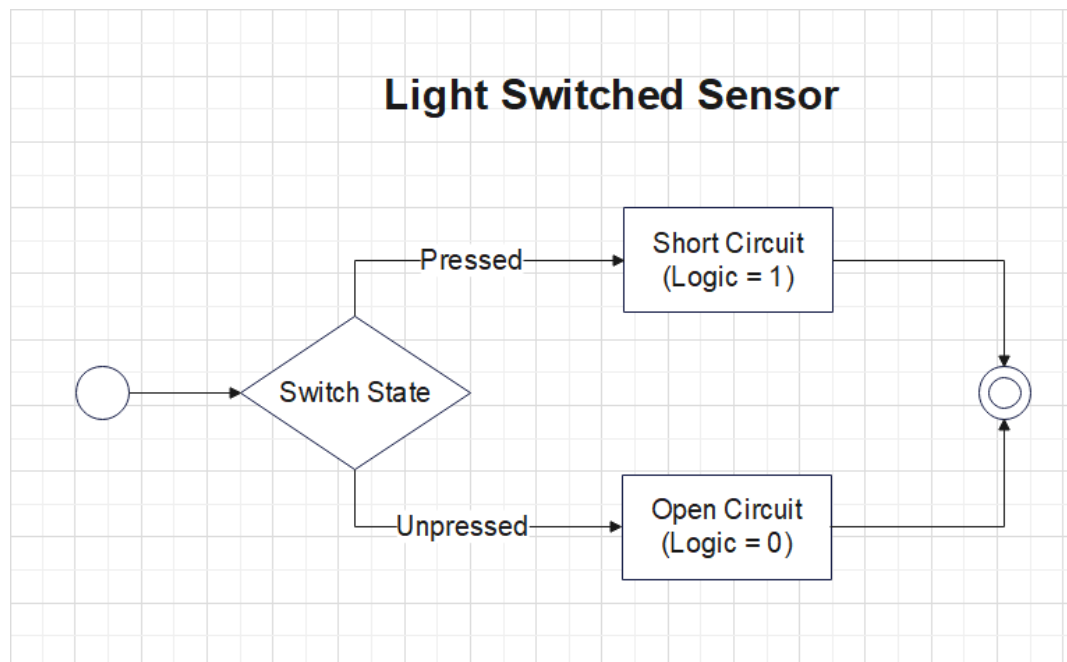
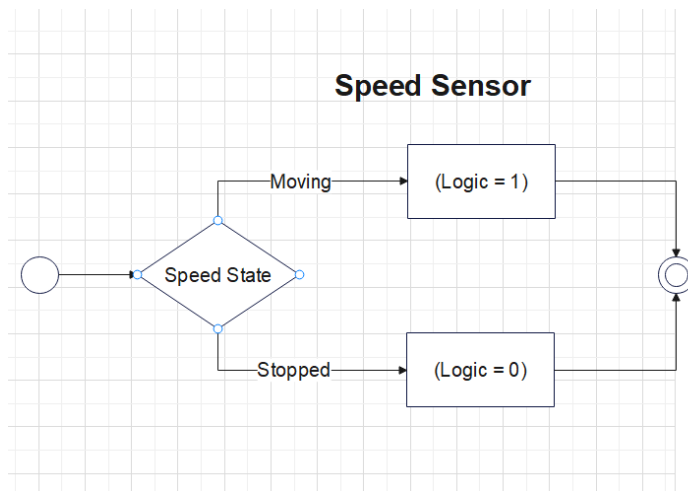
