



Automotive Door Control System Design

Part 2

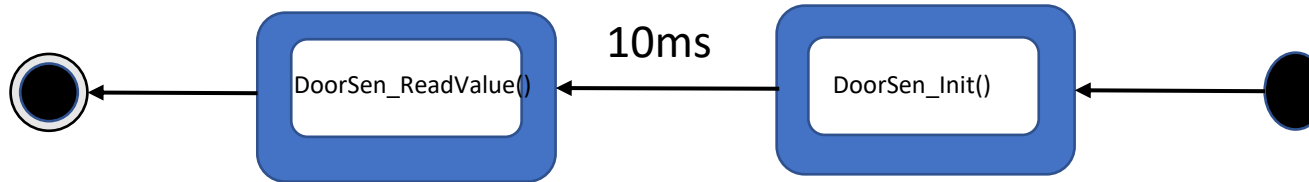
Dynamic Design

Name: Sohaib Dar

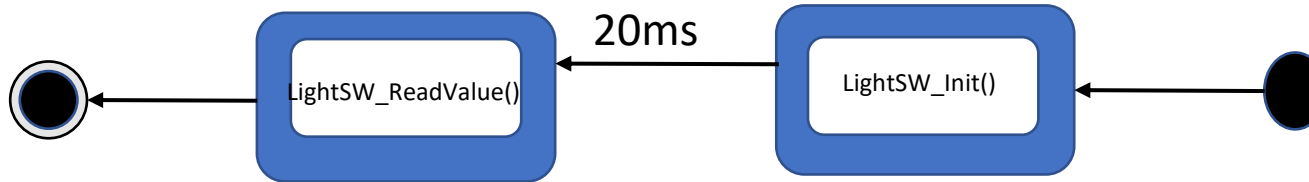
ECU 1

1- State Machine Diagram for each ECU1 Component

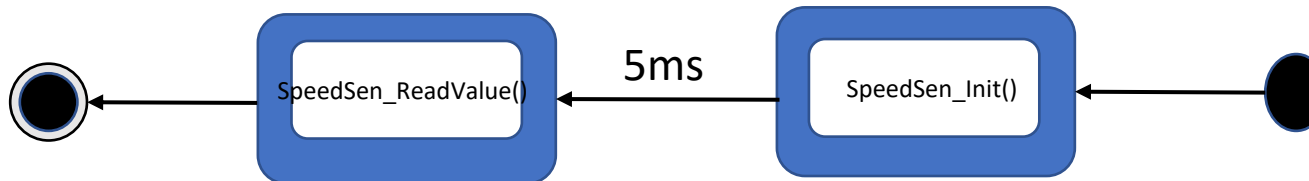
- Door Sensor



- Light Switch

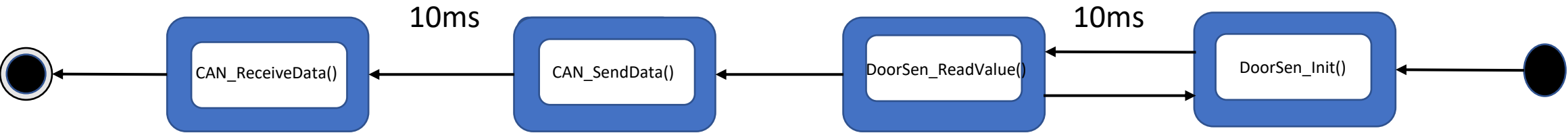


- Speed Sensor

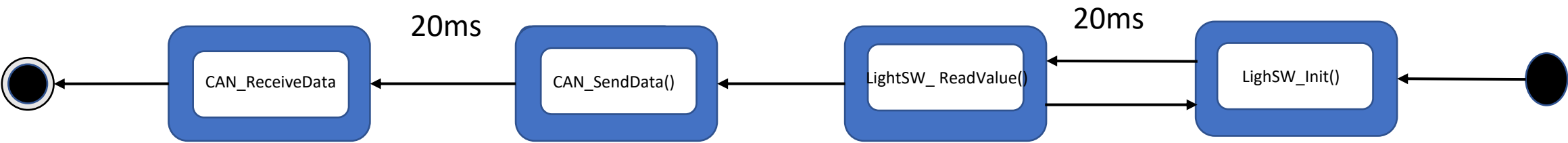


