

# EXPERIMENT -1

## AIM

Using either VERILOG / VHDL design a 8-bit ALU which can perform the following functions:

1. Addition of 8-bit numbers
2. Subtraction of 8-bit numbers
3. AND operation on 8-bit numbers
4. OR operation on 8-bit numbers
5. NOT operation on 8-bit number
6. Increment of an 8-bit number
7. Decrement of 8-bit number
8. XOR operation on 8-bit number

## SOFTWARE

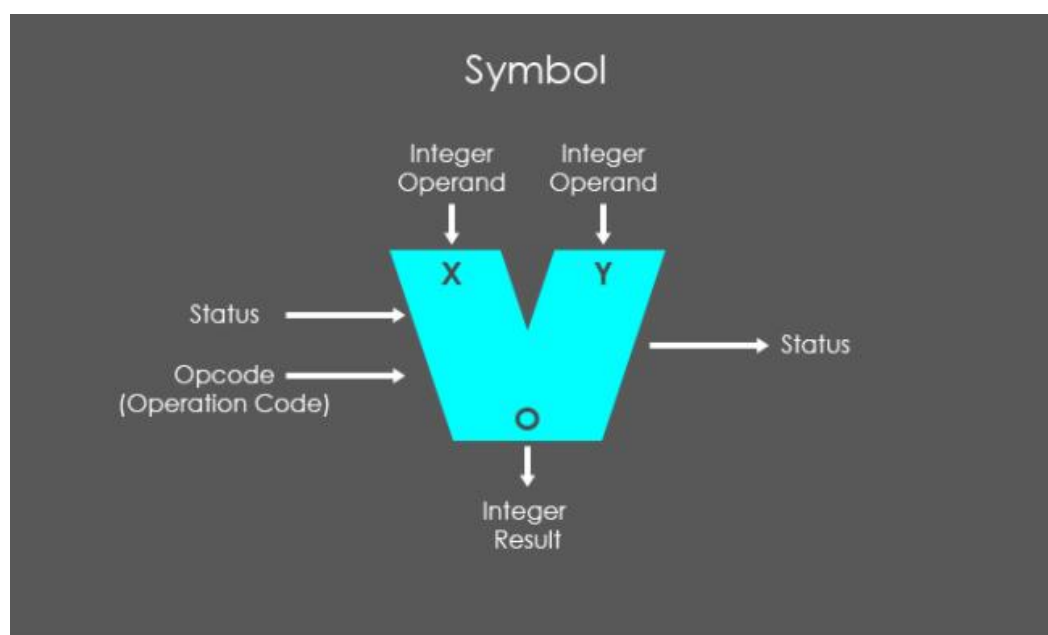
- QUARTUS PRIME

## ALU

- Introduction

ALU performs arithmetic and logic operations. It is also one of the most fundamental units of many computing circuits, including the central processing unit (CPU) of computers, and the graphic processing unit (GPU) of video cards.

In this repo you can find independent modules that can perform 8-bit arithmetic operations like ADDITION, SUBTRACTION and logic operations like AND, OR, XOR. In the end all combine to form an ALU.



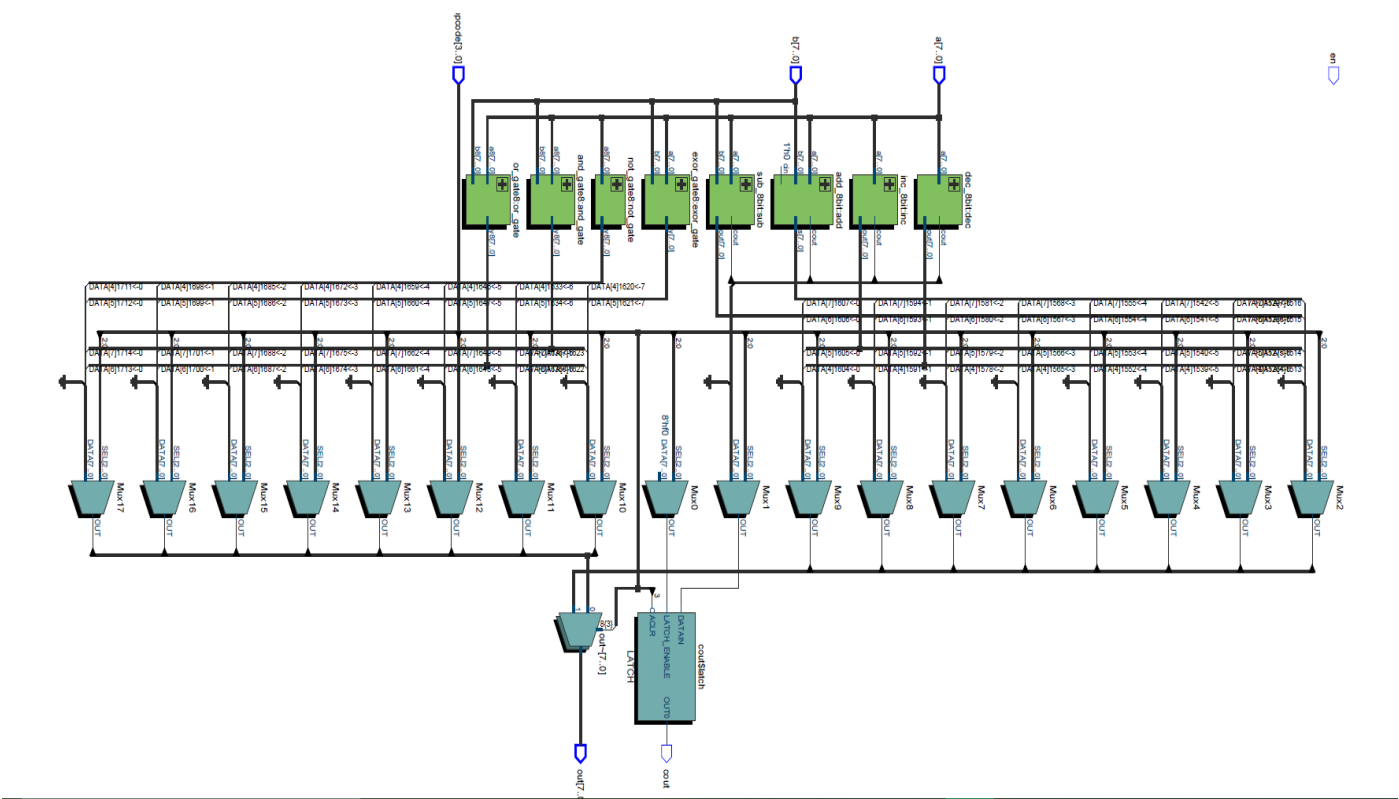
## Pin description

Pins	Description
en	enables the ALU
A7 - A0	8-bit Integer operand A
B7 - B0	8-bit Integer operand B
opcode 4-bit	operational code that selects the operation (refer opcode table)
out7 - out0	8- bit output
cout	carry output

## Opcodes

opcode	Operation
1111	$A + B$
1110	$A - B$
1101	$A + 1$
1100	$A - 1$
0111	$A \& B$
0110	$A   B$
0101	$A \wedge B$
0100	$\sim(A)$

# Internal View Of ALU



## Output

### Using Testbench



## Using waveform file

