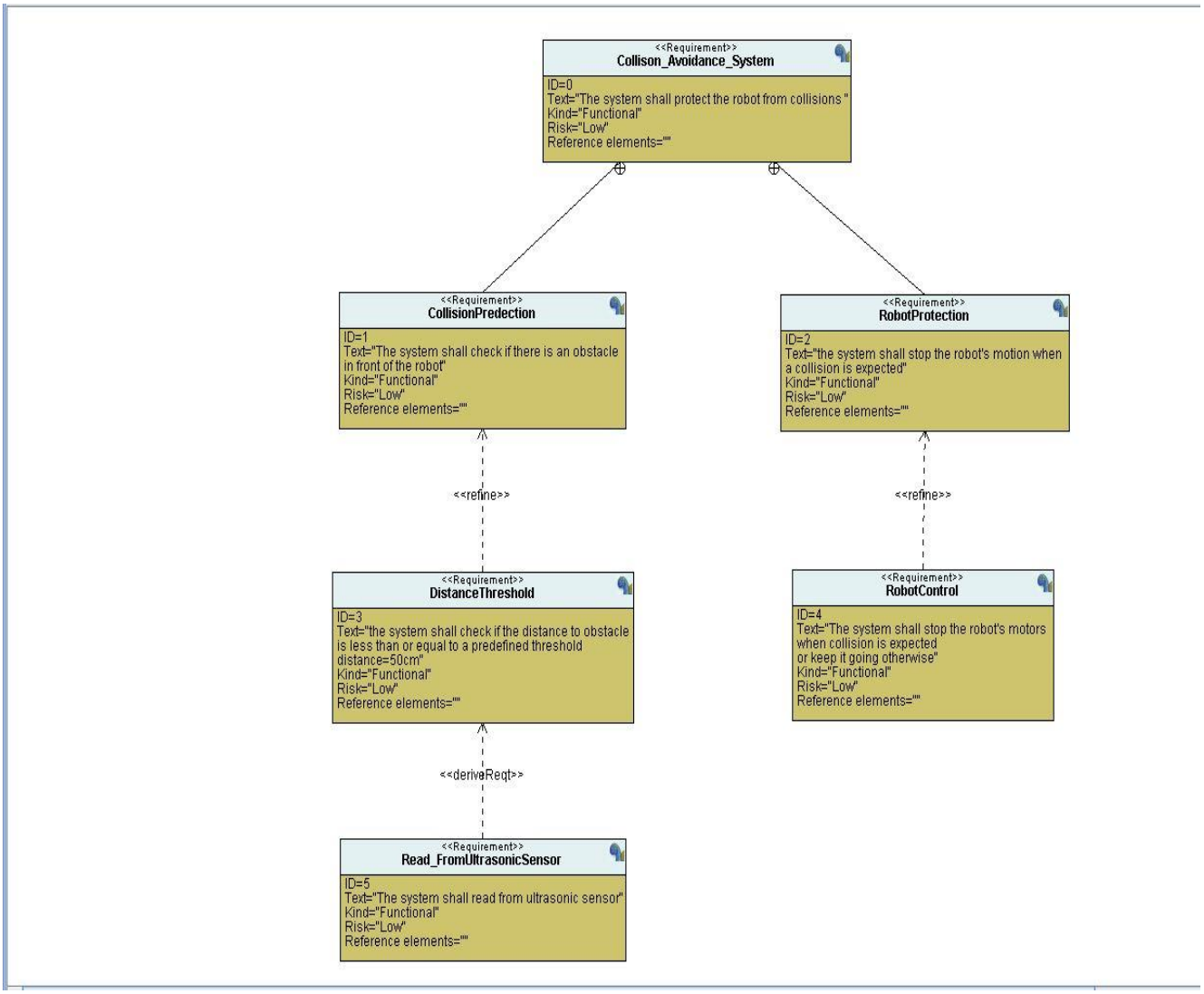
Collision Avoidance Project

- **Case study: Collision avoidance system**
  - **Collision avoidance system should check if there is an obstacle in front of the robot.**
  - **If the distance to the object is less than or equal 50cm the collision avoidance system should stop the robot.**

- **Assumptions:**
  - **System setup and shutdown procedure are not modelled.**
  - **System maintenance is not modelled.**
  - **Ultrasonic sensor never fails.**
  - **DC motors never fail.**
  - **System never faces power cut.**

- **Method: for Collision avoidance software development cycle Waterfall Model was found to be the most suitable.**

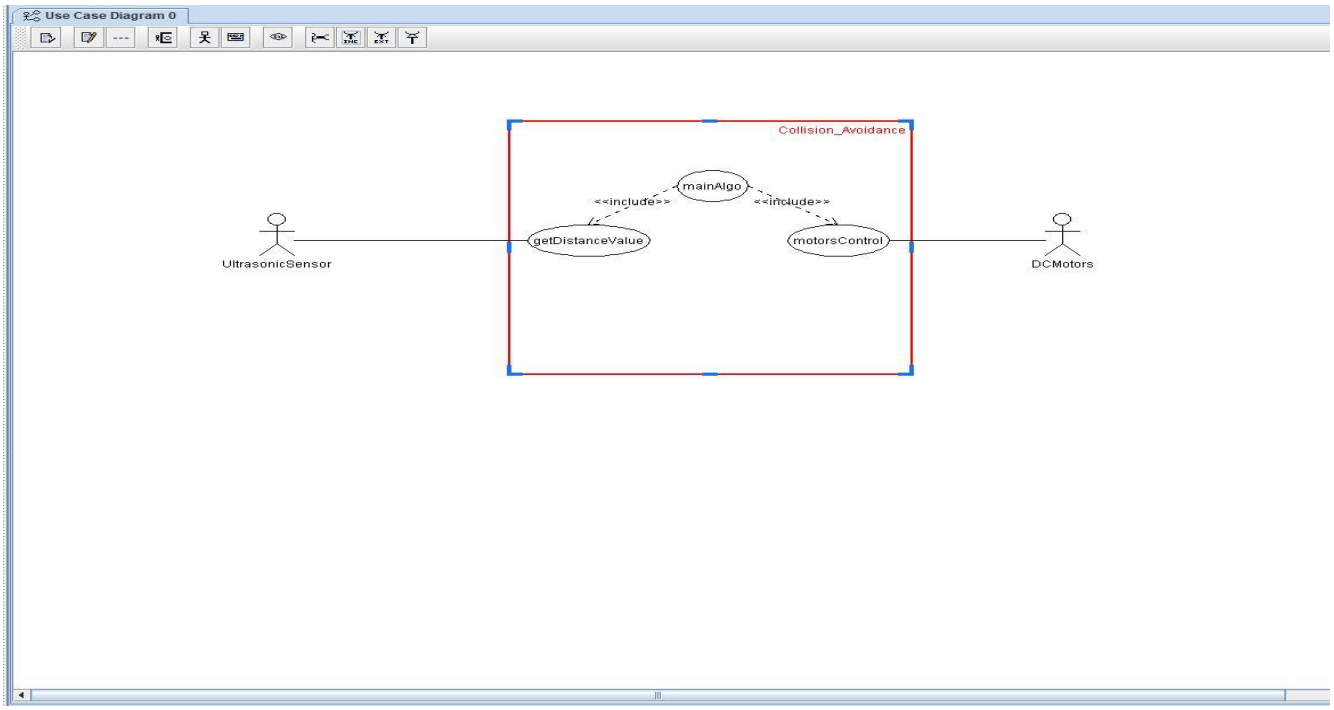
- **Requirement diagram:**



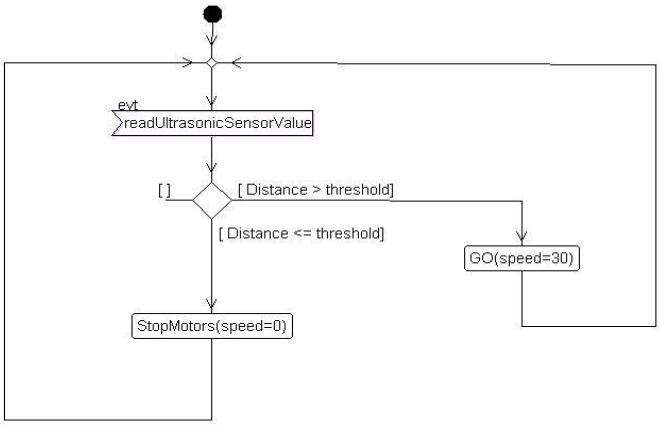
- **Space exploration/Partitioning: the project is quiet simple it doesn't require more than one ECU and STM32 was found suitable for this project.**

