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library ieee;
use ieee.std_logic_1164.all;


ENTITY MSB_slice IS
    PORT(A, B, Less, Ainvert, carryIn :IN std_logic;
         Op                                :IN std_logic_vector(2 downto 0);
         result,carryout, Set, Overflow: Out std_logic);
END MSB_slice;

architecture alu of MSB_slice is

 signal  a_sig, b_sig, alu_sig, carryout_sig: std_logic;

component fulladd is
port (A, B, Cin:IN std_logic;
      Sum,Cout: Out std_logic);
End component;



BEGIN

    a_sig <= A when (Ainvert = '0') else
              not A;
    b_sig <= B when (Op(2) = '0' ) else
              not B;


  fulladd1: fulladd port map(A=>a_sig, B=>b_sig, Cin=>carryIn,
Cout=>carryout_sig,Sum=>alu_sig);

    Result <= a_sig and b_sig when (Op(1) = '0' and Op(0) = '0') else
              a_sig or  b_sig when (Op(1) = '0' and Op(0) = '1') else
              alu_sig         when (Op(1) = '1' and Op(0) = '0') else
              less               when (Op(1) = '1' and Op(0) = '1') else
              '0';
  carryout <= carryout_sig;
  Set <= alu_sig;
  Overflow <= carryIn xor carryout_sig;

END alu;
```