AUTOMOTIVE DOOR CONTROL SYSTEM DESIGN

Dynamic Design

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State Machine Diagram:

```
                    ●
                    │
                    ▼
              ┌───────────┐
              │ System Init.│
              └───────────┘
                    │
                    ▼
              ┌───────────┐
              │ Scheduler │
              └───────────┘
                    │
     ┌──────────┬──────────┬──────────┐
     ▼          ▼          ▼          ▼
┌─────────┐┌─────────┐┌─────────┐┌─────────┐
│Door Task││Light Task││Speed Task││IDLE Task│
└─────────┘└─────────┘└─────────┘└─────────┘
```
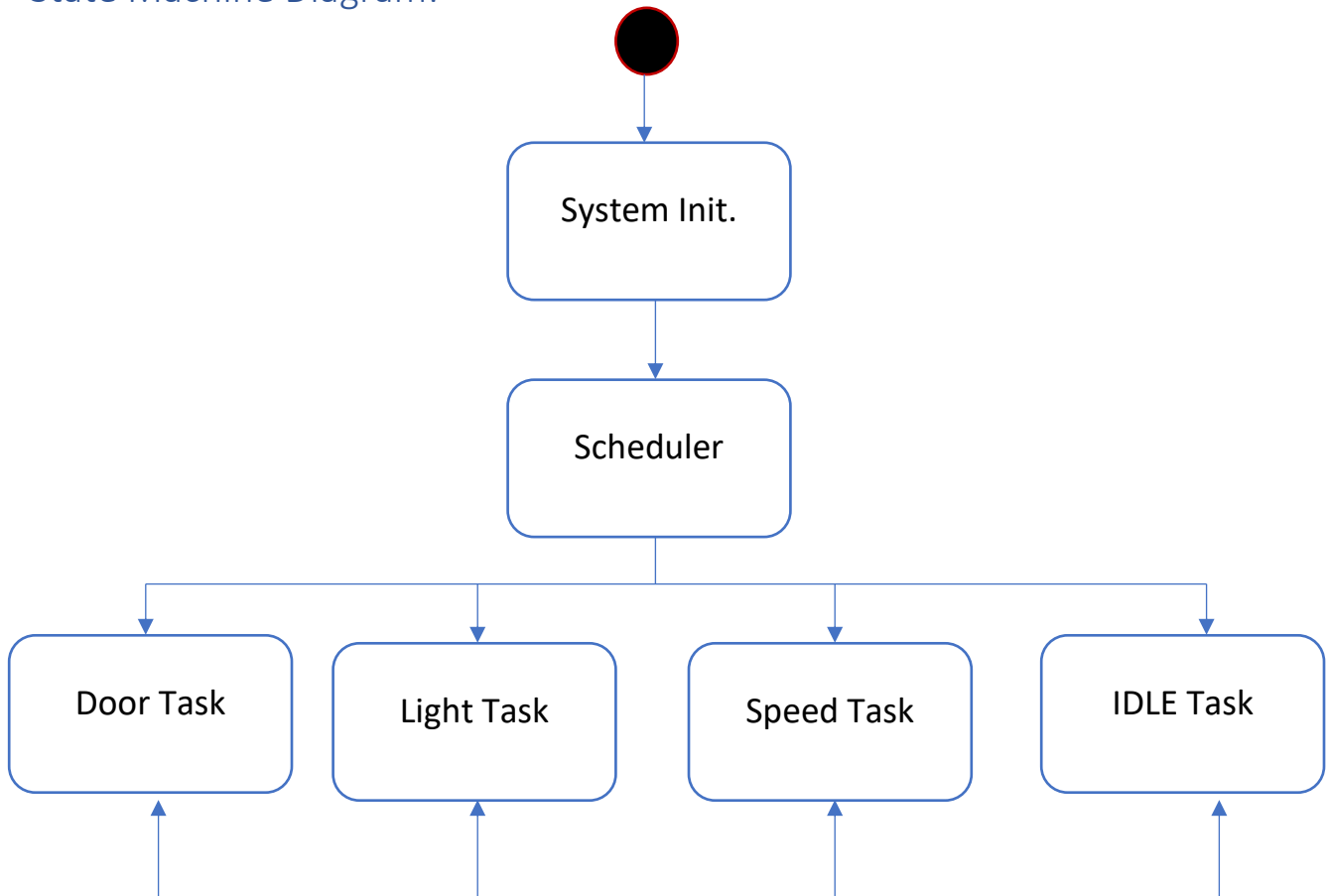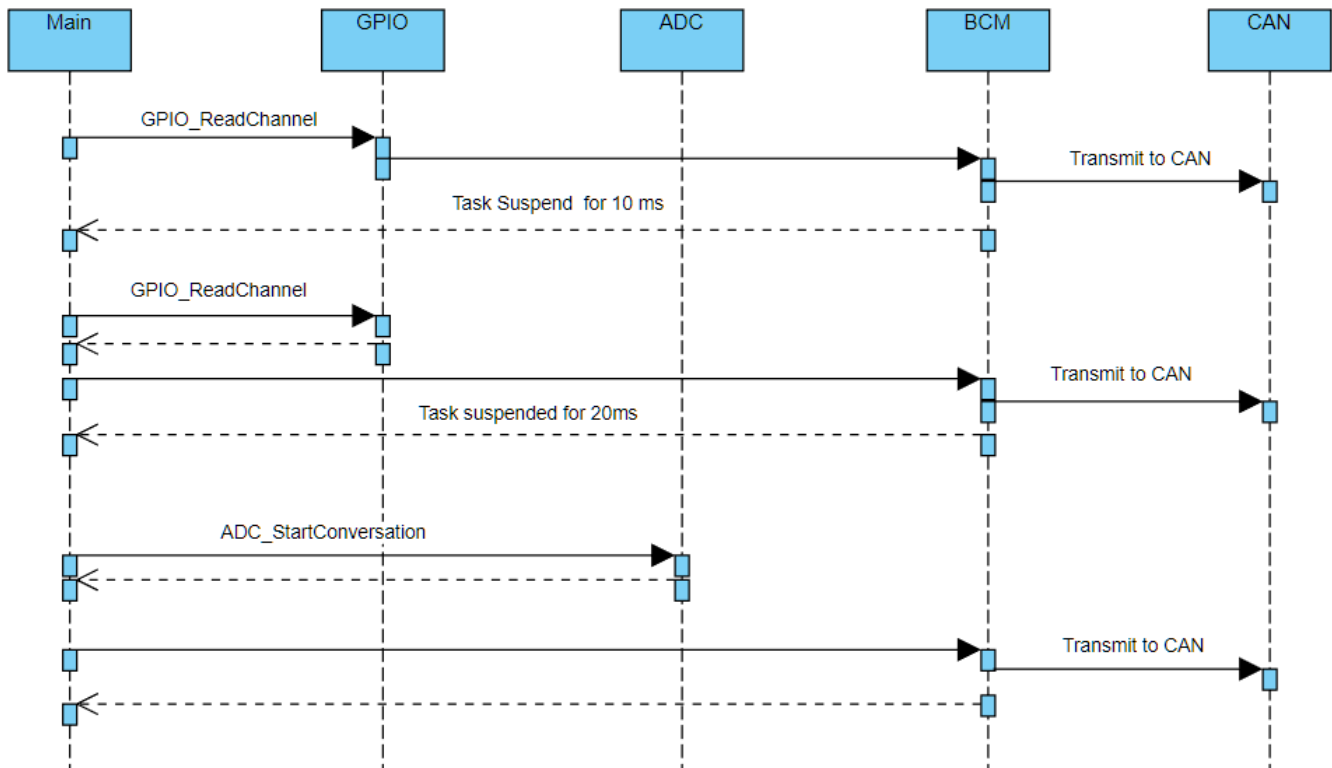
CPU Load:

