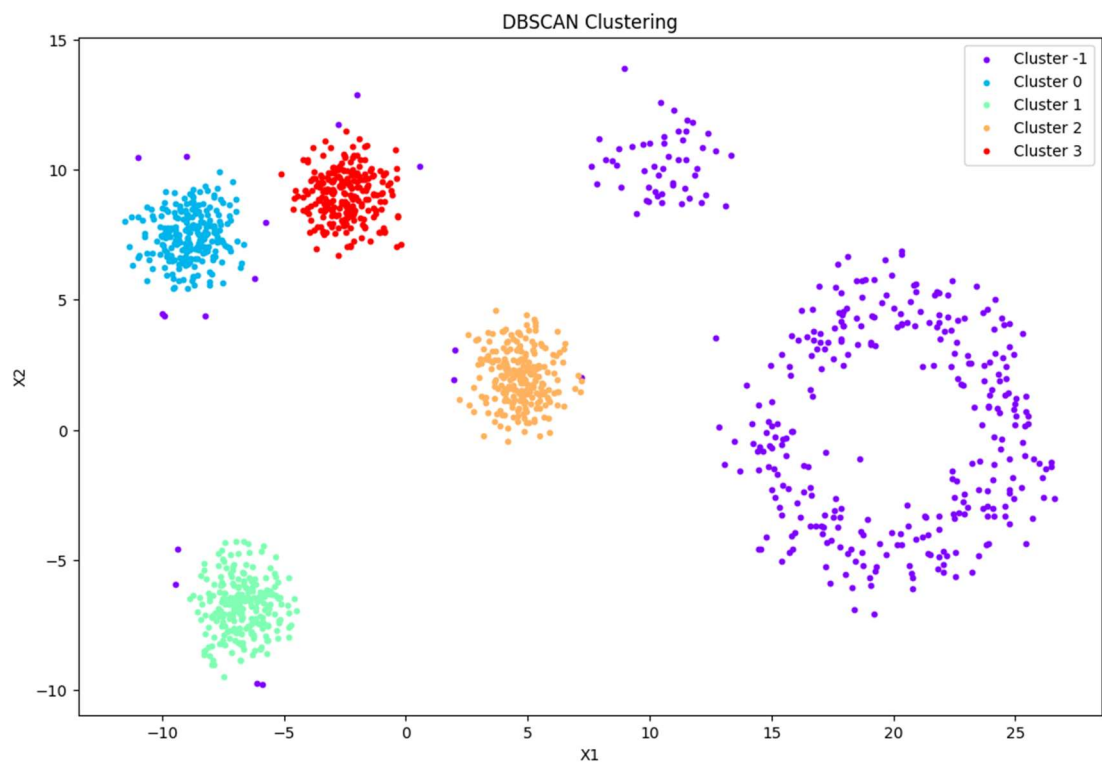
The average Silhouette score is : 0.28865209433880534

