Greedy or not

Aryan Katiyar

May 2024

1 Introduction

There is a list of n numbers and two players who move alternately. On each move, a player removes either the first or last number from the list, and their score increases by that number and that number gets deleted. Both players try to maximize their scores and play optimally. A certain player wins if their score is strictly greater than the score of the other person.

2 Task

You have to write a code which takes input a number n which is the size of the list and then the element of the list. It then outputs which Player wins if both play optimally. You are provided with an executable which contains the correct code. You can use this to check whether your code gives the correct output. We are not concerned about the time complexity of your solution.

2.1 Using the executable

Suppose the list is of size 9 and it contains the elements -5 5 9 -4 10 -9 0 3 -10. I have created a txt file input1.txt containing this input. Open the terminal where the executable and txt files are located located and run the executable using the command
"$./linux\_executable.out < input1.txt$"
This will give you the output in the terminal itself. If it shows permission denied, run the following command
"$chmod +x\ linux\_executable.out$"

2.2 Testcases

There are 11 testcases added with the expected output in the corresponding output.txt file. It is expected that testcases 0 to 7 should pass for your algorithm. Its fine if testcases 8,9 and 10 take a lot of time for your algorithm(i.e. your algorithm is exponential). These are only there for those who want to further optimize their algorithm(it should take less than a second with DP)

2.3 Additional Tasks (optional)

- (If you know Dynamic Programming) Optimize your code to solve it in quadratic time.
- Write your code in Python.