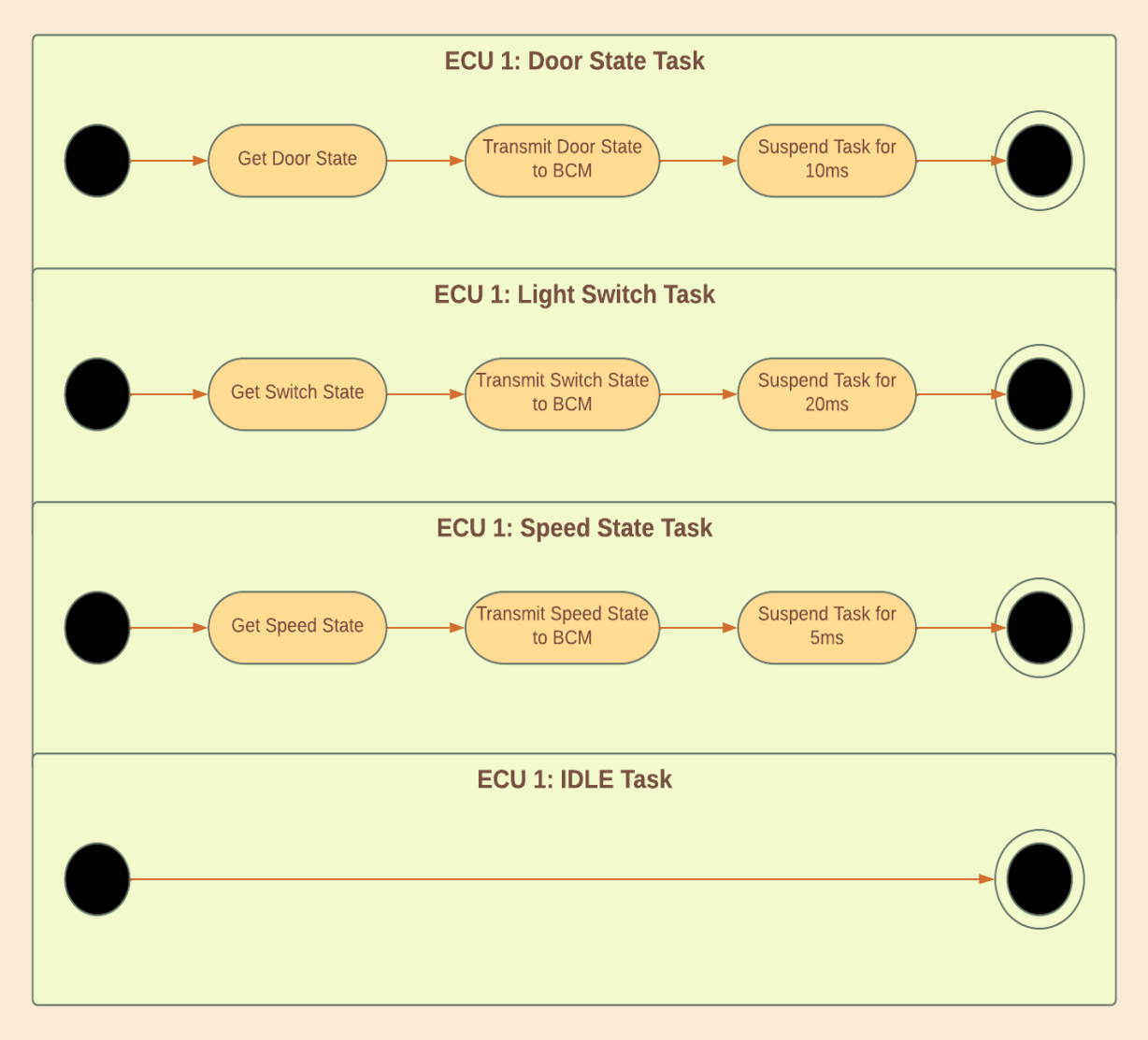
Automotive Door Control System Design

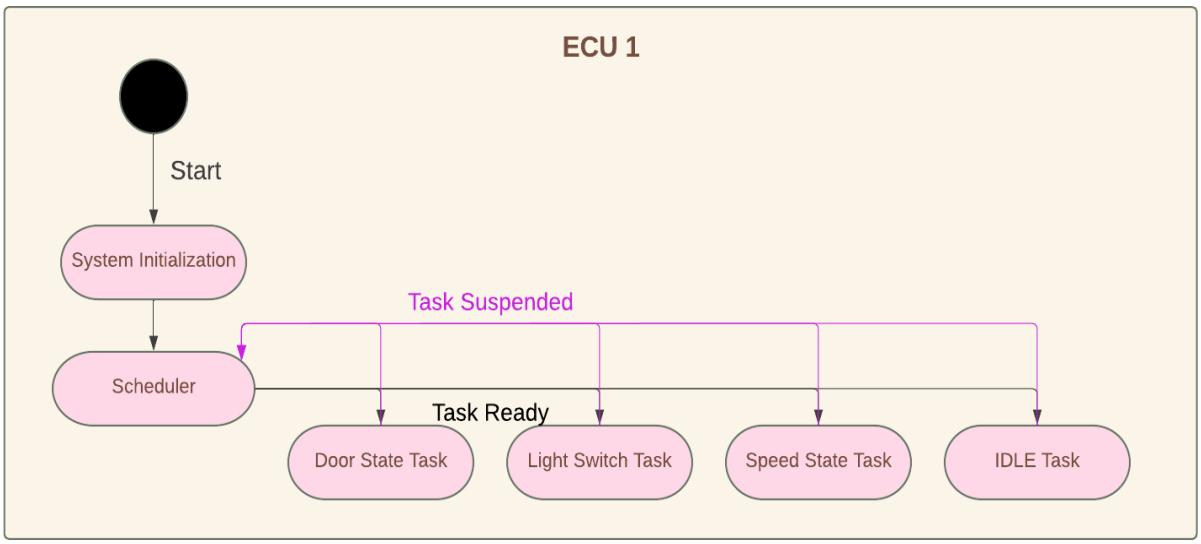
"Dynamic Design"

I. ECU 1

1-State Machine for each component:



2-State Machine for ECU operation:



3-ECU1 Sequence Diagram:

4-CPU Load:

Task	Deadline	How much it takes during Hyperperiod
Door State	**10ms**	**2**
Light Switch	**20ms**	**1**
Speed State	**5ms**	**4**

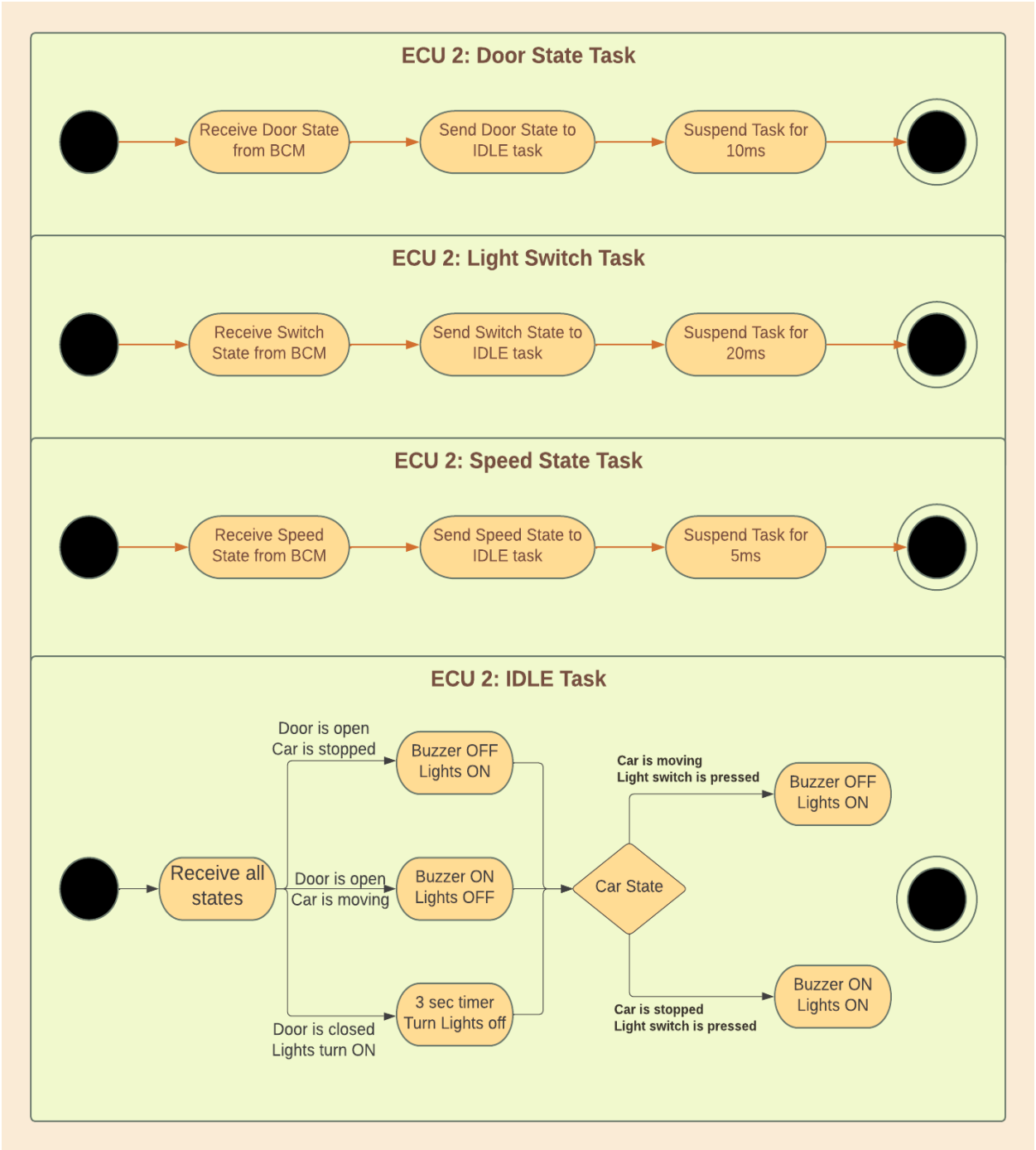
Utilization = Total Execution Time During Hyperperiod / Hyperperiod

$U = [(1m*2)+(1m*1)+(1m*4)/20m] \times 100\% = 35\%$

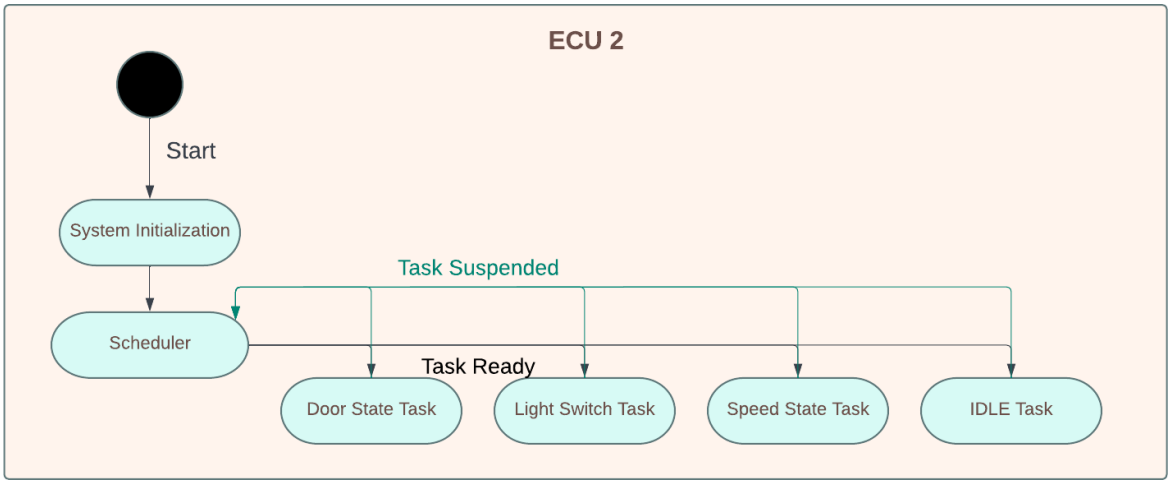
There for CPU load shall never exceed 35%

II. ECU 2

1-State Machine for each component:



2-State Machine for ECU operation:



4-CPU Load:

Task	Deadline	How much it takes during Hyperperiod
Door State	**10ms**	**2**
Light Switch	**20ms**	**1**
Speed State	**5ms**	**4**

Utilization = Total Execution Time During Hyperperiod / Hyperperiod

$U = [(1m*2)+(1m*1)+(1m*4)/20m] \times 100\% = 35\%$

There for CPU load shall never exceed 35%

3-ECU2 Sequence Diagram