3. DBSCANClustering = DBSCAN(min_samples=20)
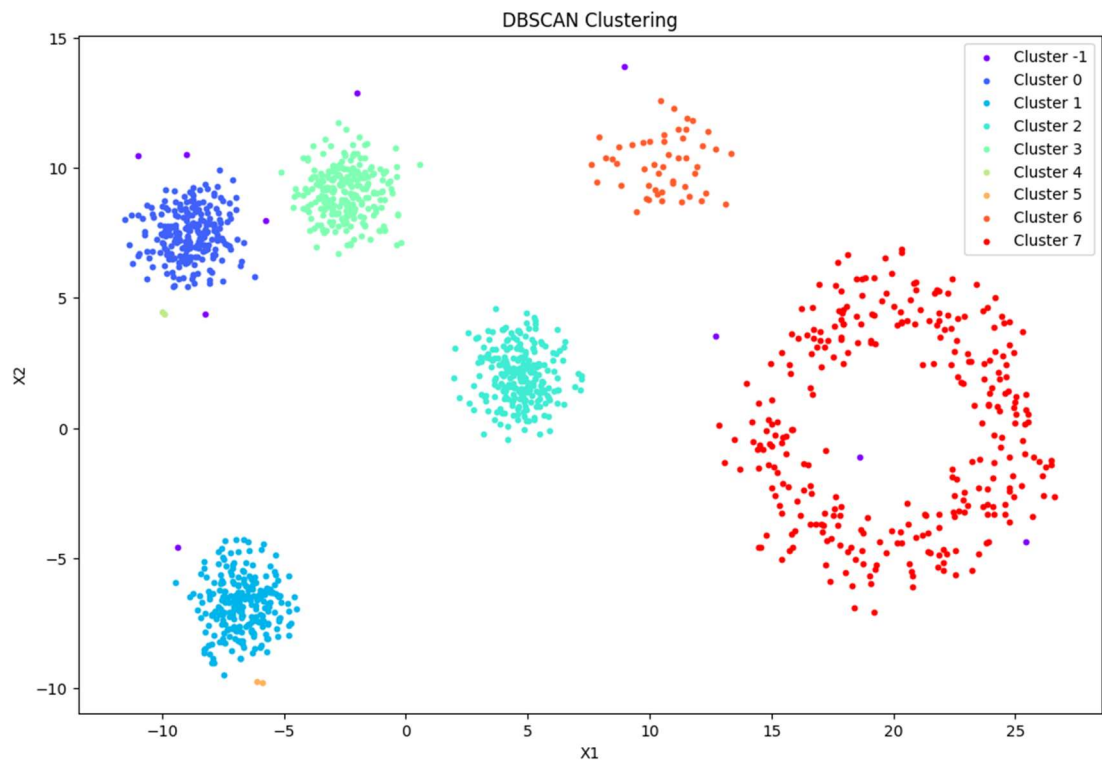   The average Silhouette score is : 0.17396195043369547

DBSCAN Clustering

4. DBSCANClustering = DBSCAN(eps=1, min_samples=20)
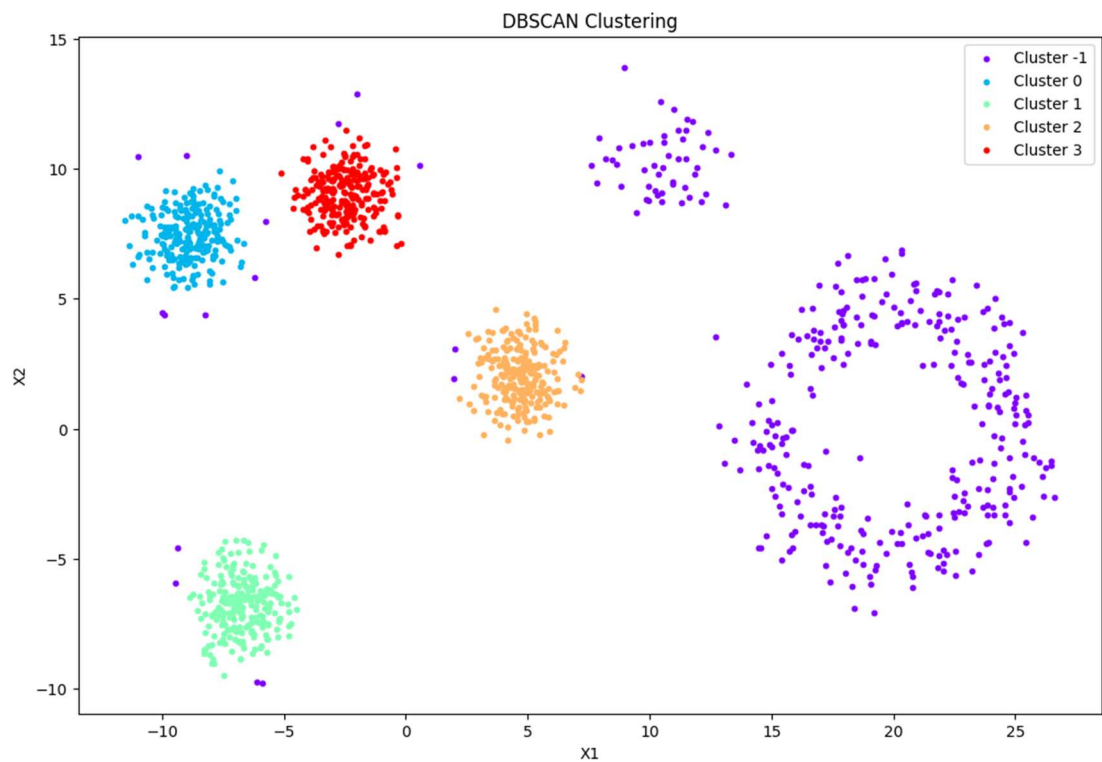   The average Silhouette score is : 0.6612622555185036

