Summary: Quantum circuits for performing an arithmetic operation are necessary for the implementation of quantum computing peripherals. An effective quantum circuit can be developed using a minimum amount of Clifford + T gates, as the implementation of Clifford + T quantum gates is more expensive than the other quantum gates. A quantum full adder (QFA) circuit for quantum computing hardware is proposed in this work. The proposed QFA circuit is optimized for T-count using a single CCNOT (Toffoli) gate. This work also focuses on implementing a quantum integer multiplication circuit using the proposed QFA to achieve better T-count savings than the existing counterparts.

MSC:
- 81Pxx Foundations, quantum information and its processing, quantum axioms, and philosophy
- 68Qxx Theory of computing
- 94Cxx Circuits, networks

Keywords:
- quantum gates; quantum circuits; quantum computing; quantum algorithms; Clifford + T

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References:


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