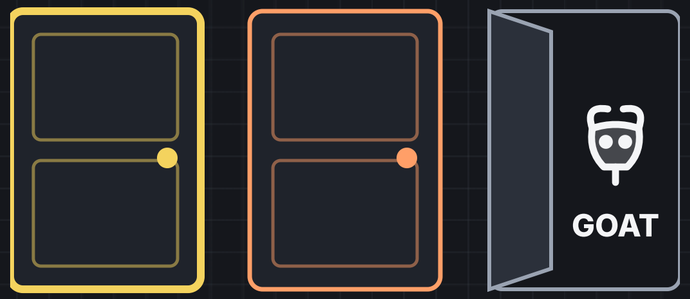
Pi & Planck

PROBLEM · SOLVED

The Monty Hall Problem

You pick a door, the host opens a goat door and offers a switch. Switching wins 2 times in 3.

THE SETUP



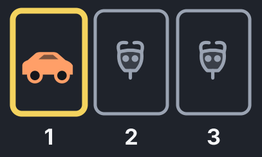
Door 1 — YOU PICK

Door 2 — STILL SHUT

Door 3 — HOST OPENS

1. The host knows where the car is.
2. He always opens a door hiding a goat.
3. He always offers you the switch.

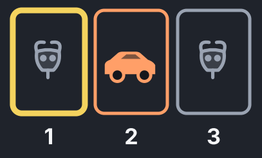
THE THREE CASES



Car behind door 1
Host opens door 2 or 3
Probability 1/3

STAY WINS

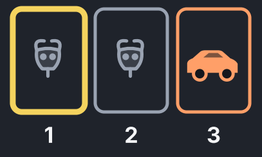
SWITCH LOSES



Car behind door 2
Host must open door 3
Probability 1/3

STAY LOSES

SWITCH WINS

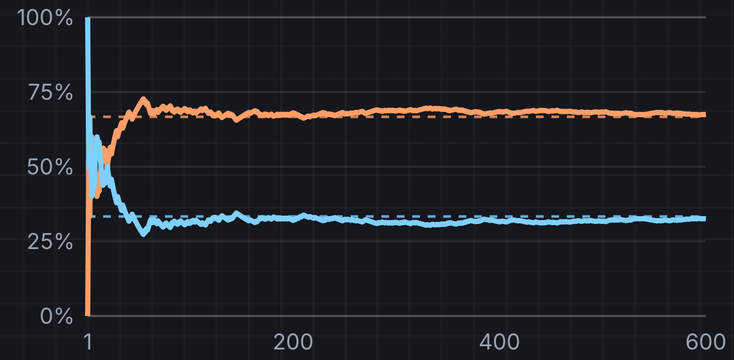


Car behind door 3
Host must open door 2
Probability 1/3

STAY LOSES

SWITCH WINS

100,000 SIMULATED GAMES



Running win rate, first 600 games

Share of games won



Exact: 2/3 and 1/3

1/3 Chance you win if you stay with your first pick.

2/3 Chance you win if you switch.

1975 · 1990 Selvin's 1975 letters and vos Savant's 1990 Parade column.

Sources: Univ. of Illinois, BIOE 582 Lecture 5 · R. Gill, "The Monty Hall Problem," Leiden (2011) · J. Rosenthal, "Monty Hall, Monty Fall, Monty Crawl," *Math Horizons* (2008) · S. Selvin, *Am. Statistician* 29(1):67 and 29(3):134 (1975)

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