



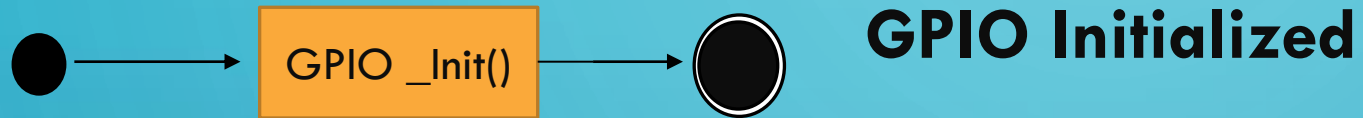
AUTOMOTIVE DOOR CONTROL SYSTEM DYNAMIC DESIGN

MUSTAFA ALI

ECU1

State machine for each ECU1 component:

1-GPIO :



2-CAN:



3-Timer:



State machine for each ECU1 Operation:

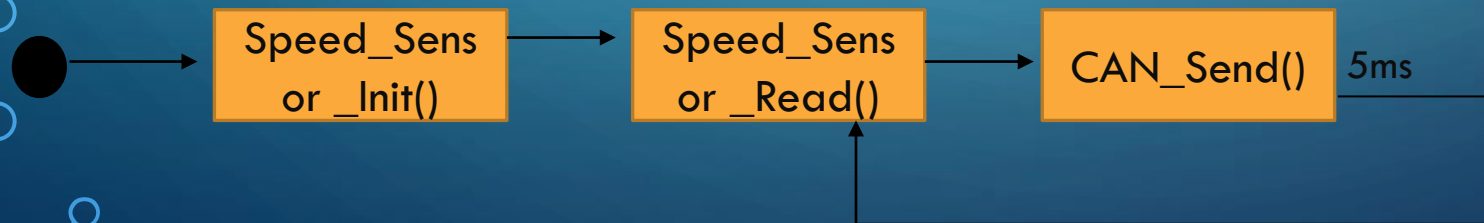
1-Door Sensor :



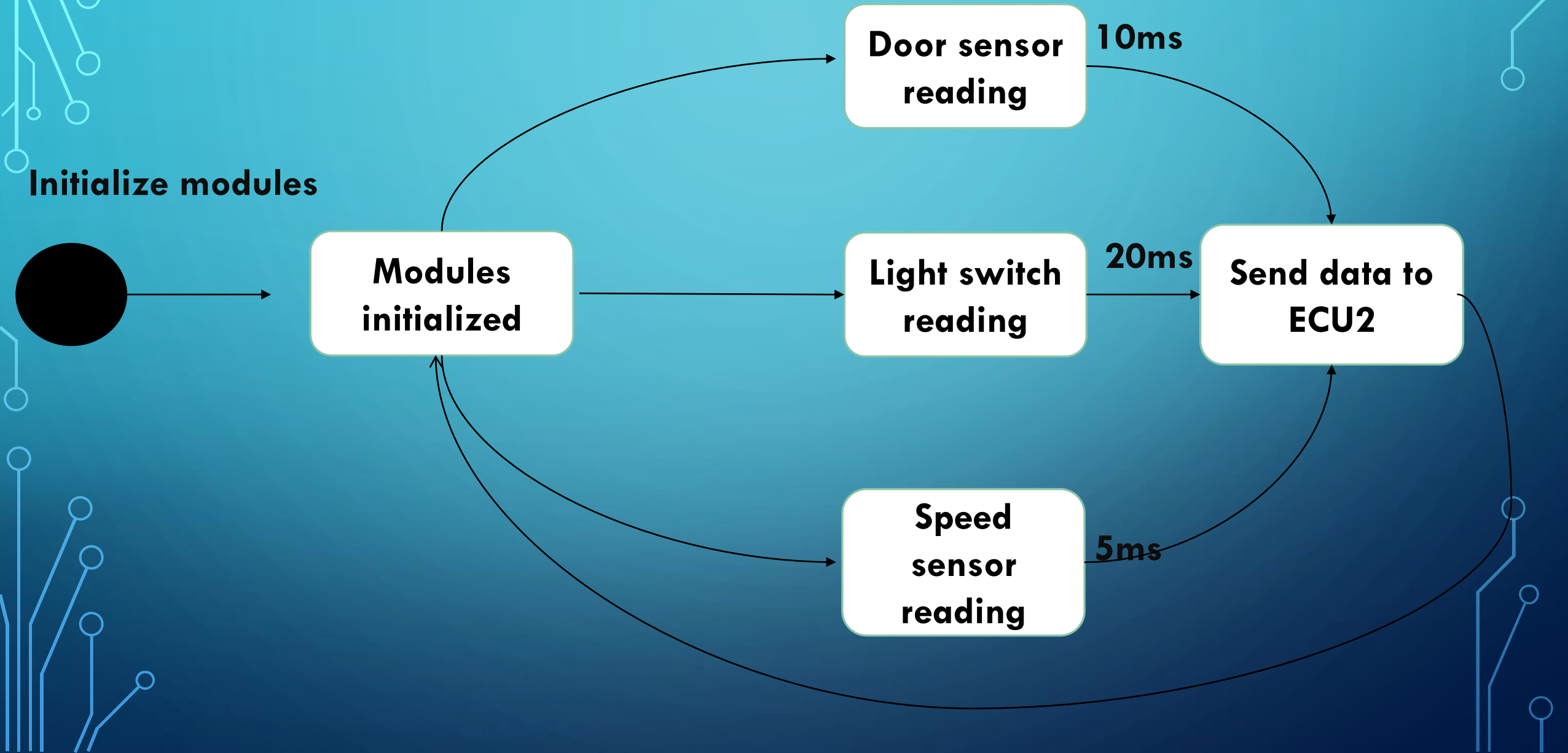
2-Light switch:



