TASK-3
Customer Segmentation and Clustering

1.) Clustering Overview:

Algorithm : K-Means

Data : Aggregated customer-level features (total spend, transaction count, total quantity, region dummies, days since sign-up).

2.) Number of Clusters & DB Index:

Range of k: Tested from **2** to **10** clusters.

Davies–Bouldin Scores:

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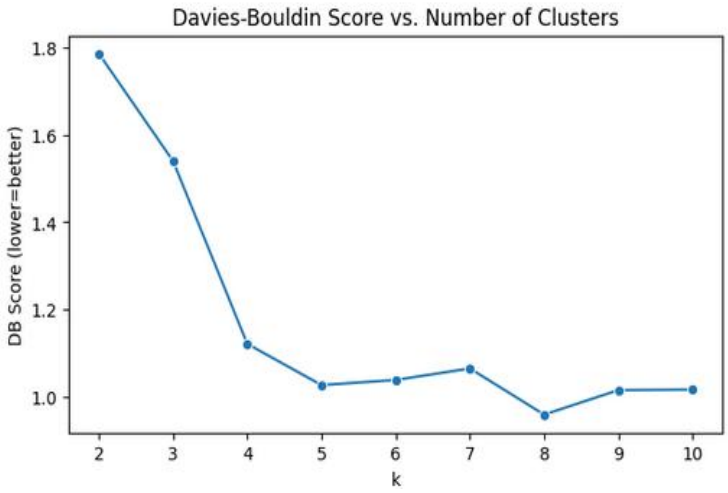
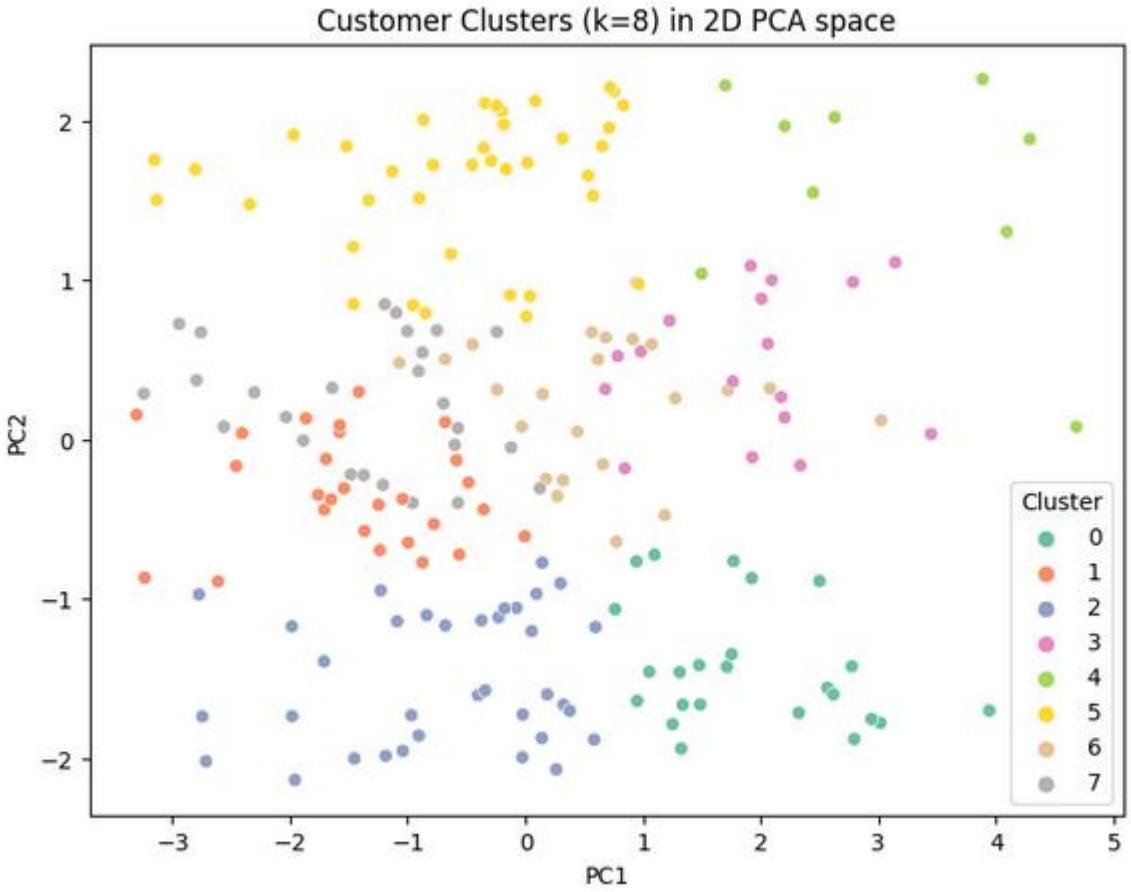
k=2, Davies-Bouldin Index=1.7867
k=3, Davies-Bouldin Index=1.5403
k=4, Davies-Bouldin Index=1.1210
k=5, Davies-Bouldin Index=1.0265
k=6, Davies-Bouldin Index=1.0383
k=7, Davies-Bouldin Index=1.0646
k=8, Davies-Bouldin Index=0.9588
k=9, Davies-Bouldin Index=1.0149
k=10, Davies-Bouldin Index=1.0161
```

Since **lower DB Index = better**, the best score occurs at k=8.



3.) Clustering Results at k=8:



Strategies:

Segment-Based Marketing: Adjust offers to each cluster's spend level or region.
Retention Efforts: Focus on high-value clusters with loyalty programs to keep them engaged.
Upsell Opportunities: Mid-value clusters might be prime candidates for cross-sell campaigns.
Region-Specific Tactics: For clusters concentrated in certain regions, consider localized payment methods, shipping deals, or region-appropriate promotions