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Final Project
EECS31L
Dr. Kavianpour

Use VHDL design a 4-bit ALU (Arithmetic logic Unit) with the 8 instructions:

ADD, REVERSE, MUL, INC, XNOR, NOT, RROTATION, LROTATION.

1-Assume codes for instructions are: 000=ADD, 001=REVERSE, 010=MUL, 011=INC, 100=XNOR, 101=NOT, 110= RROTATION, and 111= LROTATION
2- Assume input numbers are unsigned.
3- For instructions REVERSE, NOT, RROTATION and LROTATION use number $A_3A_2A_1A_0$
4-For addition result will be in $C_3C_2C_1C_0$ and carry in CO
4-For multiplication use repeated addition such as A+A+A+… (B times) and outputs are in $D_3D_2D_1D_0$, $C_3C_2C_1C_0$,
5-Inputs are clock, $A_3A_2A_1A_0$, $B_3B_2B_1B_0$, and code for instruction. Output is $C_3C_2C_1C_0$ and CO in case of add and $D_3D_2D_1D_0$, $C_3C_2C_1C_0$in case of multiplication

Example:

A=0111, B=0101, code=000

Means add A+B and the result is C=0111+0101=1100 and CO=0
If code is 101
Means NOT of A
A=0111, C=1000
If code is 001
Means REVERSE
A=0111, C=1110
If code is 010
Means Multiplication
A=0111, B=0101,

A*B=100011
D=0010
C=0011

For your report:

1-Report

a--Write if your code is working or partially working
b-Paste Screenshot of simulation results. For 8 instructions for A=1000 and B=0111
c--Paste copy of VHDL file
d-Paste copy of VHDL test bench

2-Submit VHDL and test bench files

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