Etat de l'art des ressources permettant l'apprentissage de l'informatique quantique

Dans le cadre de la création de notre club d'informatique quantique, nous nous intéressons aux différentes ressources disponibles qui nous permettent d'apprendre l'informatique quantique.

Voici les principales ressources :

1. La documentation de Microsoft concernant le Microsoft Quantum Development Kit.

   Microsoft nous propose de comprendre la programmation en Q# au travers un kit de développement quantique. Cette documentation est riche et propose à l'apprenant de coder sous différents IDE et sous différents systèmes d'exploitation. Nous avons choisi de développer avec Visual Studio sous Windows.

2. Le livre « Informatique quantique » de Benoît Prieur.

   Disponible à la médiathèque de l'Ensta Bretagne, ce livre fait progressivement le lien entre la physique quantique et le développement en Q#. D'autres livres sont disponibles mais celui de Benoît Prieur est récent et permet une approche simple de la programmation quantique (par rapport à l'approche physique).

3. Quantum Computing — An Overview at Udemy

   A detailed overview of quantum computing covering entanglement, superposition, quantum gates, superdense coding.

4. Quantum Computing Explained at Amazon

   A conversational approach to explaining quantum computing with workable solutions.

5. Daily email list of quantum computing coding tasks from GeekForge

   You can solve tasks independently or discuss them with the community. It's the best way to educate yourself on new technology and build a portfolio of your completed tasks.

6. Understanding Quantum Computers at Future Learn

   Introduction to the key concepts of quantum computing with minimal mathematics.

7. Quantum Computation lecture from Caltech Institute

   In this course, you'll study the properties that distinguish quantum information from classical information.

8. QC101 Quantum Computing & Quantum Physics for Beginners at Udemy

   Master quantum computing, quantum cryptography, and quantum physics with Microsoft Q# (Q Sharp) and IBM Quantum Experience.

9. Quantum Quest from QuSoft

   At the end of this course, you'll understand what quantum bits and quantum algorithms are and what they are good for.

10. Quantum Information Sciences from MIT

    A series of lecture notes on the MIT quantum information sciences course.

11. Quantum machine learning for data scientists from Quantee Limited

    This text aims to present and explain quantum machine-learning algorithms to a data scientist in an accessible and consistent way.

12. Quantum Computing for Computer Scientists from Microsoft

    This talk discards hand-wavy pop-science metaphors and answers one simple question: how can a quantum computer outperform a classical computer?

13. The Quantum Internet and Quantum Computers at edX

    Learn the principles and promises behind developments in quantum computers and quantum internet and how they will impact our future.

14. Quantum Computing for Computer Scientists at Amazon

    This book employs ideas and techniques familiar to every computer science student.

15. Quantum Machine Learning from Research Gate

   Quantum machine learning and what quantum computing means to data mining.

16. Quantum Cryptography at edX

   Learn how quantum communication provides security that is guaranteed by the laws of nature.

17. Opportunities and Challenges for Quantum Machine Learning from Cornell University

   Opportunities and challenges for quantum-assisted machine learning in near-term quantum computers.

18. L'informatique quantique, qu'est-ce que et pour quoi faire from Charles Corge

   Introduces from scratch to quantum informatic.

19. A first introduction to Quantum Computing and Information

   Introduces from scratch to quantum informatic.

20. Mathematica Notebook, Part 4.4, UNLV

   An Introduction to Public Key Encryption and RSA.

21. Quantum Computing for the Determined-on YouTube

   Introduces the most basic type of quantum mechanical system.

22. Quantum Computing for everyone, Chris Bernhardt.

   Introduces from scratch to quantum informatic.

23. Calcul et algorithmes quantiques, David Mermin.

   Introduces from scratch to quantum informatic.

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