

CS293S Quantum Computing System

Lecture 6-8: Quantum Algorithms and Quantum Speedup

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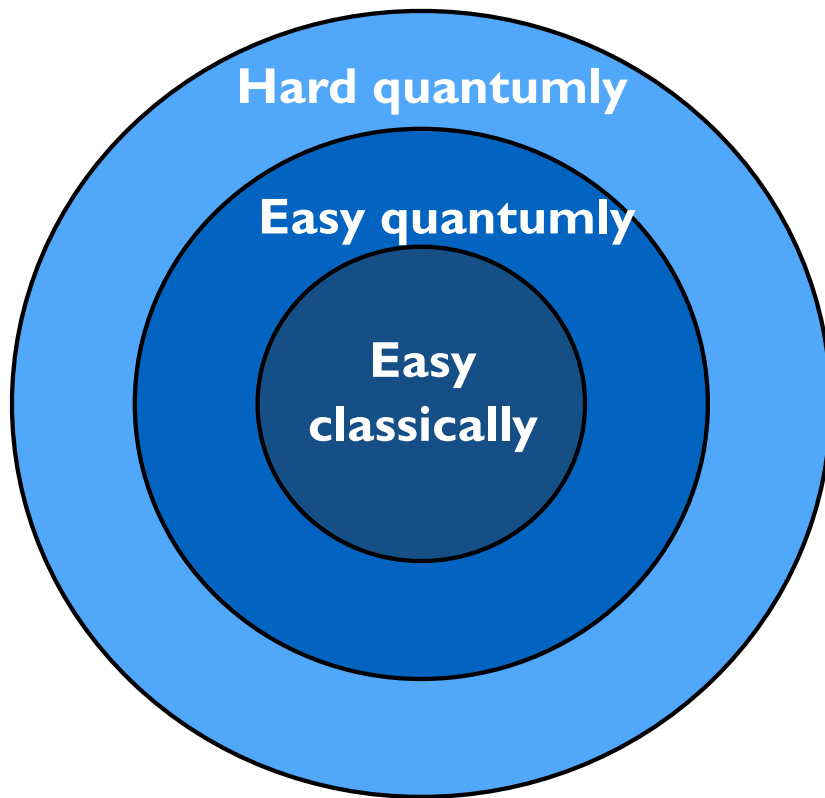
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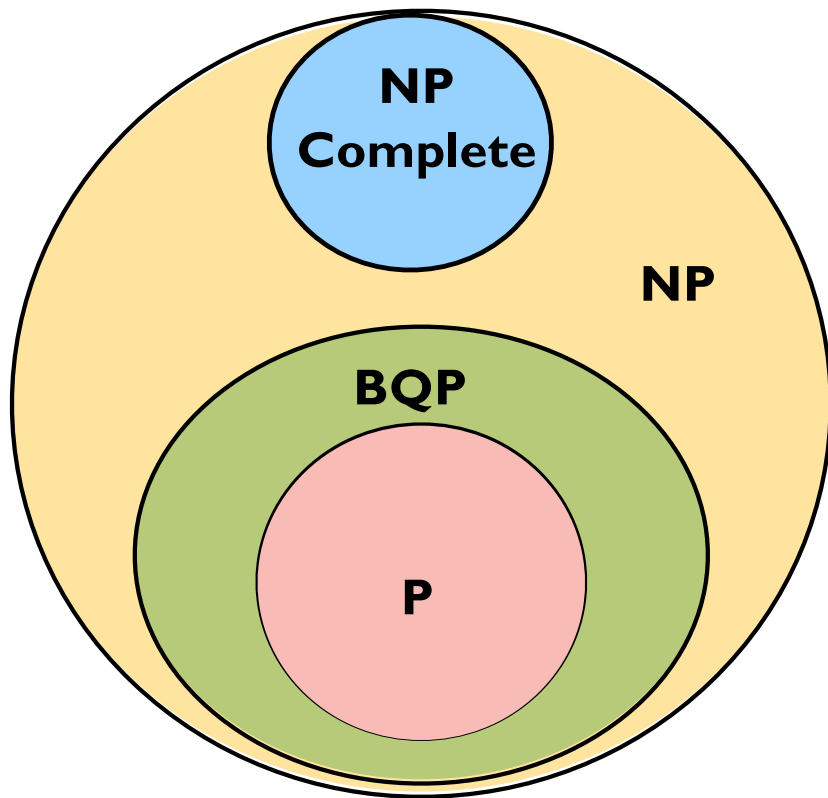


Quantum Promise



- ❖ Certain problems which are difficult classically, are easy on quantum computers, e.g., integer factoring
- ❖ Can't efficiently simulate a quantum computer on a classical computer
 - Expected to be hard due to complexity arguments

Algorithmic Complexity



- ❖ P: Efficiently solved by classical computer
- ❖ BQP: Efficiently solved by quantum computer
- ❖ $P = NP?$

Outline

- Reversible Logic and Oracles
 - Quantum circuits for classical computing.
- Quantum Speedup
 - Parallelism and Interference
- Quantum Algorithms

Reversible Logic and Oracles

- Note4.pdf