

```

1  library ieee;
2  use ieee.std_logic_1164.all;
3
4  entity msb_slice is
5      port(
6          a,b,Less,Ainvert,carryIn      : in std_logic;
7          Op                             : in std_logic_vector (2 downto 0);
8          result,carryOut,set,overflow   : out std_logic
9      );
10 end msb_slice;
11
12 architecture MSBBitSlice of msb_slice is
13     signal aMux, bMux, andOut, orOut  : std_logic;
14     signal AxorB, AandB, sum, CandXor : std_logic;
15 begin
16     --Inverter muxes
17     aMux <= a xor Ainvert;
18     bMux <= b xor Op(2);           -- Assuming Binvert is MSB of Op
19
20     --Basic gates
21     andOut <= aMux and bMux;
22     orOut  <= aMux or bMux;
23
24     --Following is adder block
25     AxorB <= aMux xor bMux;
26     AandB <= aMux and bMux;
27     CandXor <= AxorB and carryIn;
28     sum <= AxorB xor carryIn ;
29     carryOut <= AandB or CandXor;
30
31     --Big mux
32     result <= (not Op(1) and not Op(0) and andOut) or
33              (not Op(1) and Op(0) and orOut) or
34              (Op(1) and not Op(0) and sum) or
35              (Op(1) and Op(0) and Less);
36
37     --MSB additions
38     set <= sum;
39     overflow <= carryIn xor (AandB or CandXor);
40
41 end MSBBitSlice;

```