Sorting circuit for Quantum Computing

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Presentation

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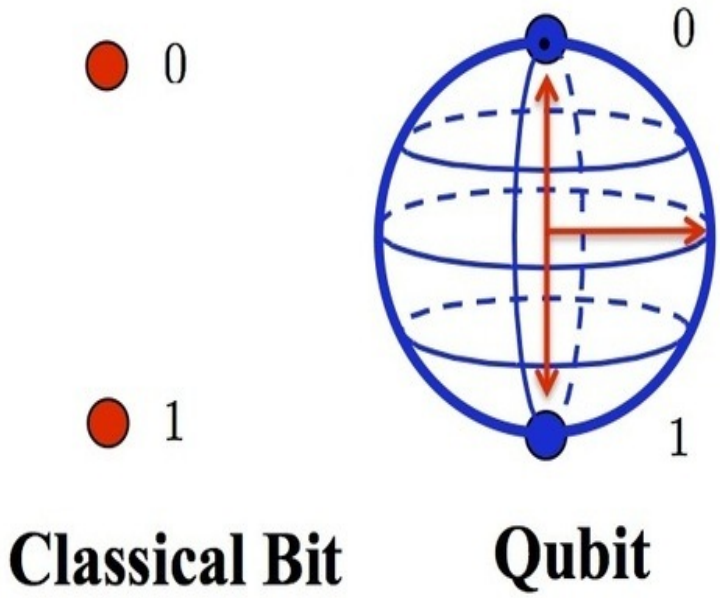
Introduction