DBSCAN Clustering

5. DBSCANClustering = DBSCAN(eps=1, min_samples=2, algorithm='kd_tree')
The average Silhouette score is : 0.5798728445599673

6. DBSCANClustering = DBSCAN(eps=1, min_samples=20, algorithm='kd_tree')
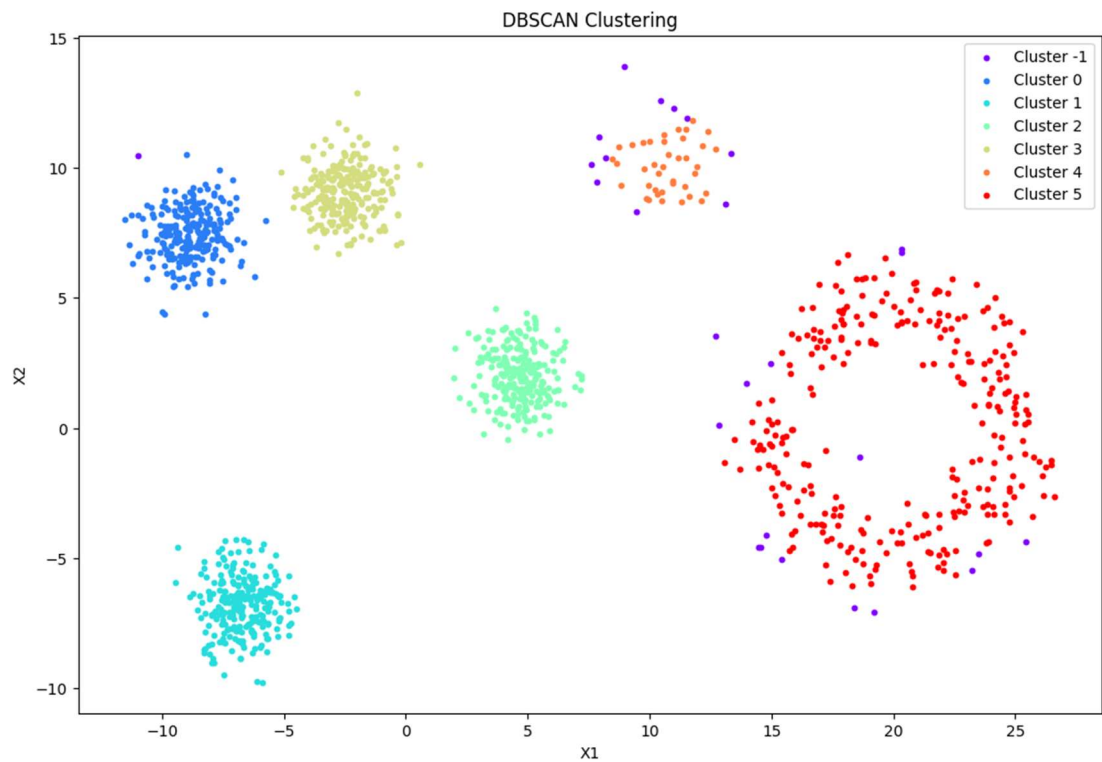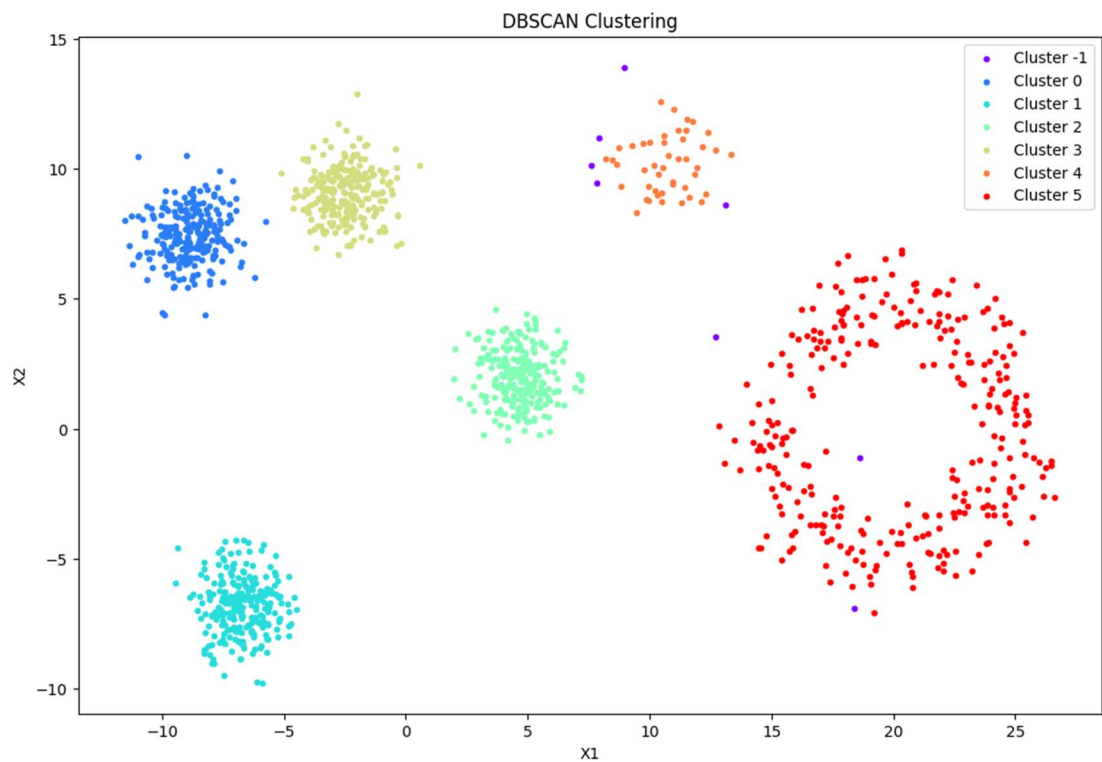The average Silhouette score is : 0.6612622555185036

