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6.00.2x Lab: Monte Carlo Simulations

We're trying out an experimental type of problem in this iteration of 6.00.2x. Try it out and let us know what you think!

Help

Info

In this Monte Carlo simulation, we will be revisiting the "drawing balls from a bucket" problem. This time, however, we are providing the simulation engine to you. Your task is to respond to the questions below by passing the correct parameters to the engine.

Step 1: The Engine

Please supply your parameters below.

Experiment properties

Number of red: 2

Number of green: 1

Number of blue: 5

When all looks fine, proceed to step 2.

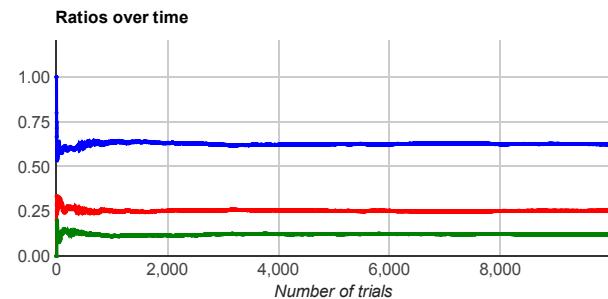
Simulation parameters

Note: the simulation will run on your computer, so avoid setting high values or your browser may crash!

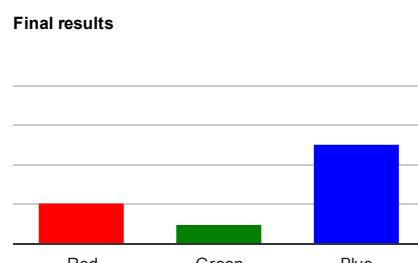
Number of trials: 10000

Step 2: The Visualization

We will now run our simulation with the parameters you specified above. Scroll below and click the "Run" button to proceed. When the simulation is done, hover over the bars in the right graph to get their numerical values.



Run



Warning

As mentioned above, running your simulation for many trials may lock up your browser. Start from small numbers of trials, and gradually try higher numbers until you find a balance between running time and stability of values. Make sure you use the time plot (to the left) to assess how stable your results are.

For reference, in our tests, a relatively high end laptop could handle around 10000 trials.

QUESTIONS (3/3 points)

It's time to do some real-life simulations. Answer the following questions below using the Monte Carlo simulation engine. Give your answers with at least three decimal points. Make sure you run your simulation for long enough!

1. Assume we have a bucket with 2 red, 5 green, and 3 blue balls. A ball is drawn at random. What is the probability that the ball is blue?

0.2996

Answer: 0.3

2. Assume we have a bucket with 4 red and 7 green balls. A ball is drawn at random. What is the probability that the ball is red?

0.3561

Answer: 0.36

3. Assume we have a bucket with 2 red, 1 green, and 5 blue balls. Two balls are drawn with replacement. What is the probability that the first ball is blue and the second ball is red? (Hint: the simulation engine can not give a direct answer to this.)

0.15854886

Answer: 0.15

Thanks for completing this exercise :) Please share your thoughts, bug reports, and comments with us in the discussion forum!

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