EE 4352 Fall 2019
Introduction to VLSI Design Final Project
"8-Bit Power ALU"

Name:_____

Instructor: Dr. Semih Aslan

Objectives:

The goal of this project is to design a chip which implements a 8-bit ALU which executes NAND, AND, NOR, OR, NOT, XOR, XNOR, ADD, SUBTRACT, COMPARE, and etc. The block diagram of the ALU can be seen Figure 1. All ALU functions execute on two's complement numbers and we will refer to this design as "POWER ALU".

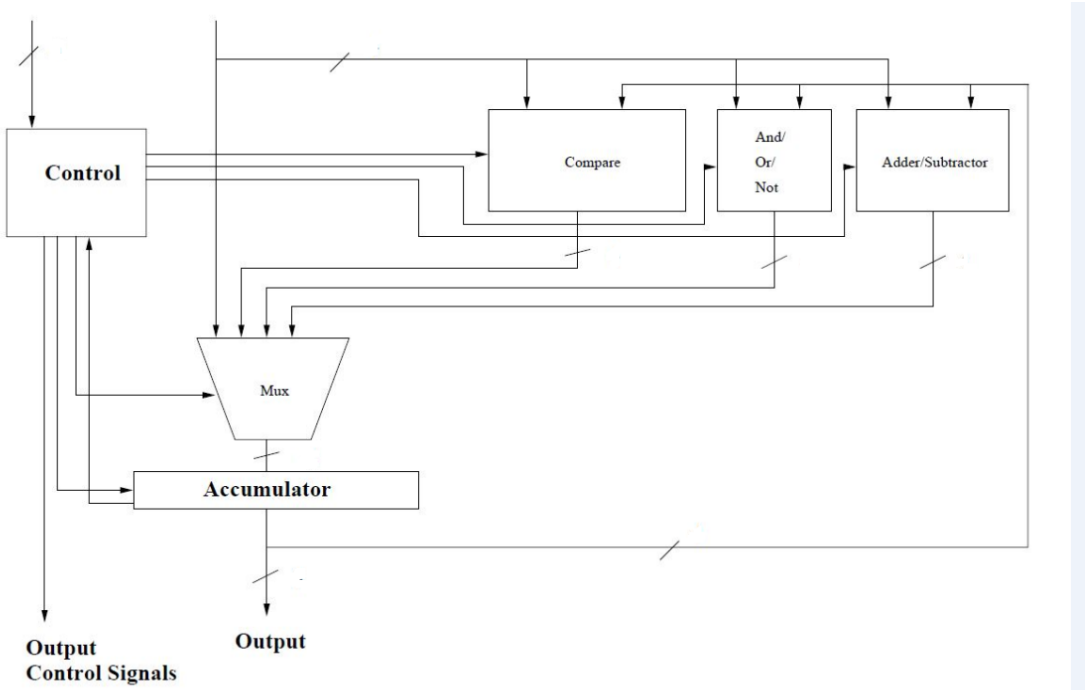

Figure 1: 8-Bit ALU Block Diagram

The POWER ALU must have minimum following operations. You may add additional operation(s) for extra credit.

- Transfer A
- Increment A
- Addition
- Subtraction
- Decrement A
- 1's Complement
- A AND B
- A NAND B
- A OR B

- A NOR B
- A XOR B
- A XNOR B
- A GT B
- A LT B
- A EQ B

These operations require 15 OP codes. An example OP codes are given in Table 1 below. You can edit this table any way you want. If you need more OP code you may need to increase the number of bits from four to five etc.

Table 1: 8-bit ALU OP Codes

s2	s1	s0	Cin	Operation
0	0	0	0	
0	0	0	1	
0	0	1	0	
0	0	1	1	
0	1	0	0	
0	1	0	1	
0	1	1	0	
0	1	1	1	
1	0	0	0	
1	0	0	1	
1	0	1	0	
1	0	1	1	
1	1	0	0	
1	1	0	1	
1	1	1	0	
1	1	1	1	

Section A - Design Requirements:

You need to have the minimum operations that are given above. Some other important points that you need to follow

- You need to design using your POWER ALU using Verilog HDL.
- All blocks needs to be designed and verified individually.
- You top level Verilog code must be named PowerALU_YourName_LastName.
- You need to write a project paper and this is an individual paper.

Section B - Process and Deadline:

Will be explained in the class !