MPRI 2-24-1: Algorithms and Uncertainty (2024)

Homework 6 *Due on October 31, beginning of class*

Instructions You can write your solutions either in English or French. Please observe the homework policy as described in the course web page.

1 Pandora's box game (5 marks)

Consider a game played in alternation between 2 players. Player 1 starts. There are 4 boxes, each box i has an opening cost c_i, and a hidden value X_i which is drawn from a known distribution D_i. In every round, the player in turn can decide to open one of the unopened box, or to skip this round. The player's payoff is the maximum value among the boxes he/she has opened minus their total opening cost. The player with the highest payoff wins.

Study this game. Is there always a winning strategy for the first player?

2 Pandora's Problem with Nonobligatory Inspection (5 marks)

This is not really a question. Your goal is to read the paper "Pandora's Problem with Nonobligatory Inspection" by Hedyeh Beyhaghi and Robert Kleinberg from 2019. Then give a summary in your own words of their 4/5 approximation policy for 2 boxes. For this homework, ignore their matching lower bound.