**Game Show Problem**

You are a contestant on a game show. The host has placed a prize behind one of three doors. It’s a fantastic prize that you’d really like to win. There are two significantly crappier prizes behind the other two doors. The host asks you to guess which door contains the good prize. After recording your guess, the host opens one of the other two doors, revealing a crappy prize.

Now the host now offers you a deal. You can either:

1. Maintain your original guess.
2. Swap your guess and choose the other unopened door.
3. What are your odds of winning the really nice prize?
4. Build a simulation that mimics this game. For each run the simulation should provide:
   1. The location of the fabulous prize
   2. The contestant’s initial guess
   3. The “swap door” (the other unopened door)
   4. Whether the contestant wins by maintaining his or her initial guess
   5. Whether the contestant wins by switching doors
5. Run the simulation multiple times. How many times does a contestant win by maintaining the original guess versus taking the swap?

**Bonus Opportunity #1:** Re-jigger the simulation so there are now four (4) doors, but still only one good prize. The game is played the same way, except the host will open two doors, both revealing crappy prizes. What are your odds of winning with each option (maintain your guess vs. swapping)?

What if there are n doors? The host will always open n-2 doors, giving you two doors to pick from at the end.

**Bonus Opportunity #2:** Complete this exercise while eating a lightly fried ham and cheese sandwich. Try it dusted with powdered sugar and a side of strawberry jam. Blackberry jam would also be delicious.