

# Overview

A pilot survey was conducted of 30 individuals to understand their different attitudes towards discount stores (e.g., K-Mart), which usually come with low levels of service versus departmental stores (e.g., Macys) which come with higher levels of service. Respondents were asked their opinion on a 0-9 agree-disagree scale (where 0 indicates strongly disagree and 9 indicates strongly agree) on the following questions.

1. I never go back to a store that had treated me with disrespect.
2. I find salespeople who fawn over me irritating, I just expect them to be courteous.
3. I have a lot of questions when I shop, I greatly appreciate a salesperson who is willing to spend time answering my questions.
4. I care little for the fancy displays in departmental stores.
5. Discount stores are much more of a bargain than departmental stores.

The data for this study are provided in `assg1.csv`. Using this data, answer the following questions.

## Questions

1. Import, scale, and summarize the data in R. (1 point)
2. Present the matrix of correlations for the five variables (X1-X5) and plot the correlations. Explain (in words) your inferences based on this exploratory analysis. (1 point)
3. Perform PCA on the data and show the results (including the summary of the PCA and the matrix showing the relationship between the factors and original attributes). (1 point)
4. Write down the five equations that formally define the relationship between the original attributes and the factors from the PCA. (1 point)
5. How many factors or principal components should we retain? Explain your decision. (1.5 points)
6. Can you think of intuitive names for the first and second factors? What do these factors represent? Explain how you arrived at them. Hint: Use the equations that quantify the relationship between the original attributes and the factors from the PCA (from answer to Question 4) and focus on strong correlations. (2 points)
7. Now plot all the consumers on a two-dimensional map based on the first two principal components. Label the x and y-axis using the names from your answer to the previous question. (1.5 points)
8. Based on the plot from the previous answer, how many segments (roughly) do you find in the market? Hint: A segment is a group of consumers who are similar to each other in their tastes and preferences. (2 points)
9. Describe the characteristics of each segment. Discuss the relationship between the segment characteristics and the original attributes? (2 points)

10. Which segment do you expect to be the most profitable and why? Assuming the data to be representative, what is the size of this segment (in percentage)? (2 points)