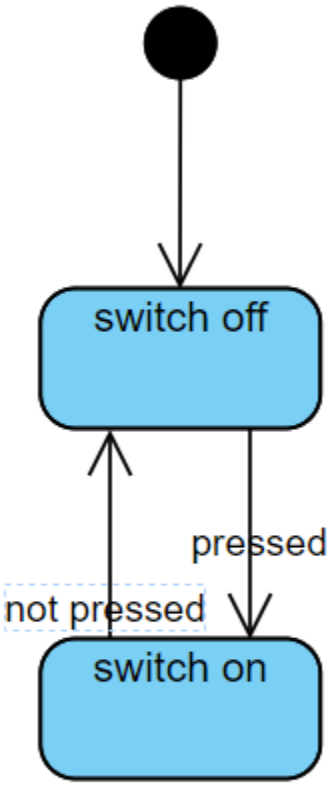
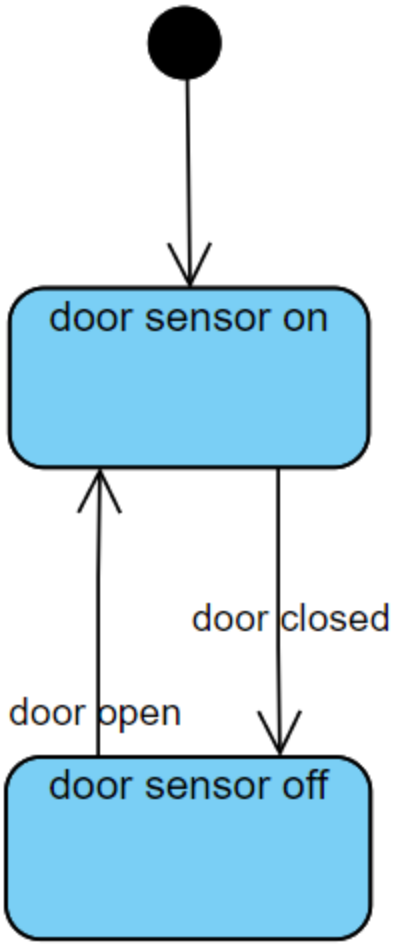
Components States State Machine Diagram

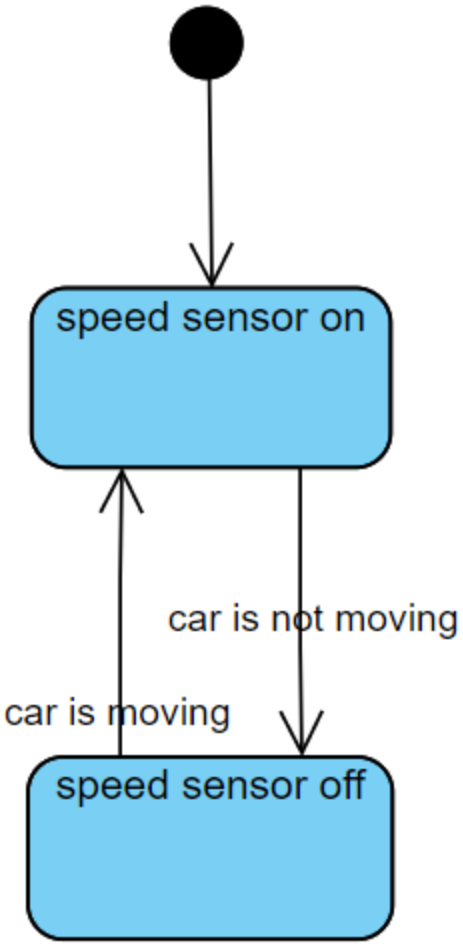
Switches State Machine :-



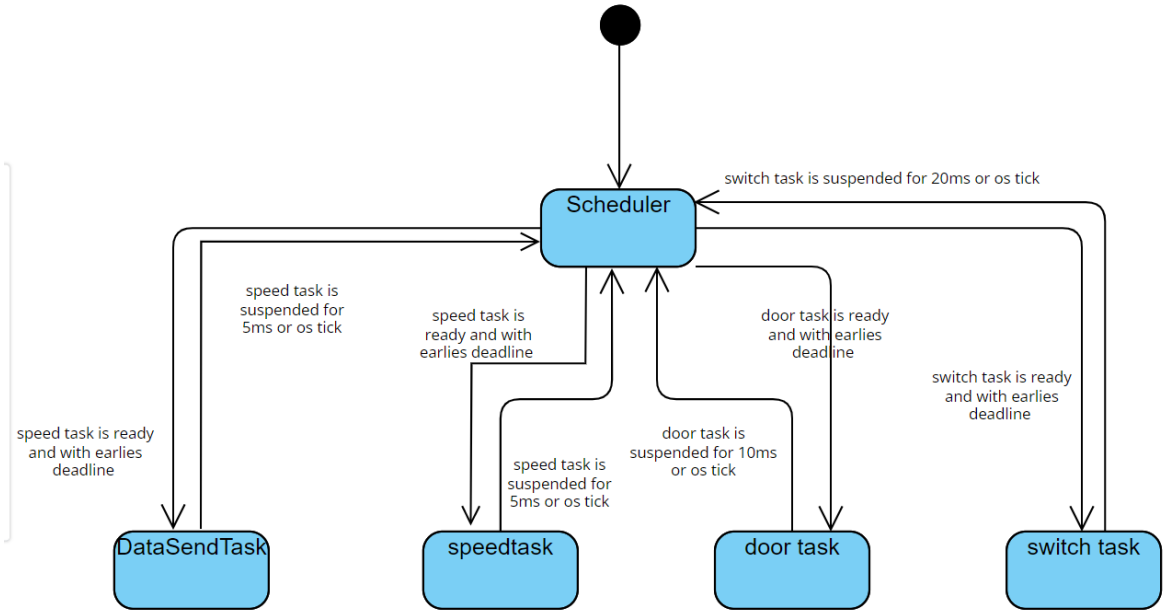
Door Sensor State Machine :-



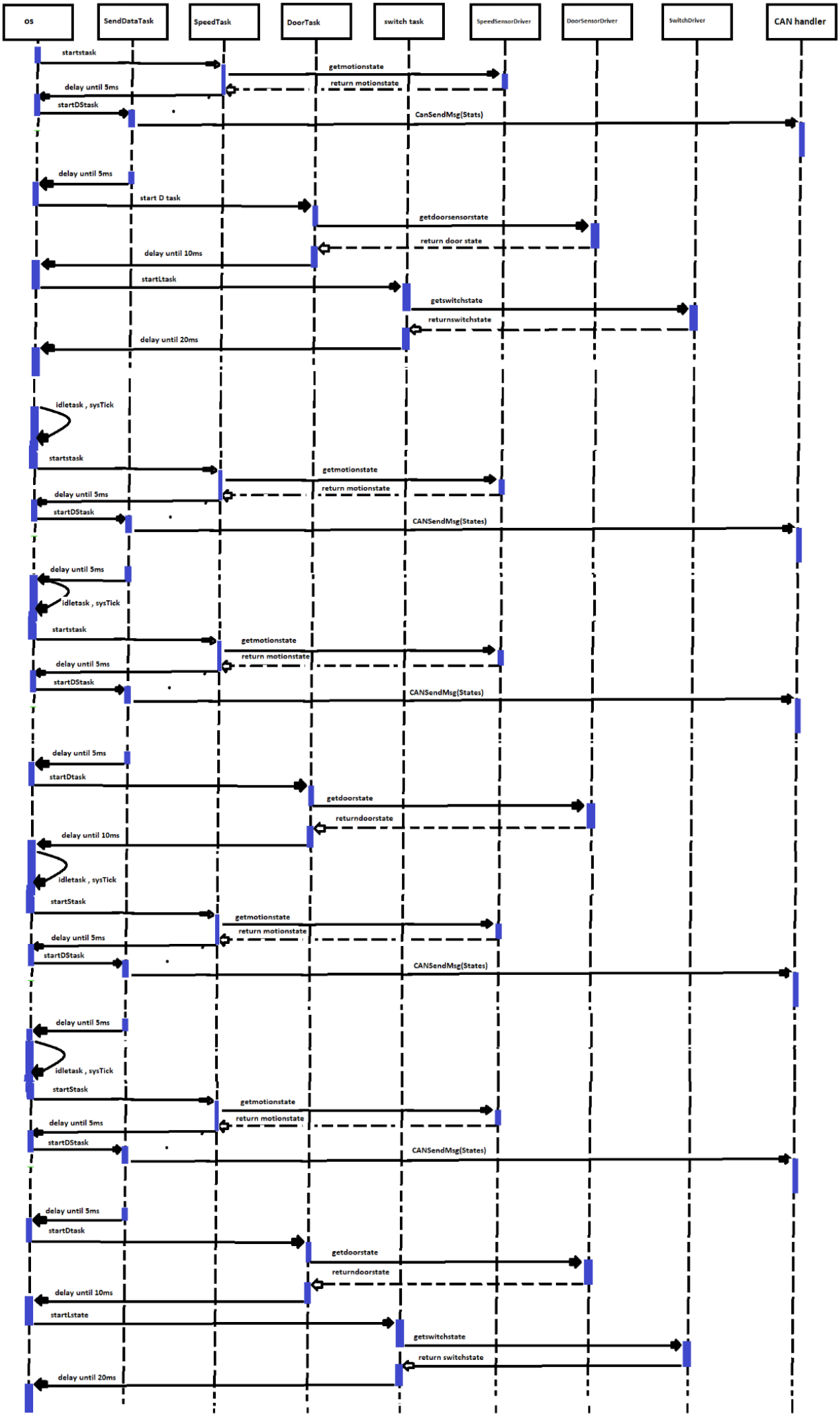
Speed Sensor State Machine



ECU1 State Machine



Next page is the ECU1 Seq. Diagram


os
SendDataTask
SpeedTask
DoorTask
switch task
SpeedSensorDriver
DoorSensorDriver
SwitchDriver
CAN handler
startstask
getmotionstate
return motionstate
delay until 5ms
startDStask
CanSendMsg(Stats)
delay until 5ms
start D task
getdoorsensorstate
return door state
delay until 10ms
startLtask
getswitchstate
returnswitchstate
delay until 20ms
idletask , sysTick
startstask
getmotionstate
return motionstate
delay until 5ms
startDStask
CANSendMsg(States)
delay until 5ms
idletask , sysTick
startstask
getmotionstate
return motionstate
delay until 5ms
startDStask
CANSendMsg(States)
delay until 5ms
startDtask
getdoorstate
returndoorstate
delay until 10ms
idletask , sysTick
startStask
getmotionstate
return motionstate
delay until 5ms
startDStask
CANSendMsg(States)
delay until 5ms
idletask , sysTick
startStask
getmotionstate
return motionstate
delay until 5ms
startDStask
CANSendMsg(States)
delay until 5ms
startDtask
getdoorstate
returndoorstate
delay until 10ms
startLstate
getswitchstate
return switchstate
delay until 20ms

To calculate CPU Load
We assume all task take 1 ms WCET , only the DATA SEND task take 2ms WCET
Hyper period is 20 ms
CPULOAD = ((20/5)+(20/10)+(20/20)+((20/5)*2))/20= 75%

The CANBus Load :-
The CAN BUS is sending once per 5 ms
The Data Size is 4 bytes (States Structure size is 4 Bytes)
The CAN Frame with 4 bytes data in bits is :- 74 bit
The CAN BUS Maximum Capacity is 125000 bits per sec

Calculate the used capacity = 74 / 5 ms = 14800 bits per sec

Calculate bus = 14800 / 125000 = 0.1184 =11.8 %