

# **Implement Simple State Machine In C Using Multiple Modules**

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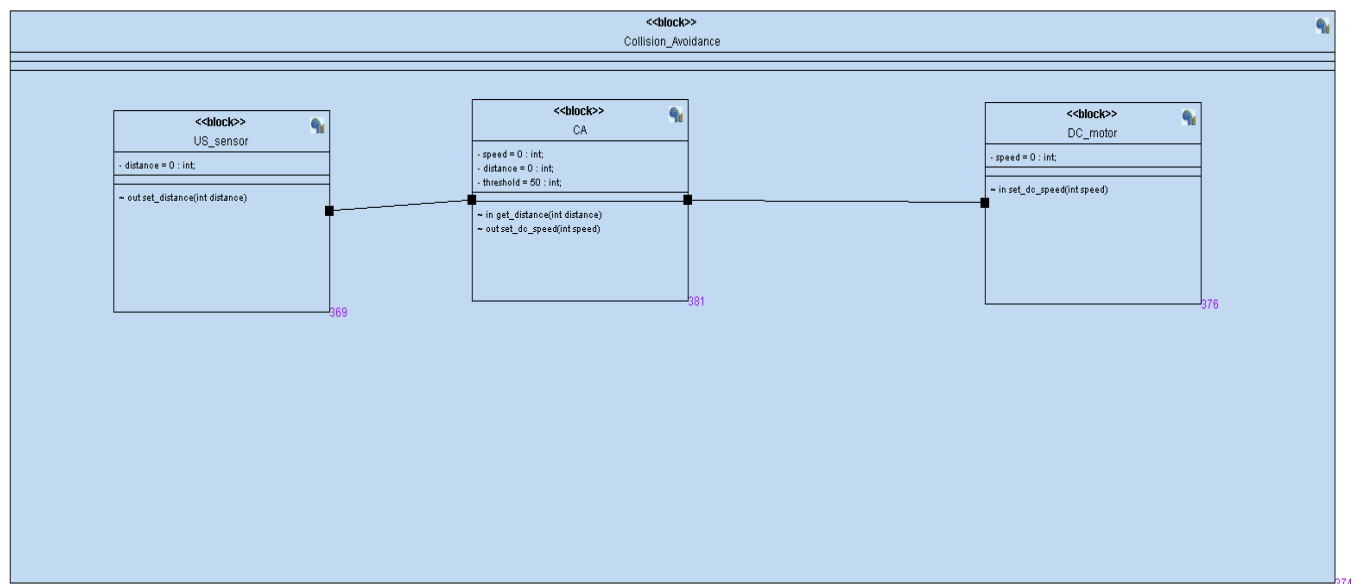
Supervised to: Eng. Keroles

