Course feedback

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What I learned

During this course I learned the main principles of quantum computers programming; these are:

- How qubit works, at least from a high-level perspective and not from a physical one;
- How to deal with qubits, *i.e.* single and multiqubit (basic) operations;
- Entanglement and a bit of quantum teleportation, still from an high-level perspective;
- How to deal with simple arithmetic and logic when it comes to qubits;
- Amplitude amplification and phase logic;
- More sophisticated concepts like QFT.

I've also learned how to read and write some simple code for quantum computers, mainly using QCEngine and IBM Qiskit.

Moreover, with the project I've acknowledged how Quantum Support Vector Machines works from a high-level perspective; doing this, I've also read about Quantum Simulation and the HHL algorithm.

Finally, from a less in-depth perspective I would say that now I have a clearer idea on the point we are with quantum computers design and what is the future of quantum computing.

What I didn't learn

As I wrote in the first learning diary, I didn't expect to learn the physical concepts behind quantum computer, as they were not included in the course syllabus. I would say that this expectation has been respected, since we didn't see basically any physical concepts, but honestly I'm totally fine with this since I'm not a physics student and I would have probably had a hard time in undertanding these notions.

Apart from this, I would say that all my other expectation was respected, as we covered the entire course program. However, I feel that I'm still unconfortable with some sophisticated concepts like quantum teleportation, and this reflected in the assignment from the lecture, in which I got a low grade. Anyway, even though these concepts are still not much clear to me, this course left me the desire to learn more about it.

For the next edition

For the next edition I would keep almost everything we did during the course; I feel that the least useful lecture we had was the visiting lecture from Teppo Seesto, since we actually didn't learn any new concepts. I would, however, keep also this since I believe it makes students to want to deepen the subject, as I also stated in Homework 9. In conclusion, I would not drop anything.

On the other hand, I think that some other work can be included in the course, maybe cutting the first lectures times; personally, I would try to include also how to deal with real data (Chapter 9 in Johnston et al. book), as I believe this topic is interesting and useful for almost every topic for the course's project.