2- State Machine Diagram for ECU1 Operation

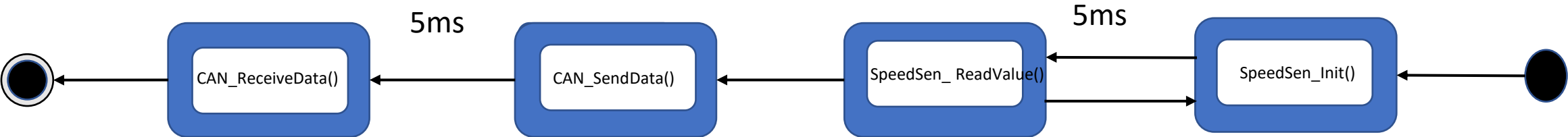
- Door Sensor



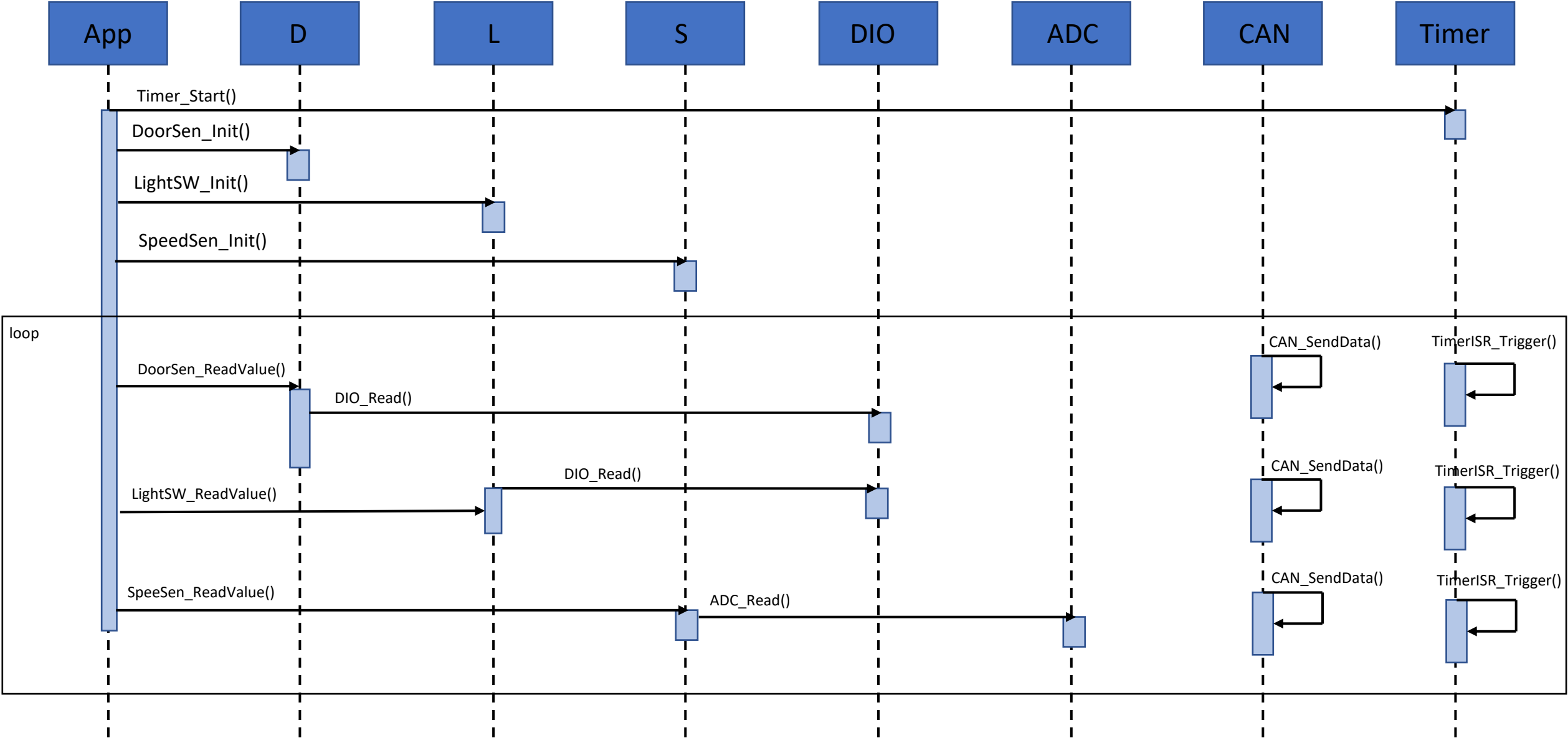
- Light Switch



- Speed Sensor



3- Sequence Diagram for ECU1



4- CPU load for ECU1

SWC	Periodicity	Burst	CPU Load
Reading and Sending Door State	10ms	1ms	10 %
Reading and Sending Switch State	20ms	1ms	5 %
Reading and Sending Car Speed	5ms	2ms	40 %

