Simulation in Marketing

Week 7

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Monte Carlo Simulation

- ***Simulation is a numerical technique for conducting experiments on a digital computer.***

- Monte Carlo is a method of estimating the value of an unknown quantity using the principles of inferential statistics.
- Inferential statistics
  - **Population**: all possible scenarios
  - **Sample**: a proper subset of a population
  - **Key fact**: a random sample tends to exhibit the same properties as the population from which it is drawn

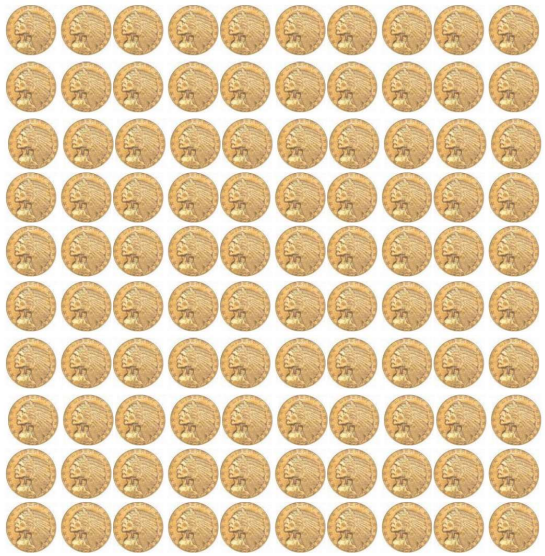
- If we choose the sample ***at random***, the sample tends to represent the populations

Monte Carlo Simulation: Example

- Flipping coins
  - Suppose I flip it once and it shows head, would you think the next one is head?
  - What if we flip it twice and it is head, would you think the next one is head?

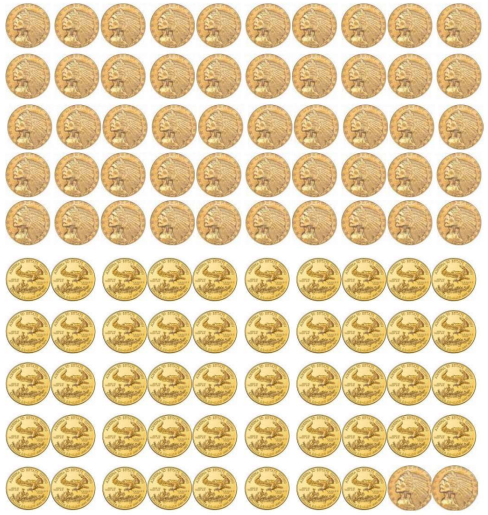
Monte Carlo Simulation: Example

- Flipping coins
  - How about a hundred times and it is head?
    - Maybe you should assume the next one is head.



Monte Carlo Simulation: Example

- Flipping coins
  - What if it was mixed between heads and tails?
    - Would you be able to predict?



P(T)=52/100

Variance is the key word here!

Motivation

1. No matter how smart you are, there will always be probabilistic problems, that are too hard to solve analytically.

2. Monte Carlo simulation helps you to approach to the solution (the more simulations, the better solution).

3. Can use any probability distribution functional.

4. Works for non-linear variables.

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