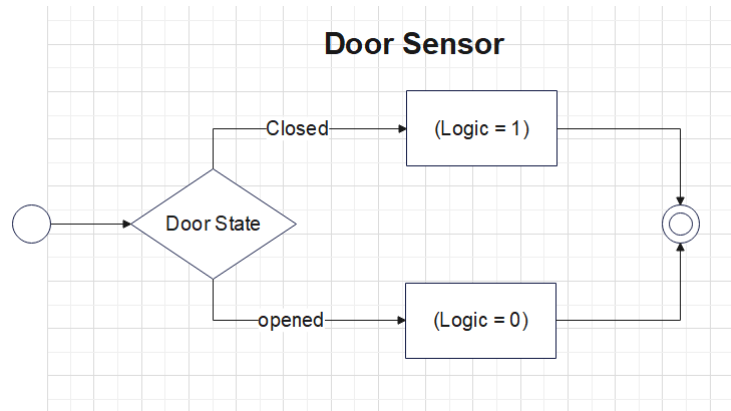
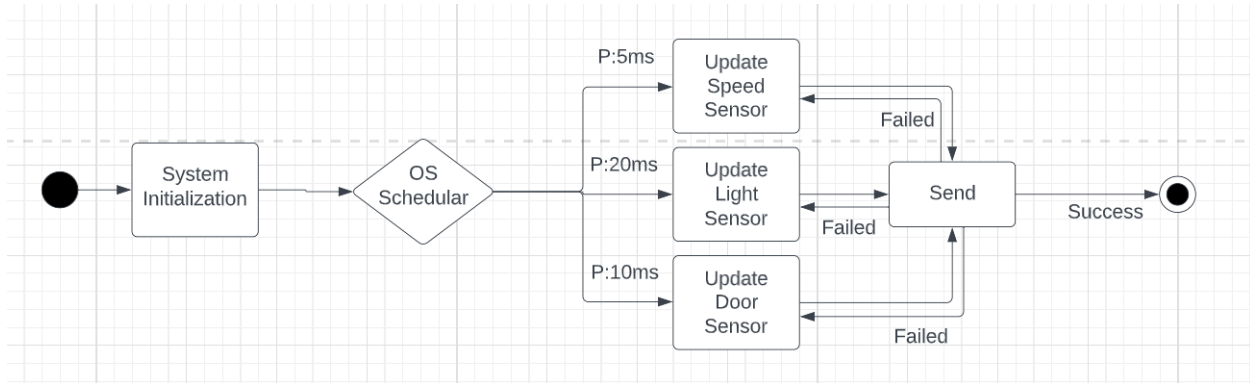