7. DBSCANClustering = DBSCAN(eps=1.5, min_samples=20, algorithm='kd_tree')
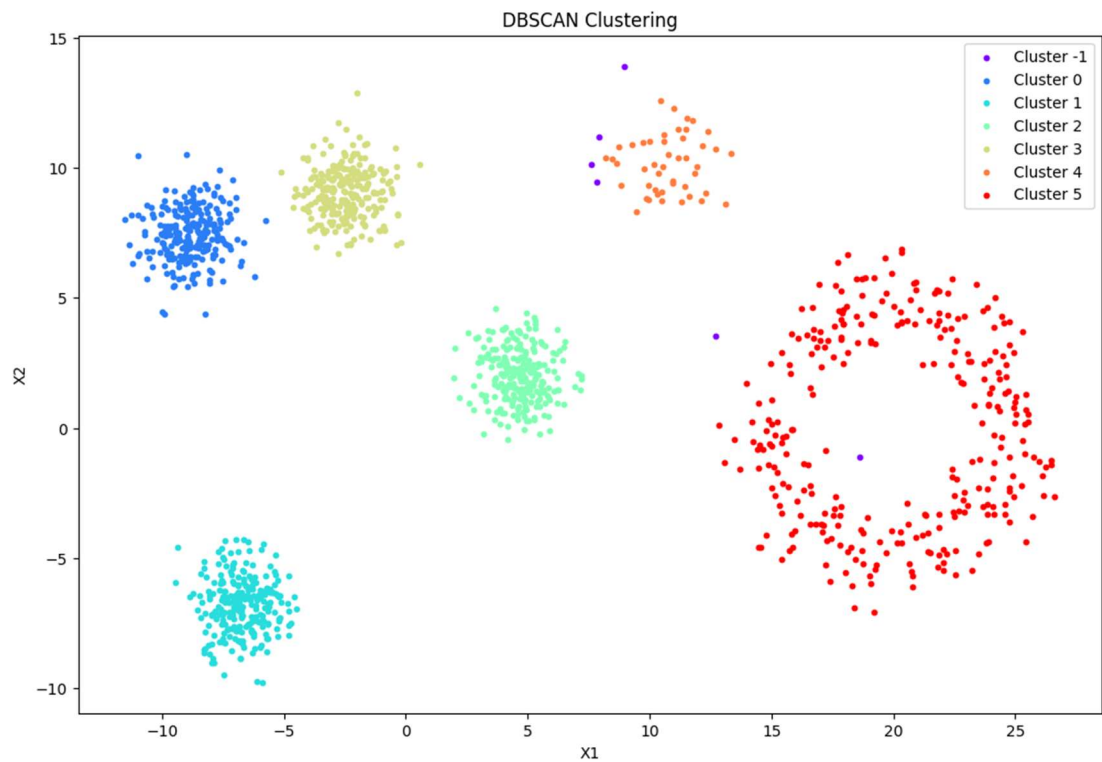   The average Silhouette score is : 0.6884017793929554