## -Ultrasonic Obstacle-Avoiding Robot

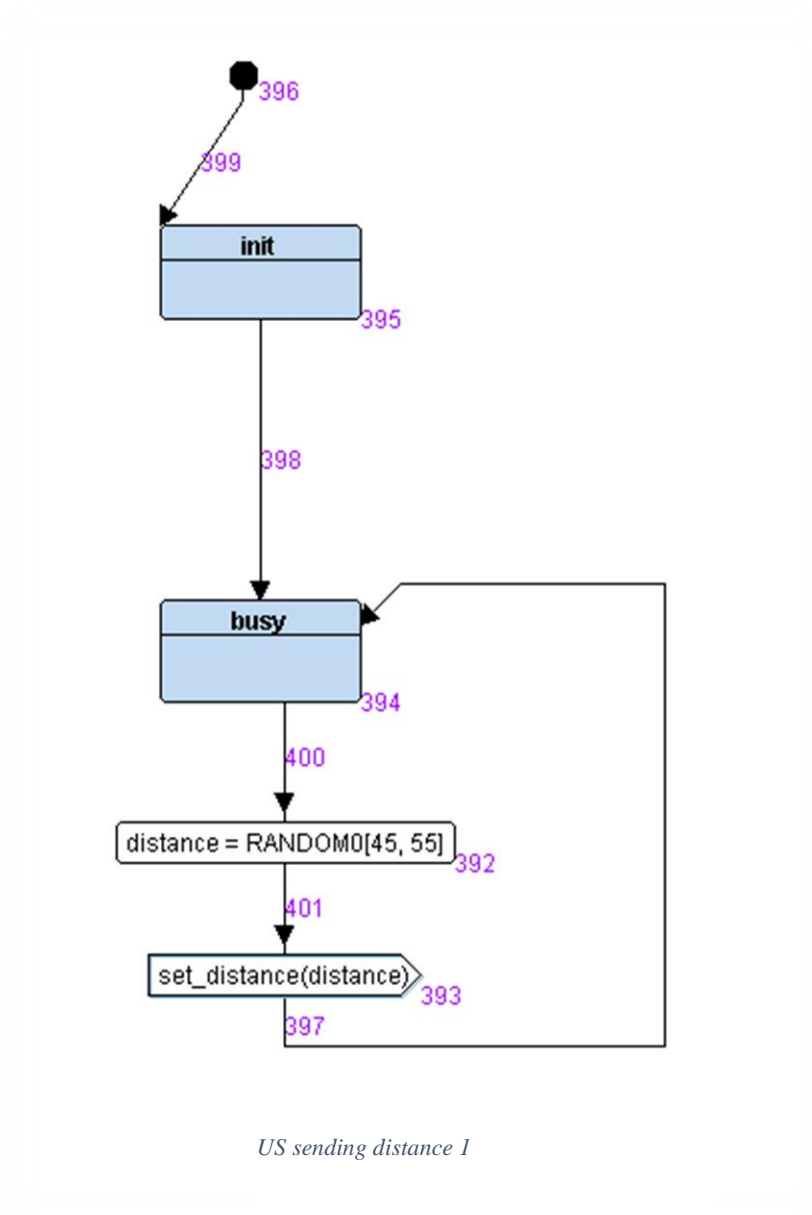
This software is collision avoidance system for cars, it is using :

1. Ultrasonic sensor
2. Collision avoidance sw
3. DC motor

This is modules level

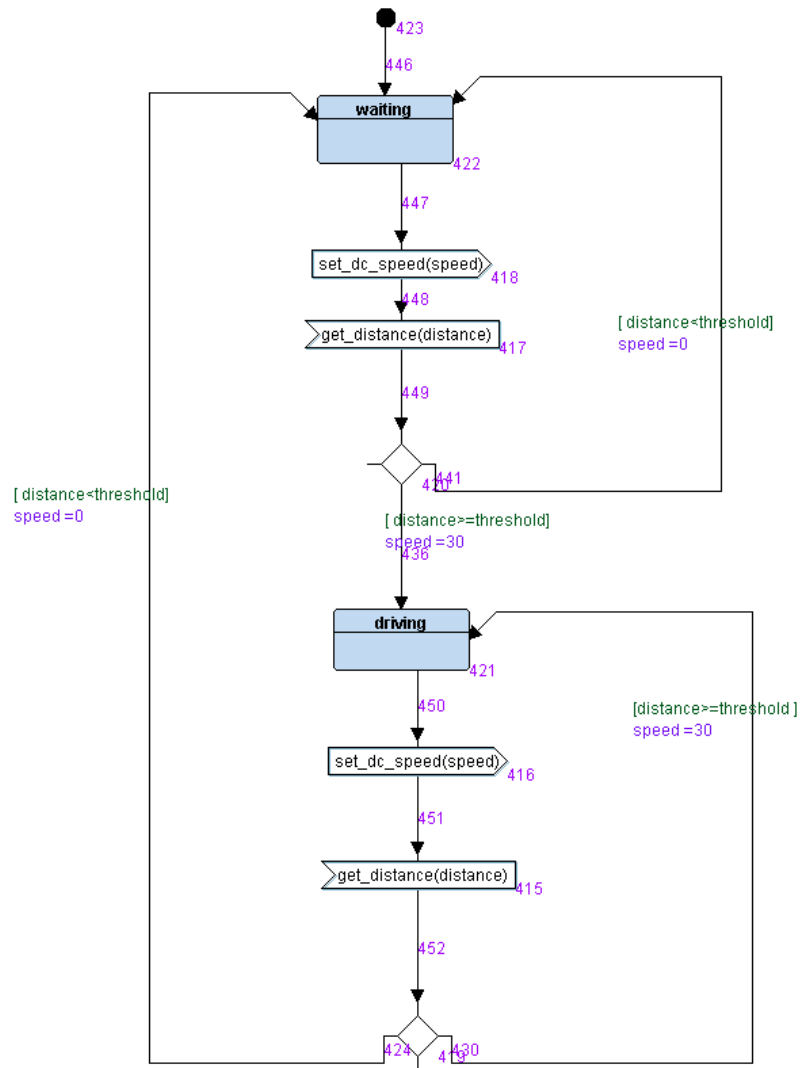


- Ultrasonic Sensor is sending distance between car and objects to collision avoidance