Quantum Computer

- Quantum bits (Qbits)
- Quantum Computing
- Quantum Gates

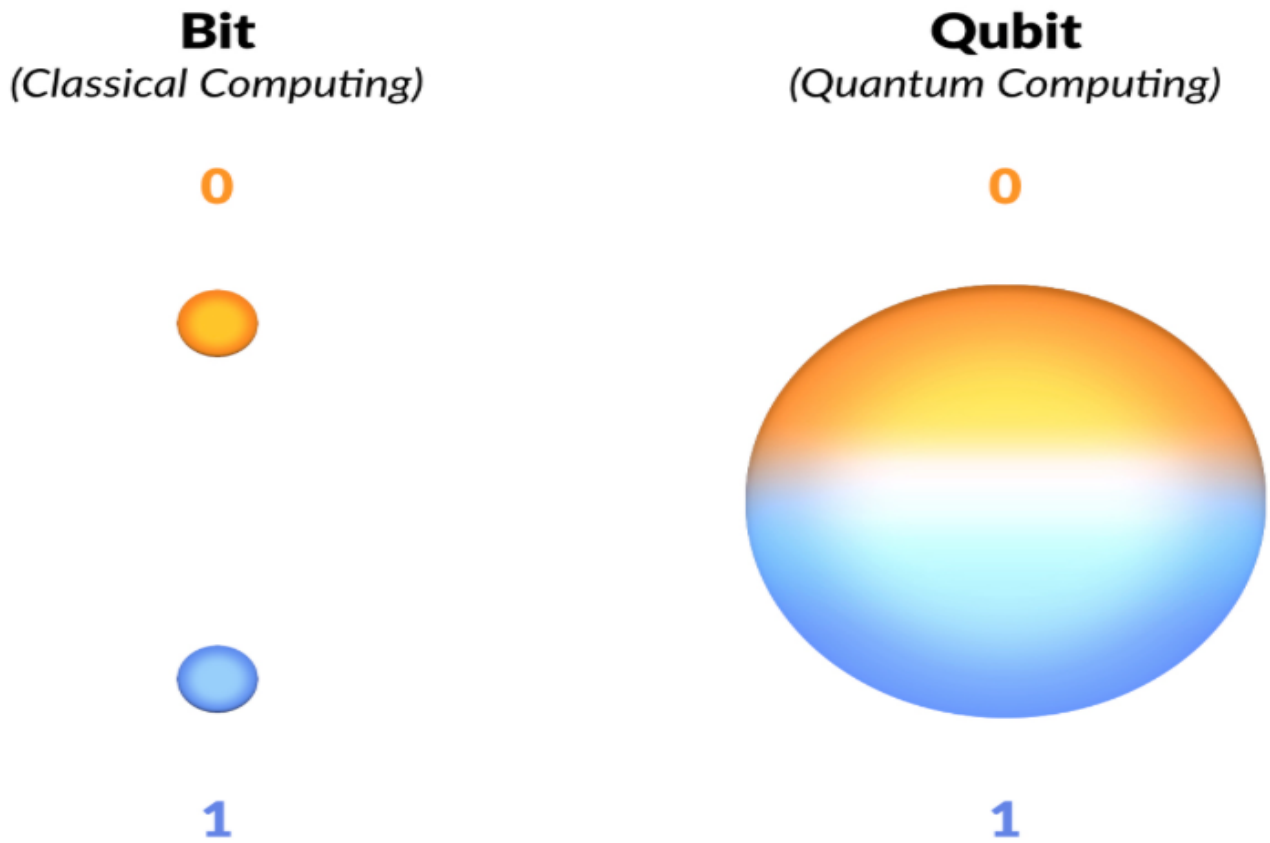
Quantum Bit

- What is Quantum bit?
- What is Qbit made off?
- Temperature
- Super Conductor



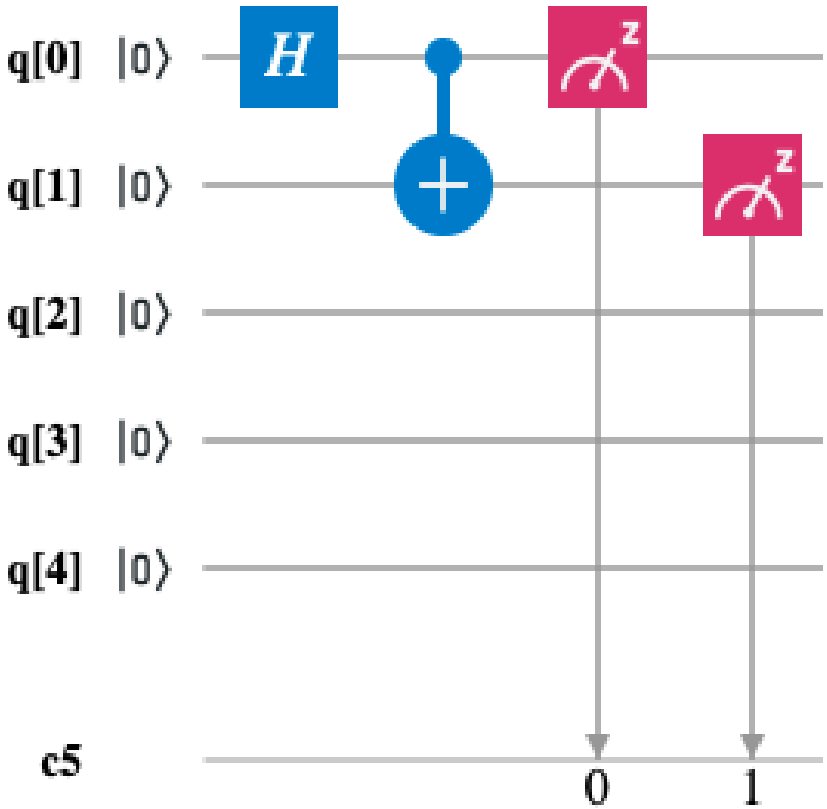
Quantum Phenomenon

- Super Position
- Entanglement



Circuit of Hello World

- Hello World



Quantum Gates

- Hadamard Gate

- ID Gate

- Swap Gate

- X Gate

- CX Gate

Quantum Operations

- Barrier Operation

- IF Operation

- $|0\rangle$ Opertaion

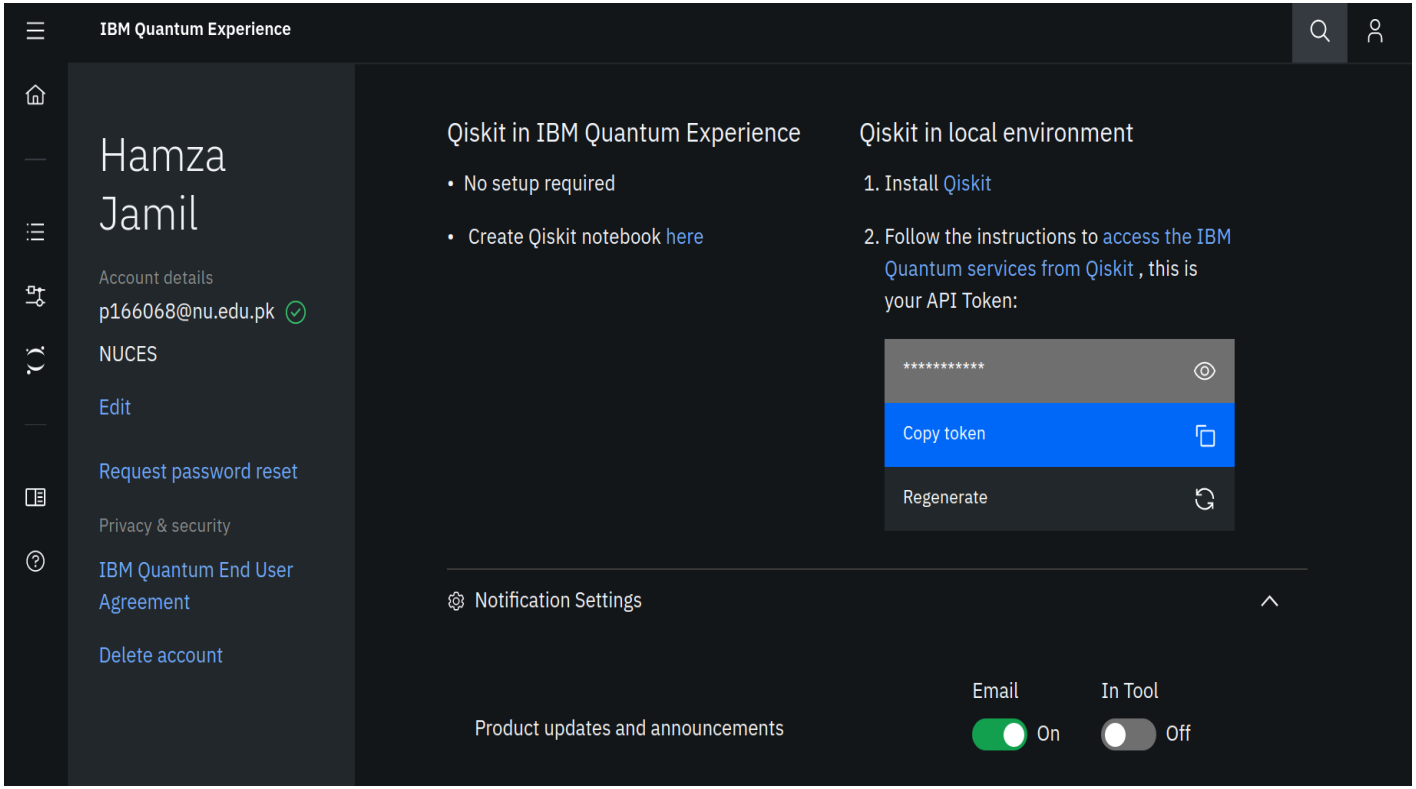
- Z measurement

Tools

- IBMQ

- Qiskit

IBM Q Experience




```
IBMQ.save_account('2a18c21d0290fdae39f5415414efdb49a4dfe503d8101a3ee4afd
```

```
Credentials already present. Set overwrite=True to overwrite.
```

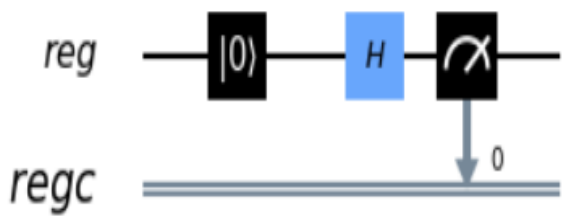
Milestone

Milestone	Status
Develop working understanding of quantum computing	Done
Study Quantum literature	In progress
Run,deploy quantum program on IBMQ's quantum machine	Done
Implement a Quantum sorted circuit	Done
Increase the qubits for sorting	In progress