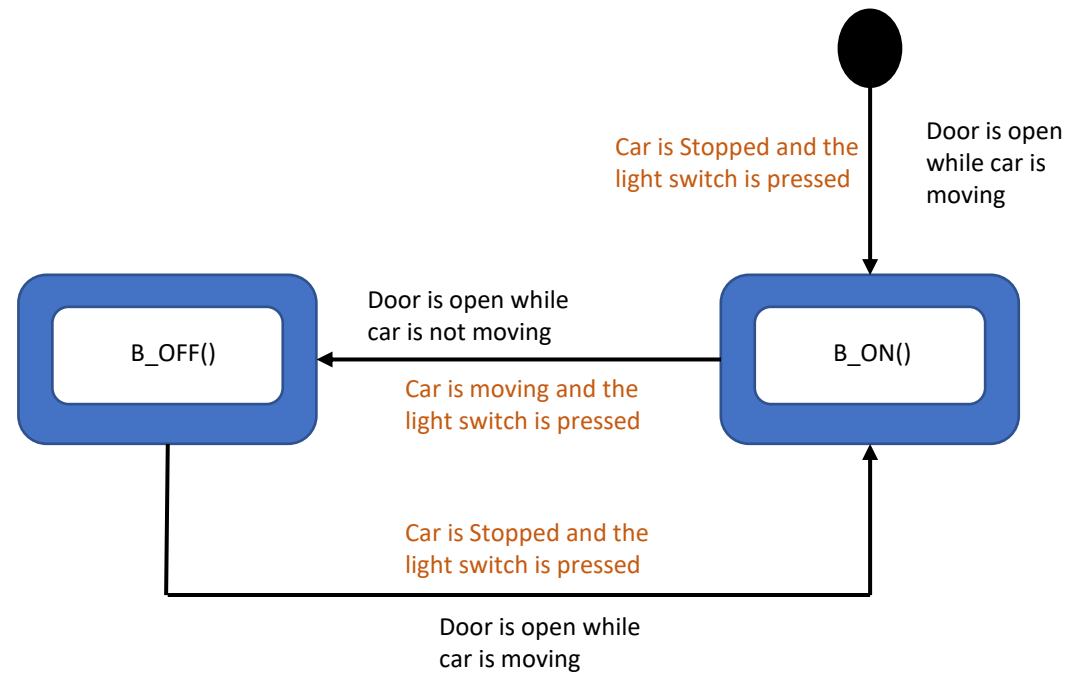
CPU Load = Load-1 + Load-2 + Load-3 = 10 % + 5 % + 40 % = 55 %

