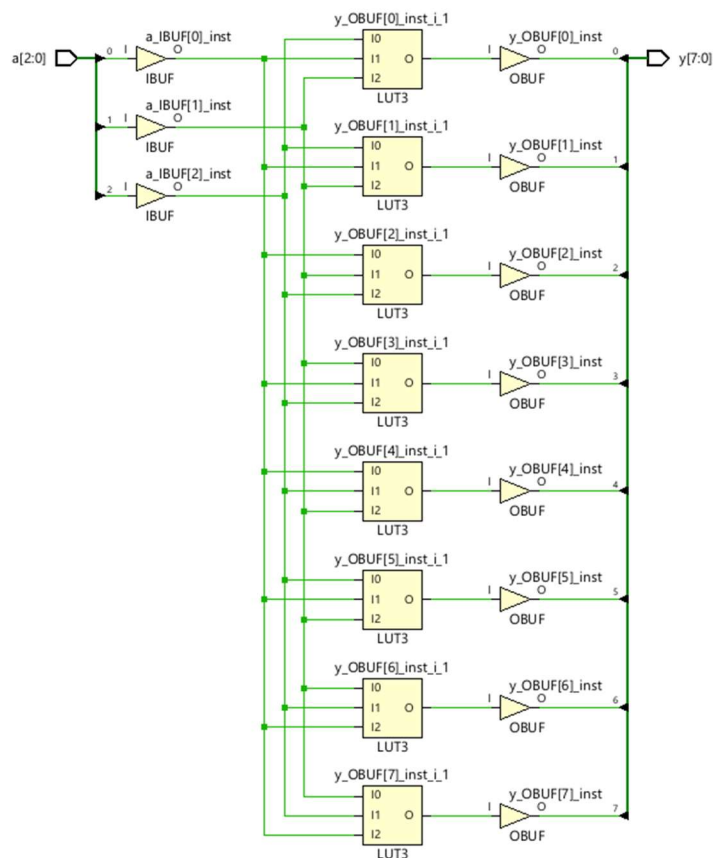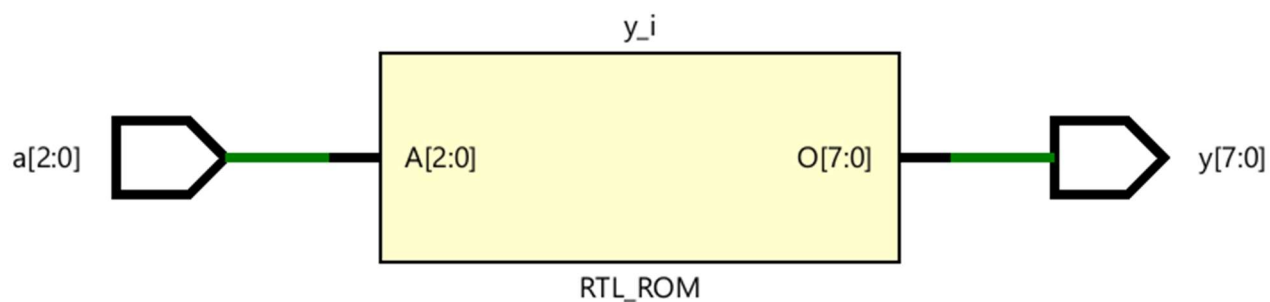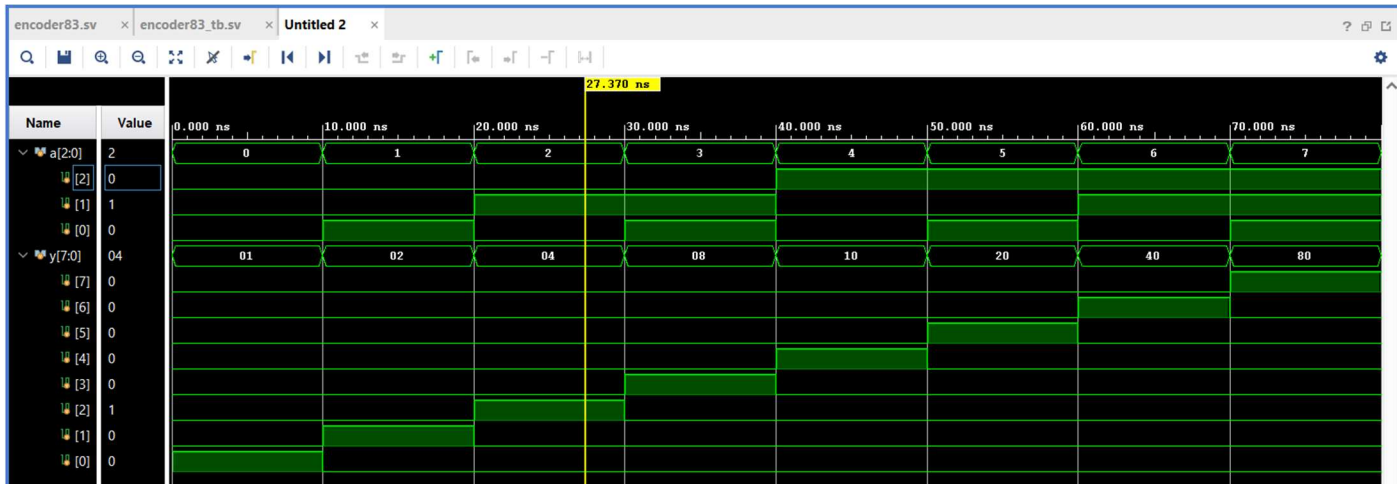# DECODER

```
module encoder83(input logic[2:0] a,
        output logic[7:0] y );
        always @(a)
        case (a)

    3'b000 : y= 8'b00000001;
    3'b001 : y= 8'b00000010;
    3'b010 : y= 8'b00000100;
    3'b011 : y= 8'b00001000;
    3'b100 : y= 8'b00010000;
    3'b101 : y= 8'b00100000;
    3'b110 : y= 8'b01000000;
    3'b111 : y= 8'b10000000;
    default: y= 8'b00000000;
    endcase
endmodule


module encoder83_tb();
    logic [2:0] a;
    logic[7:0] y;
    encoder83 uut(a,y);
    initial
    begin
        a= 3'b000;
      #10 a=  3'b001 ;
      #10 a=  3'b010 ;
      #10 a=  3'b011 ;
      #10 a= 3'b100 ;
      #10 a=   3'b101;
      #10 a=  3'b110;
      #10 a= 3'b111 ;
      #10;
     $finish;
      end
endmodule
```

