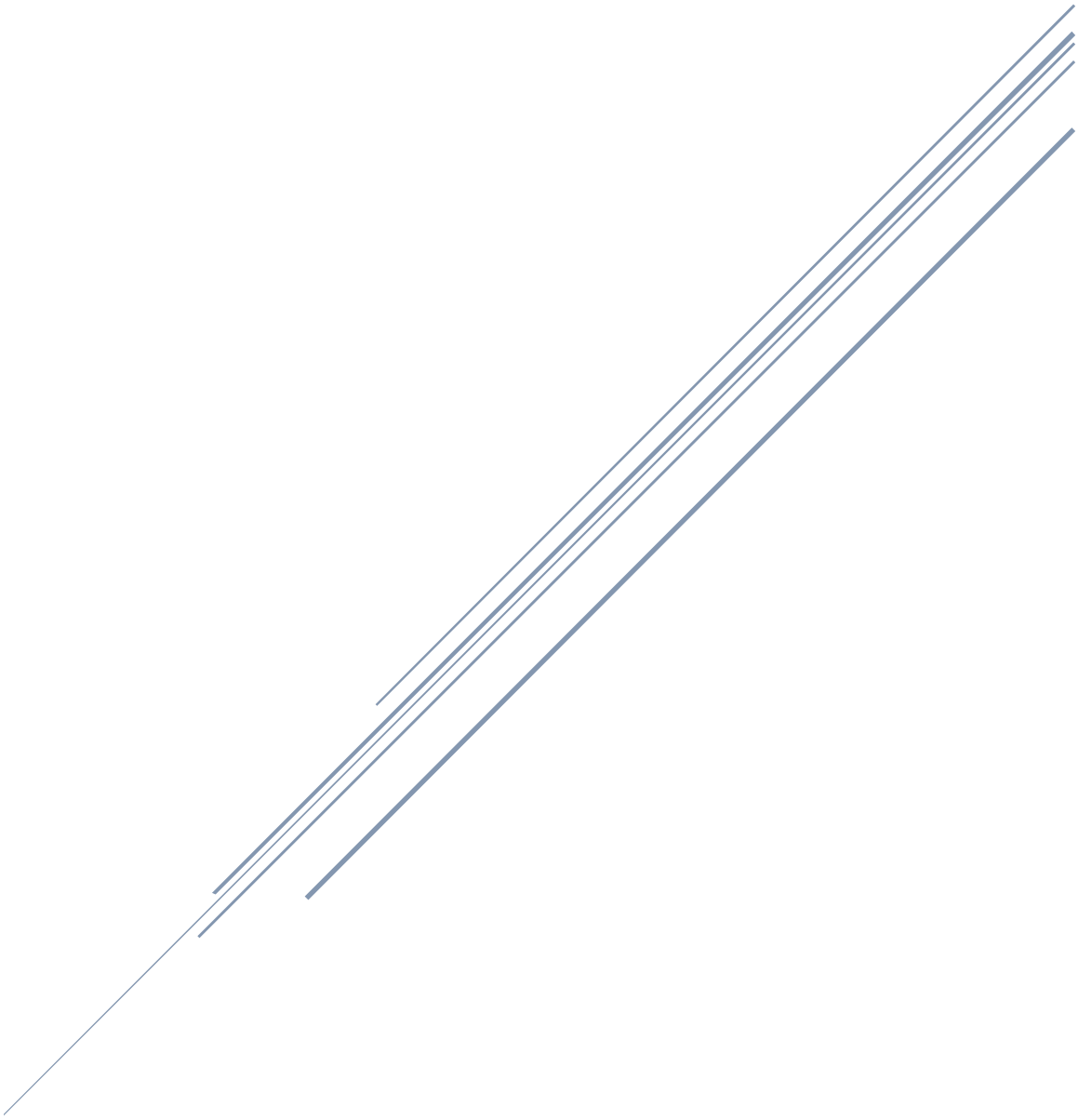
SYSTEM ARCHTECT

LESSON 2

BASSAM KHAMIS MANSOUR



Case study:

- **Required software to control the robot such that it keeps moving until faced an object, when it as distance 50 cm or less, the robot at this moment the robot must be stop.**

