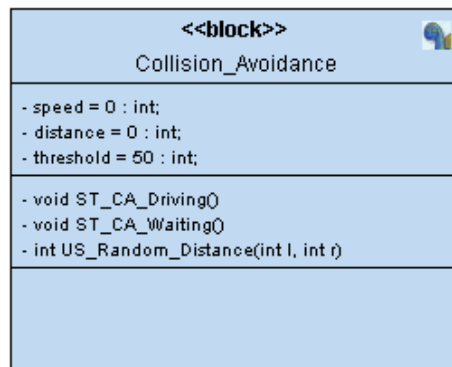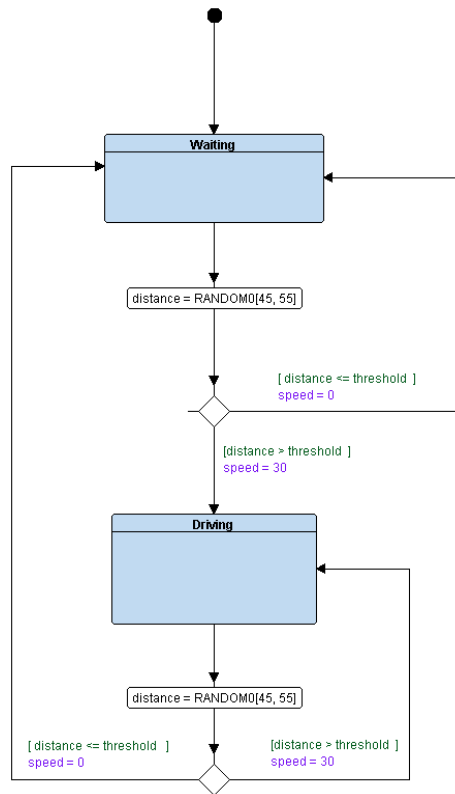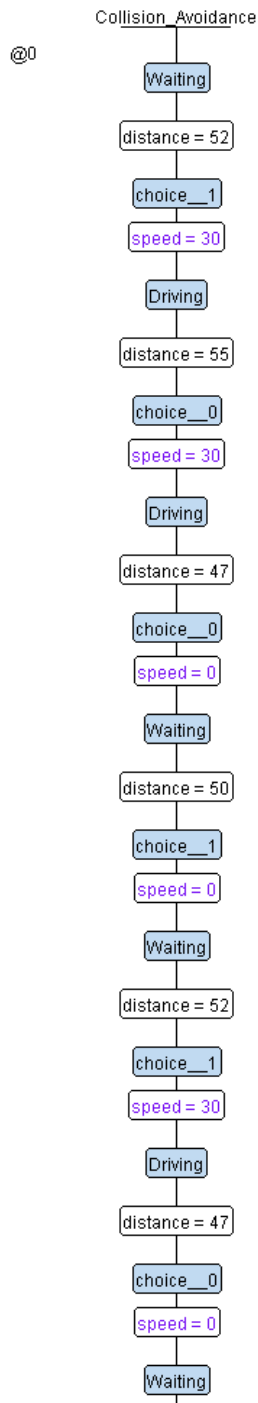# State Machine design

Using one model:-

- Designing a simple collision Avoidance system to use state machine for implementation
- Starting from waiting state and switching to driving state if distance is higher than threshold which is 50 in our case

