



1/15/2022

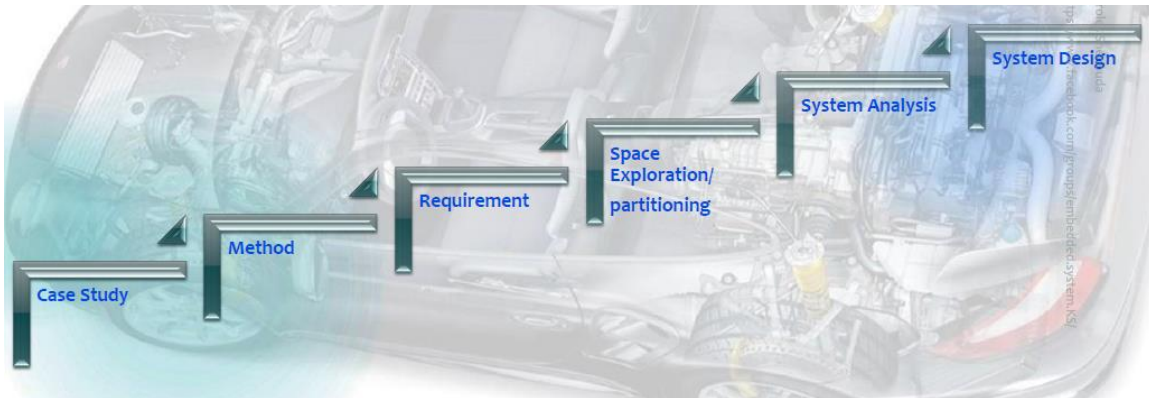
# Embedded System Design Sequence

Lab (1)

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# Introduction:

Embedded System Architecting/Design Sequence consists of several steps; case study, Method, Requirement, Space Exploration, System Analysis, System Design.



## 1-Case Study: Ultrasonic obstacle avoiding Robot

- **Specification:**

an ultrasonic obstacle stops the robot when the distance between robot and obstacle is smaller than 50cm.