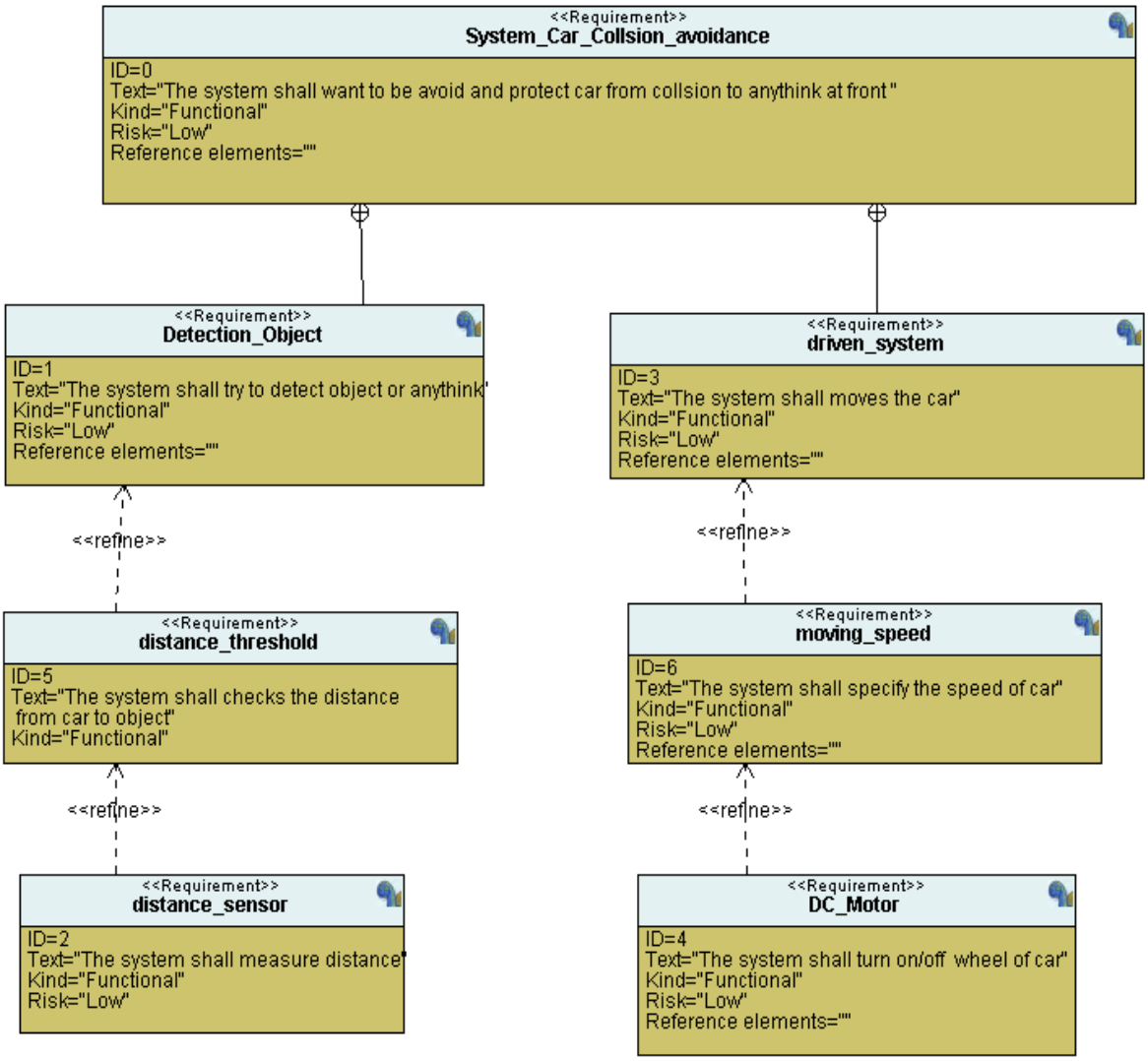
- **Assumption:**

1- The sensor idle sensor (not fail at any time).
2- Actuator used in this project is perfect one (no lag time).
3- The system never cut power of for it.
4- Setup and shutdown rule not considered.

Method:

According to this project and our specification we will use V method.

