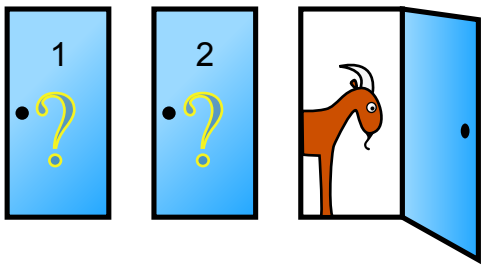
The car, goat, goat problem

(Monty Hall problem)



The problem: Suppose you're on a game show with a chance to win a car. You're given the choice of three doors: Behind one door is the car; behind the other two doors are goats. Of course, you can't see what's behind the doors. You pick a door, (say No. 1), and the host, who knows what's behind the doors, opens another door, (say No. 3), which has a goat. He then offers you the chance to change your mind and choose a different door. What is the best strategy? Should you stay with your original choice (No. 1) or should you switch and choose the other closed door (No. 2)?

Note: In this game show, the host will always behave in the above manner whether you originally chose a goat or the car. That is, no matter what door you choose first, at least one of the two remaining doors will have a goat, and the host will always open such a door, and offer you the chance to change.

Suggestion. Try to simulate the game with playing cards. You need two players, a host and a contestant. Three cards from an ordinary deck can be used to represent the three doors; one 'special' card (for instance an ace) represents the door with the car and two other cards (for instance numbers) represent the goat doors. Find out which strategy is better, switch or no switch. Play the game with one strategy several times (at least 15 times) and note how many times you win the car. Then play the game with the other strategy the same number of times and note how many times you win then. So which strategy is better? Switch or no switch? Can you explain why?
If you play the game 100 times, how often do you expect the switch strategy will win? How often do you expect the no-switch strategy will win?

What is the best strategy for 4 doors and 3 goats?

Further reading: Peter Taylor, or Wikipedia