



DAY-31

#100DAYSOFRTL

Aim:- Implementation of 4-Bit Comparator Using 1-Bit Comparator.

RTL CODE:-

```
//////DATE:31/01/2024
//////Implementation of 4bit Comparator using 1 bit Comparator
module Compl_1bit(input A,B,
output L,E,G);
wire w1,w2,w3,w4,w5;
and g1(w1,A,B);
not g2(w2,A);
not g3(w3,B);
and g4(w4,w2,w3);
or g5(E,w1,w4);
and g6(G,A,w3);
and g7(L,w2,B);
endmodule

module Comp_4bit(input [3:0] A,B,
output L,E,G);
wire [3:0] M,N,O;
wire w1,w2,w3,w4,w5,w6,w7,w8,w9,w10;
wire w11,w12,w13,w14,w15,w16,w17,w18;
Comp1_1bit J1(A[0],B[0],M[0],N[0],O[0]);
Comp1_1bit J2(A[1],B[1],M[1],N[1],O[1]);
Comp1_1bit J3(A[2],B[2],M[2],N[2],O[2]);
Comp1_1bit J4(A[3],B[3],M[3],N[3],O[3]);
and g1(w1,N[0],N[1]);
and g2(w2,N[2],N[3]);
and g3(E,w1,w2);
and g4(w3,N[1],M[0]);
and g5(w4,N[2],N[3]);
and g6(w5,w3,w4); ////
and g7(w6,N[2],N[3]);
and g8(w7,w6,M[1]);
and g9(w8,N[3],M[2]);

or g10(w9,M[3],w8);
or g11(w10,w7,w5);
or g12(L,w9,w10);
and g13(w11,N[1],O[0]);
and g14(w12,N[2],N[3]);
and g15(w13,w11,w12); ////
and g16(w14,N[2],N[3]);
and g17(w15,w14,O[1]);
and g18(w16,N[3],O[2]);
or g19(w17,O[3],w16);
or g20(w18,w13,w15);
or g21(G,w17,w18);
endmodule
```

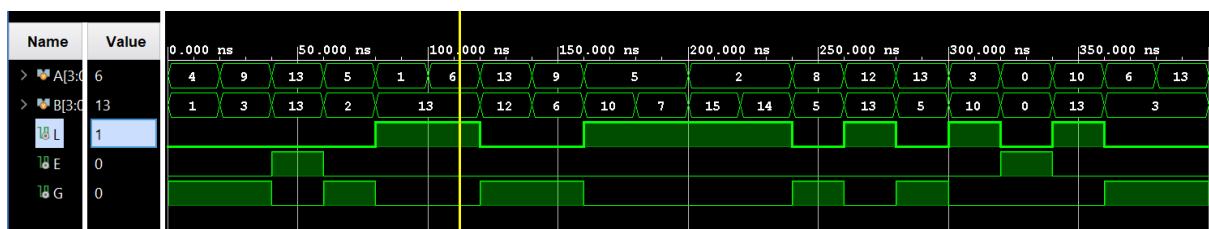
TESTBENCH:-

```
module Comp_4Bit_tb();
    reg [3:0] A,B;
    wire L,E,G;
    Comp_4bit UUT(A,B,L,E,G);
    initial begin
        for(int i=0; i<20; i=i+1) begin
            A=$random();
            B=$random();
            #10;
            $display("A=%d,B=%d,L=%d,E=%d,G=%d",A,B,L,E,G);
            #10;
        end
        initial begin
            #400;
            $finish();
        end
    end
endmodule
```

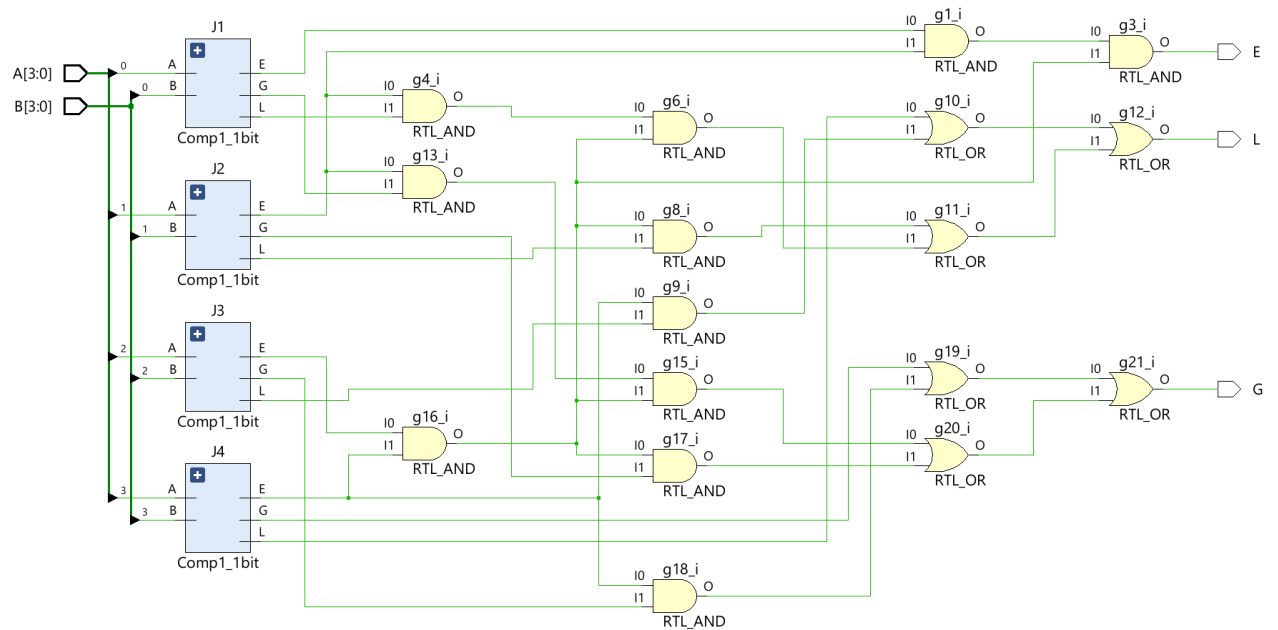
OUTPUT:-

A= 4,B= 1,L=0,E=0,G=1
A= 9,B= 3,L=0,E=0,G=1
A=13,B=13,L=0,E=1,G=0
A= 5,B= 2,L=0,E=0,G=1
A= 1,B=13,L=1,E=0,G=0
A= 6,B=13,L=1,E=0,G=0
A=13,B=12,L=0,E=0,G=1
A= 9,B= 6,L=0,E=0,G=1
A= 5,B=10,L=1,E=0,G=0
A= 5,B= 7,L=1,E=0,G=0
A= 2,B=15,L=1,E=0,G=0
A= 2,B=14,L=1,E=0,G=0
A= 8,B= 5,L=0,E=0,G=1
A=12,B=13,L=1,E=0,G=0
A=13,B= 5,L=0,E=0,G=1
A= 3,B=10,L=1,E=0,G=0
A= 0,B= 0,L=0,E=1,G=0
A=10,B=13,L=1,E=0,G=0
A= 6,B= 3,L=0,E=0,G=1
A=13,B= 3,L=0,E=0,G=1

WAVEFORMS:-



SCHEMATIC:-



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