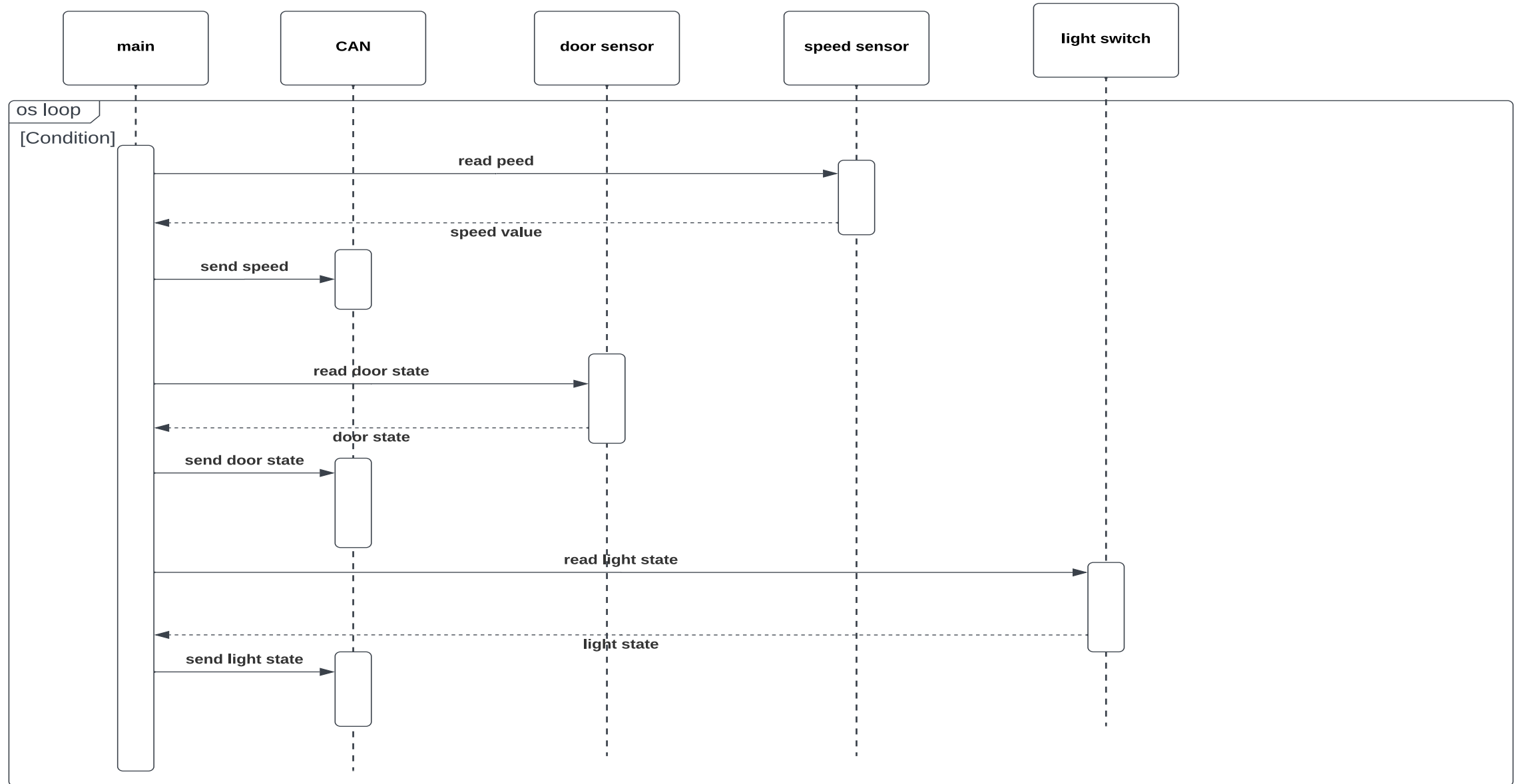
3-speed sensor:



