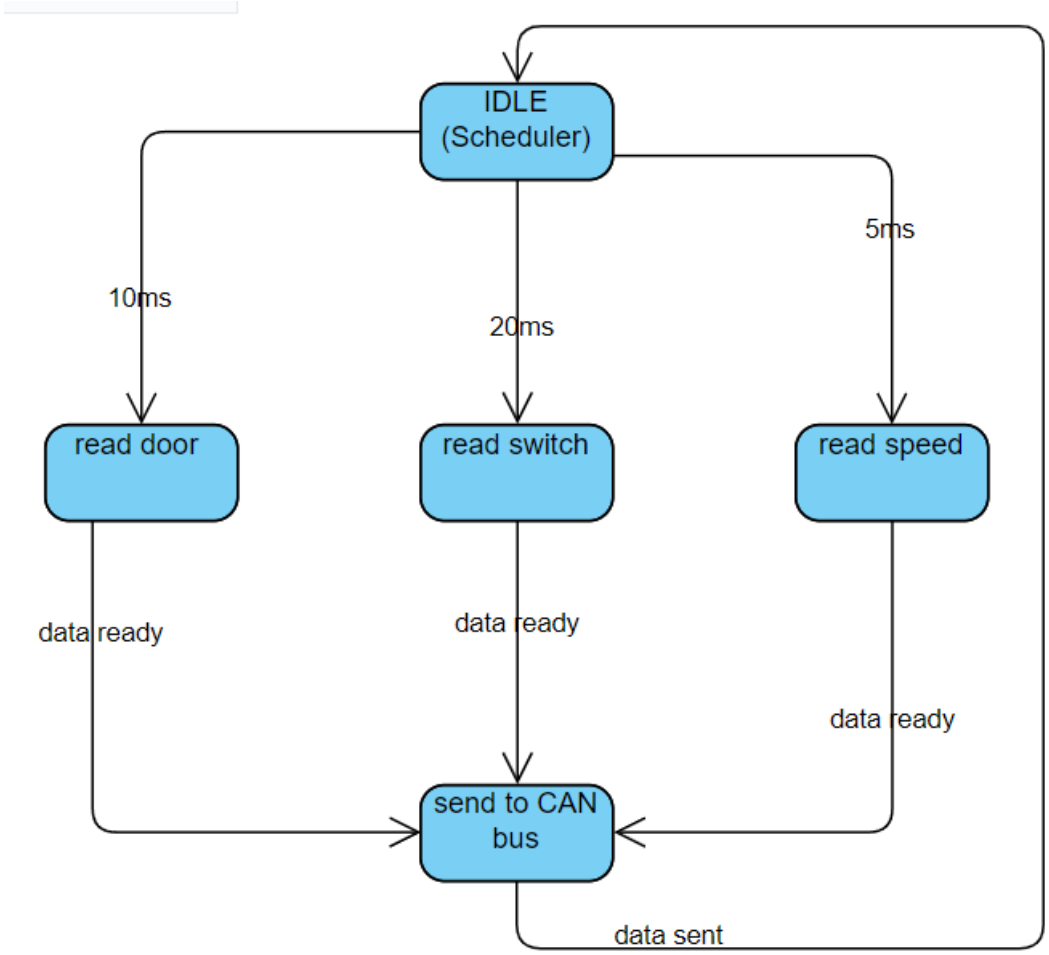
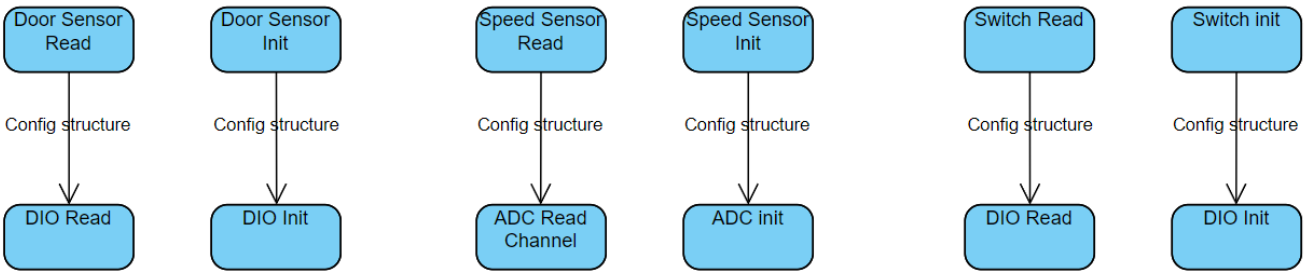
