Monty Hall Problem Simulation Results

Git link:

https://github.com/razvanbaboiucs/BMDC-game-theory-assginment/tree/master/2-doors

Simulation Results

N = 10 Doors

Simulations (K)	Keep Initial Door Win %	Switch Door Win %
10	0.00%	80.00%
100	10.00%	96.00%
1,000	10.10%	91.20%
10,000	10.54%	89.92%

N = 100 Doors

Simulations (K)	Keep Initial Door Win %	Switch Door Win %
10	0.00%	100.00%
100	1.00%	98.00%
1,000	1.60%	99.20%
10,000	1.04%	99.09%

N = 1,000 Doors

Simulations (K)	Keep Initial Door Win %	Switch Door Win %
10	0.00%	100.00%
100	1.00%	100.00%
1,000	0.10%	100.00%
10,000	0.08%	99.93%

N = 10,000 Doors

Simulations (K)	Keep Initial Door Win %	Switch Door Win %
10	0.00%	100.00%
100	0.00%	100.00%
1,000	0.10%	100.00%
10,000	0.01%	99.96%

Analysis

The simulation results clearly demonstrate that:

1. As the number of doors (N) increases, the advantage of switching doors becomes more pronounced.
2. The win probability for keeping the initial door approaches 1/N, which is the theoretical expectation.
3. The win probability for switching doors approaches (N-1)/N, which is the theoretical expectation.
4. With larger numbers of simulations (K), the results tend to converge closer to the theoretical probabilities.

These results confirm the counter-intuitive nature of the Monty Hall problem, showing that switching doors is always the optimal strategy, with the advantage becoming more dramatic as the number of doors increases.