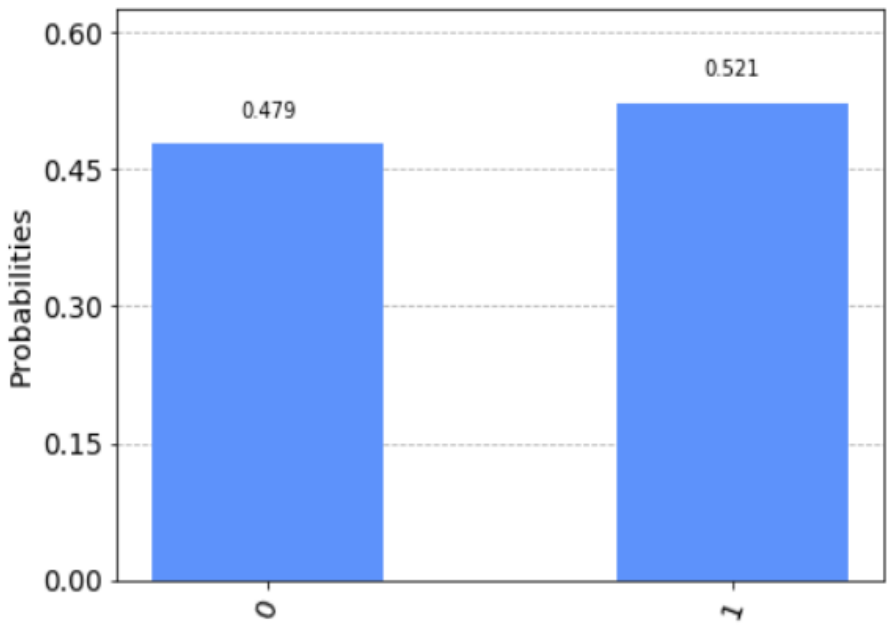
Sample Quantum Output

- Random Bit Generator

```
counts: {'0': 1}
[1.+0.j 0.+0.j]
```

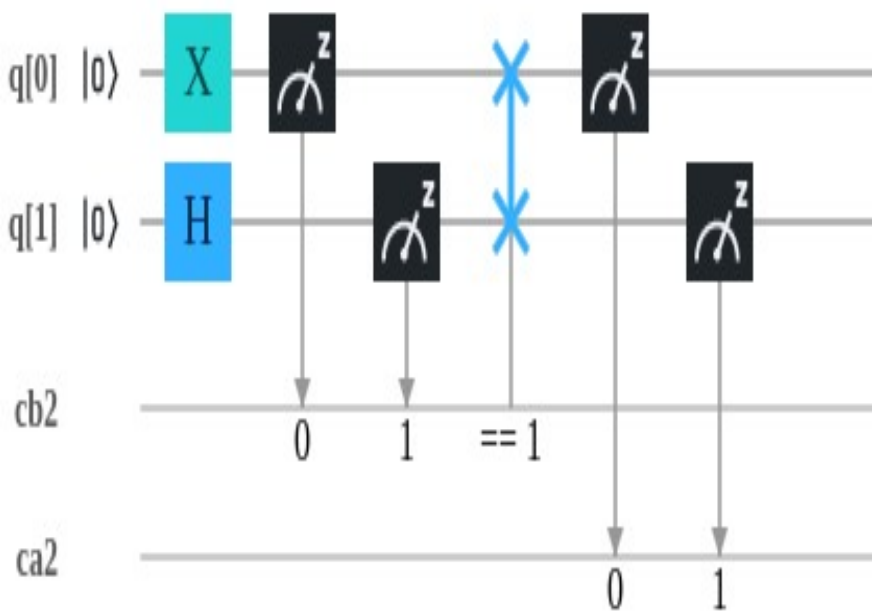



```
counts: {'0': 1}
[1.+0.j 0.+0.j]
counts : {'0': 490, '1': 534}
```