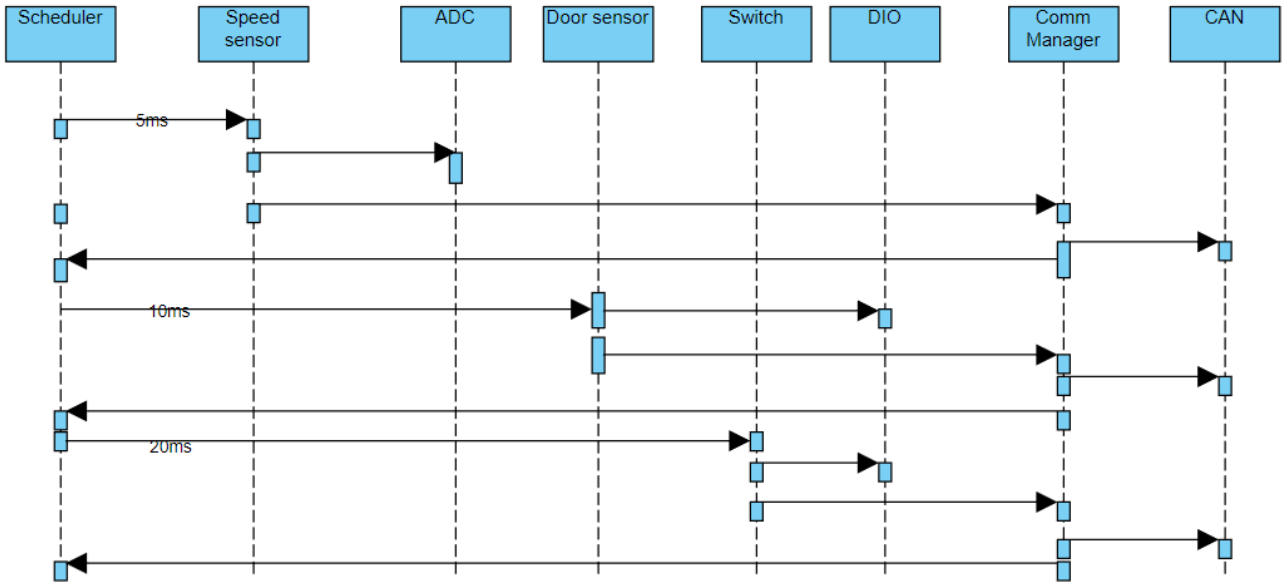
ECU 1

