

A dark blue vertical bar runs down the left side of the page. A blue arrow points to the right from this bar, containing the date.

8/26/2023

# Collision Avoidance

## Report

Several thin, curved lines in dark blue and light grey originate from the bottom left and sweep upwards and to the right.

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**Report for:** Learn-in-depth Diploma (K.S)



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## 2) Introduction

### 1. Case Study

A collision avoidance system is a system to check if there is enough distance needed to be able to move without avoidance.

The enough distance to move is at least 50cm.

The speed, if there is enough distance, is 30m/s.

### 2. Assumptions

There are drivers, IRQ, Hal to be defined later.

Min distance need to can move is 50cm.

Controller setup and shutdown procedures are not modeled.

The controller maintenance is not modeled.

Ultrasonic Sensors will never fail.

DC Motor will never fail.

The controller never faces power cut.

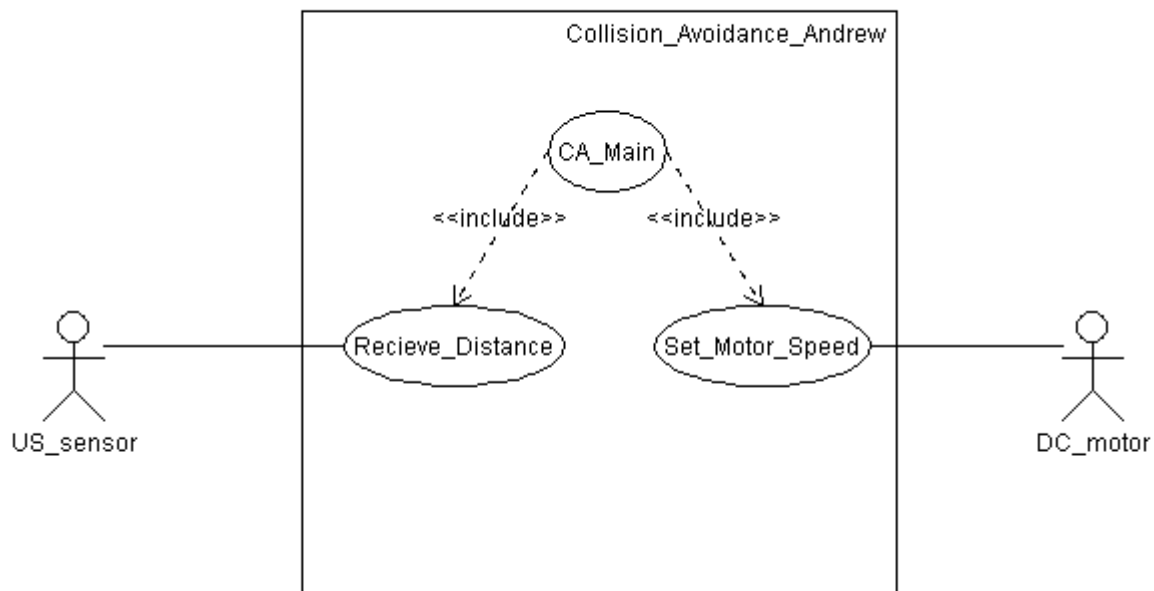
### 3. Lifecycle method

Waterfall model, so we develop each module separately until finishing it, without looping on code.