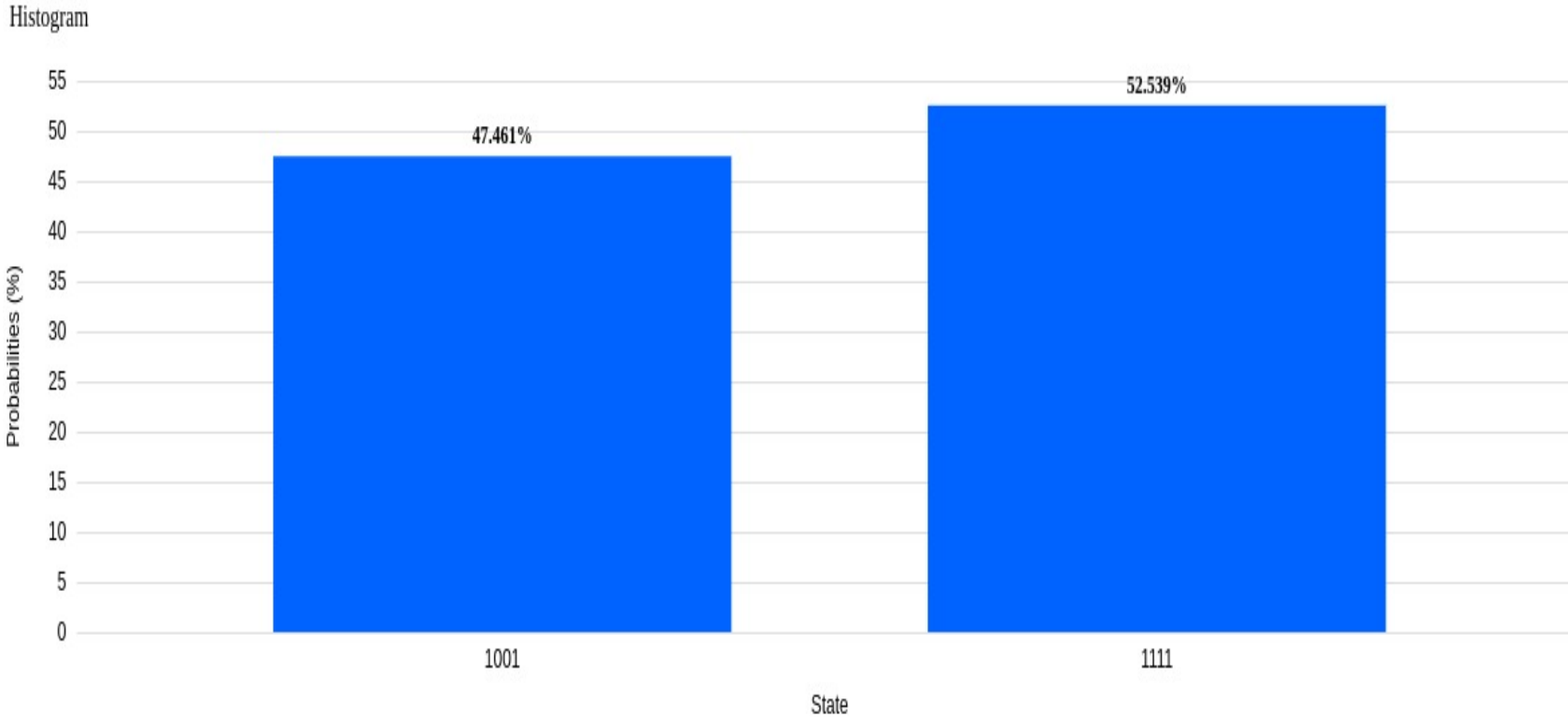
Sorting Quantum Circuit

- Two Qubits Circuit



Sorting Quantum Output

- Output



Literature Review

Sorting N Elements Using Quantum Entanglement sets

D. S. Oliveira and R. V. Ramos, "Quantum bit string comparator: circuits and applications,"Quantum Computers and Computing, vol. 7, pp. 17-26, 2007

J. Maziero, H. Guzman, L. Céleri, M. Sarandy, and R. Serra, "Quantum and classical thermal correlations in the XY spin-1/2 chain,"Physical Review A, vol. 82, p. 012106, 2010.

Literature Review

Quantum Sort Algorithm bassed On Entanglement Qubits

A. Odeh, K. Elleithy, M. Almasri, and A. Alajlan, "Sorting N Element Using Quantum Entanglement Sets"in innovative Computing Technology (INTECH), 2013 Third International Conference on 2013, pp.213-216

R. P. Feynammn, A. R. Hibbs, and D. Styer, Quantum mechanics and path integrals, Aaver Publications. 2010

Books

Introduction to Quantum Computing

 Phillip Kaye, Raymond Laflamme and Michele Mosca

Quantum Computer Science

 N. David Mermin

Quantum Computing for Computer Science

 Noson S. Yanofsky and Micro A. Mannucci

The End