- Flow of implementation

- Simulation result

Collision_Avoidance

@0

Waiting

distance = 52

choice__1

speed = 30

Driving

distance = 55

choice__0

speed = 30

Driving

distance = 47

choice__0

speed = 0

Waiting

distance = 50

choice__1

speed = 0

Waiting

distance = 52

choice__1

speed = 30

Driving
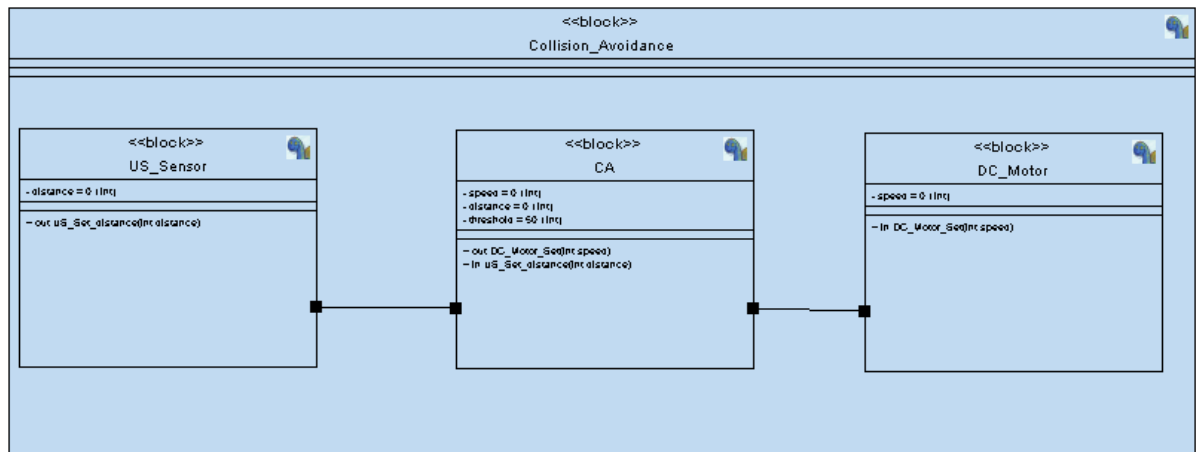
distance = 47

choice__0

speed = 0

Waiting

- Implementation with C

```
Driving State : Distance = 49 Speed = 30
Waiting State : Distance = 52 Speed = 0
Driving State : Distance = 45 Speed = 30
Waiting State : Distance = 49 Speed = 0
Waiting State : Distance = 54 Speed = 0
Driving State : Distance = 53 Speed = 30
Driving State : Distance = 53 Speed = 30
Driving State : Distance = 45 Speed = 30
Waiting State : Distance = 53 Speed = 0
Driving State : Distance = 47 Speed = 30
Waiting State : Distance = 47 Speed = 0
Waiting State : Distance = 48 Speed = 0
Waiting State : Distance = 48 Speed = 0
Waiting State : Distance = 45 Speed = 0
Waiting State : Distance = 48 Speed = 0
Waiting State : Distance = 45 Speed = 0
Waiting State : Distance = 50 Speed = 0
Waiting State : Distance = 46 Speed = 0
Waiting State : Distance = 46 Speed = 0
Waiting State : Distance = 52 Speed = 0
Driving State : Distance = 50 Speed = 30
Waiting State : Distance = 53 Speed = 0
Driving State : Distance = 52 Speed = 30
Driving State : Distance = 53 Speed = 30
Driving State : Distance = 52 Speed = 30
Driving State : Distance = 47 Speed = 30
Waiting State : Distance = 48 Speed = 0
```
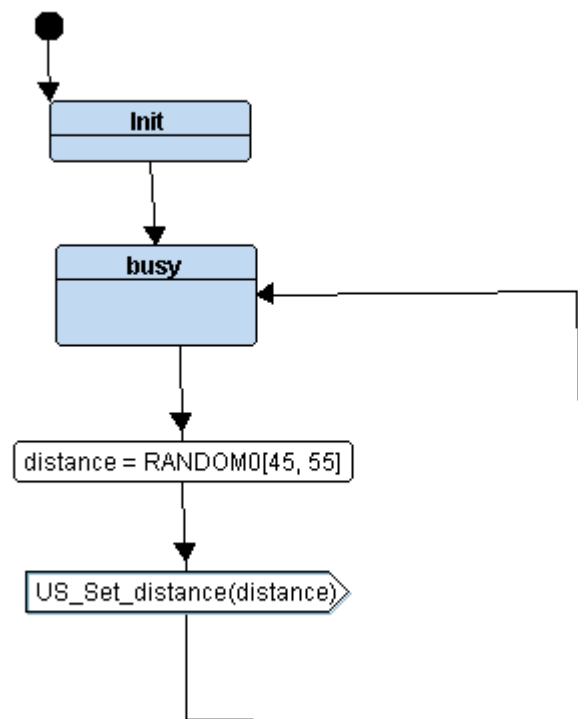
Codes Can be found in the Repo