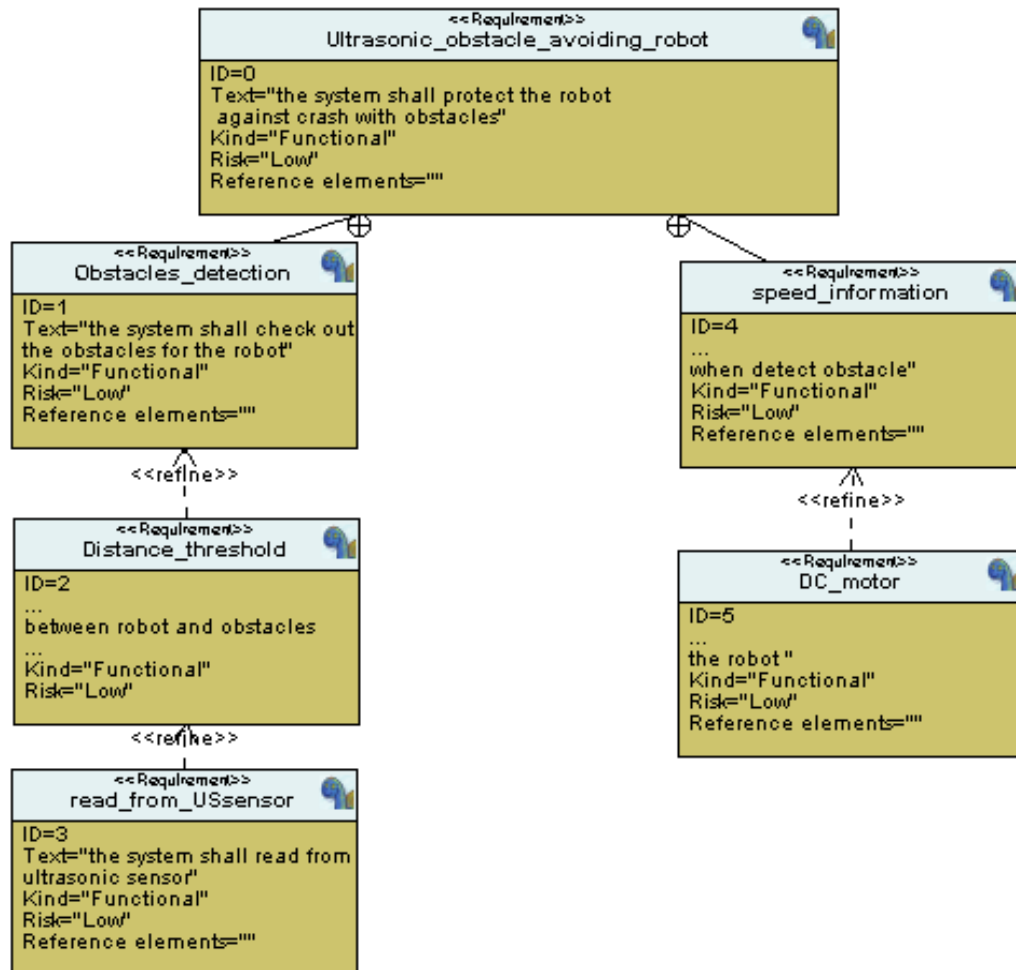
- **Assumption:**

- 1.The controller set up and shutdown procedures are not modeled.
- 2.The controller maintenance is not modeled.
- 3.The ultrasonic sensor never fails.
- 4.The controller never faces power cut.

## 2-Method:

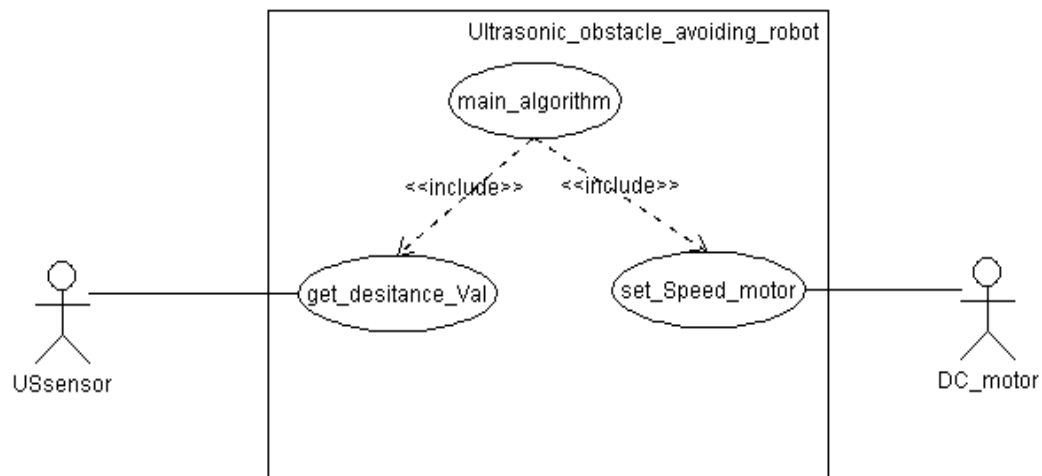
using VModel SDLC.