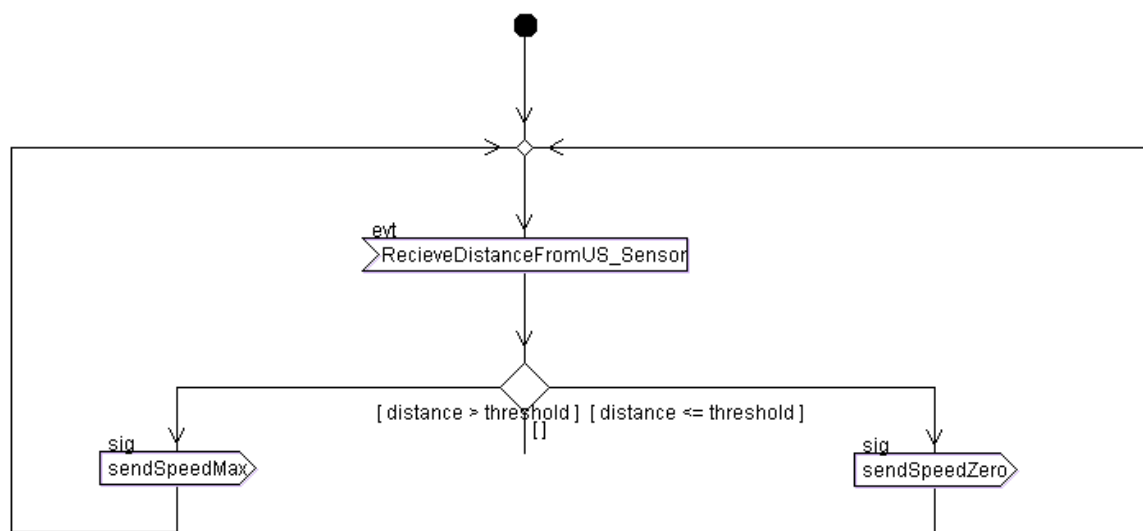


### 3) Diagram

#### 4. Use Case Diagram



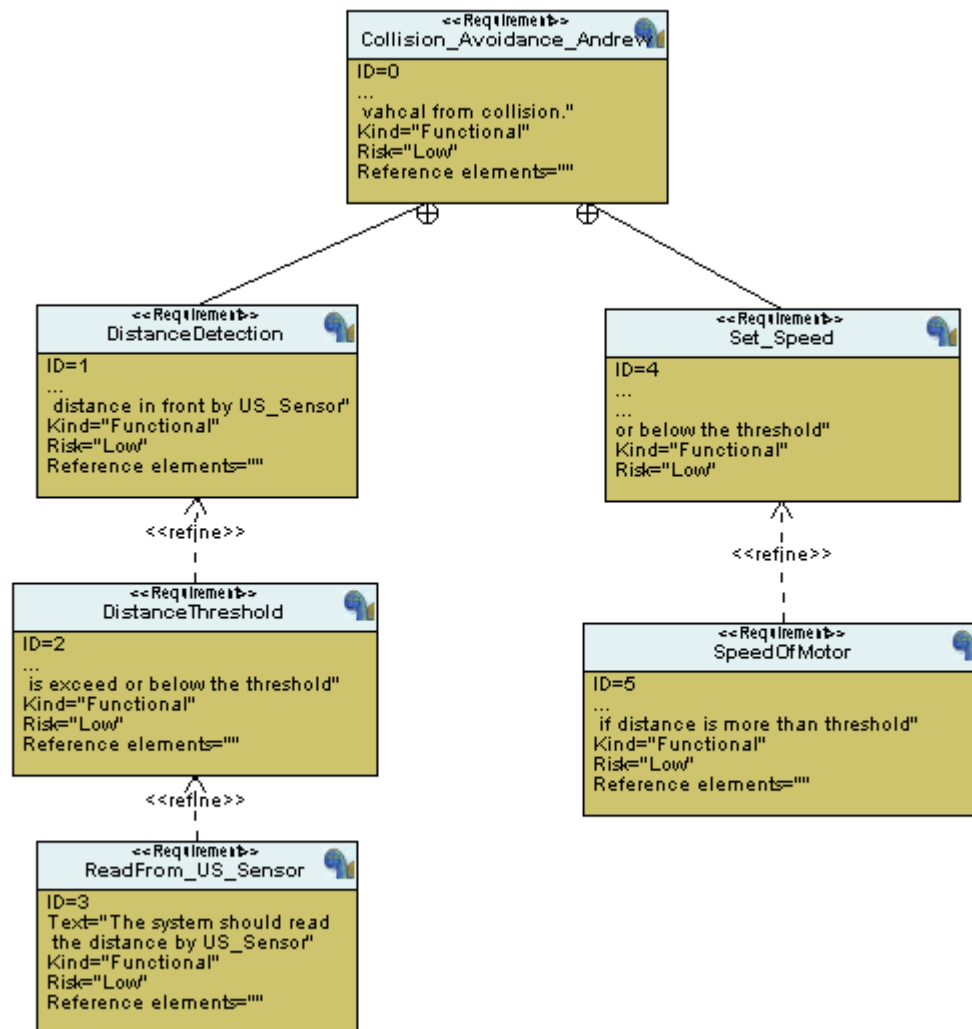
#### 5. Activity Diagram



6.