8. DBSCANClustering = DBSCAN(eps=1.7, min_samples=20, algorithm='kd_tree')
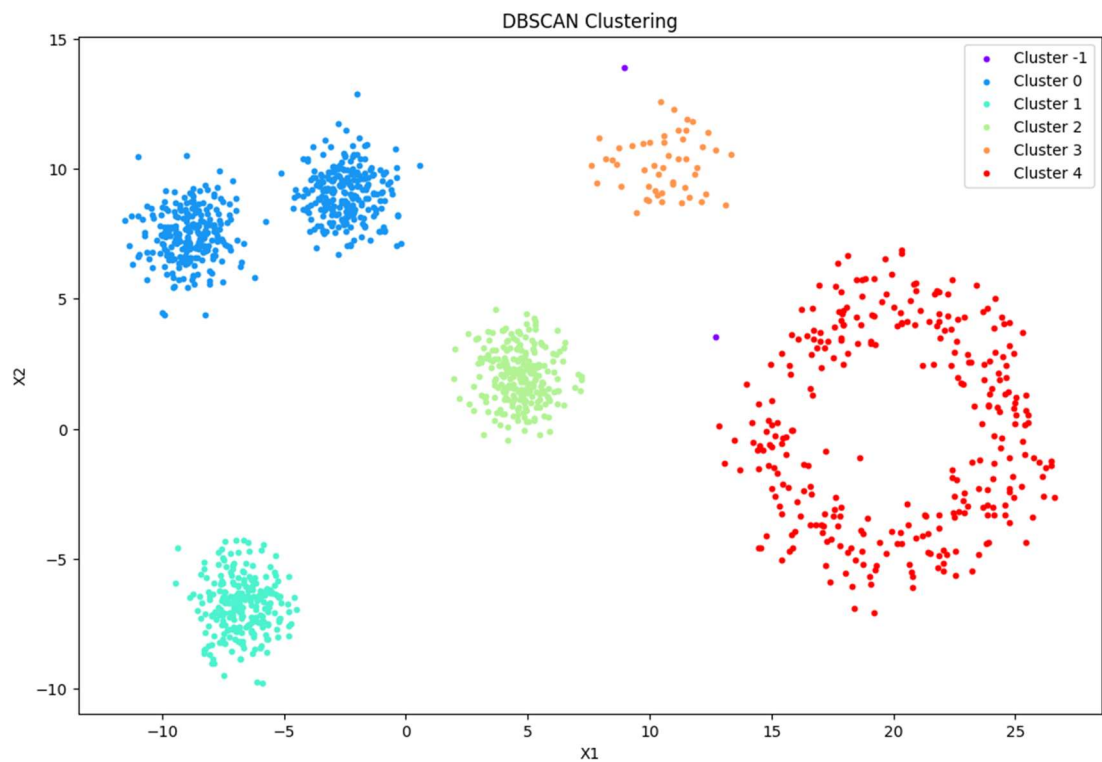   The average Silhouette score is : 0.7076030173305257

