

Chapter 11: Understanding Randomness

Simulation Steps

1. Identify the Component to be repeated.
2. Explain how you will model the outcome.
3. Explain how you will simulate the trial.
4. State clearly what the response variable is.
5. Run several trials.
6. Analyze the response variable.
7. State your conclusion (in the context of the problem, as always).

1. Suppose a basketball player has an 80% free throw success rate. How can we use random numbers to simulate whether or not she makes a foul shot? How many shots might she be able to make in a row without missing? Conduct 20 trials.

Component: shooting the basketball

Outcomes: 0-7 success, 8-9 failure

Trial: Generate a random digit until a failure (8 or 9) occurs. Count the number of successes until a failure occurs.

Response variable: Number of successes.

Results:

# shots in a row made successfully	tally	frequency

Statistic: \bar{x}

Conclusion: On average, according to our simulation, she is expected to make _____ shots in a row without missing.

2. How would our simulation procedure change if her success rate were only 72%?

Component:

Outcomes: 00-71 success, 72-99 failure

Trial: Generate 2-digit random numbers

Response variable:

Results:

Statistic:

Conclusion:

3. How would a trial and our response variable change if we wanted to know how many shots she might make out of 5 chances she gets at a crucial point in the game?

Component:

Outcomes:

Trial: Generate 5 random digits, ^(or 2-digit numbers) Count how many successes there were out of the 5 simulated shots.

Response variable: The number of shots made out of 5.

Results:

Statistic:

Conclusion:

4. How would a trial and our response variable change if we want to know her chances of hitting both shots when she goes to the line to shoot two?

Component:

Outcomes:

Trial: Generate 2 random digits (or 2-digit numbers). Count the number of shots made out of 2.

Response variable: The number of shots made out of 2.

Results:

Statistic:

Conclusion:

5. How would the simulation change if we want to know her score in a 1-and-1 situation. (Here she gets to try the second shot *only* if the first shot is successful.)

Component:

Outcomes:

Trial: Generate a random digit. If it is a success, generate a second random digit. Otherwise conclude the trial. Record the number of points earned (0, 1, or 2).

Response variable:

Results:

Statistic:

Conclusion: