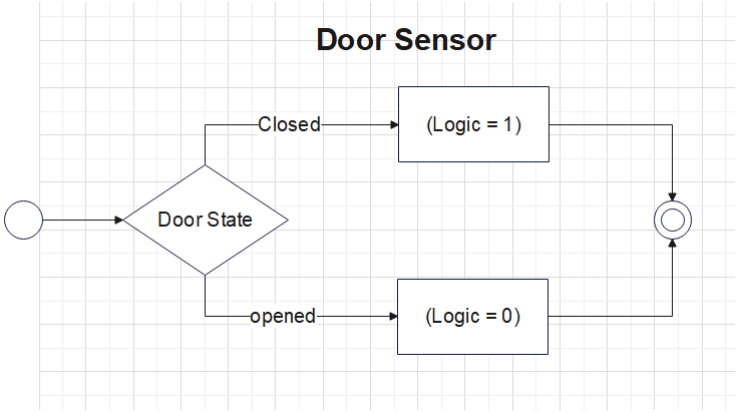
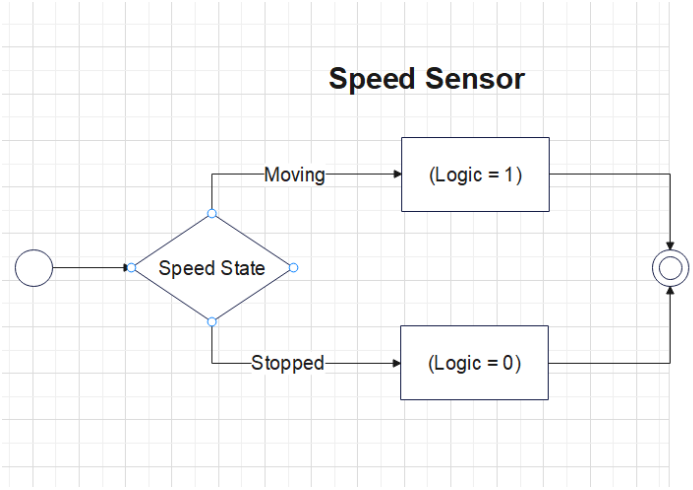
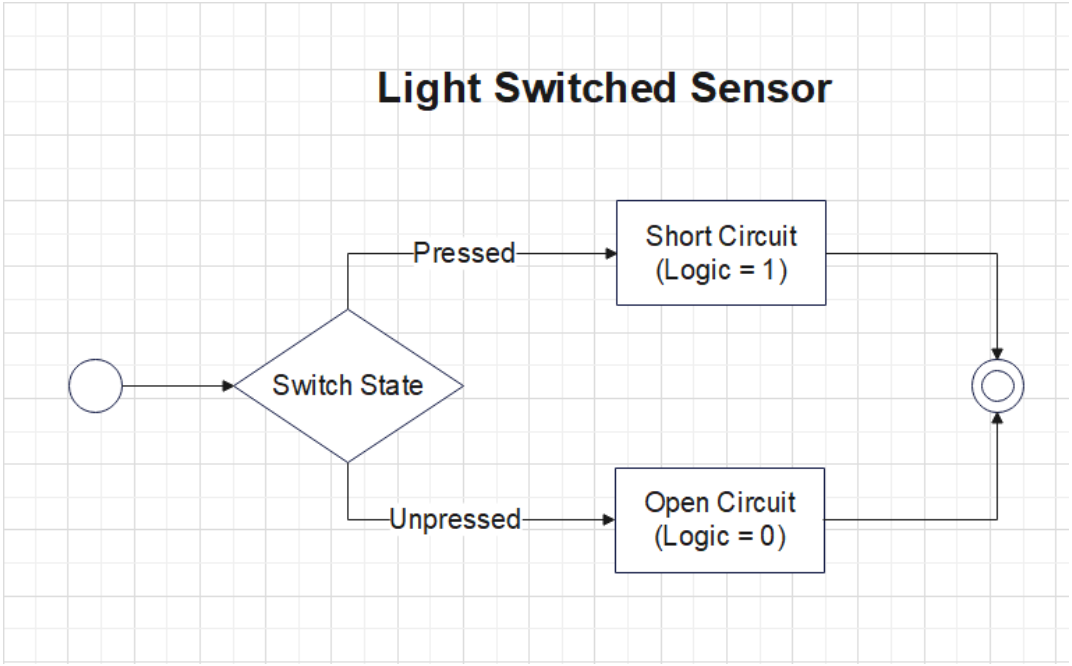
1- State Machine for each component