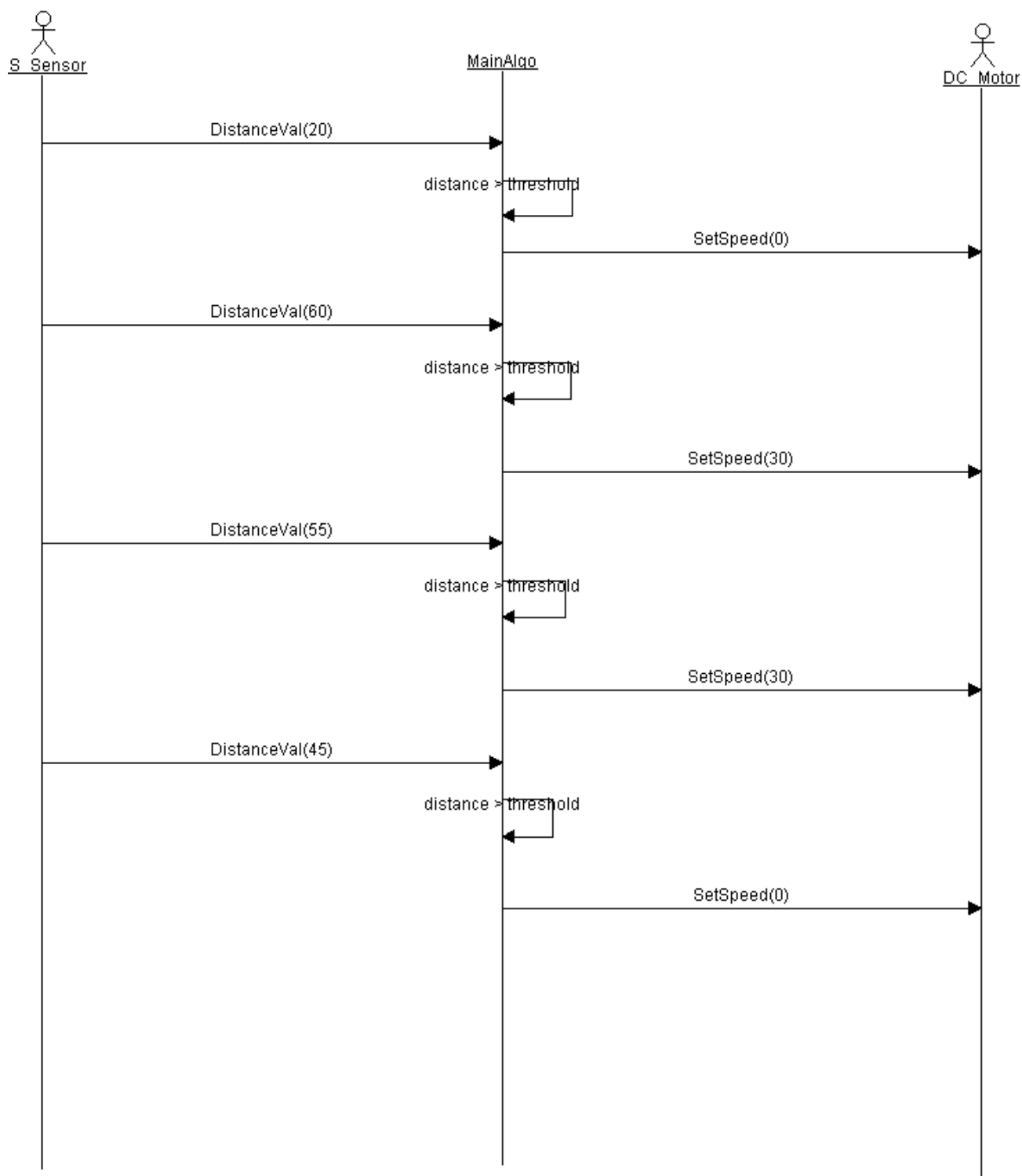


## 8. Requirements Diagram



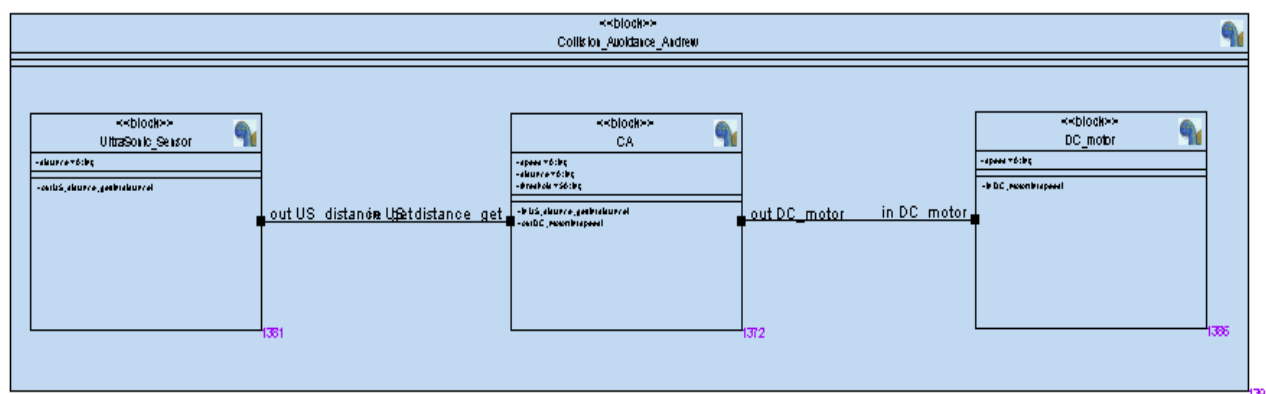


## 9. Sequence Diagram



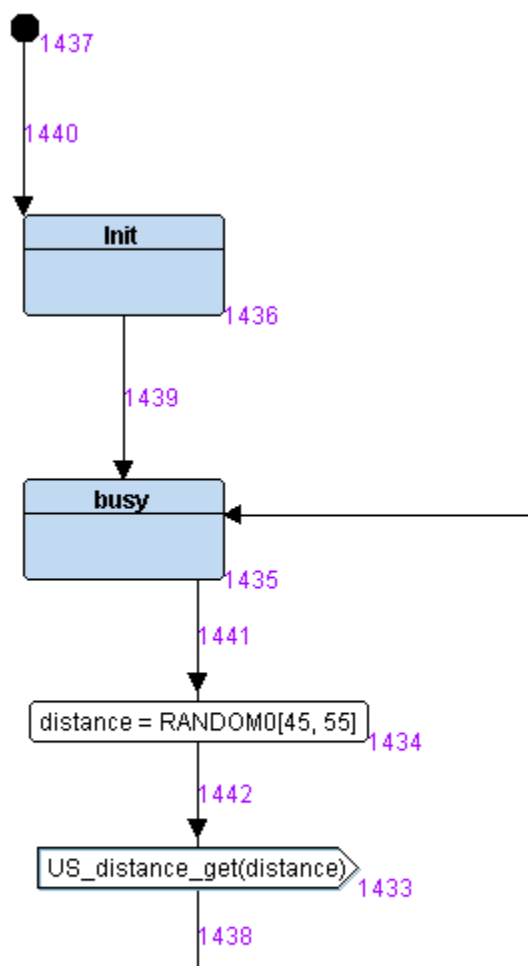


## 10. BlockDiagram



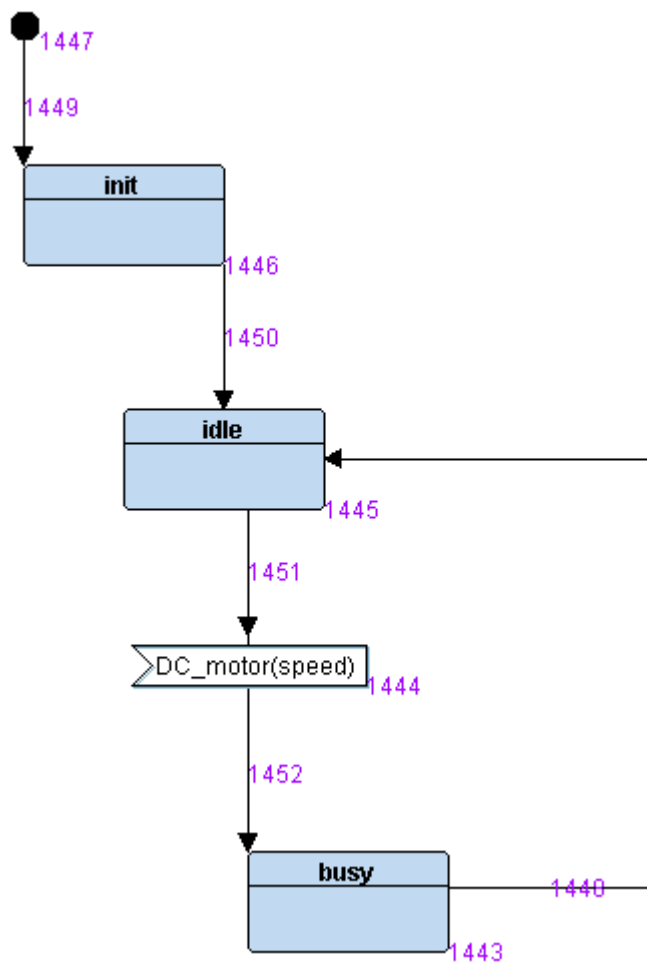
## 11. State Machine Diagram

### I. Ultrasonic Sensor





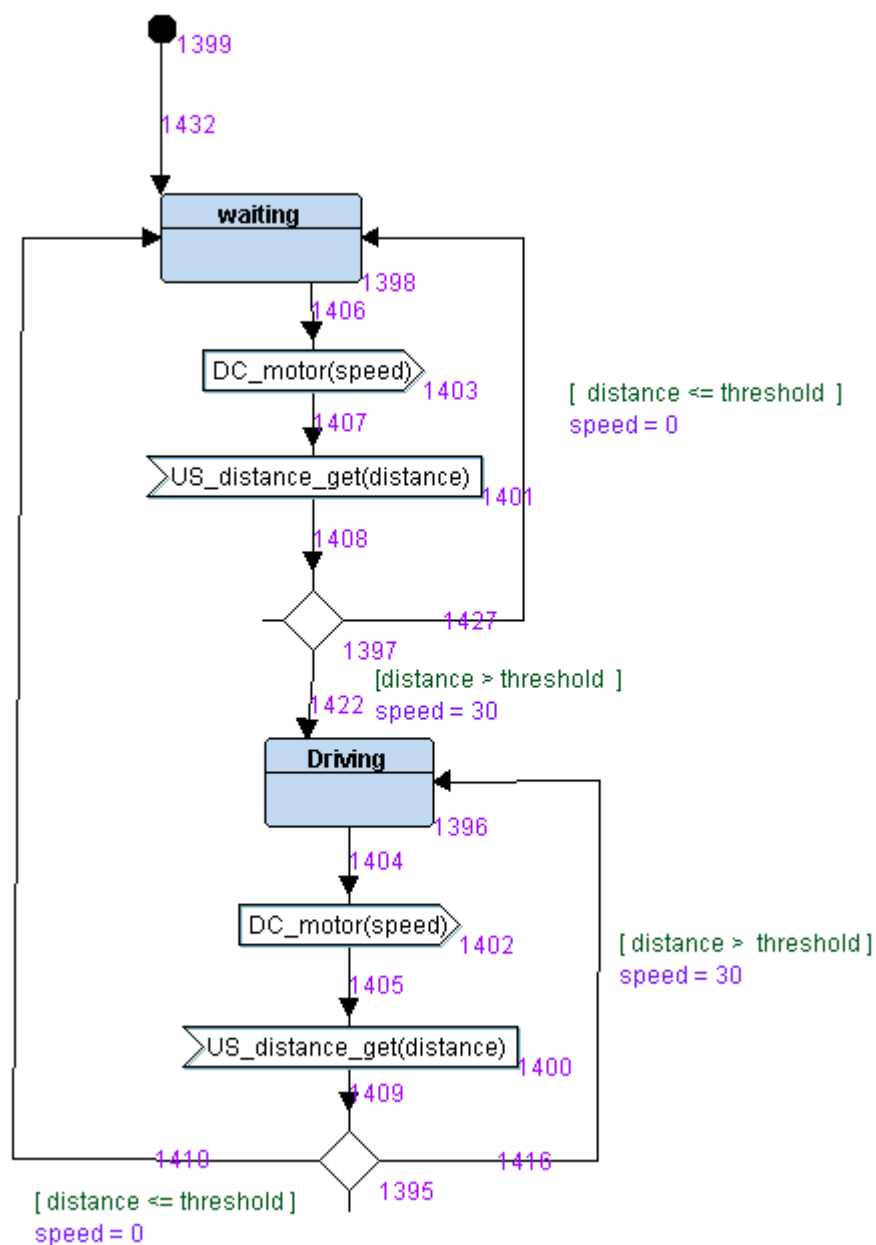
## II. DC\_Motor







III. CA\_Main





```

sequenceDiagram
    participant CA
    participant UltraSonic_Sensor
    participant DC_motor