- Hyper period = 20 ms
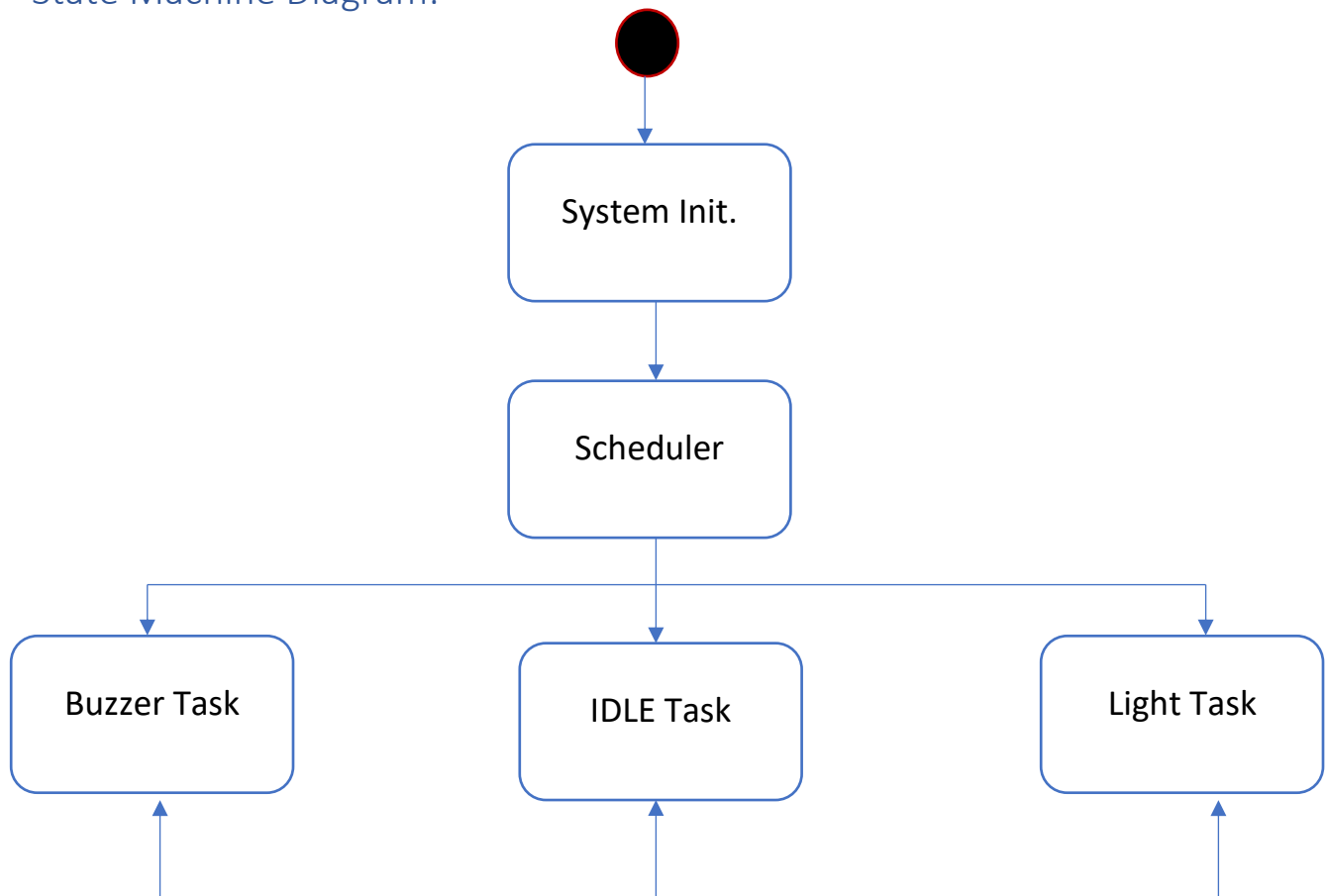
- Estimate each task has execution time of 1.5 ms

$$\text{CPU Load} = \frac{1.5}{5} + \frac{1.5}{10} + \frac{1.5}{20} = 52.5\%$$

Sequential Diagram:

State Machine Diagram:

CPU Load:

- Hyper period = 5 ms

- Estimate each task has execution time of 1.5 ms

$$CPU\ Load = \frac{1.5}{5} + \frac{1.5}{5} = 60\%$$

Sequential Diagram:

Main	GPIO	ADC	BCM	CAN

GPIO_ReadChannel

Transmit to CAN

Task Suspend for 10 ms

GPIO_ReadChannel

Transmit to CAN

Task suspended for 20ms