Name	Value
∨ ꙮ a[2:0]	2
ꙮ [2]	0
ꙮ [1]	1
ꙮ [0]	0
∨ ꙮ y[7:0]	04
ꙮ [7]	0
ꙮ [6]	0
ꙮ [5]	0
ꙮ [4]	0
ꙮ [3]	0
ꙮ [2]	1
ꙮ [1]	0
ꙮ [0]	0

27.370 ns

a[2:0]: 0, 1, 2, 3, 4, 5, 6, 7

y[7:0]: 01, 02, 04, 08, 10, 20, 40, 80

y_i

a[2:0] → A[2:0] ... O[7:0] → y[7:0]

RTL_ROM

a[2:0] — a_IBUF[0]_inst (IBUF), a_IBUF[1]_inst (IBUF), a_IBUF[2]_inst (IBUF)

y_OBUF[0]_inst_i_1 (LUT3: I0, I1, I2, O) → y_OBUF[0]_inst (OBUF) → y[7:0]
y_OBUF[1]_inst_i_1 (LUT3) → y_OBUF[1]_inst (OBUF)
y_OBUF[2]_inst_i_1 (LUT3) → y_OBUF[2]_inst (OBUF)
y_OBUF[3]_inst_i_1 (LUT3) → y_OBUF[3]_inst (OBUF)
y_OBUF[4]_inst_i_1 (LUT3) → y_OBUF[4]_inst (OBUF)
y_OBUF[5]_inst_i_1 (LUT3) → y_OBUF[5]_inst (OBUF)
y_OBUF[6]_inst_i_1 (LUT3) → y_OBUF[6]_inst (OBUF)
y_OBUF[7]_inst_i_1 (LUT3) → y_OBUF[7]_inst (OBUF)

Name	Slice LUTs (20800)	Slice (8150)	LUT as Logic (20800)	Bonded IOB (106)
N encoder83	4	1	4	11