Requirement Diagram:

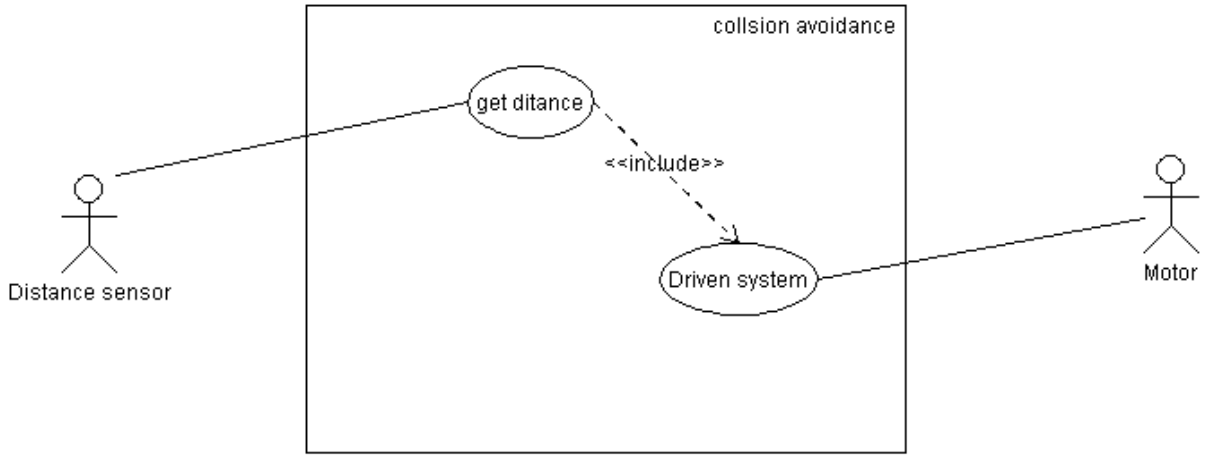


Space Exploration (SW/HW partitioning):

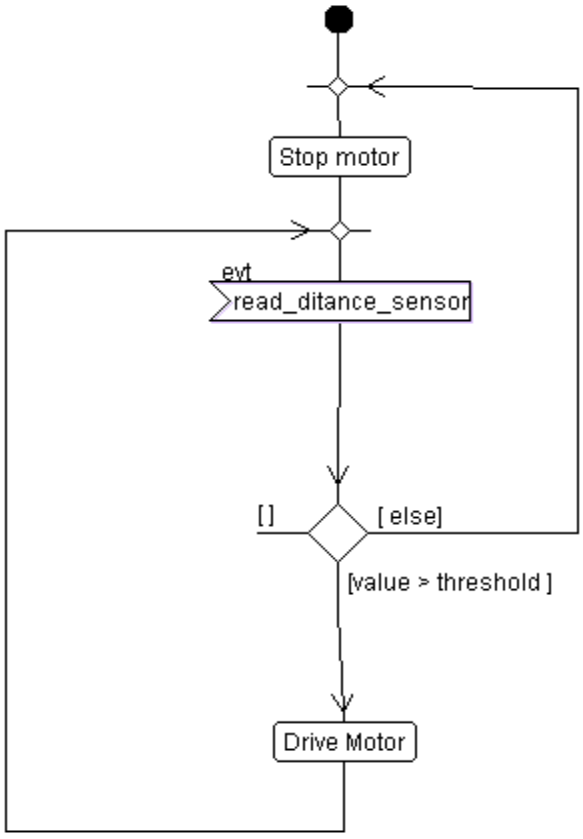
- The system is simple and not required high computation and no load on CPU, So, we will choose PIC 8-bit microcontroller.

System Analysis:

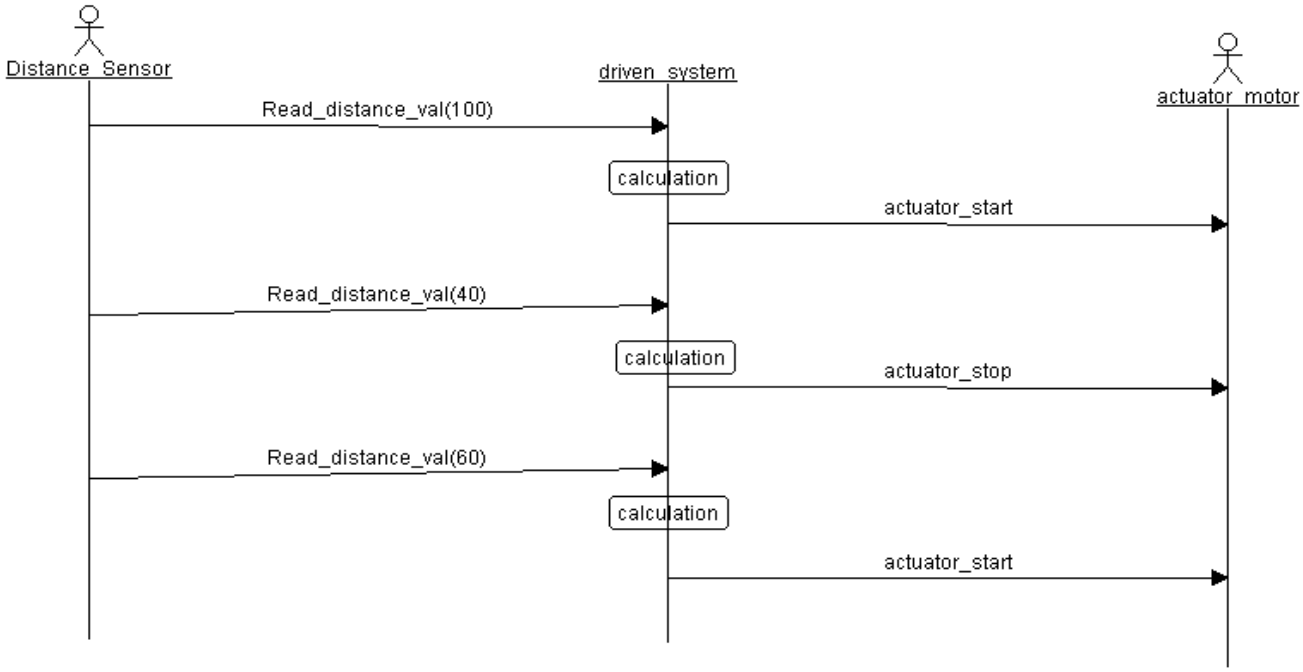
- Case use Diagram



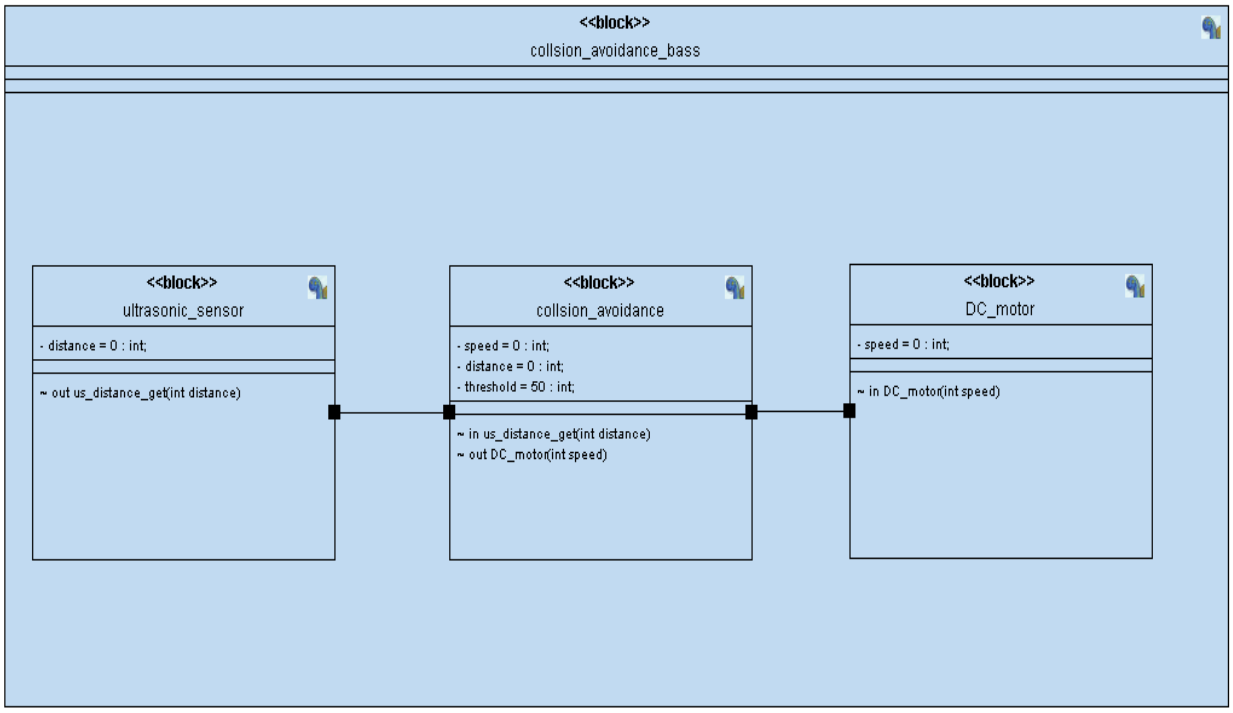
- Activity diagram



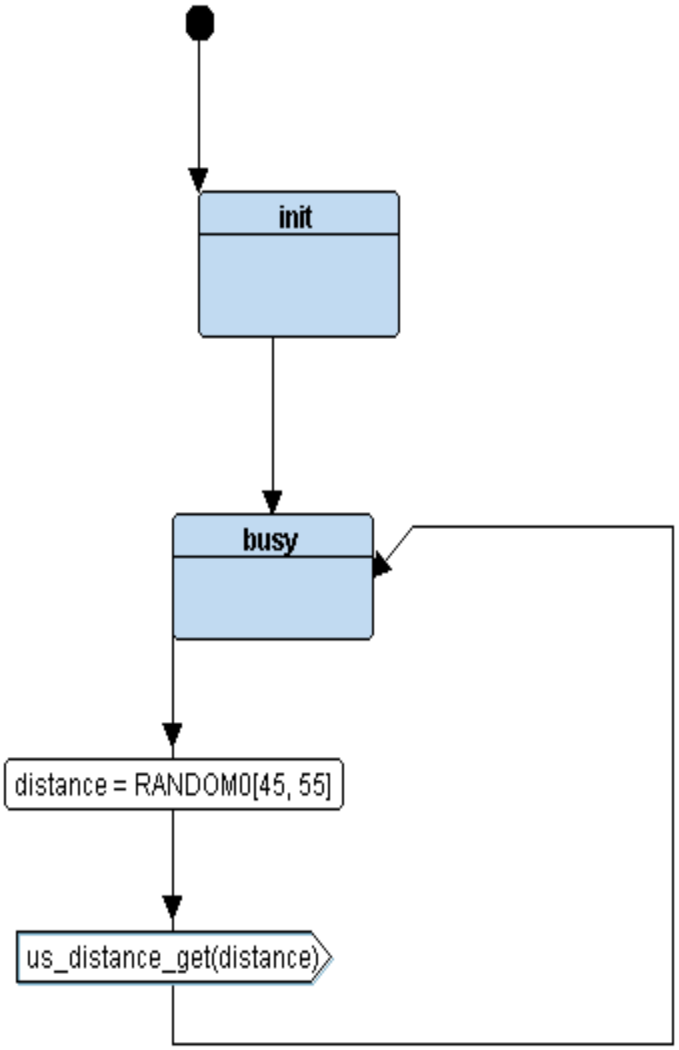
- **Sequence diagram**



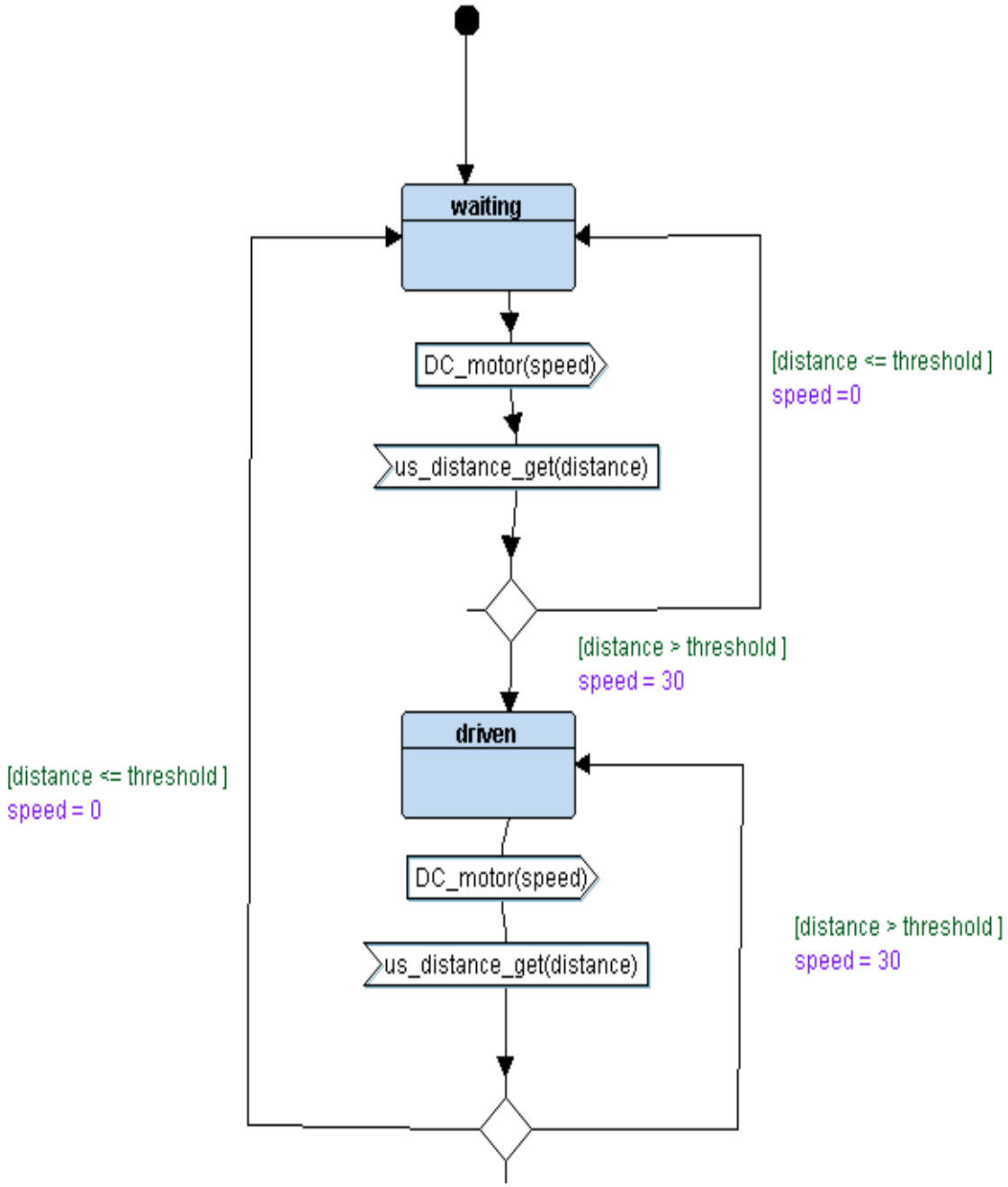
System Design:



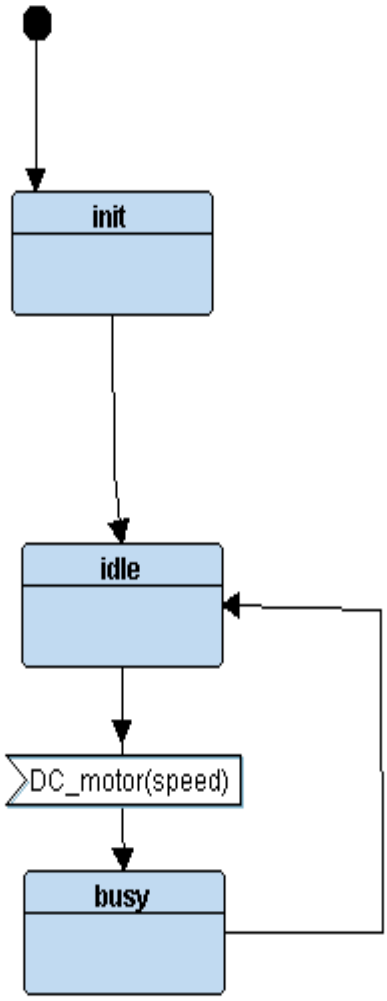
- **Ultrasonic sensor**



- **collision avoidance algorithms**



- **DC motor**



- **The Result**

```
DC_busy state: speed=30
US_busy state: distance=55
US>>>>>>CA:distance=55
driven state: dis=55, speed=30
CA>>>>>>DC:speed=30
DC_busy state: speed=30
US_busy state: distance=55
US>>>>>>CA:distance=55
driven state: dis=55, speed=30
CA>>>>>>DC:speed=30
DC_busy state: speed=30
US_busy state: distance=49
US>>>>>>CA:distance=49
waiting state: dis=49, speed=0
CA>>>>>>DC:speed=0
DC_busy state: speed=0
US_busy state: distance=45
US>>>>>>CA:distance=45
waiting state: dis=45, speed=0
CA>>>>>>DC:speed=0
DC_busy state: speed=0
US_busy state: distance=53
US>>>>>>CA:distance=53
driven state: dis=53, speed=30
CA>>>>>>DC:speed=30
```