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DESIGN OF OPTIMIZED QCA SEQUENTIAL CIRCUITS

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Abstract- **The scenario of the digital industry has changed in the past few years due to the rapid development of technology. Among several other alternatives, QCA is the innovative technology to design digital logic circuits using quantum dots confined in the potential well. This paper proposes the optimum design of sequential circuits like flip-flops and counters by using majority gates and is implemented by cell minimization technique. It will reduce the area and complexity. The functionality of the circuits can be tested by using QCADesigner version 2.0.3.**

Keywords- Quantum-dot cellular automata , sequential circuit, flip-flops, counters, QCADesigner.

I.INTRODUTION

To making the small transistor, it is a great advancement in electronics and computer industry over the past 60 years. In CMOS the serious effects due to physical barriers such as short channel effect, leakage current and excessive power dissipation at Nanoscale regions. Hence one possible alternative method is QCA to overcome this problem.QCA technology transfer's information by means of polarization using the flow of electrical current. It provides ultra-small factor, power consumption and high speed clock circuits.

A sequential circuit is a type of digital circuit who's the output depends on the present value of the input signal as well as the sequence of past inputs.

Types of sequential circuit:

1. Synchronous circuit: It uses the clock input to derive the circuit.
2. Asynchronous circuit: It doesn't use the clock signal to drive the circuit.

QCA is the new paradigm that performs computation and routing information at Nano domain. The advantage of QCA over the CMOS is lesser delay, high density circuit and low power consumption.

II.REVIEW OF QCA

The logic states are the unique feature of the QCA and it is represented by a cell. QCA cell contain four quantum dots arranged in corners of the square. Then two electrons are used to provide a tunneling between these two dots. The polarized charge can transfer by the columbic repulsion within the square cells.

A basic QCA cell consists of four quantum dots in square array.

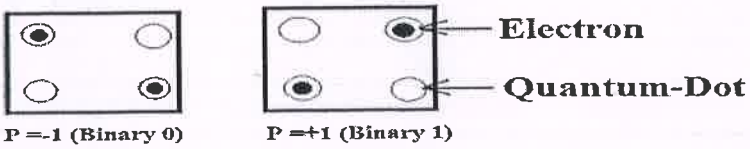

Fig.1 Polaraized QCA cells