**Complexity and greedy**

**What’s complexity?**

There are two different types of complexity, time and space complexity.

Time complexity in competitive programing contest is: what’s the running time in the worst case scenario.

Space complexity in competitive programing contest is: what’s the space in the worst case scenario.

Scientist they found way to calculate time complexity and represents as how many operations your program will take.

These days, personal computer’s CPU can do up to operation per second and super computer’s CPU can do up to operation per second.

Example:

I’ll give you an integer **N**that representsthe number of students (1 ≤ N ≤ )

And the time limit of this question is 1 second, and the space limit is 265 megabytes.

If you iterate over the input you are given by using loops that will take operation that’s fine.

And if you memorize them inside array, that will take space if the array had integer data type and for each element has 4 byte if you do some math byte if you convert it to megabyte that will be equal 0.4 megabytes that’s fine.

But if that input up to you can’t iterate over all input by using loops because that will take operation and that’s wrong the program will take more than one second to handle this state you have to found smarter solution maybe by using binary search algorithm by complexity O(log(n)) that’s fine.

The main reason of competitive programing is to design algorithm find solution using as few time and space complexity as possible in the shortest time.

**What’s greedy?**

constructs a solution to the problem by always making a choice that looks the best at the moment.

Example: <https://codeforces.com/contest/996/problem/A> read this problem

Answer:

if the input was 25,

the coins are {100,20,10,5,1}.

The best choice at the first moment is to choose 20 and the remaining is 5

the best choice at the second moment is to choose 5 and the remaining is 0

the answer is 2 -> {20,5}.

This technique called greedy if we choose best choice at this moment we don’t need to go back to edit our solution.

\*video below we discuss complexity and greedy.

<https://youtu.be/RxMQq1B4Vt4>

We solved these problems:

<https://codeforces.com/contest/996/problem/A>

<https://codeforces.com/contest/58/problem/A>

try to solve these problems:

<https://codeforces.com/problemset/problem/1385/B>

<https://codeforces.com/problemset/problem/978/B>

<https://codeforces.com/problemset/problem/1197/B>

<https://codeforces.com/problemset/problem/158/B>

<https://codeforces.com/problemset/problem/1324/C>