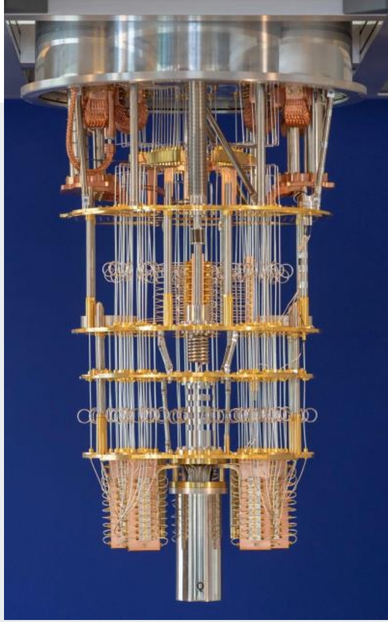
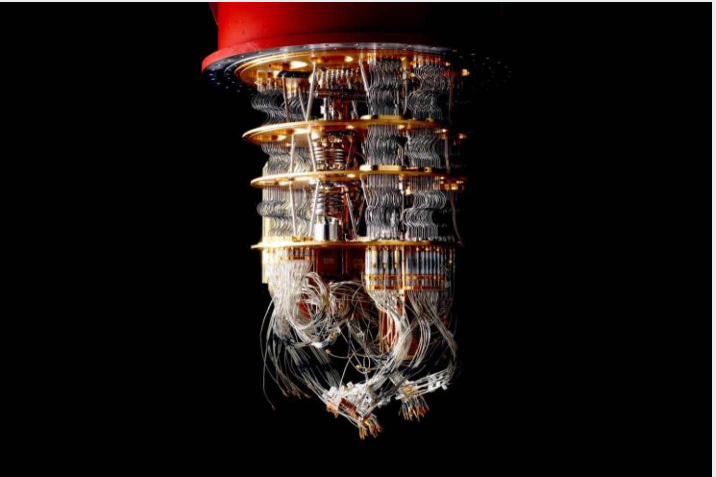
DOCUMENTATION OF

QUANTUM COMPUTING





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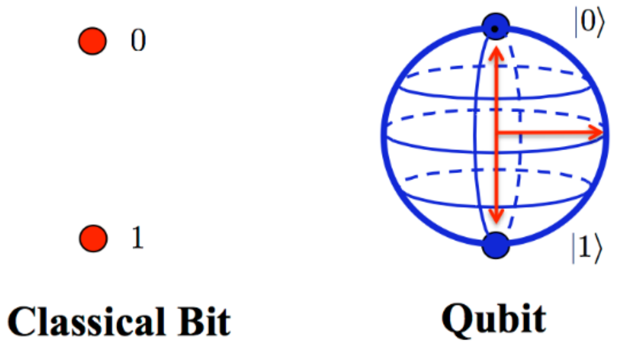
https://www.wired.co.uk/article/quantum-computing-explained

Presentation Outline

- ➢ Introduction
  - ○ Introduction of Quantum Computing and Virtual Quantum Computing Machine(VQCM)
- ➢ Explain VQCM in the perspective of **Written Documentation**
- ➢ Explain VQCM in the perspective of **Code Documentation**
- ➢ Explain VQCM in the perspective of **Community Documentation**
- ➢ Conclusion

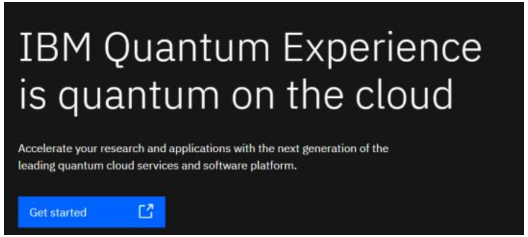
INTRODUCTION



- ➢ What is Quantum Computing?
- ➢ What is Virtual Quantum Computing Machine?
- ➢ How Quantum Computing been applied on the Virtual Quantum Computing?

WRITTEN DOCUMENTATION

- ➢ Guides and tutorials
    - ○ Introduction of Quantum Computing and Quantum Algorithm
- ➢ Reference Documents
    - ○ Some of example of the virtual quantum computing machine.
        - ■ IBM's Q Experience
        - ■ Microsoft QDK



https://www.microsoft.com/en-ca/quantum/
https://www.ibm.com/quantum-computing/technology/experience/

CODE DOCUMENT

- Quantum Code
  - Quantum programming is based on Q# language, here is an example of Q language from Microsoft.

Q#

```
let f = Fun<Int>;              // f is Int->Unit.
SomeOtherFun(Fun<Double>);     // A Double->Unit is passed to SomOtherFun.
let g = Fun;                   // This causes a compilation error.
SomeOtherFun(Fun);             // This also causes a compilation error.
```

- Quantum Algorithm
  - Just like modern computers, quantum computer also have to be based on quantum algorithm to solve problems.
    - Classcial Alogrithm : Shor's algorithm -> Integer Factorization

$$Pr(|y,z\rangle) = \left|\frac{1}{Q}\sum_{x\in\{0,\ldots,Q-1\};\ f(x)=z}\omega^{xy}\right|^2 = \frac{1}{Q^2}\left|\sum_{b=0}^{m-1}\omega^{(x_0+rb)y}\right|^2 = \frac{1}{Q^2}|\omega^{x_0y}|^2\left|\sum_{b=0}^{m-1}\omega^{bry}\right|^2$$

$$= \frac{1}{Q^2}\left|\sum_{b=0}^{m-1}\omega^{bry}\right|^2 = \frac{1}{Q^2}\frac{\omega^{mry}-1}{\omega^{ry}-1} = \frac{1}{Q^2}\frac{sin(\frac{\pi mry}{Q})}{sin(\frac{\pi ry}{Q})}$$

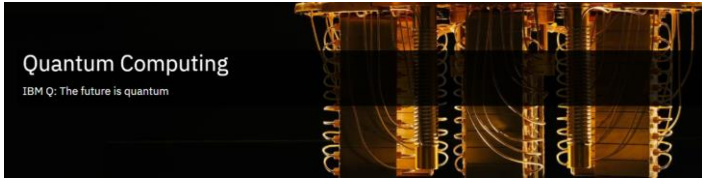
- Quantum circuits
  - A model for quantum computation in which a computation is a sequence of quantum gates

https://en.wikipedia.org/wiki/Shor%27salgorithm

COMMUNITY DOCUMENTATION

- QA
  - This form allows software developers to seek help from another software developer.
    - Example: Quora, StackOverflow

- Blog post
  - A page that the developers and users that can get immediate update information from software developers.
    - Example: IBM blog post page



https://www.ibm.com/blogs/research/ https://stackoverflow.com/ https://www.quora.com/Is-there-any-hidden-meaning-in-Quoras-logo

Conclusion

There are quite a lot of advantages of quantum computer and quantum algorithms.

However, Quantum computers can not run by itself. A reasonable quantum computer, should be implemented with a suitable quantum algorithm, and an environment that keeps photons or particles in excited state and so on. Therefore, qunatum computing can be more considering as a co-processor of computing

Question & Answer

https://www.searchenginejournal.com/google-tests-qa-videos-in-search-results-for-universities/332797/

https://quilttolast.com/deposit-place-your-order-now/ecommerce-thank-you-page/