

Homework 11

April 30th
Due May 7th

Your assignment may be handwritten or typeset, but in any case it should be neat and readable. Your name, class number and assignment number should be clearly visible (like on this document for example).

You are encouraged to work in groups for this assignment. However, the redaction should be done on one's own: do not copy some other student's work, or give your assignment to some other student. To consult textbooks or online resources is fair game; on the other hand, to look up the exact exercise and its solution is not.

Exercises from the book

Included in this homework are exercises 2.35, 2.42, 2.46, (i,ii,iii) of 2.48, 3.5 and 3.6.

For Exercise 3.5, the point of the game is that the player decides to give up the first envelope and switch for the second one *before* she sees the other.

For Exercise 3.6, you may want to consider variables X_i such that $X_i = 1$ if the i th component works, 0 otherwise.

Exercise 1

Let X_1, \dots, X_n be independent continuous variables with distribution $\mathcal{Unif}(0, 1)$. What is the distribution of $\max(X_1, \dots, X_n)$?

Exercise 2

Throw a die until you get one 6. Call X the number of 1 you got, and Y the total number of throws. For instance, we can get

3, 1, 1, 2, 4, 5, 3, 5, 6,

at which point we stop and $X = 2, Y = 9$.

1. What are the possible values for (X, Y) ? For instance, $(3, 3)$ is not possible.
2. For (x, y) a possible value, what is the probability $\mathbb{P}(X = x, Y = y)$?