**Lab report no 9**



**Fall 2022**

**CSE-308L Digital Systems Design Lab**

**Submitted By**

**Names Registration No**

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Section: **A**

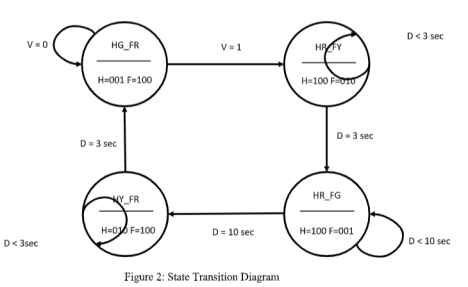
**Date**:24,jun,22

**Submitted To: MAM. Madiha Sher**

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**Implement Traffic Light Controller using FSM.**



**Task code: -**

module Traffic\_lights(clk,rst,v,out\_farm,out\_highway);

input clk,rst,v;

output reg [2:0] out\_farm, out\_highway;

reg [1:0] PS,NS;

parameter [1:0] FR\_HG = 0, FY\_HR = 1, FG\_HR = 2, FR\_HY = 3;

parameter [2:0] red = 100, yellow = 010, green = 001;

wire out\_clk;

clk\_divider d1(clk,out\_clk,rst);

always @(posedge out\_clk)

if(rst==0)

begin

PS = FR\_HG;

end

else

PS = NS;

always @(PS or v or rst)

case(PS)

FR\_HG:

begin

NS = v?FY\_HR: FR\_HG;

out\_highway = v?red:green;

out\_farm = v?yellow:red;

end

FY\_HR:

begin

NS = FG\_HR;

out\_highway = red;

out\_farm = green;

end

FG\_HR:

begin

NS = FR\_HY;

out\_highway = yellow;

out\_farm = red;

end

FR\_HY:

begin

NS = FR\_HG;

out\_highway = green;

out\_farm = red;

end

endcase

endmodule

**clock divider: -**

module clk\_divider(input in\_clk,output reg out\_clk, input rst);

reg [100:0] count;

always @(posedge in\_clk)

if(rst==0)

begin

out\_clk = 0;

count = 0;

end

else

begin

count = count+1;

if(count==3\*100000000)

begin

out\_clk = ~out\_clk;

count = 0;

end

end

endmodule

**UCF file:**

net "rst" LOC =K18 | IOSTANDARD = LVCMOS33 | DRIVE = 8 | SLEW = FAST | PULLUP; net "v" LOC =F17 | IOSTANDARD = LVCMOS33 | DRIVE = 8 | SLEW = FAST | PULLUP; net "clk" LOC =V10 | IOSTANDARD = LVCMOS33 | period = 100MHz;

net "out\_highway[0]" LOC = N16 | IOSTANDARD = LVCMOS33 | DRIVE = 8 | SLEW = FAST; net "out\_highway[1]" LOC = U17 | IOSTANDARD = LVCMOS33 | DRIVE = 8 | SLEW = FAST; net "out\_highway[2]" LOC = U18 | IOSTANDARD = LVCMOS33 | DRIVE = 8 | SLEW = FAST; net "out\_farm[0]" LOC = P15 | IOSTANDARD = LVCMOS33 | DRIVE = 8 | SLEW = FAST;

net "out\_farm[1]" LOC = P16 | IOSTANDARD = LVCMOS33 | DRIVE = 8 | SLEW = FAST; net "out\_farm[2]" LOC = N15 | IOSTANDARD = LVCMOS33 | DRIVE = 8 | SLEW = FAST;