1- State Machine for each component

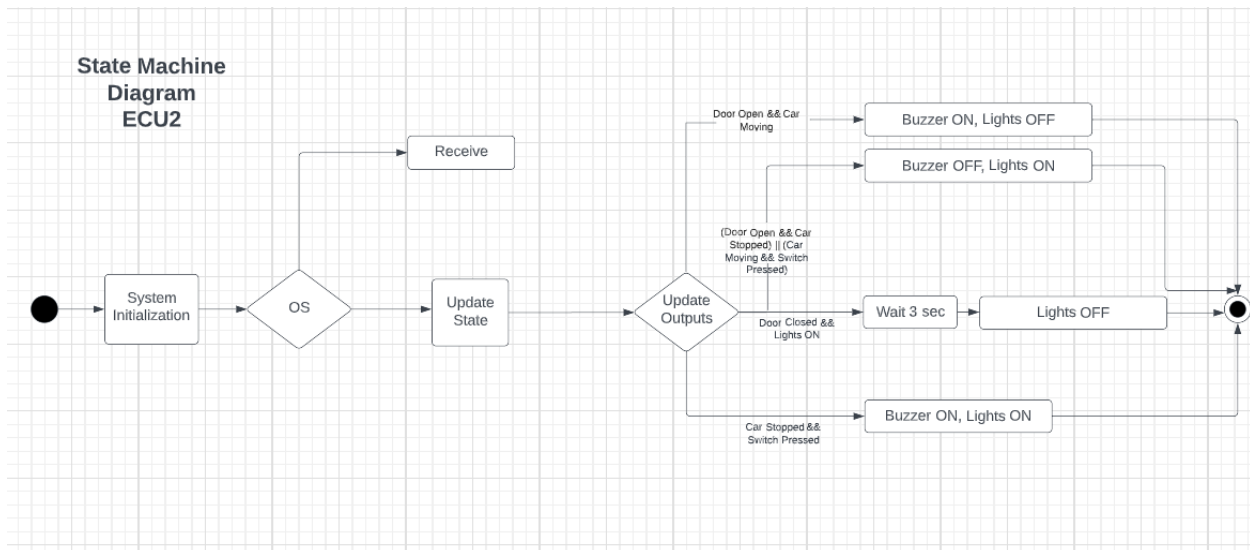


2- State Machine for the system

ECU1

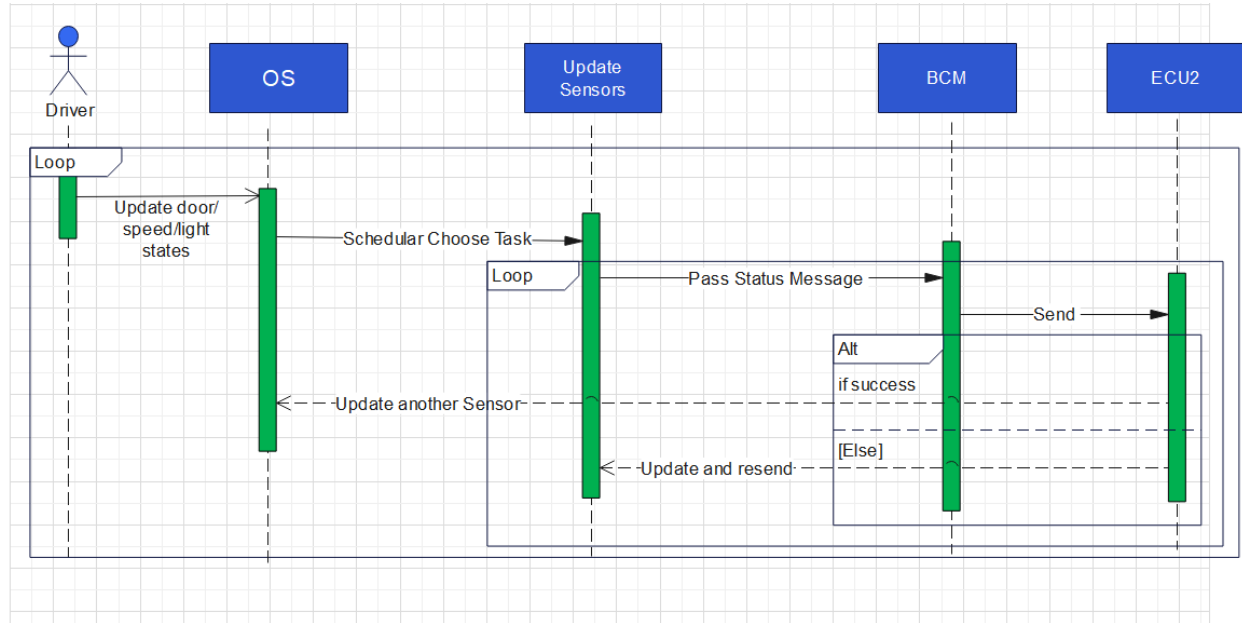


ECU2

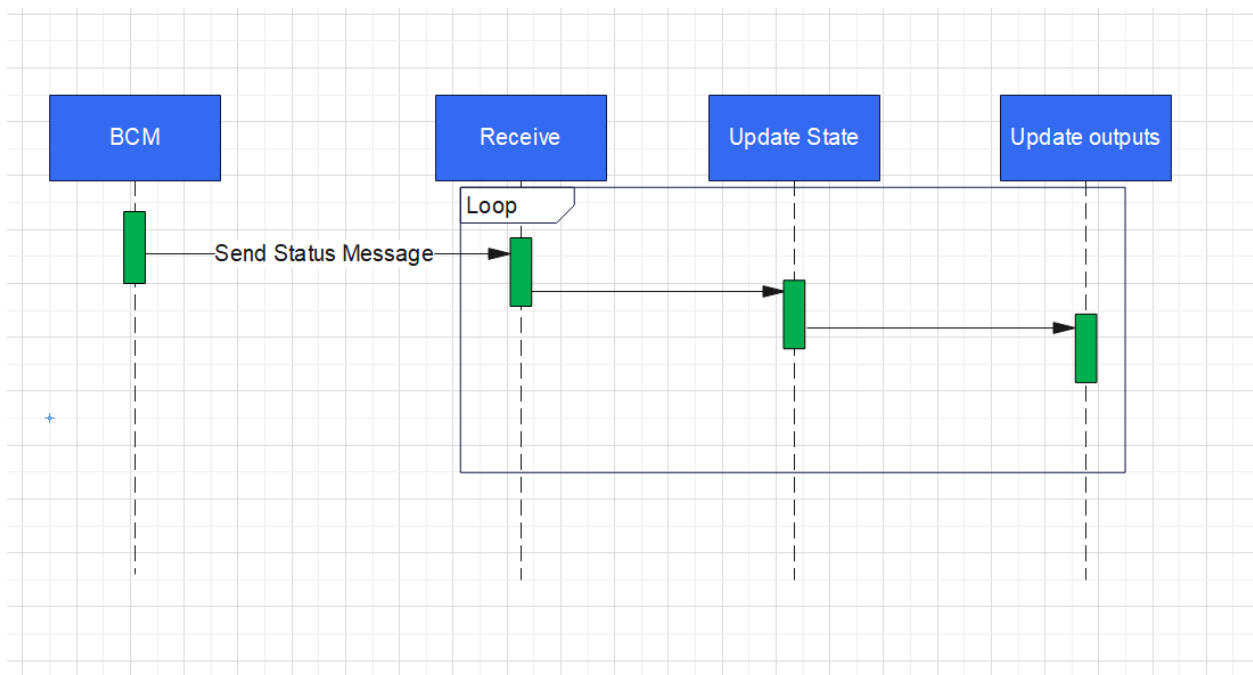


