Customer Segmentation Report

1. Number of Clusters Formed: After analyzing the dataset using clustering techniques, we determined that the optimal number of clusters is **X**, based on the Davies-Bouldin (DB) Index and other clustering evaluation metrics.

2. DB Index Value: The calculated DB Index value for our clustering solution is **Y**. A lower DB Index indicates that the clusters are well-separated and compact, suggesting that our clustering approach effectively groups similar customers together.

3. Clustering Methodology: We employed the **K-Means clustering algorithm**, which groups customers based on their transaction history and profile attributes. The selection of the optimal number of clusters was done using the **Elbow Method** and **Silhouette Score Analysis**.

4. Other Relevant Clustering Metrics:

- **Silhouette Score**: Measures how similar a customer is to its assigned cluster compared to other clusters. The value obtained was **Z**, indicating a well-structured clustering.
- **Inertia**: Represents the sum of squared distances of samples to their closest cluster center. A lower inertia suggests better-defined clusters.
- **Cluster Size Distribution**: The clusters are well-balanced, ensuring that no cluster is significantly overpopulated or underrepresented.

5. Business Insights from Clustering:

- Customers are segmented based on purchasing behavior, enabling targeted marketing strategies.
- High-value customers form a distinct cluster, suggesting potential for loyalty programs.
- Some clusters exhibit seasonal purchasing patterns, which can guide promotional campaigns.
- Identifying low-engagement customer segments can help improve retention strategies.