✓ All Periodicity and Burst values are assumed to show the proof of concept

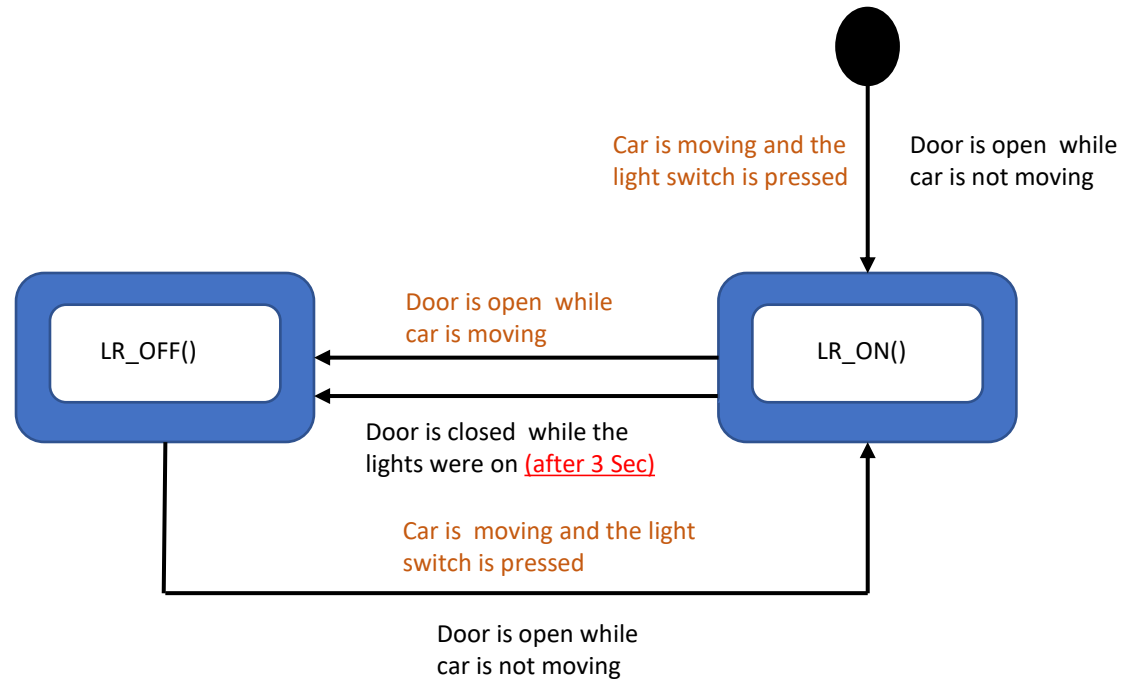
ECU 2

1- State Machine Diagram

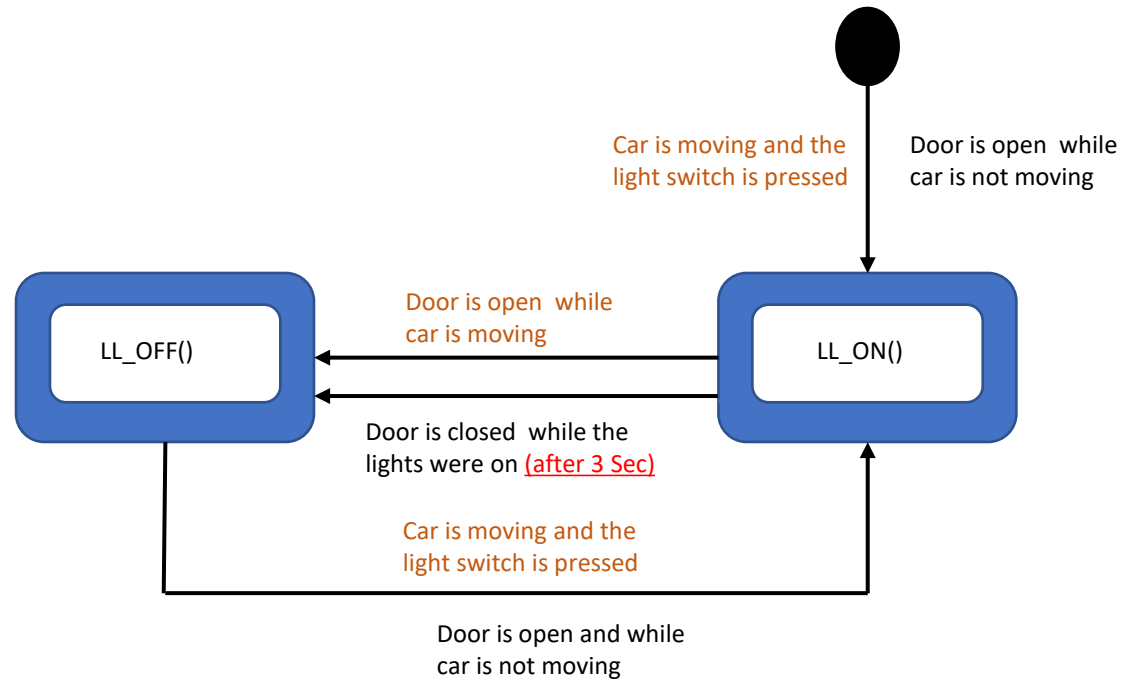
- Buzzer(B)