- **System analysis:**

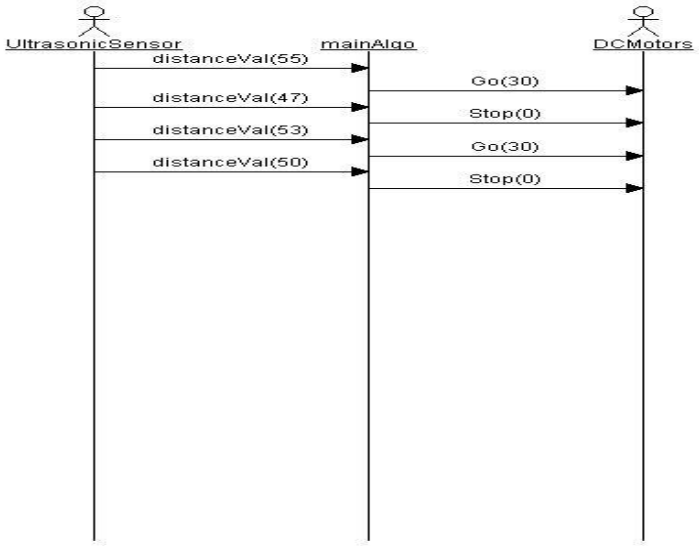
- **Use Case diagram:**



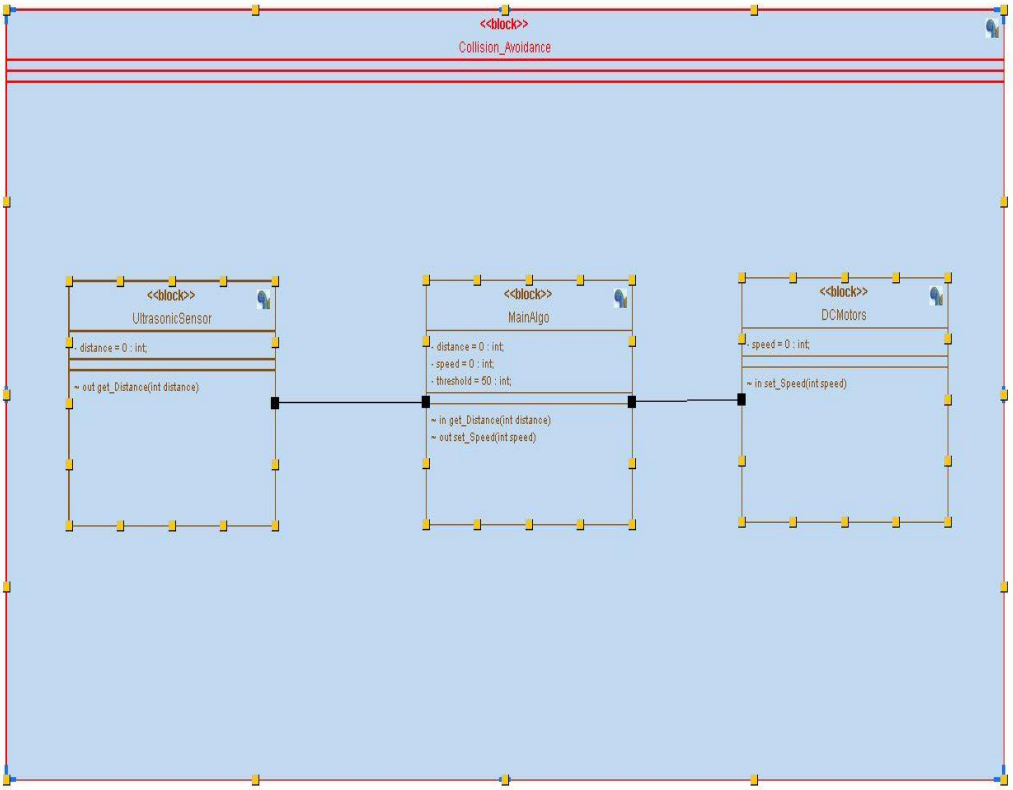
- **Activity diagram:**



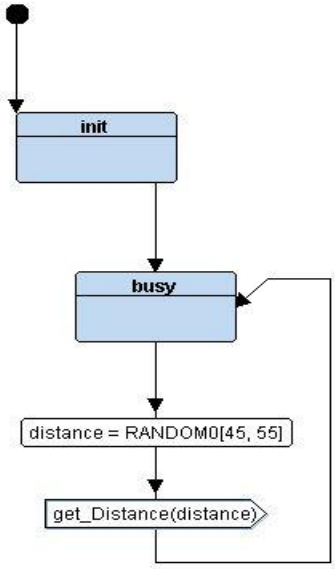
