

PROBABILITIES: TWO TRICKY PROBLEMS

JANUARY 23, 2022

1. (Two envelope problem) You are given two indistinguishable envelopes, each containing money. It is known that one contains twice as much as the other.
You pick one envelope, open it and see that it has \$10. But now you are given a choice: you can either keep the money or return this envelope and take instead the other envelope.
Should you switch?
2. (Secretary problem, aka marriage problem).
A princess is selecting a husband from a long list of suitors. They are shown to her one by one. She can easily rank them by attractiveness (let's assume that attractiveness can be described by a single number, so she can always compare any two candidates).
When a next candidate is shown, the princess has to decide whether to marry him or reject him. There is no going back: once a candidate is rejected, he leaves immediately and never comes back.
What is the optimal strategy for the princess?