Group Project

Introduction to Probability and Statistics

April 7, 2025

Part 1

The dataset *competition_final.xls* contains data about the *Rock Paper Scissors* games that you have played through the course. At first, one could think that this game is a random game where at each round, the probability for a random player to play rock, paper or scissors is the same:

$$P(Rock) = P(Paper) = P(Scissors) = \frac{1}{3}$$

Assuming that, find:

- $P(Rock$ against $Rock)$, $P(Rock$ against $Paper)$ and $P(Rock$ against $Scissors)$
- $P(Paper$ against $Paper)$ and $P(Paper$ against $scissors)$
- $P(Scissors$ against $Scissors)$

  (Notice that Rock against Paper consists of the cases Rock vs Paper as well as Paper vs Rock and so on for the rest of the cases where different options are faced to each other.)

Do a matrix or table that shows the probabilities that you just calculated. Then, analyze the data to see how many rocks, papers and scissors were actually played. Also, determine how many times each option faced the others and make a proportion matrix that allows you to compare the previous theoretical matrix with the actual hands that were played. Finally, draw some conclusions.

Part 2

Determine the following:

- A summary of how many times each player played rock, paper or scissors trough the competition.
- For the first two rounds of each game, a summary of the winning, drawing and loosing hands for each player.
- For the first two rounds of each game, a summary of how many rocks, papers, and scissors each player used.

- Repeat the two previous items, but this time considering every round except the first two.

Compare how players play the first two rounds and the remaining one. Do you see any difference? Can you draw some conclusions?

Part 3

Determine the actual final standings of the competition and order it by the games won and the difference between the winning and losing hands.

As a team, try to find reasons to the standings position for each of your groupmates. Furthermore:

- Compare the strategy used for the first 5 players with the one used for the last 5.
- Compare the hand results of the first two rounds for the same two groups.

Draw some conclusions.

Part 4

Time to think by yourself. Think about three aspects that you think might be interesting and use R to summarize the information.

Draw some conclusions.