

Learning Diary: Lecture 1

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Reasons and expectations for the course

The reasons I am taking this course are mainly two. First of all, I have always been interested in different programming paradigms (e.g. procedural programming, OOP, functional programming); this is, of course, not directly related to the topics we will see, but I think that Quantum Computing is a radically different paradigm with respects to the general way of thinking of a computer program. From this perspective, programming of quantum computers could not be outside of my personal interests as a curious person.

Secondly, even if I know that quantum computers are still on its embryonic state, I hope that it can be useful for my future work. I'm building a curricula strongly focused on Machine and Deep Learning; from a neophyte point of view, I hope that the possibly-huge power of quantum computers can be used in the future for “standard” resource intensive tasks such as neural networks training.

Coming to the expectations, I hope that after this course I will at least be able to understand a program (or some code) for quantum computers; moreover, even if this course is not focused on the functioning of quantum computers, I hope that understanding their programs will help me in the future if I will want to deepen the topic. Anyway, the only reasonable expectations I have are to learn how to read, write and execute some simple code for quantum computers, as stated in the course syllabus.

Visions of the quantum computing growth and future

Talking about the future of quantum computing I think, as the authors of the course's book say, that it will be useful to solve difficult problems we always had as computer scientists (for instance, cryptography-related problems or non polynomial problems), but quantum computers will not be used as “daily driver” computers. In the next future I believe it will be (and actually, from what I got from the first lecture and the book, is) like it was for normal binary computers in the past decades: a few big and powerful mainframes used for only some specialized tasks. The only difference I can see is that, while in 50s-60s the computers were guided by human beings, quantum computers can possibly be guided by actual standard computers in an automated fashion. If I may bring an example, a standard computer could have to solve a long and complicated task that includes some operations that it cannot solve in a reasonable amount of time (such as, for instance, a SAT or a Traveling Salesman problem); it could then run the program locally and use a quantum computer to solve the particularly difficult problem, improving then the possibilities of which programs could be created.