Competitive Programming and Mathematics Society

Problem Solving (Interactive + Communication)

CPMSoc

Welcome

- Mathematics workshops will run every odd-numbered week (3, 5, 7, ...)
- Programming ones will run every even-numbered week (4, 6, 8, ...)
- Slides will be uploaded on our website (unswcpmsoc.com)

Attendance form :D

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Workshop Overview

- Interactive Problems
- Tips
- Communication Problems
- Strategies to Use

Interactive Problem

- What is an interactive problem?

Interactive Problem

- What is an interactive problem?
- Your program interacts with the judging program in real time

Guess the Number

Check out the first problem on the sheet at this link:

- https://leetcode.com/problems/guess-number-higher-or-lower/

The problem has a judge which picks a number, that your program needs to guess in the minimum possible guesses. The way you interact with the judge in this problem is to guess a number:

- The judge will answer 0 if it is the correct guess.
- -1 if the guess is too high.
- 1 if the guess is too low.

General Tips

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- Some types of interactive problems are adaptive, where the input is changed as you query to make it as hard as possible for your program.

Interactive Problems

Communication Problems

- What is a communication problem?

Communication Problems

- What is a communication problem?
- You write two programs that must communicate with each other in set ways.

Sample Problem

The problem needs you to make two functions.

- The first function will receive a prime number between 1 and 84000, and will return a bitset (boolean array) of length K.
- The second function will receive this bitset you have created in the first function, and returns the original prime number.

The functions that you write should minimise K.

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- Often, you should compress/encode the data you are given in the first function, which may not require sending all the data.
- The XOR operation is very useful for working with data (the property where $A \bigoplus B \bigoplus A = B$)

Communication Problems

Attendance form :D

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Feedback form :D

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Further events

Please join us for:

- Maths workshop next week
- Programming workshop in two weeks