

Problems:

1. Poker hand

If you are dealt a 5 card poker hand, what is the probability that you have a straight?

2. Lottery ticket

Imagine a lottery ticket called Ultra win:

Price: €5

Payouts:

Probability Win

20% €9

10% €18

10% Two new Ultra win tickets

60% No win

Calculate the expected value in Euros of one Ultra win ticket.

3. Uniform draw

You have an array of an unknown number of elements. You may only store one element in memory at a time and you may only access each element in the array once. You want to draw one of the elements uniformly randomly.

Please provide an algorithm for accomplishing this.

Simulation exercise

What is the probability of winning the following game “the wristwatch”?

From one deck of cards you place cards face up in a ring of 12 cards. The 13th in the middle of the ring. If an Ace was put on “place one” or a deuce on “place two” and so on (a king on “place 13”) you simply skip that place on the next lap and continue to place cards on top of the cards not corresponding to their positions.

Every time you have a new match you pick up the cards on that certain position and place them in the bottom of your deck and leave the matched card on its position in the ring. You continue this procedure until you either run out of cards or have all 13 positions matched.

You win if you have all 13 positions matched. Please provide the answer together with simulation code or similar.