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End-of-Course Project

Chapter 11: Understanding Randomness

Random- An event is random if we know what out come could happen, but not which particular values will happen.

-Random selection seems fair because:

-nobody can guess the outcome before it happens

-when we want things to be fair, usually some underlying set of outcomes will be equally likely.

-Random outcome have structure especially in the long run. You can't predict if a coin will be heads or tails for each single toss, but if you flipped the coin a thousand times you could be pretty sure that it would be about 50% heads and 50% tails.

-It is extremely difficult to data values that are both random and equally likely to occur, however it is possible.

-We can generate random values through a computer, a randomizing device (a die or spinner), or the internet.

-The best ways to generate data that give a fair and accurate picture of the world rely on randomness, and the ways in which we draw conclusions from those data depend on the randomness, too.

-We can use these generated random values as a basis for a **simulation** which is a sequence of random outcomes that model a situation. Simulations can provide us with useful insights about the real world. We use a simulation to investigate a question for which:

-there are many possible outcomes

-we can't or don't want to collect data

-a mathematical answer is hard to calculate

-The most basic event in the sequence of random outcomes is a **component** of the simulation. For each component in a simulation there is a set of possible **outcomes** that occur at random.

-**Trial:** the sequence of events we want to investigate. Trials usually include several components.

-After completing a trial, we record the **response variable,** or what happened in the trial. Values of the response variable record the results of each trial we record in regard to what we are interested in.

-The steps for making a simulation are:

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. Analyze the response variable
6. State your conclusion in the context of the problem

-When running a simulation make sure that you:

-Don't overstate your case. Your future results will not match your simulated results exactly.

-Model the outcome chances accurately

-Run enough trials