

# CERTIFICATE

This is to certify that

**Nestor Ivan Martinez Ostoa**

has taken part in the Winter Camp in Competitive Programming

at ITMO University

3 ECTS credits

held on January 10-21, 2022

First Vice Rector



**The following course has been completed within the program:**

- Algorithms, Complexity, O-notation, Recursion
- Sorting and Binary Search
- Dynamic Programming
- Graphs, Depth First Search, Connected Components and Strongly Connected Components
- Graphs, BFS, Shortest Paths, Dijkstra Algorithms
- Strings, Prefix-function, Z-function, Hashing
- Segment Tree
- RMQ, LCA, Sparse Table
- Filtering of Random Processes. Kalman-Bucy Filter
- Grundy Theorem, Retroactive Analysis of Cyclic Graphs
- Fast Fourier Transform
- Suffix Array