Performance Analysis of Binary to Gray Code Converter using Reversible Logic Gates

N. Dharshini[1] A. Ellakkia[2] G. Dinesh Kumar[3] S. Gowtham[4] A. Ram Kumar[5]
[1,2,3,4,5]Department of Electronics and Communication Engineering
[1,2,3,4,5]Saveetha School Of Engineering, Saveetha University , Chennai-602105

Abstract— In this technological world development in the field of nanometer technology makes power consumption of logic gates as minimum as possible. Reversible logic design became the promising technologies gaining greater interest due to less dissipation of heat and low power consumption .the main objective of the proposed system is To reduce the transistor count, power consumption and delay using reversible logic gates .In digital systems code conversion is a widely used process for reasons such as enhancing security of data. Using the micro wind software which is Reducing the complexity of arithmetic operations and thereby reducing the hardware required, dropping the level of switching activity leading to more speed of operation and power saving.

Key words: D,C,B,A, MICRO WIND Software.

I. INTRODUCTION

Reversible Logic has gained importance within the recent past. The speedy decrease within the size of the chips has cause the exponential increase within the transist account per unit space. As a result, the energy dissipation is turning into a serious barrier within the evolving nano-computing era. Reversible logic ensures low energy dissipation. associate operation is alleged to be physically reversible if there's no energy to heat conversion and no modification in entropy. In reversible logic, the state of the procedure device simply before associate operation is unambiguously determined by its state simply once the operation. In alternative words, no info concerning the procedure state will ever be lost and thus the reversible logic may be viewed as a settled state machine. Computations performed by this computers square measure normally irreversible, even if the physical devices that execute them square measure essentially reversible. At the essential level, however, matter is ruled by mechanics and quantum physics, that square measure reversible. With procedure device technology quickly approaching the subatomic particle level, it's been argued repeatedly that this result gains in significance to the extent that economical operation of future computers needs them to be reversible. Hence, reversible logic is gaining grounds. A reversible gate could be a logical cell that has identical variety of inputs and outputs. Also, the input and output vectors have a matched mapping. Direct fan-outs from the reversible gate aren't allowable. Feedbacks from gate outputs to inputs aren't allowed. A reversible gate with n-inputs and n-outputs is termed a n x n reversible gate.

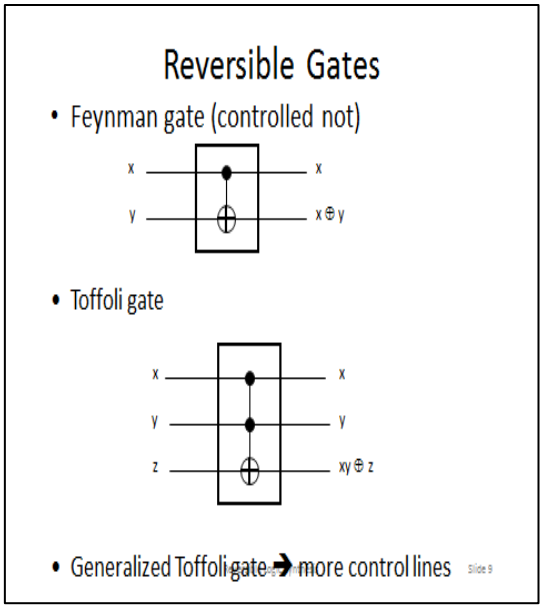

Fig. 1: Reversible Gates

II. EXISTING SYSTEM

The existing system is that the Reversible processor style that desires its building blocks ought to be reversible during this read the coming up with of reversible code converters became essential one. This paper has introduced and planned reversible logic gates and reversible circuits for realizing completely different code converters like BCD to Excess-3, Excess-3 to BCD, Binary to grey and grey to Binary mistreatment reversible logic gates. within the digital domain, information or info is diagrammatical by a mixture of 0's and 1's. A code is largely the pattern of those 0's and 1's accustomed represent the info. Code converters are a category of combinatory digital circuits that are accustomed convert one form of code in to a different. a number of the foremost conspicuously used codes in digital systems are Natural Binary Sequence, Binary Coded Decimal, Excess-3 Code, Gray Code, computer code etc. like several combinatory digital circuit, a code convertor may be enforced by employing a electronic equipment of AND, OR and NOT gates. Here this paper focuses a lot of on conversion of code between binary to grey and BCD to excess-3. the present reversible code convertor is a lot of economical then the traditional code converters. analysis of the present circuit may be appreciated simply however it faces some disadvantages like quality in doing during this code ,having high level of shift and relatively high power consumption.

III. PROPOSED SYSTEM

In the proposed system , we use MICRO WIND software, MICROWIND is truly integrated EDA software

encompassing IC designs from concept to completion, enabling chip designers to design beyond their imagination. MICROWIND integrates traditionally separated front-end and back-end chip design into an integrated flow, accelerating the design cycle and reduced design complexities. It tightly integrates mixed-signal implementation with digital implementation, circuit simulation, transistor-level extraction and verification – providing an innovative education initiative to help individuals to develop the skills needed for design positions in virtually every domain of IC industry.
Usage of MICRO WIND software in reversible logic gates:

A. Reversible Binary to Gray and Gray to binary code converter:

Binary to Gray code converters used to reduce switching activity by achieving single bit transition between logical sequences using the MICRO WIND software.

If Input vector is I(D,C,B,A) then the output vector o(Z,Y,X,W). The circuit is constructed with the help of Feynman Gate (FG) gate[7], the Table 3.1 shows the truth table of FG gate and figure 3.1 & 3.2 shows the circuit diagram of reversible Binary to Gray code converter & Gray to Binary code converter.

TRUTH TABLE:

A	B	P	Q
0	1	0	0
0	0	0	1
1	1	1	1
1	0	1	0

Table 1: Truth Table

B. Block Diagram of Binary to Gray Code Converter:

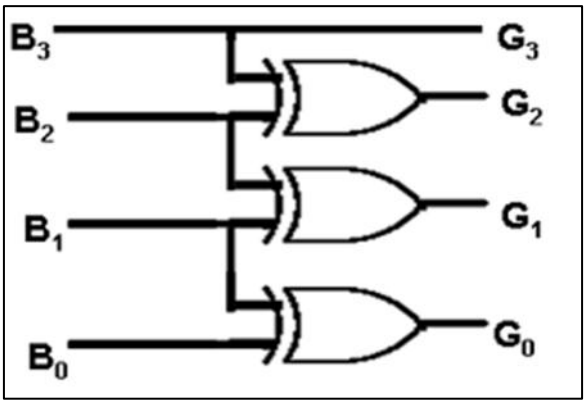

Fig. 2: Block Diagram of Binary to Gray Code Converter

IV. Advantages of the Proposed System

- Reducing the complexity of arithmetic operations.
- Reducing the hardware required.
- Dropping the level of switching activity.
- Increase the speed of operation.
- Power saving is high in the proposed system.

V. Applications

- QUANTUM COMPUTATION
- CRYPTOGRAPHY
- COMPUTER GRAPHICS
- DIGITAL SIGNAL PROCESSING
- NETWORK CONGESTION

VI. Conclusion

This paper has introduced and proposed reversible logic gates and reversible circuits for realizing different code converters like BCD to Excess-3, Excess-3 to BCD, Binary to Gray and Gray to Binary using reversible logic gates. The proposed design leads to the reduction of power consumption compared with conventional logic circuits, the design proposed is implemented with MICRO WIND software that reduces little more greater extent, not only that there will be a chance of implementing different logic circuits using reversible logic gates and which intern helps to increase the energy efficiency to a greater extent.

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