

1)

State	Highway Output	Farm Road Output	Delay	Delay
S0	Red	Red	1	50,000,000
S1	Green	Red	31	1,500,000,000
S2	Yellow	Red	3	150,000,000
S3	Red	Red	1	50,000,000
S4	Red	Green	15	750,000,000
S5	red	yellow	3	150,000,000

2)

Min = 0, Max = 30, Therefore we need 0 to 30, 30 takes 5 bits to create 1110, n = 5

```

1  `timescale 1ns/1ps
2  //default_nettype none;
3
4  module tlc_fsm(
5      output reg [3:0] state,
6      output reg RstCount,
7      output reg [1:0] highwaySignal, farmSignal,
8      input wire [n-1:0] Count,
9      input wire Clk, Rst);
10
11      reg [2:0] nextState; // declare internal nets
12
13      // parameters for easy understanding
14      parameter S0 = 3'b000,
15                 S1 = 3'b001,
16                 S2 = 3'b010,
17                 S3 = 3'b011,
18                 S4 = 3'b100,
19                 S5 = 3'b101,
20                 Srst = 3'b110;
21
22      parameter red = 2'b00,
23                 yellow = 2'b01,
24                 green = 2'b10;
25
26      reg [3:0] state;
27      reg [3:0] nextState;
28
29      always@(state)
30      case(state)
31          Srst: begin
32              highwaySignal = red;
33              farmSignal = red;
34              RstCount = 1;
35          end
36          S0: begin
37              highwaySignal = red;
38              farmSignal = red;
39              if(Count == 1 && RstCount == 1)
40                  nextState = S1;
41              else
42                  nextState = S0;
43          end
44          S1: begin
45              highwaySignal = green;
46              farmSignal = red;
47              if(Count == 1 && RstCount == 1)
48                  nextState = S2;
49              else
50                  nextState = S1;
51          end
52          S2: begin
53              highwaySignal = yellow;
54              farmSignal = red;
55              if(Count == 1 && RstCount == 1)
56                  nextState = S3;
57              else
58                  nextState = S2;
59          end
60          S3: begin
61              highwaySignal = red;
62              farmSignal = green;
63              if(Count == 1 && RstCount == 1)
64                  nextState = S4;
65              else
66                  nextState = S3;
67          end
68          S4: begin
69              highwaySignal = red;
70              farmSignal = green;
71              if(Count == 1 && RstCount == 1)
72                  nextState = S5;
73              else
74                  nextState = S4;
75          end
76          S5: begin
77              highwaySignal = red;
78              farmSignal = yellow;
79              if(Count == 1 && RstCount == 1)
80                  nextState = S0;
81              else
82                  nextState = S5;
83          end
84      endcase
85
86      always@(posedge Clk)
87      if(RstCount)
88          state <= S0; // reset state
89      else
90          state <= nextState; // set next state
91
92  endmodule

```