In this figure we imagine distance bring from random function  
after get it send it to collision avoidance it is be in next Page

## logical design for collision avoidance

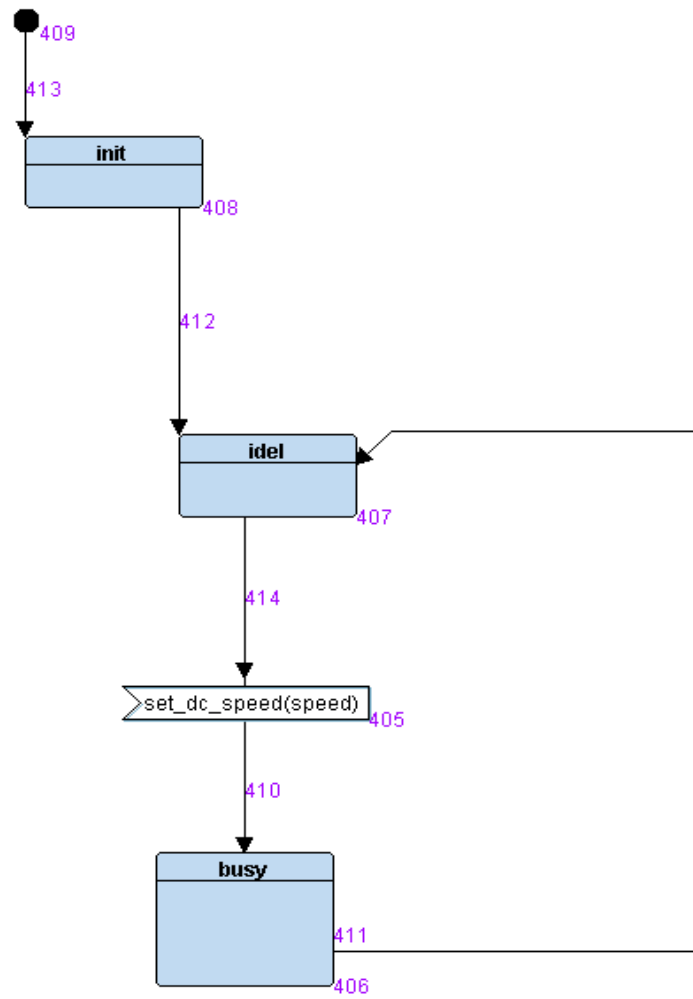


CA figure

In this software we get distance from US sensor and make condition if it is less than 50 cm we stay at waiting state and send speed=0 m/s for DC motor

