My name is Sergey Tikhomirov, I was a full professor in the department of Mathematics and Computer Sciences in Saint-Petersburg State University. We suggested a course "Introduction to Quantum Computing" since 2018. I was the leading teacher in the course. I enthusiastically offer this letter in support of Ivan Ogloblin’s application for a research position. Ivan was my student in the course “Introduction to Quantum Computing”. I found him to be a creative and industrious student who showed a natural flair for how quantum algorithms should be applied. As expected he got the highest mark.

In my course, students were regularly tasked with tackling new and some-what deep mathematical abstractions. Ivan exhibited expert-level skills and outstanding involvement in the material. Not only Ivan did all the interjacent tasks summa cum laude, but also showed initiative in solving additional problems outside the main program (quantum addition of two numbers with a constant number of auxiliary qubits).

Besides my course, Ivan made a semester project on the topic “quantum algorithms for VRP and VRPTW (Vehicle Routing Problem with Time Windows) problems” with application to the real case problems of building the routes of drilling machines for oil production in collaboration with GazpromNeft -- one of Russian major oil companies. Ivan was directly assigned a research task of studying best practices for solving logistics problems on classical computers and current results for quantum computers. Based on the results of this study, it was required to develop a simple solver (a quantum program) for a small-scale toy multi-traveling salesman problem. Ivan excelled at all the assigned tasks. He developed a QUBO formulation for the problem and managed to implement it on Qiskit framework.

I supervised him through his second project on the “Study of the Effect of Noise on Efficient Quantum Search Algorithms”. In the course of working on this project, he had to analyze an article describing several approaches to optimizing the Grover algorithm, implement these optimizations and test the algorithms using noise simulation on the IBM Qiskit framework. Ivan successfully and quickly coped with all the tasks and took the initiative in the study of side issues related to optimizing the effect of noise on quantum algorithms. As a result, two noise models were simulated and test results were obtained for different amounts of noise and different numbers of qubits - from 6 to 10.

Back in highschool Ivan had participated and won a great deal of mathematical Olympiads. He also has interest in other mathematical disciplines such as math statistics and the theory of random processes. Ivan is a very responsible person and at the lessons he not only helps me with the material, but also takes the initiative in any other everyday issues. All in all Ivan is a very strong, enthusiastic and determined candidate.

Sincerely Yours,

Dr. Habil. Sergey Tikhomirov

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