QAMP - Checkpoint 2

Design of Quantum Circuits for performing Arithmetic Operations (#17)

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As part of the QAMP project, we have developed reversible logic circuits, such as the BCD to Excess-3 code converter (Fig.1) and the 2's complement subtractor circuit (Fig.2).

These circuits provide a reversible approach to traditionally irreversible operations, contributing to the understanding of reversible computation principles and the potential applications of reversible logic in quantum computing.

Implementation of these circuits was complemented by manual verification of reversible circuits against their classical non-reversible counterparts ensuring their equivalence, further validating their utility in quantum computation.

This research contributes to the advancement of reversible logic design, optimization techniques, and the overall progress of quantum computing.

While we have only implemented 2 such circuits till the checkpoint 2, we aim towards designing other reversible logic circuits as well. We also aim towards the optimisation of the hence designed circuits in terms of the quantum cost and circuit depth, in order to make efficient quantum circuits.

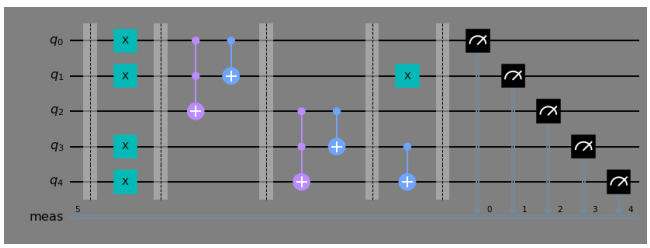

Fig.1

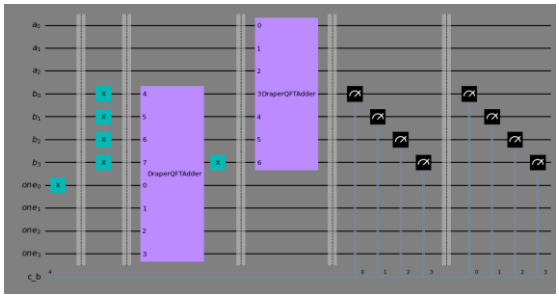

Fig.2