Alexander Golovanov

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Summary

My two main passions are mathematics and competitive programming. I crave problems that require algorithmic thinking or mathematical research, or, in general, tasks where the objective is to find how to do something nobody knows how to do. However, if I have to push myself to do some boring routine, it becomes noticeable. My mind being sharp is more valuable to me than my job performance.

Work Experience

think-cell May 2023 – May 2024

Improved a plugin for Powerpoint.

Moscow Institute of Physics and Technology Sep 2020 – Jun 2021, Sep 2022 – Jan 2023

Conducted lessons on Mathematical Logic and Computation Complexity.

Aim Tech Sep 2019 – Dec 2020

Implemented some strategies for high-frequency trading, improved some others.

Yandex May 2018 – Jul 2019

Improved the auto-corrector and misspell detector for query search. Also developed and launched a tool for inside use.

Projects

Codeforces Antimagic Link to Github

There is an annual time period of about two weeks when everybody can change the color of their nickname (which usually represents their rating). It is very misleading when one decides which blog to read. Antimagic is a Chrome/Firefox extension to reveal the true colors.

Print Server Link to Github

When conducting a programming camp, one basic functionality that needs to be available is a page where a team can paste their code and then send it to printer, so that the code will be pretty-printed and captioned with the team name. This server does just this. Works on Flask and Jinja2.

Connect Four Link to Github

A simple game client that I made in my 3rd year at MIPT, because this was the assignment in some of the cources (python, if I remember correctly). The opponent is the computer, and it does about 6-7 layers of recursion.

Rectangular grid drawer Link to the page

A self-explanatory tool for visualizing configurations on the cellular plane.

Hexagonal grid drawer Link to the page

Same, but with hexagonal cells.

Stepping stones Link to the page

A simple stepping stones playground.

Sphere of Influence Graph Link to the page

A simple sphere of influence graph playground.

Generalized kissing number Link to the page

Assume that we have coins on the table, some touching the others. Assume that, starting with some coin, we can reach any other in no more than n steps, going to a touching coin in a step. László Fejes Tóth and Aladár Heppes proved that for $n = 2$ the maximal number of coins is 19. They also conjectured that for $n = 3$ the answer is 37, which turned out to be true (Golovanov 2022). The answer for $n = 4$ is not known. If it is not 61, one can prove this by a screenshot of this page.

Education

2022	PhD at **Moscow Institute of Physics and Technology**	Discrete Mathematics
2019	Master's Degree at **Moscow Institute of Physics and Technology**	Discrete Mathematics
2017	Bachelor's Degree at **Moscow Institute of Physics and Technology**	Discrete Mathematics
2013	Lobachevsky Lyceum, Kazan	—

Publications

Golovanov, Alexander (2022). "On the maximum size packings of disks with kissing radius 3". In: *Moscow Journal of Combinatorics and Number Theory* 11.3, pp. 263–286.

Голованов, Александр (2022). "Обобщённое контактное число плоскости для нескольких слоёв". Russian. In: *Труды МФТИ* 14.3, pp. 111–116.

Golovanov, Alexander et al. (2023). "Odd-distance and right-equidistant sets in the maximum and Manhattan metrics". In: *European Journal of Combinatorics* 107, p. 103603.

Skills

C++	Can transform my thoughts into a good, asymptotically fast C++ code.
Python	Very familiar with such modules as `requests`, `beautifulsoup4`, `flask`, `sympy`, while doing basic things with a new module is also not a problem. Also can transform my thoughts into a good, asymptotically fast Python code, though prefer C++ when I need speed.
Problem solving	Can solve mathematical problems better than most people.
Researching	If the problem is not clearly stated, or I just need to know the subject better, I can do this.
English	Advanced.

Achievements

Google Code Jam 2022	8th place
VK Cup 2021	7th place
ICPC 2020 World Finals	4th place (Gold Medal)
ICPC 2018 World Finals	2nd place (Gold Medal)
VK Cup 2018	4th place
Google Code Jam 2018	23rd place
IMC 2014–2017	First prize