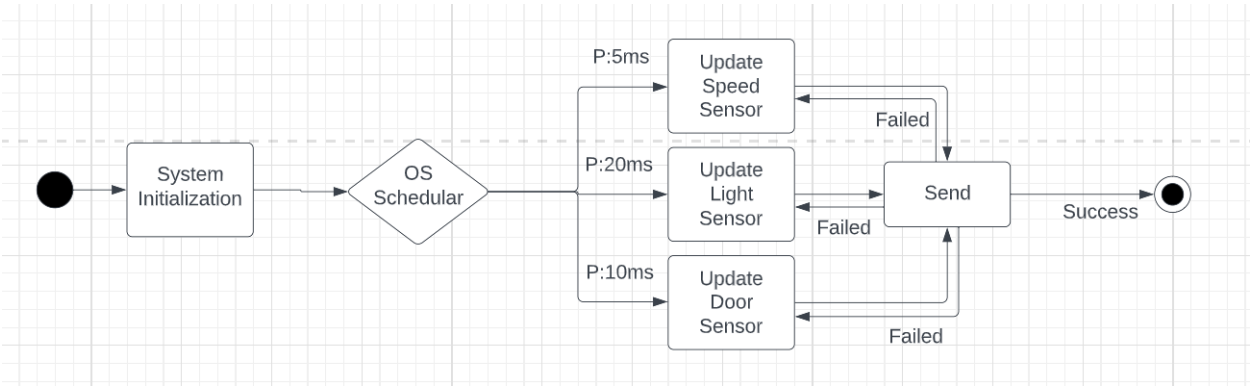




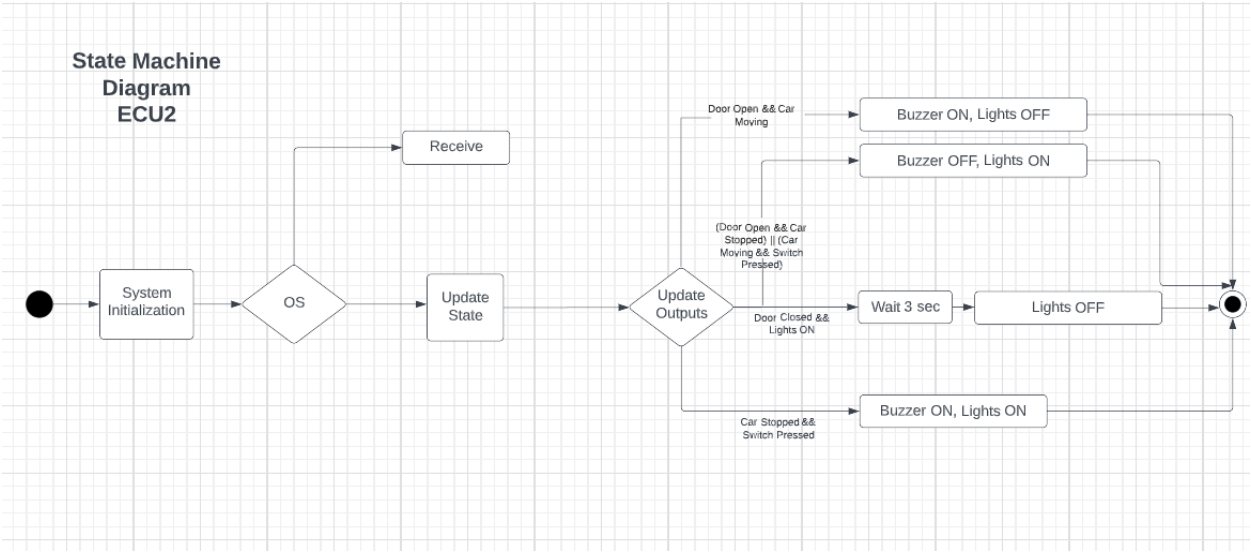


2- State Machine for the system