9. DBSCANClustering = DBSCAN(eps=1.8, min_samples=20, algorithm='kd_tree')
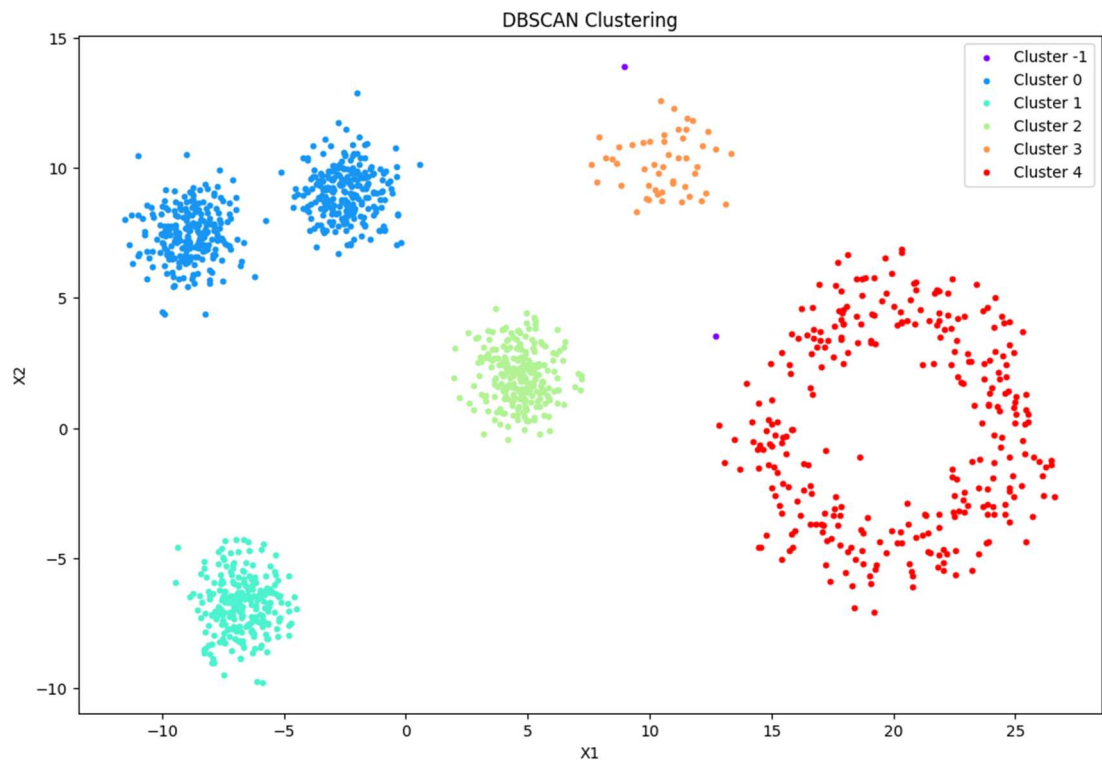
   The average Silhouette score is : 0.7125671527937365