3- Sequence Diagram

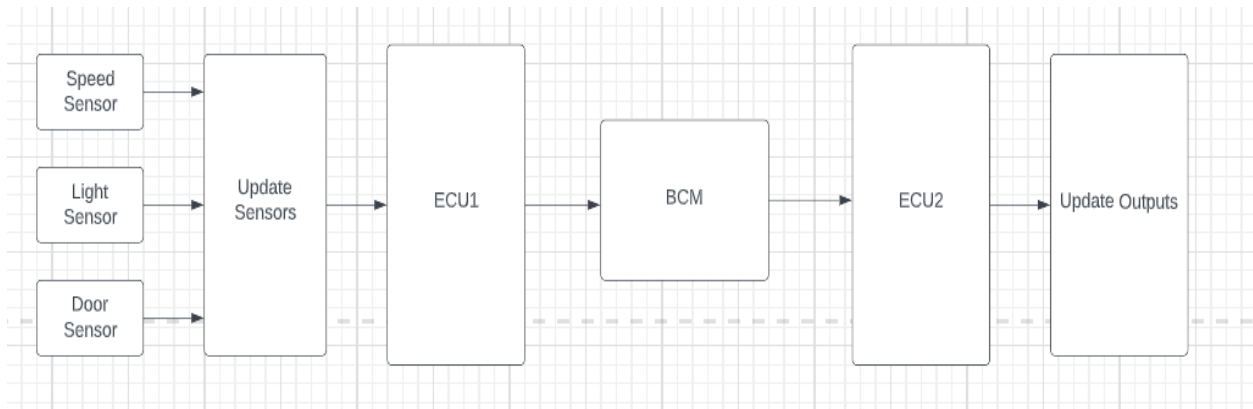
ECU1



ECU2



4- Block Diagram



ECU1 CPU Load

We have three tasks:

sendDoor(), sendSpeed(), sendLight().