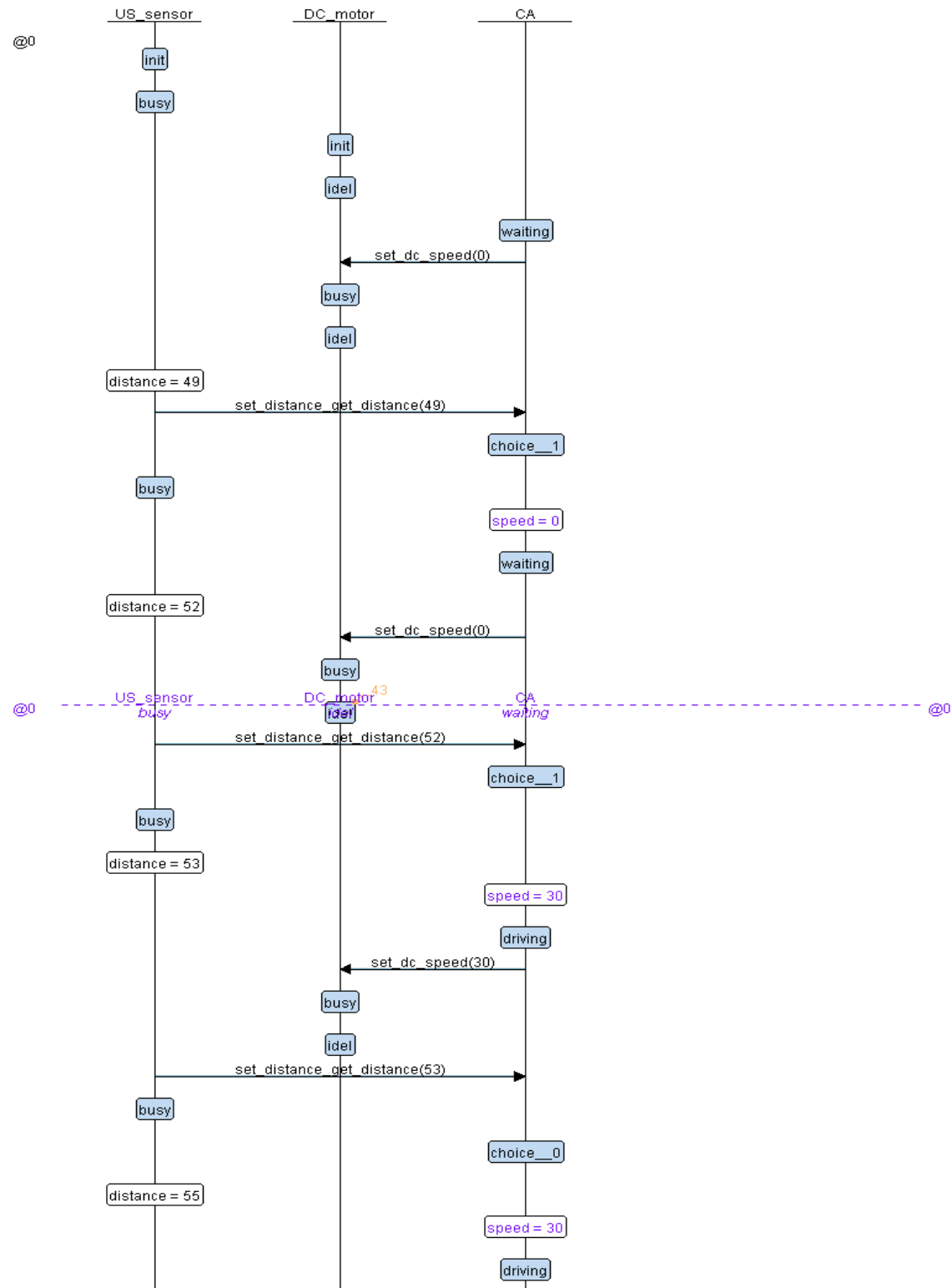
If US send distance bigger than 50 cm we will move to driving state and send speed 30 m/s to DC motor and enter to the second condition to check distance like above

