Question 1: Construction of Bridges

Consider a planar map with a horizontal river passing through the center. There are n cities on the south shore with the coordinates a [0] ... a [n-1] (all distinct) and n cities on the north shore with the coordinates b [0] ... b [n-1 ] (also all separate). You want to connect as many north-south city pairs with straight bridges, such that the bridges do not intersect. Connections are only possible between the i-th city in the north with the i-th city in the south.

Question 2: Optimal Strategy for a Game

Consider a row of n coins of value v [0] to v [n-1], with n even. Two players take turns, each taking the first or the last piece in the row. Player 1 starts the game. Determine the maximum total coin value Player 1 can win.

Question 3: Longest Increasing Subsequence

What is the problem statement?

How to solve?

Question 4: You are given a DAG (Directed Acyclic Graph), Find a sequence of nodes so that the number of reverses is the minimum possible with the following restriction and definition:

1. The sequence must be a topological sort sequence
2. There is a given order of nodes. If two adjacent nodes in the sequence u and v has a different order in the given order, then we say it is a reverse.

For example, if the given order is 12345 and your sequence is 13245, then there is one reverse (32).