

EJOY 2067

Analysis of task Fountain

Subtask 1

Here we have to make the observation that since $0 \leq N \leq 0$, then $N = 0$. Therefore we are not thirsty and we do not have to do anything. The solution is in `cheshma_5p.cpp`.

Subtask 2

Note from the author: I do not know why this subtask exists. The solution is in `cheshma_15p.cpp`.

Subtask 3

The intended solution for this subtask is the naive bruteforce solution. We take N litres and pour them into the cup, after which we drink the N litres from the cup. This is the intuitive method for drinking water. But in this case we do not need to store the water for later, because we will drink it right away. After all, Bobi is very thirsty. This is the reason why the intuitive solution is slow – that is a sum of $S = N + N = 2N$. The solution is in `cheshma_25p.cpp`.

Subtask 4

Here begins one of the two important observations for this task. As we noticed a moment ago, it is trivial that we can drink directly from the fountain. Therefore in our new solution we will only drink N litres from the fountain. The solution is in `cheshma_30p.cpp`.

Subtask 5

Here we have to make the most important and last observation for the task. We can imagine the fountain as a device which has an output of its own. Our goal is to get water from the fountain faster than linearly. How do we do this? You may have heard of different ways of speeding up input and output. One of them is `ios::sync_with_stdio(false); cout.tie(0);`. This, however, is related to the streams in the C++ language, and not to the fountain. Another of them is the so-called Russian buffer. We cannot implement it, since we do not have access to the inside of the fountain. But the Russians can. We have access to a VPN which can teleport our fountain to Russia, where the Russians can implement a Russian buffer on the fountain instead of us. It turns out that the Russian buffer speeds up the output of our fountain 3 times. In this subgroup the idea from subtask 3 is required, but with the optimization that we are in Russia. The solution is `cheshma_75p.cpp`.

Subtask 6

We make the optimization from subtask 5, but we use the idea of subtask 4. This way we simply drink from the fountain which is in Russia. This solution gives full points. The solution is in `cheshma_100p.cpp`.

Note: in the country bulgaria the water is dirty and the solution would give 0 pts!