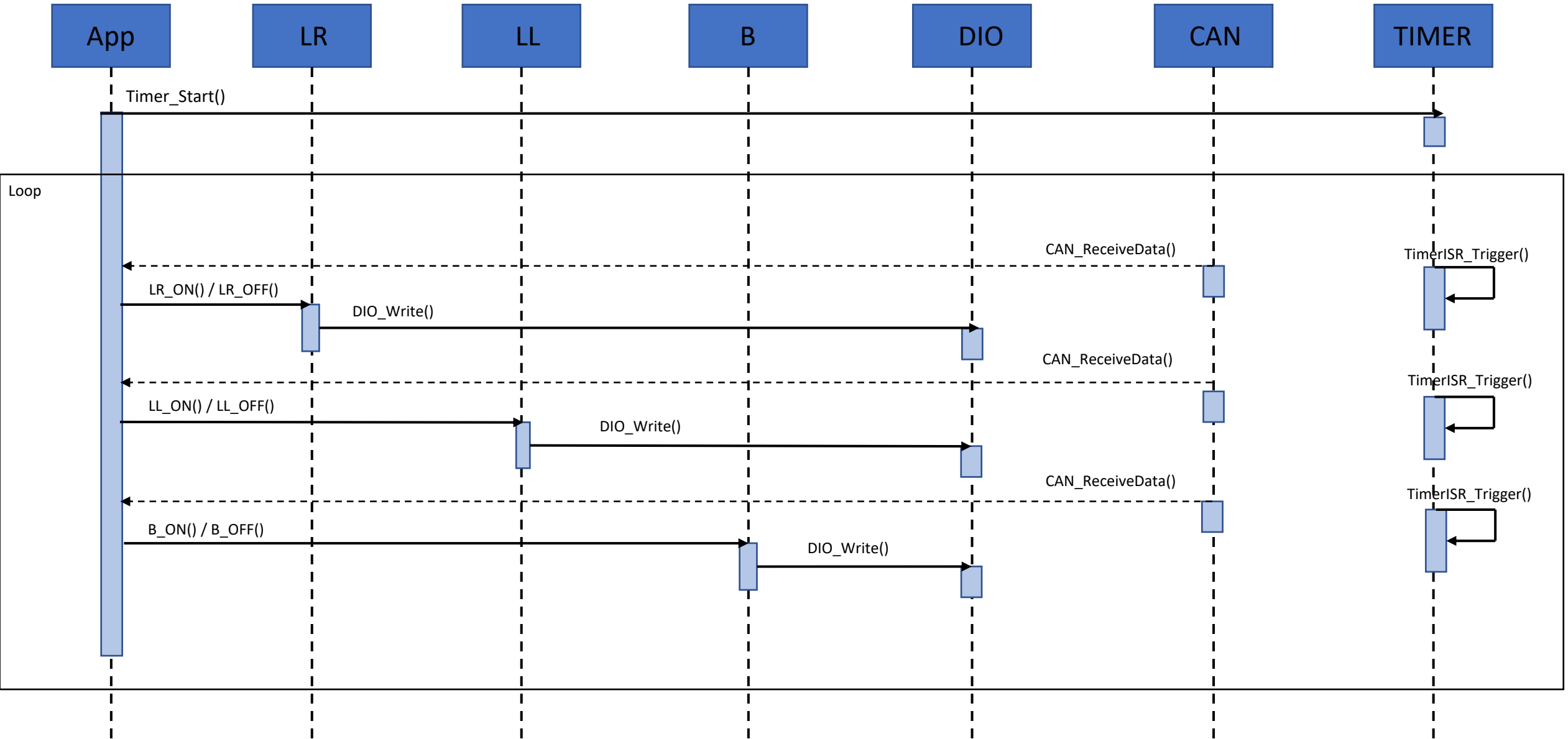
- Light Right (LR)



- Light Right (LL)



3- Sequence Diagram for ECU2



4- CPU load for ECU2

SWC	Periodicity	Burst	CPU Load
Updating Left Light State	10ms	1ms	10 %
Updating Right Light State	10ms	1ms	10 %
Updating Buzzer State	10ms	2ms	20 %

$$\text{CPU Load} = \text{Load-1} + \text{Load-2} + \text{Load-3} = 10 \% + 10 \% + 20 \% = 40 \%$$

✓ All Periodicity and Burst values are assumed to show the proof of concept