GEORGIA INSTITUTE OF TECHNOLOGY

SCHOOL of ELECTRICAL AND COMPUTER ENGINEERING

Lab 1: Introduction to VHDL and Modelsim with the design of Barrel Shifter

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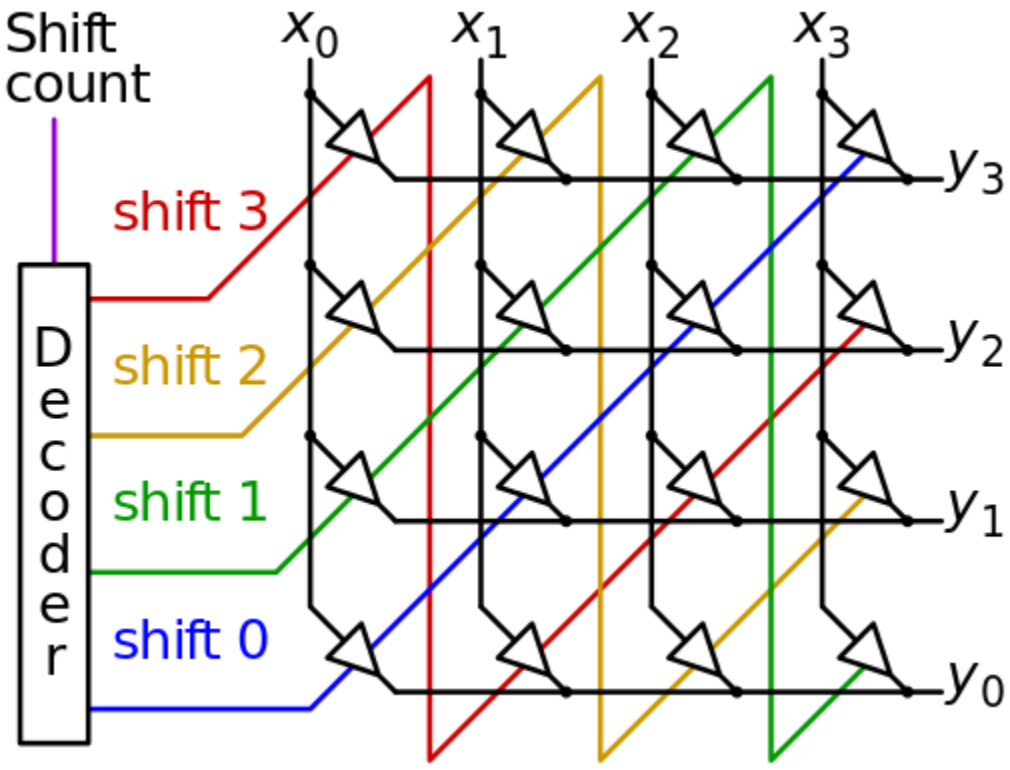
Due Date : Thursday September 7 (11:55 pm)



Cmglee. Schematic Diagram of a 4-Bit Crossbar Barrel Shifter.upload.wikimedia.org/wikipedia/commons/2/2b/Crossbar_barrel_shifter.svg.

1. Introduction

The purpose of this lab is to get acquainted with the MentorGraphics Modesim Environment through a Simple Design. A **barrel shifter** is a digital circuit that can shift a data word by a specified number of bits. For more information, refer https://en.wikipedia.org/wiki/Barrel_shifter . In this lab, we will be designing a 8 bit barrel shifter with a control word of bit-width 3.

2. Instructions

i. Simulate the design (instructions are given in the document "lab_1_instructions")

ii. Also, write three test cases in the testbench corresponding to your GTID. If your GTID is "123456789", the three test cases are

1. Input => 8'h12(8'b00010010) , Control => 3'b011 (3 lsbs of 3)
2. Input => 8'h45(8'b01000101) , Control => 3'b110 (3 lsbs of 6)
3. Input => 8'h78(8'b01111000) , Control => 3'b001 (3 lsbs of 9)

These test-cases should be added before any of the already define test-cases

iii. Create a report containing the Block Diagram of the system implemented in VHDL and screenshot of the waveform. Compare the obtained results (only for the 3 GTID test-cases) with your manual answer . While taking a screenshot of the Linux screen, make sure your name is visible in the top right corner of the screen.

iv. Also, answer the following question
Is the verification strategy used in the current test bench the best strategy? If not, what are the other strategies that could be used and what are their pros and cons? Answer should not exceed 3-4 sentences

3. Deliverables

Create a PDF document which contains the block diagram, screenshot of the waveform, manual verification of the 3 GTID test-cases and the answer to the question in the previous section. The title of the document should be of the form "lab1_firstname.lastname".pdf for e.g. "lab1_george.burdell".pdf and submit on T-Square

Note : Late submissions are not accepted. In case of extraordinary circumstances, written permission must be obtained from Dr.Madisetti