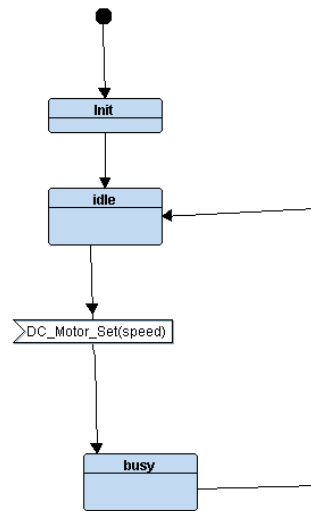# Using multiple models

- Here we implement using 3 models, one for CA program, one for US sensor and one for DC motor
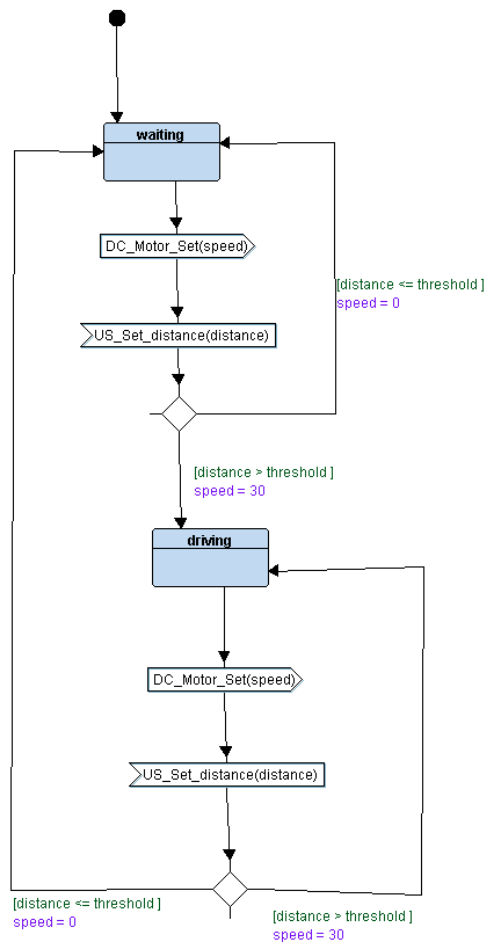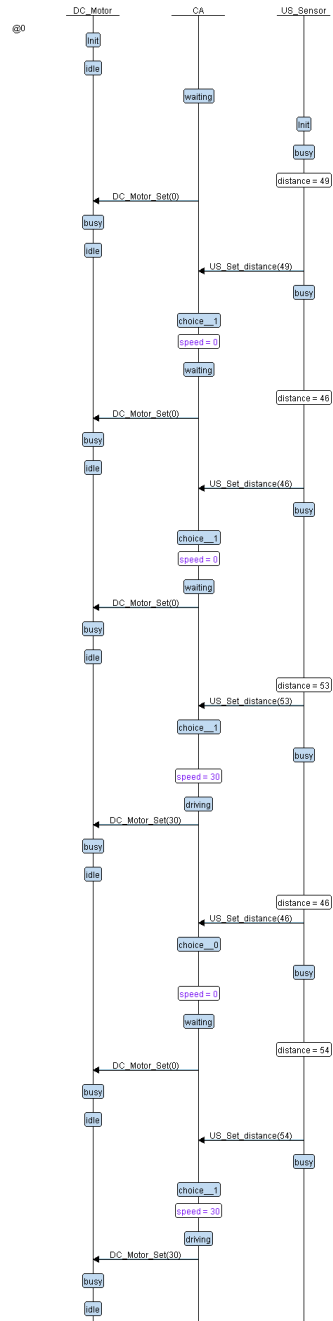

- US diagram

- DC diagram

- CA diagram

- Simulation

- C implementation

```
CA_Waiting State: distance =47 Speed =0
CA ---------speed = 0-----------> DC

DC_busy State: speed =0
US_Waiting State: distance =46
US ---------distance = 46-----------> CA

CA_Waiting State: distance =46 Speed =0
CA ---------speed = 0-----------> DC

DC_busy State: speed =0
US_Waiting State: distance =53
US ---------distance = 53-----------> CA

CA_driving State: distance =53 Speed =0
CA ---------speed = 30-----------> DC

DC_busy State: speed =30
US_Waiting State: distance =47
US ---------distance = 47-----------> CA

CA_Waiting State: distance =47 Speed =30
CA ---------speed = 0-----------> DC

DC_busy State: speed =0
US_Waiting State: distance =51
US ---------distance = 51-----------> CA

CA_driving State: distance =51 Speed =0
CA ---------speed = 30-----------> DC

DC_busy State: speed =30
US_Waiting State: distance =53
US ---------distance = 53-----------> CA
```

Codes Can be found in the Repo