ECU1

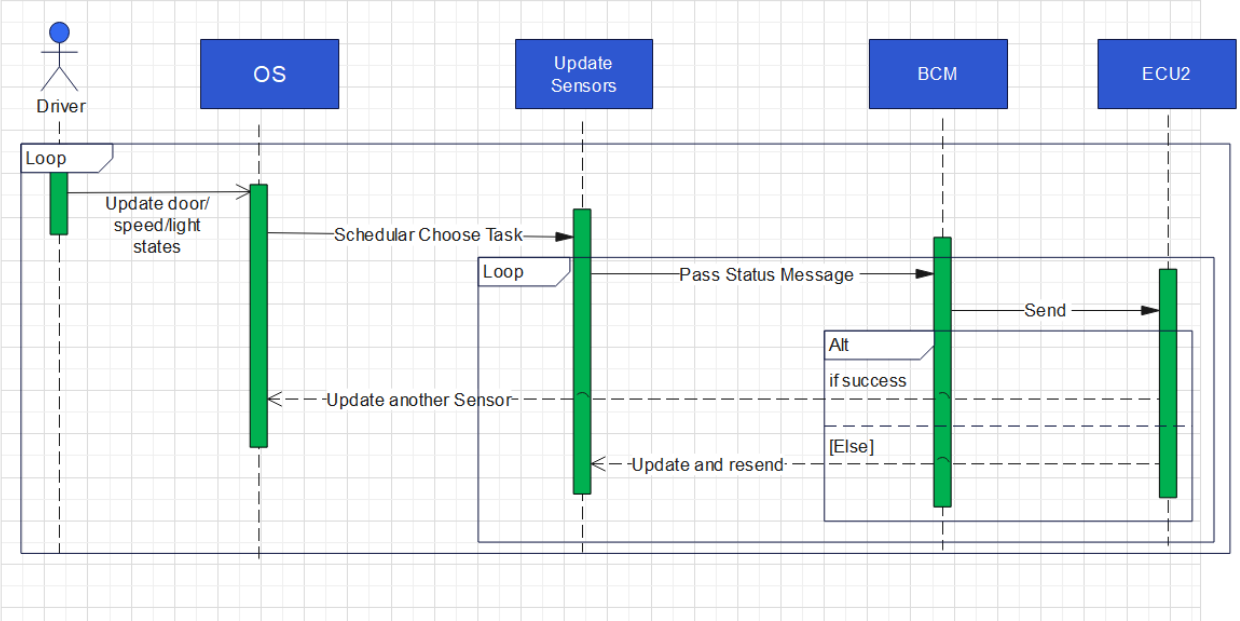


ECU2

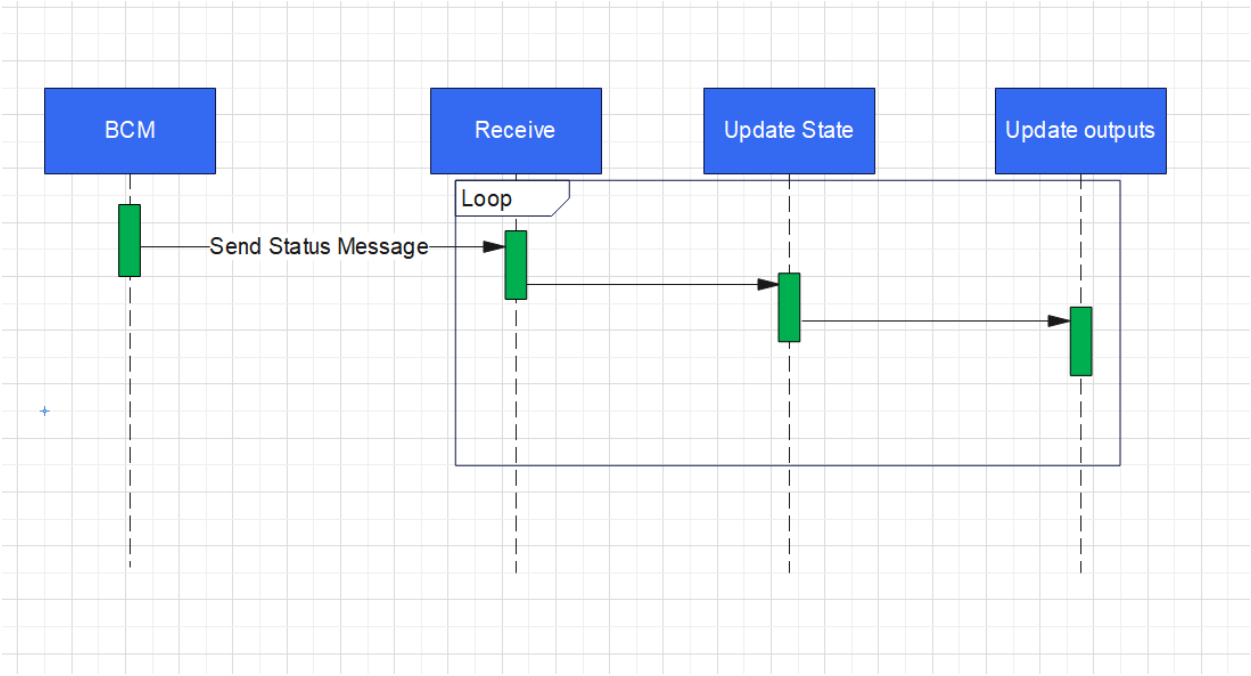


3- Sequence Diagram