E1 = 0.5ms, E2 = 0.5ms, E3 = 0.5ms

Hyper Period = 20ms

$$CPU\ Load = \sum_{n=1}^3 \frac{E_n}{Hyper\ Period} * \frac{Hyper\ Period}{P_n} = \frac{E_n}{P_n}$$

$$CPU\ Load = \frac{0.5}{5} + \frac{0.5}{10} + \frac{0.5}{20} = 0.175 = 17.5\%$$

SimSo: Real-Time Scheduling Simulator - [Results]

Qt File View Help

* Unsaved			
General	Logs	Tasks	Scheduler
Observation Window:			
from 0.00 to 100.00 ms			
	Total load	Payload	System load
CPU 1	0.1750	0.1750	0.0000
Average	0.1750	0.1750	0.0000

ECU2 CPU Load

We have two tasks:

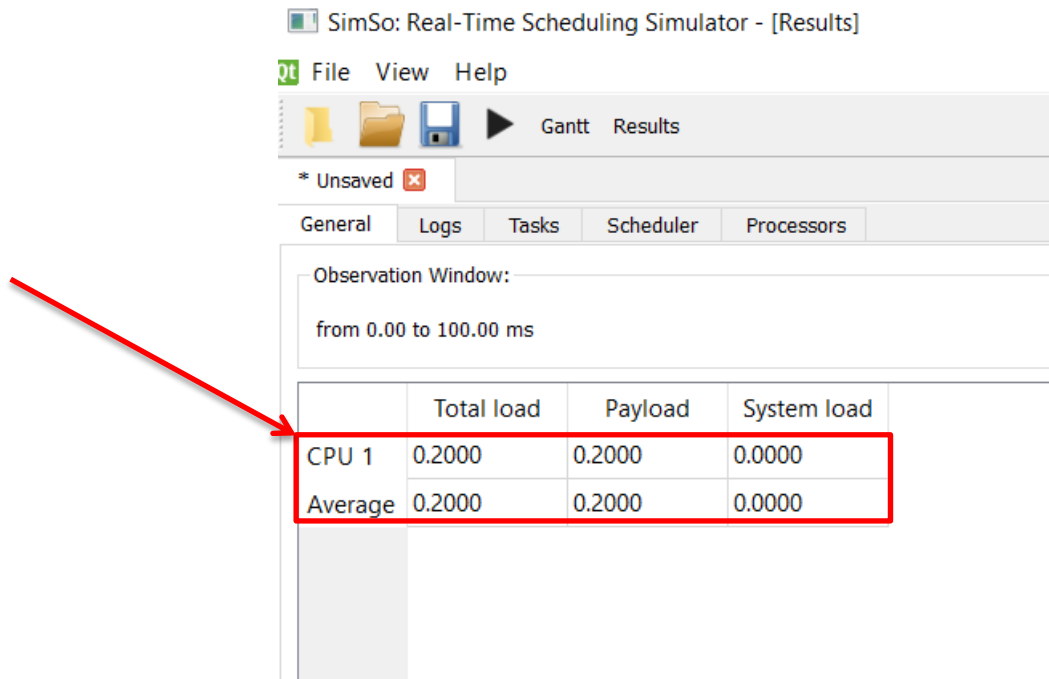
receive(), updateState().

E1 = 0.5ms, E2 = 0.5ms

Hyper Period = 5ms

$$CPU\ Load = \sum_{n=1}^2 \frac{E_n}{Hyper\ Period} * \frac{Hyper\ Period}{P_n} = \frac{E_n}{P_n}$$

$$CPU\ Load = \frac{0.5}{5} + \frac{0.5}{5} = 0.2 = 20\%$$



	Total load	Payload	System load
CPU 1	0.2000	0.2000	0.0000
Average	0.2000	0.2000	0.0000

Bus Load

We have only three tasks that use the bus:

sendDoor(), sendSpeed(), sendLight().

E1 = 0.5ms, E2 = 0.5ms, E3 = 0.5ms

Hyper Period = 1s

$$\text{Bus Load} = \sum_{n=1}^3 \frac{E_n}{\text{Hyper Period}} * \frac{\text{Hyper Period}}{P_n} = \frac{E_n}{P_n}$$

$$\text{Bus Load} = \frac{0.5}{5} + \frac{0.5}{10} + \frac{0.5}{20} = 0.175 = 17.5\%$$