## DC motor Logical Design

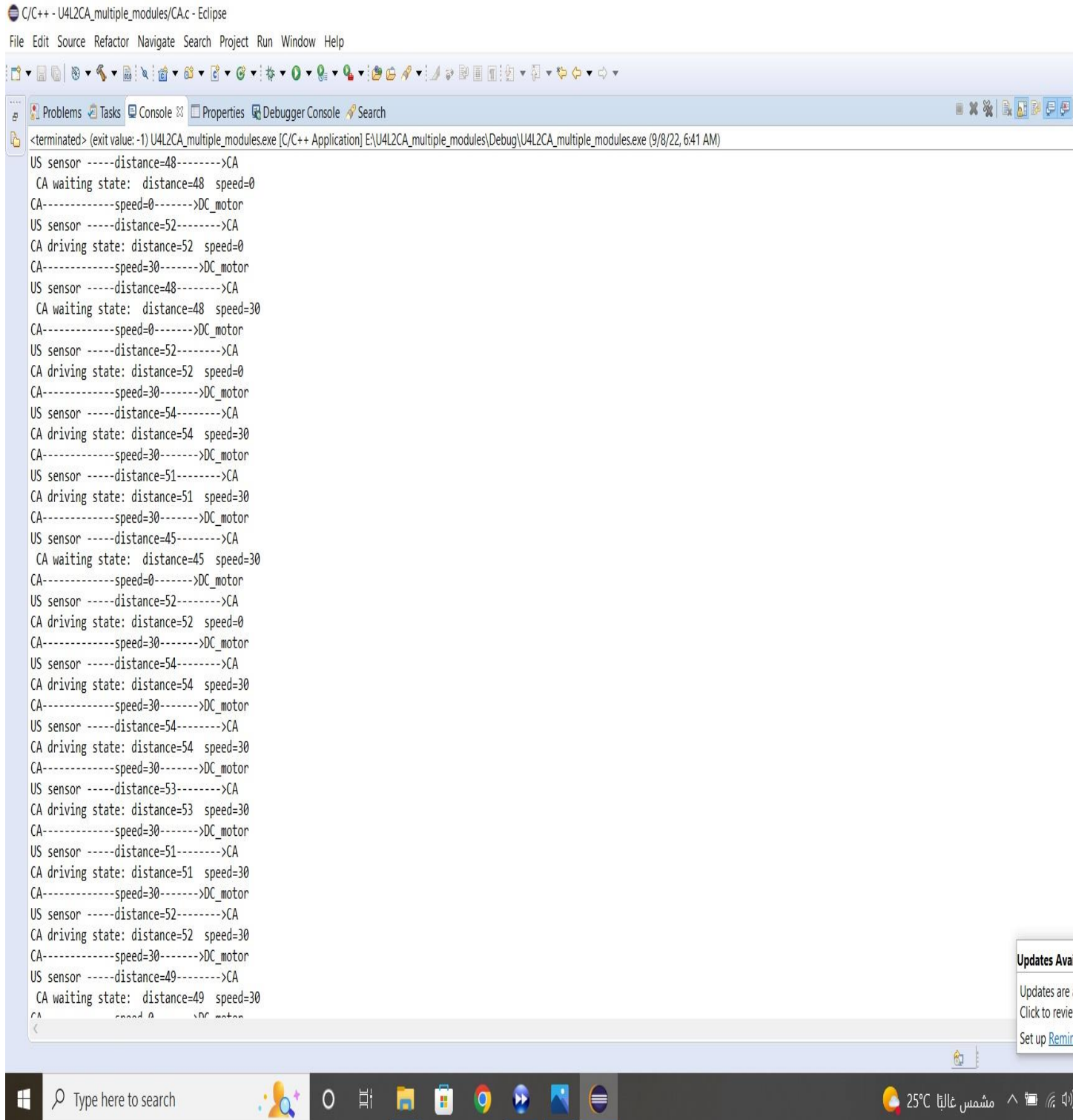


In this figure we get speed from collision avoidance and go with it using driver in embedded

# SW Logical Verification



## C Verification



```
C/C++ - U4L2CA_multiple_modules/CA.c - Eclipse
File Edit Source Refactor Navigate Search Project Run Window Help

<terminated> (exit value: -1) U4L2CA_multiple_modules.exe [C/C++ Application] E:\U4L2CA_multiple_modules\Debug\U4L2CA_multiple_modules.exe (9/8/22, 6:41 AM)
US sensor ----distance=48----->CA
CA waiting state: distance=48 speed=0
CA-----speed=0----->DC_motor
US sensor ----distance=52----->CA
CA driving state: distance=52 speed=0
CA-----speed=30----->DC_motor
US sensor ----distance=48----->CA
CA waiting state: distance=48 speed=30
CA-----speed=0----->DC_motor
US sensor ----distance=52----->CA
CA driving state: distance=52 speed=0
CA-----speed=30----->DC_motor
US sensor ----distance=54----->CA
CA driving state: distance=54 speed=30
CA-----speed=30----->DC_motor
US sensor ----distance=51----->CA
CA driving state: distance=51 speed=30
CA-----speed=30----->DC_motor
US sensor ----distance=45----->CA
CA waiting state: distance=45 speed=30
CA-----speed=0----->DC_motor
US sensor ----distance=52----->CA
CA driving state: distance=52 speed=0
CA-----speed=30----->DC_motor
US sensor ----distance=54----->CA
CA driving state: distance=54 speed=30
CA-----speed=30----->DC_motor
US sensor ----distance=54----->CA
CA driving state: distance=54 speed=30
CA-----speed=30----->DC_motor
US sensor ----distance=53----->CA
CA driving state: distance=53 speed=30
CA-----speed=30----->DC_motor
US sensor ----distance=51----->CA
CA driving state: distance=51 speed=30
CA-----speed=30----->DC_motor
US sensor ----distance=52----->CA
CA driving state: distance=52 speed=30
CA-----speed=30----->DC_motor
US sensor ----distance=49----->CA
CA waiting state: distance=49 speed=30
CA-----speed=0----->DC_motor
<
```

You will find this code in my [github Link](#)