STAT 2857A – Lecture 24 Examples and Exercises

Example 6.1

Spin the wheel at https://www.roulettesimulator.net/ 5 times placing FUN 1000 bets on black each time. Enter your final balance in the spreadsheet here.

a) Describe the simulated distribution for the balance.
b) What are some statistics you could compute from our sample?

Example 6.2

For student i denote:

- Number of wins: $X_i \sim \text{Binomial}(5, 18/37)$
- Final balance: $W_i = 5000 + 1000X - 1000(5 - X) = 2000X_i$.

The average balance over all students is

$$\bar{W} = \left(\sum_{i=1}^{n} W_i \right) / n.$$

a) What is the sampling distribution of $\bar{W}$ if the simulator is realistic?
b) What are the mean and variance of $\bar{W}$?
c) Do you think the simulator is realistic?

Exercise 6.1

Suppose that each student spun the wheel on the online roulette simulator betting on black repeatedly until they had won 5 times. Let X_i be the number of times that the i-th student played and

$$\bar{X} = \frac{\sum_{i=1}^{n} X_i}{n}$$

be the average number of times played per student.

a) What is the sampling distribution of $\bar{X}$ if the simulator is realistic?
b) What are the mean and variance of $\bar{X}$?
c) How could you use the sample values to determine if the simulator is realistic?