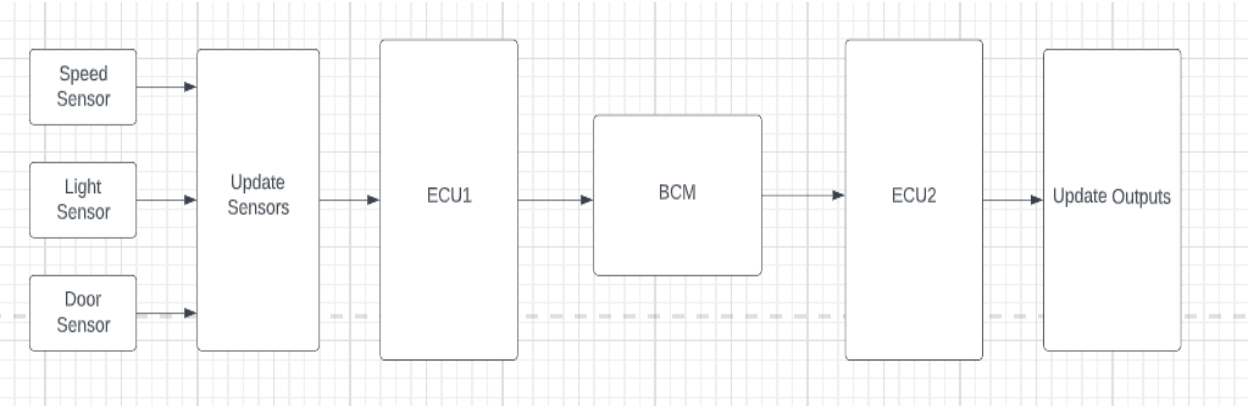
ECU1



ECU2



4- Block Diagram



ECU1 CPU Load

We have three tasks:

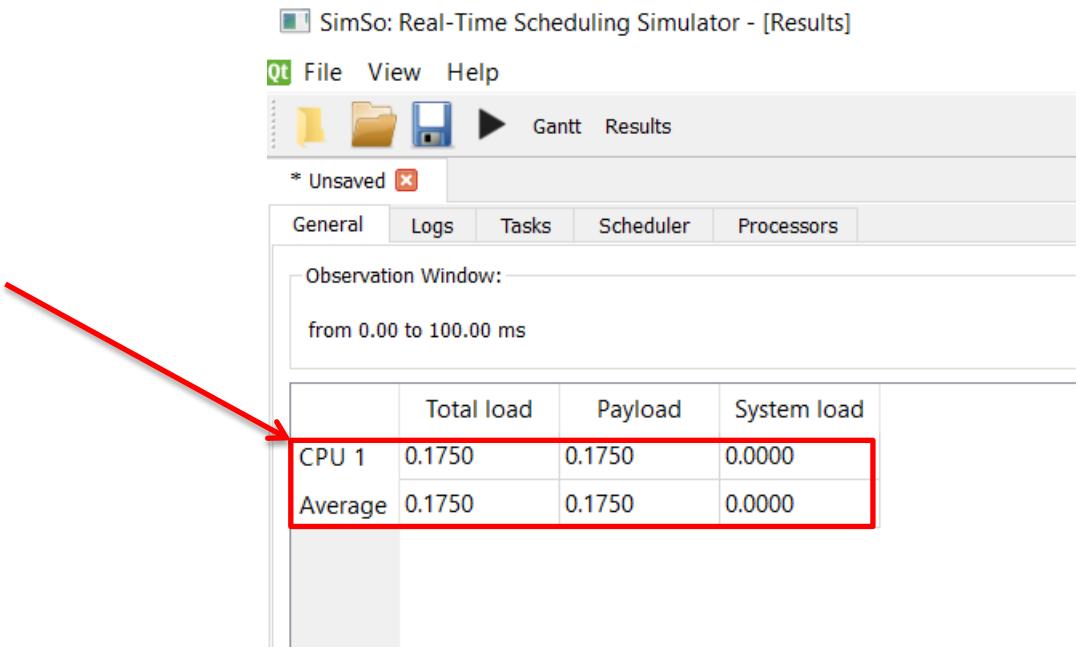
sendDoor(), sendSpeed(), sendLight().

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

$$Hyper\ Period = 20ms$$

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

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



ECU2 CPU Load

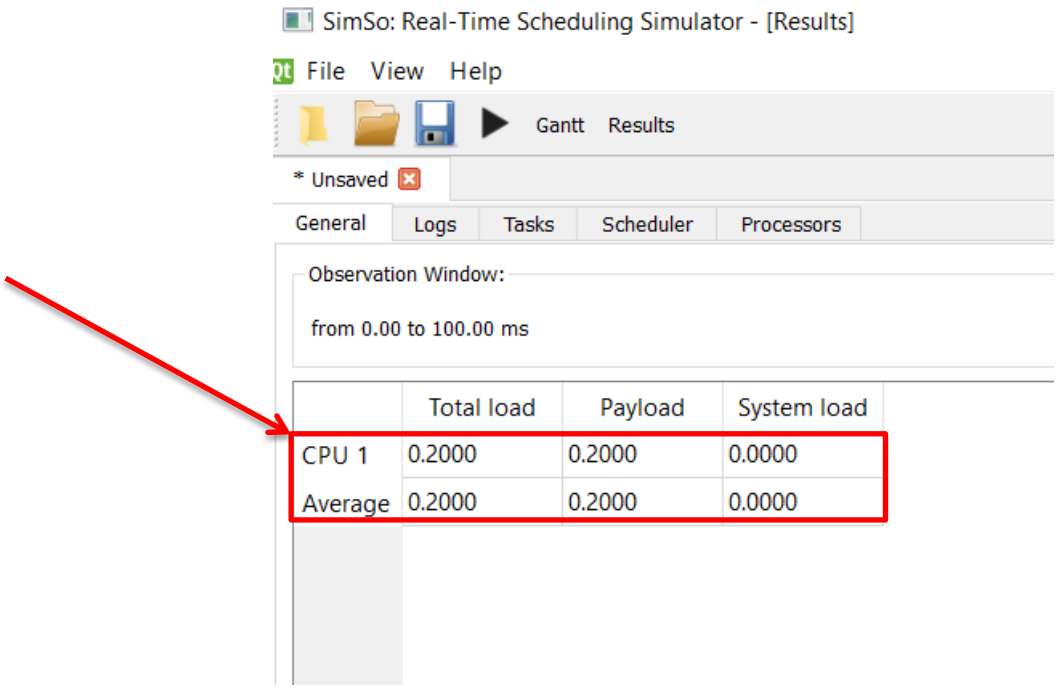
We have two tasks:
receive(), **updateState().**

E1 = 0.5ms, **E2 = 0.5ms**

$$Hyper\ Period = 5ms$$

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

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



Bus Load

We have only three tasks that use the bus:

sendDoor(),	**sendSpeed(),**	**sendLight().**
E1 = 0.5ms,	**E2 = 0.5ms,**	**E3 = 0.5ms**

$$Hyper\ Period = 1s$$

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

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