State Machines





Sequence Diagram



CPU Load

Let Tasks execution times = 1 ms

Task No	Task Function	Period
Task 1	DoorState	20ms
Task 2	LightSwitch	10ms
Task 3	SpeedState	5 ms
Task 4	CAN send	5ms

Hyper period = 20 ms

CPU_LOAD = (1 * 1+ 2 * 1 + 4 * 1+ 4 *1) / 20 **= 55%**

BUS load

Task 1 = 8 bits every 20ms = 0.4kbps

Task 2 = 8 bits every 10ms = 0.8 kbps

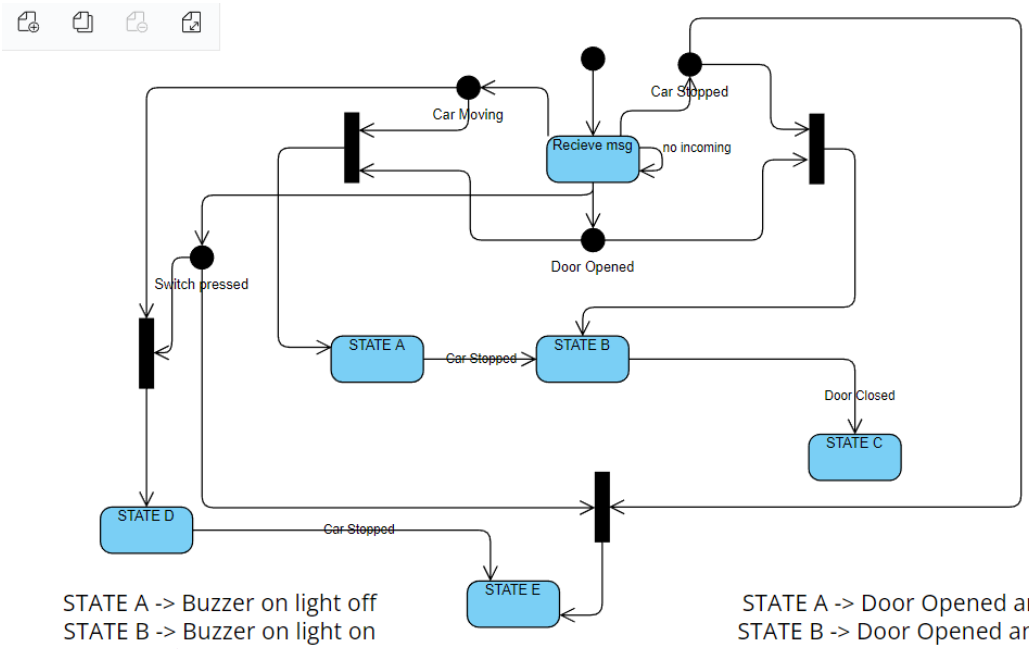
Task 3 = 16 bit every 5ms = 3.2kbps

Total kbps =4.4kbps

Total bus load if 125Kbps speed is used **= 3%**

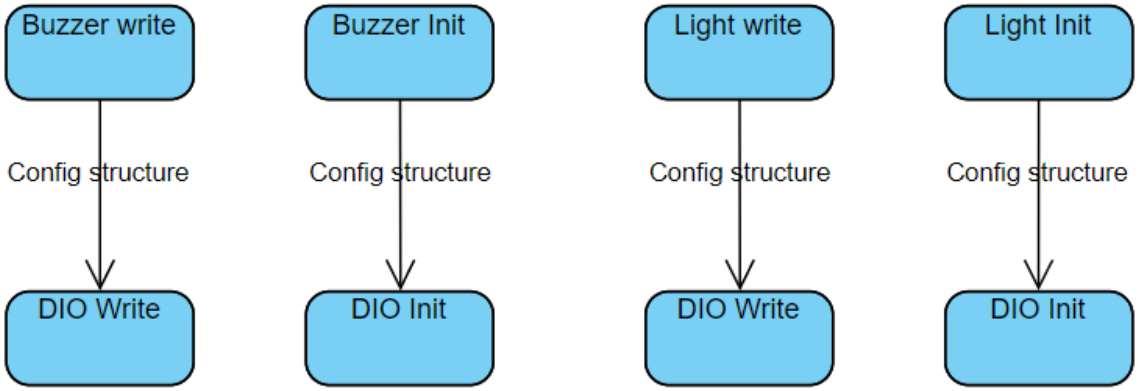
ECU 2

State Diagrams

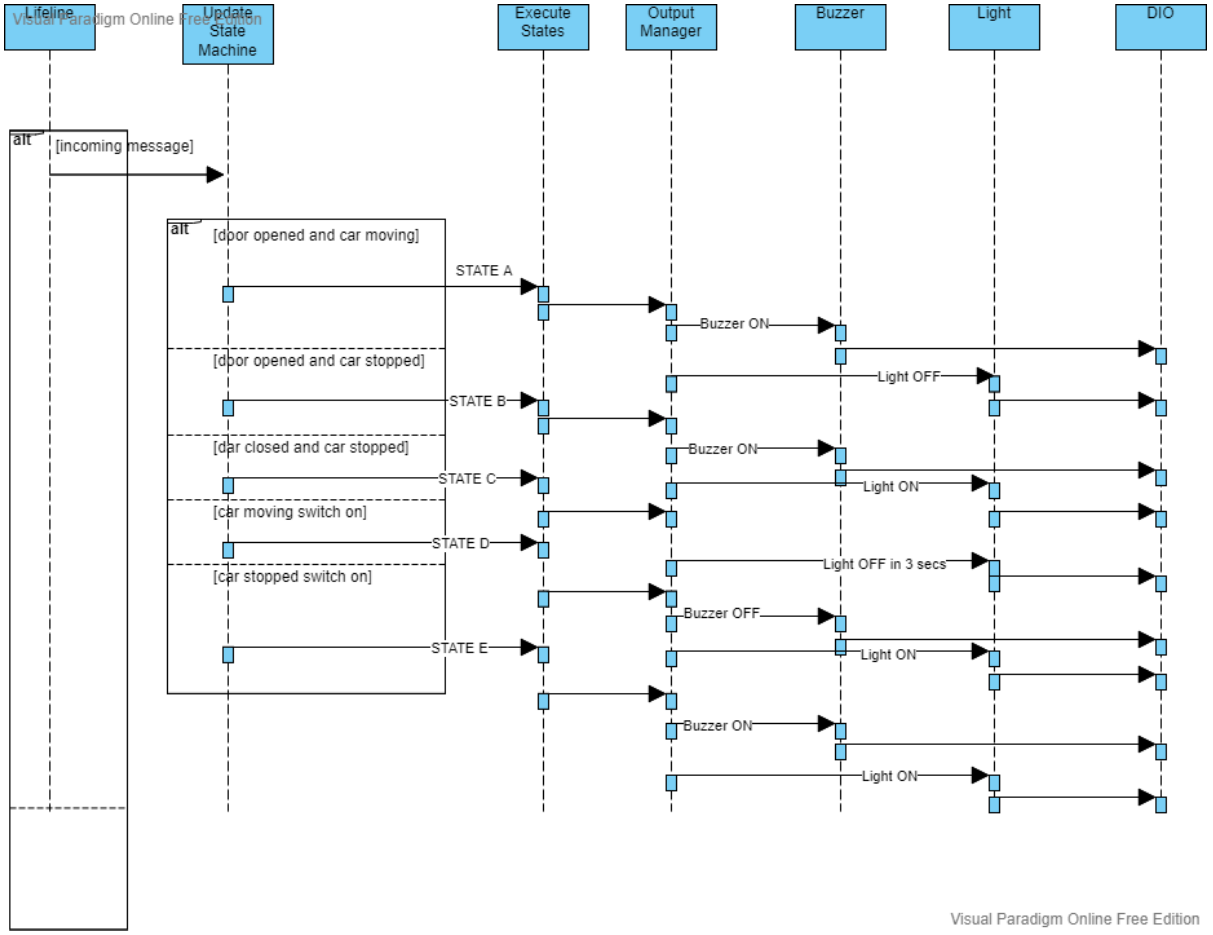


STATE A -> Buzzer on light off
STATE B -> Buzzer on light on
State C -> light off after 3 secs
State D -> Buzzer off light on
STATE E -> Buzzer on light on

STATE A -> Door Opened and car moving
STATE B -> Door Opened and car stopped
State C -> Door Closed Light ON
State D -> Car moving light switch pressed
STATE E -> Car Stopped light switch pressed



Sequence diagram



CPU Load

Task No	Task Function	Period	Execution time(assumed)
Task 1	UpdateState	10ms	1ms
Task 2	Execute State	15ms	5ms
Task 3	CAN receive	5 ms	1ms

Hyper period = 30ms

CPU_LOAD = (3*1 + 2*5 + 6*1) /30 **= 53.3%**

Communication stack