**RTC 12hh : 59mm :59ss - 01hh : 00mm : 00ss**

module rtc(input clk,rst,output [6:0]sec\_l,sec\_m,min\_l,min\_m,hrs\_l,hrs\_m);

wire[3:0]count1,count2,count3,count4,count5,count6;

wire c2\_en,c3\_en,c4\_en,c5\_en,c6\_en;

wire clr\_en;

assign clr\_en=((count1==4'd9)&&(count2==4'd5)&&(count3==4'd9)&&(count4==4'd5)&&(count5==4'd3)&&(count6==4'd2));

**assign c2\_en=(count1==4'd9);//sec 0 to 9**

**assign c3\_en=c2\_en&&(count2==4'd5);//sec 0 to 9 and 0 to 5**

**assign c4\_en=c3\_en&&(count3==4'd9);//min 0 to 9**

**assign c5\_en=c4\_en&&(count4==4'd5);//min o to 9 and min o to 5 hrs 0 to 9**

**assign c6\_en=c5\_en&&(count5==4'd2);**

uni\_counter #(9) l0(.clk(clk),.rst(rst),.clr(1'b0),.en(1'b1),.count(count1));

bcd\_ss l1(.a(count1),.s(sec\_l));

uni\_counter #(5) l2(.clk(clk),.rst(rst),.clr(1'b0),.en(c2\_en),.count(count2));

bcd\_ss l3(.a(count2),.s(sec\_m));

uni\_counter #(9) l4(.clk(clk),.rst(rst),.clr(1'b0),.en(c3\_en),.count(count3));

bcd\_ss l5(.a(count3),.s(min\_l));

uni\_counter #(5) l6(.clk(clk),.rst(rst),.clr(1'b0),.en(c4\_en),.count(count4));

bcd\_ss l7(.a(count4),.s(min\_m));

uni\_counter #(2) l8(.clk(clk),.rst(rst),.clr(clr\_en),.en(c5\_en),.count(count5));

bcd\_ss l9(.a(count5),.s(hrs\_l));

uni\_counter #(1) l10(.clk(clk),.rst(rst),.clr(clr\_en),.en(c6\_en),.count(count6));

bcd\_ss l11(.a(count6),.s(hrs\_m));

endmodule

module uni\_counter # (parameter max\_width=9)

(input clk,rst,en,clr,output reg[3:0]count);

always@(posedge clk)

begin

if(rst==1'b0)

count<=4'b0;

else if(clr)

count<=4'b0;

else if(en==1'b1)

begin

if(count==max\_width)

count<=4'b0;

else

count<=count+1;

end

else

count=count;

end

endmodule

module bcd\_ss(input [3:0]a,output reg [6:0]s);

always@(a)

begin

case(a)

4'b0000 :s=7'b0111\_111;

4'b0001 :s=7'b0000\_110;

4'b0010 :s=7'b1011\_011;

4'b0011 :s=7'b1001\_111;

4'b0100 :s=7'b1100\_110;

4'b0101 :s=7'b1100\_101;

4'b0110 :s=7'b1111\_100;

4'b0111 :s=7'b0000\_111;

4'b1000 :s=7'b1111\_111;

4'b1001 :s=7'b1100\_111;

endcase

end

endmodule