    CA->>CA: waiting
    UltraSonic_Sensor->>UltraSonic_Sensor: Init
    UltraSonic_Sensor->>UltraSonic_Sensor: busy
    UltraSonic_Sensor->>UltraSonic_Sensor: distance = 48
    CA->>DC_motor: DC_motor(0)
    DC_motor->>DC_motor: init
    DC_motor->>DC_motor: idle
    DC_motor->>DC_motor: busy
    DC_motor->>DC_motor: idle
    UltraSonic_Sensor->>CA: US_distance_get(48)
    CA->>CA: choice_1
    UltraSonic_Sensor->>UltraSonic_Sensor: busy
    UltraSonic_Sensor->>UltraSonic_Sensor: distance = 55
    CA->>CA: speed = 0
    CA->>CA: waiting
    CA->>DC_motor: DC_motor(0)
    DC_motor->>DC_motor: busy
    DC_motor->>DC_motor: idle
    UltraSonic_Sensor->>CA: US_distance_get(55)
    CA->>CA: choice_1
    CA->>CA: speed = 30
    CA->>CA: Driving
    CA->>DC_motor: DC_motor(30)
    DC_motor->>DC_motor: busy
    DC_motor->>DC_motor: idle
    UltraSonic_Sensor->>UltraSonic_Sensor: distance = 49
    UltraSonic_Sensor->>CA: US_distance_get(49)
    CA->>CA: choice_0
    UltraSonic_Sensor->>UltraSonic_Sensor: busy
    CA->>CA: speed = 0
    CA->>CA: waiting
    UltraSonic_Sensor->>UltraSonic_Sensor: distance = 49
    CA->>DC_motor: DC_motor(0)
    DC_motor->>DC_motor: busy
    DC_motor->>DC_motor: idle
    UltraSonic_Sensor->>CA: US_distance_get(49)
    CA->>CA: choice_1
    CA->>CA: speed = 0
    CA->>CA: waiting
    CA->>DC_motor: DC_motor(0)
    DC_motor->>DC_motor: busy
    DC_motor->>DC_motor: idle
    DC_motor->>DC_motor: idle
    
```