Simulation of Error Correction for Quantum Circuits Using Qiskit MAZHARUL ISLAM MONDAL, KISHOR T KAPALE, Western Illinois University — Abstract: Quantum teleportation, an indispensable tool for quantum information processing, is affected by errors and decoherence, but can be made reliable via quantum error correction. We have designed a 3-qubits encoded circuit in qiskit and then check whether a bit-flip error occurs on one of the three qubits or no error occurs. After that, we correct for a σx–error that happened earlier. Two ancilla are added in the circuit in order to check the parity between qubits. Therefore, ancilla are measured however the data qubits are not measured directly. This measurement detects where an error has taken place. Using this syndrome information, we corrected the error by including a classically controlled σx gate in the circuit. The IBM based platform qiskit is used to design the circuit and for the simulation.

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