ECU 1 STATE MACHINE DIAGRAM:



ECU1 SEQUENCE DIAGRAM:



ECU1 CPU load

Hyper period = $\text{LCM}(5, 10, 20) = 20$ & assuming tasks execution time = 1 ms

CPU Load = total time / Hyper period

$= (1 * 1 + 1 * 2 + 1 * 4) * 100 / 20 = 35\%$

ECU 2

Buzzer

door open and car move

Switch is pressed and car stop

door open and care stop

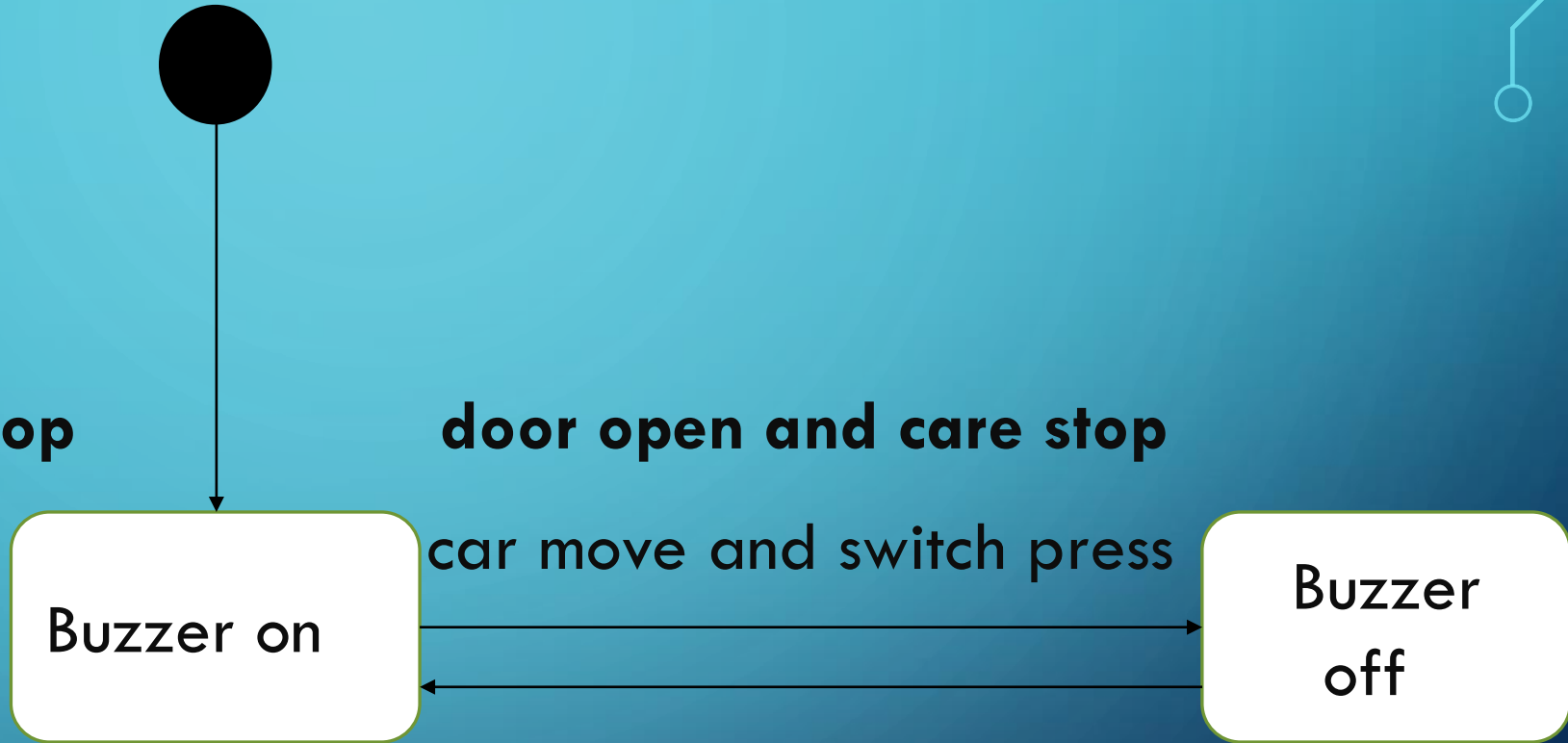
car move and switch press

Buzzer on

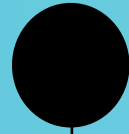
Buzzer
off

car move while door opened

switch pressed while car stop



ECU 2



Light on

door is opened while car moving

door closed and wait 3s

while car stop door open