10. DBSCANClustering = DBSCAN(eps=2, min_samples=20, algorithm='kd_tree')
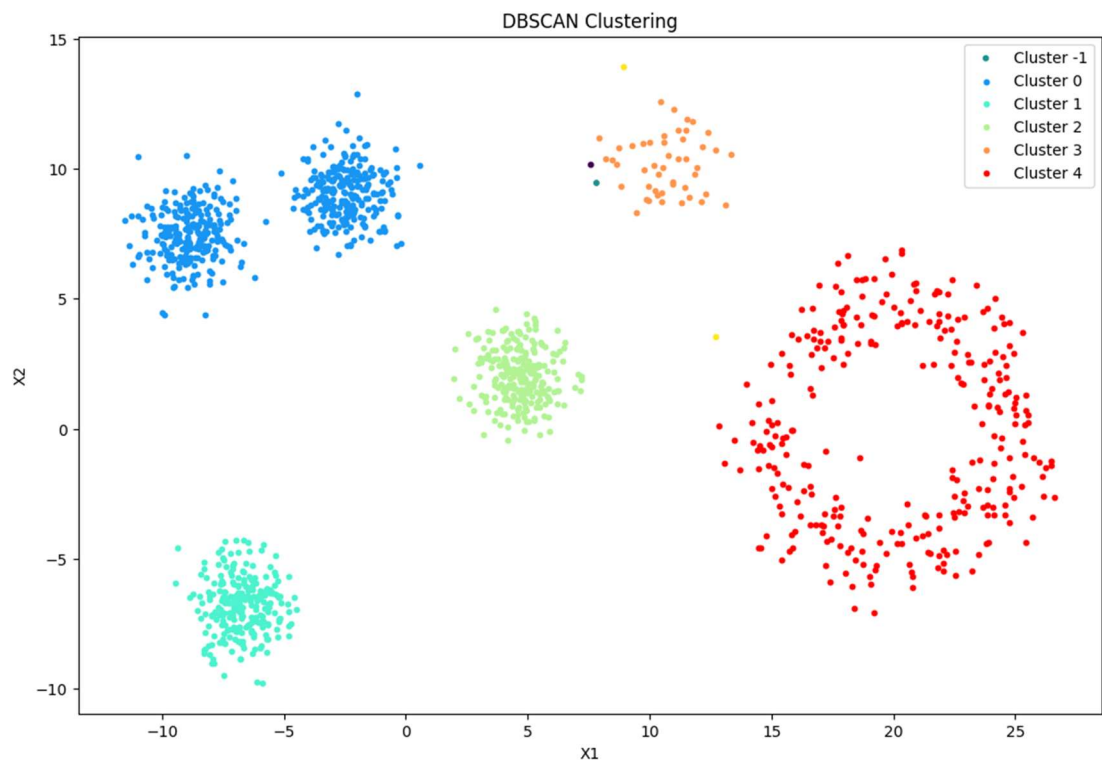
   The average Silhouette score is : 0.6809842207458477

11. DBSCANClustering = DBSCAN(eps=1.9, min_samples=20, algorithm='kd_tree')
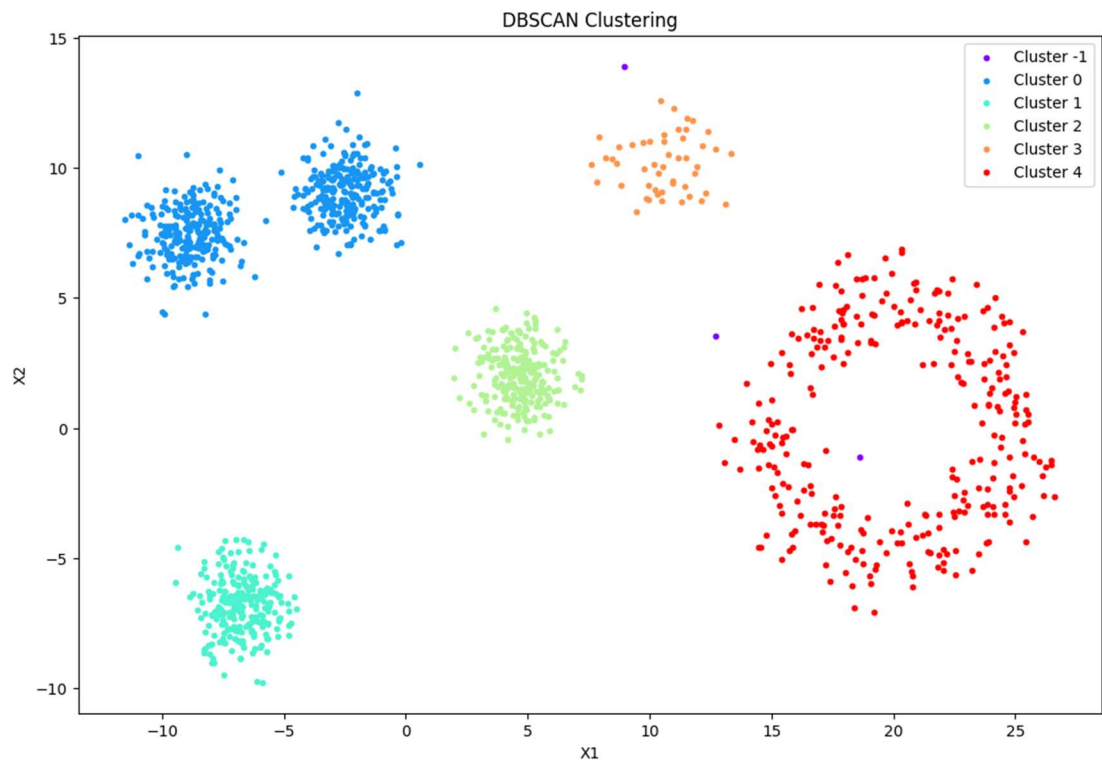The average Silhouette score is : 0.6809842207458477