- **Sequence diagram:**



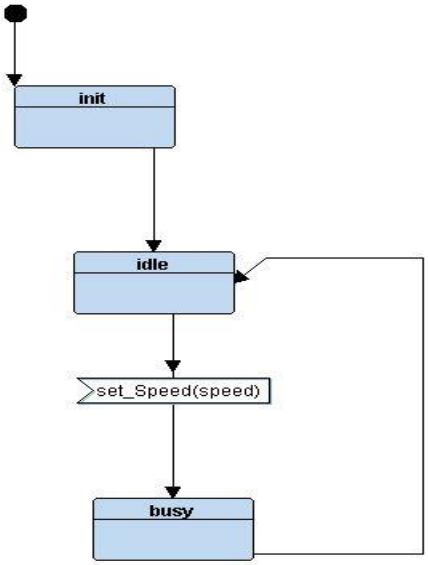
- **Block diagram:**



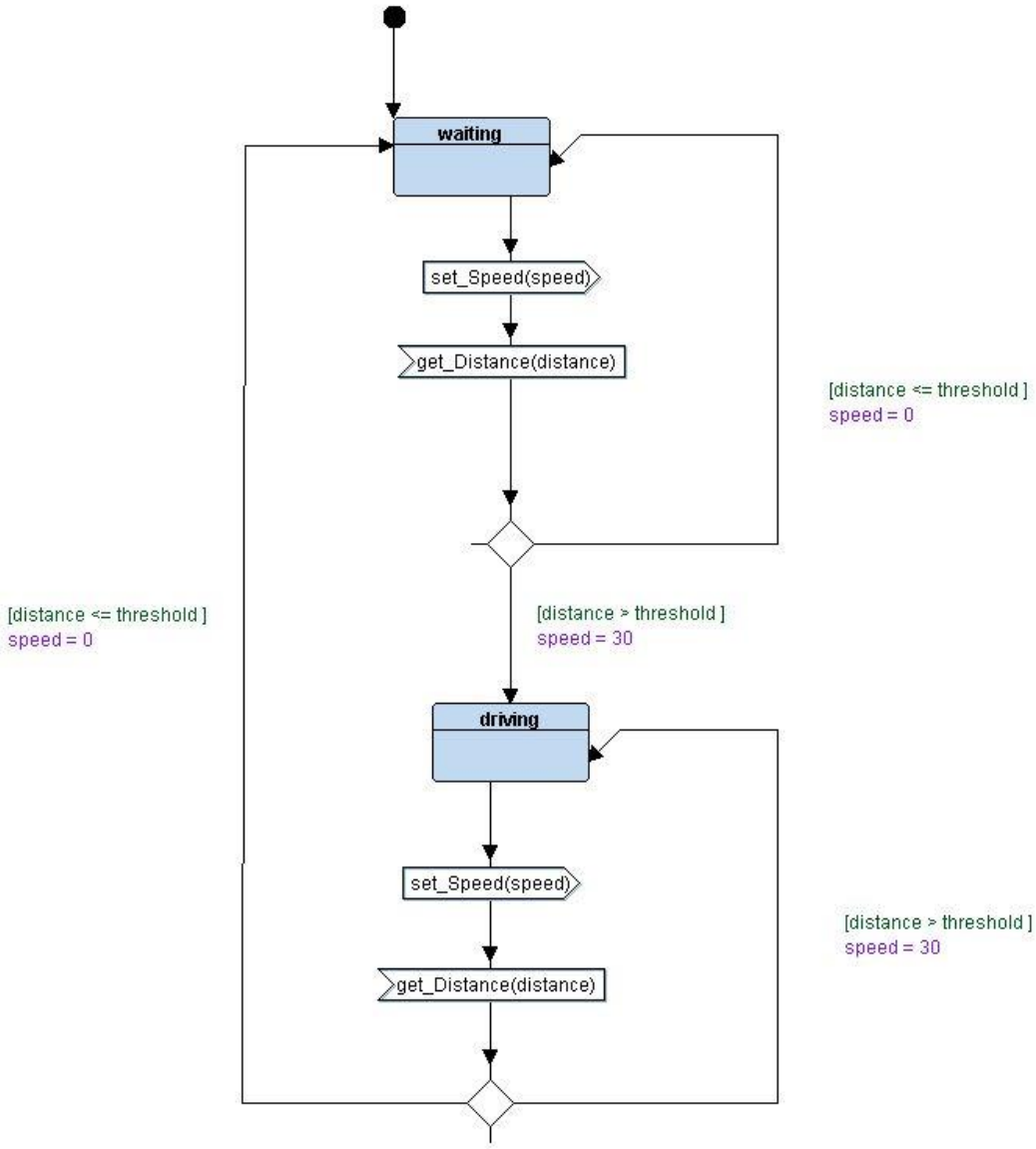
- **System Design:**
    - **State Machine UltrasonicSensor:**