pressed switch

Light off

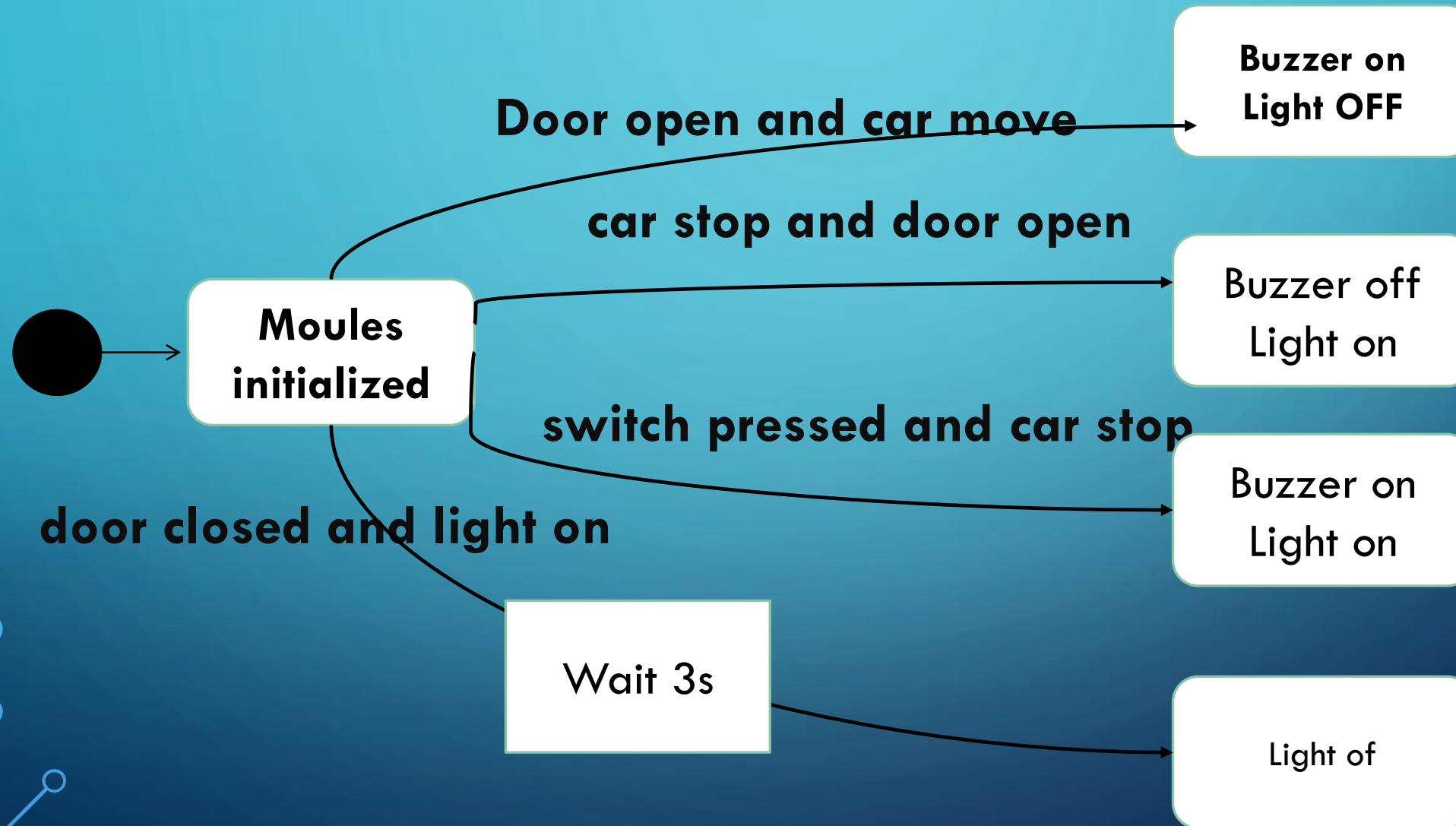


light

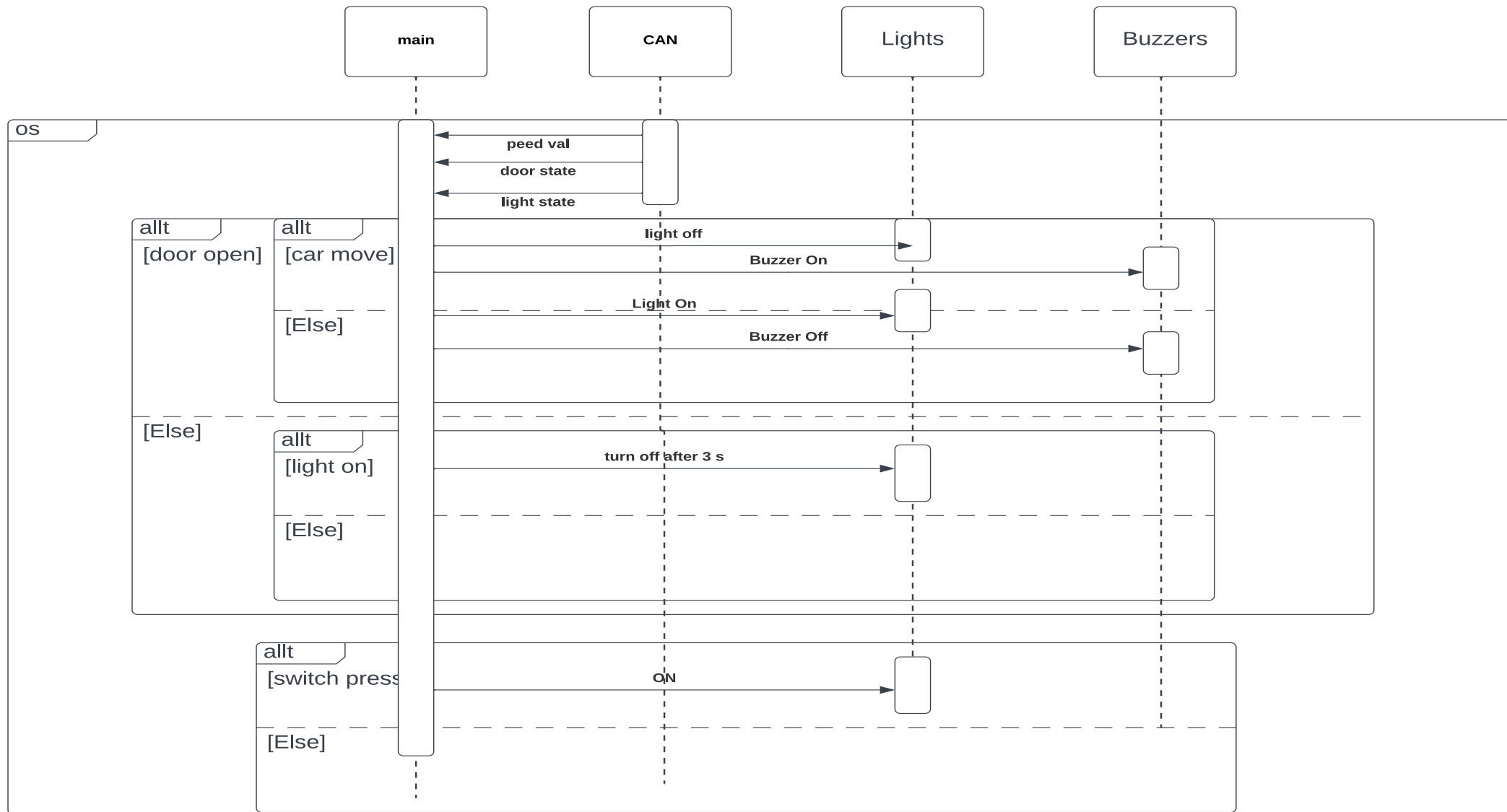
door open and car stop

Car move or stop switch pressed

OPERATION STATE MACHINE DIAGRAM:



ECU 2 SEQUENCE DIAGRAM:



CPU LOAD:

Hyper period= $\text{LCM}(5,5)=5\text{ms}$

Cpu $= (1+1)/5 = 40\%$