12. DBSCANClustering = DBSCAN(eps=1.85, min_samples=20, algorithm='kd_tree')
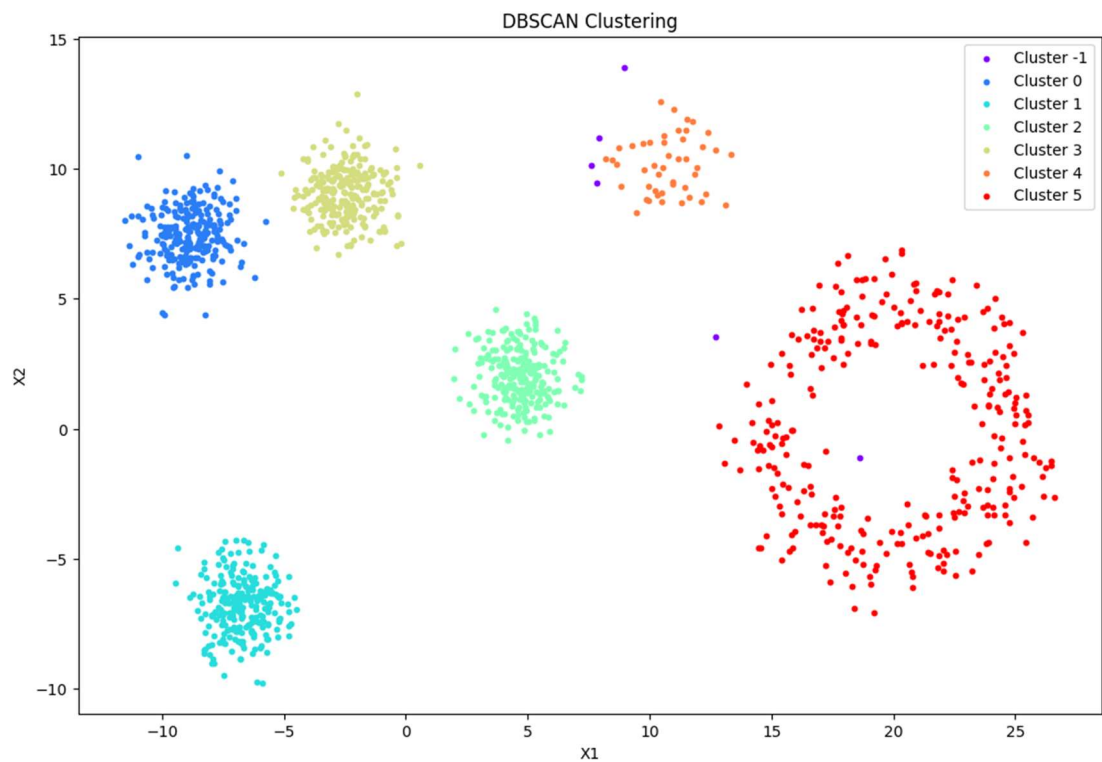The average Silhouette score is : 0.677553835911806

13. DBSCANClustering = DBSCAN(eps=1.7, min_samples=10, algorithm='kd_tree')
The average Silhouette score is : 0.6589926660328136

14. DBSCANClustering = DBSCAN(eps=1.8, min_samples=20, algorithm='ball_tree')
The average Silhouette score is : 0.7125671527937365

15. DBSCANClustering = DBSCAN(eps=1.8, min_samples=20,
    algorithm='brute')
    The average Silhouette score is : 0.7125671527937365