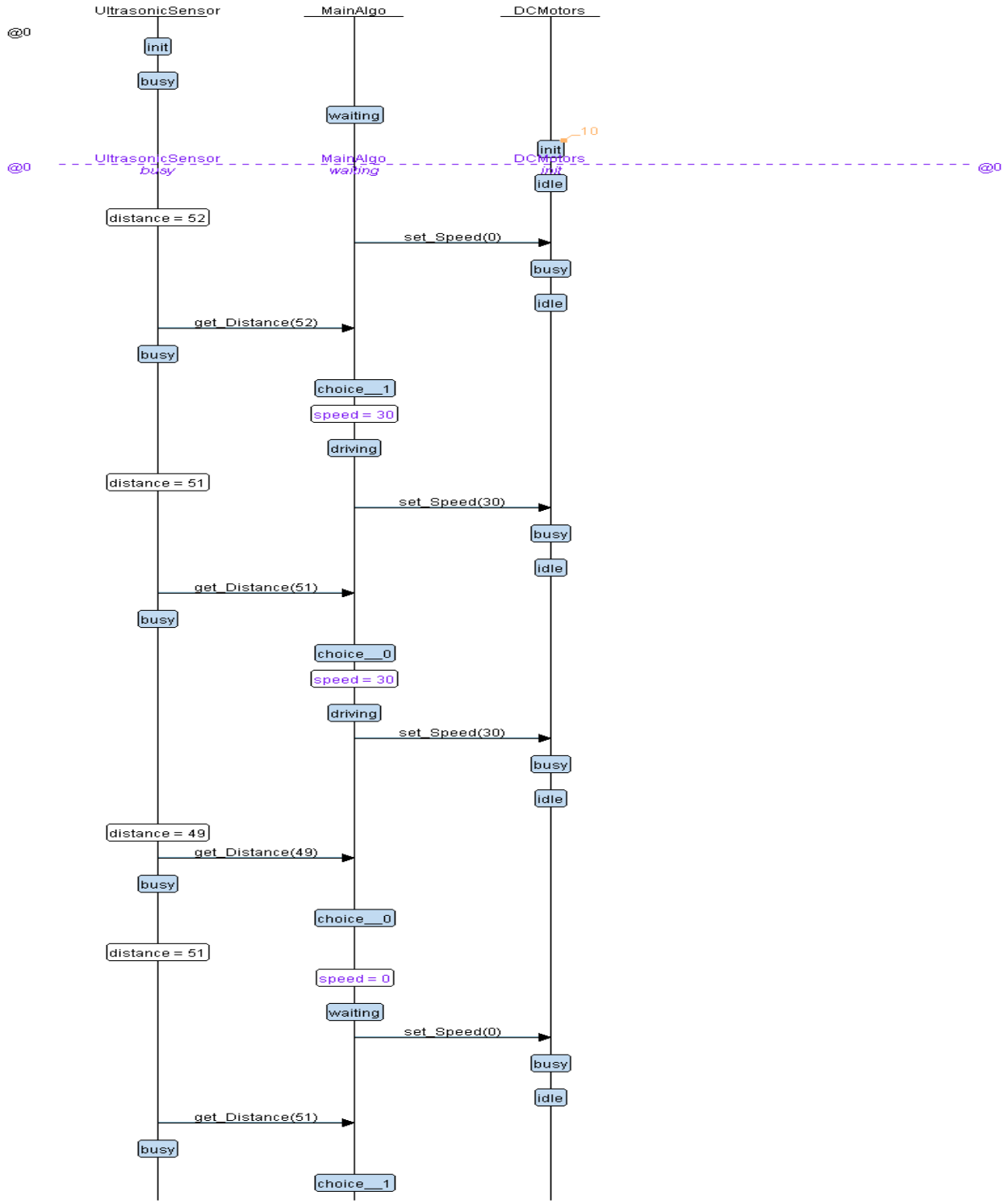
    - **State Machine DCMotors:**



- **State Machine MainAlgo:**



- **Simulation:**


UltrasonicSensor
MainAlgo
DCMotors
@0
init
busy
waiting
init
10
UltrasonicSensor
busy
MainAlgo
waiting
DCMotors
init
@0
@0
idle
distance = 52
set_Speed(0)
busy
idle
get_Distance(52)
busy
choice__1
speed = 30
driving
distance = 51
set_Speed(30)
busy
idle
get_Distance(51)
busy
choice__0
speed = 30
driving
set_Speed(30)
busy
idle
distance = 49
get_Distance(49)
busy
choice__0
distance = 51
speed = 0
waiting
set_Speed(0)
busy
idle
get_Distance(51)
busy
choice__1