### 3-Requirement:

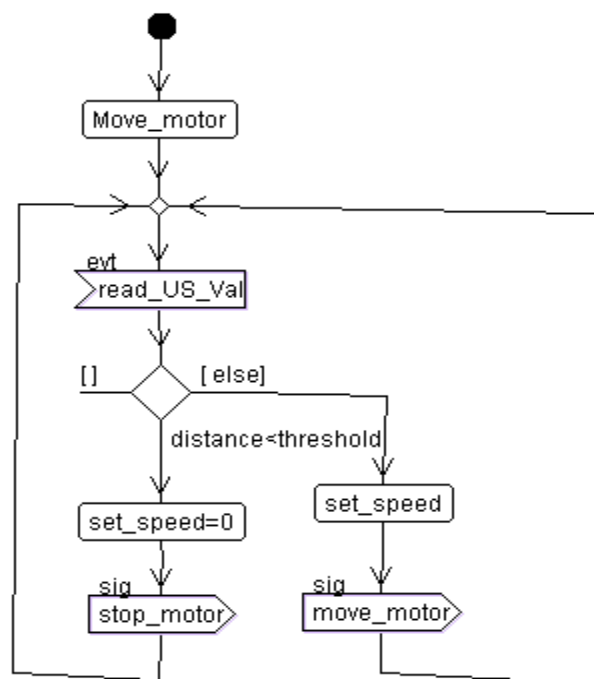


## 4-System Analysis:

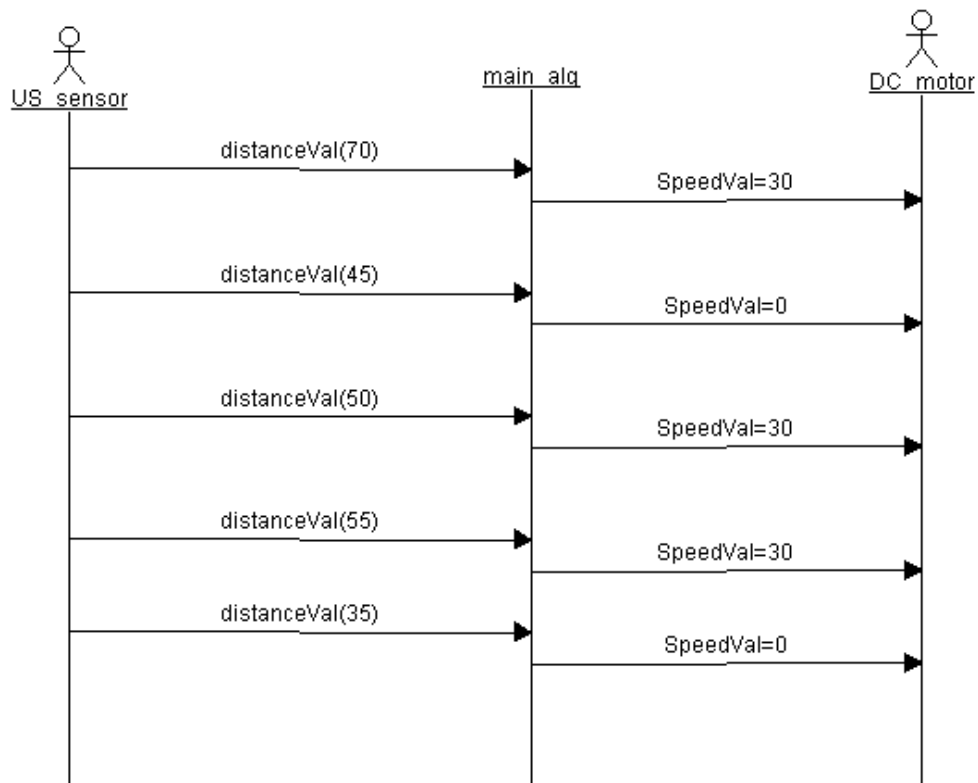
### 1.Use Case Diagram:



### 2.Activity Diagram:

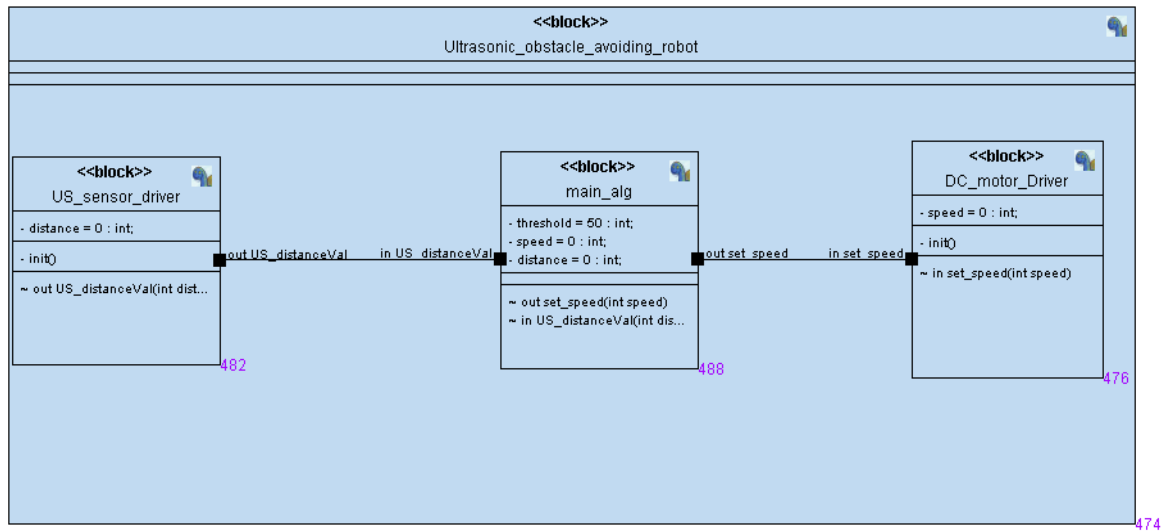


### 3.Sequence Diagram:



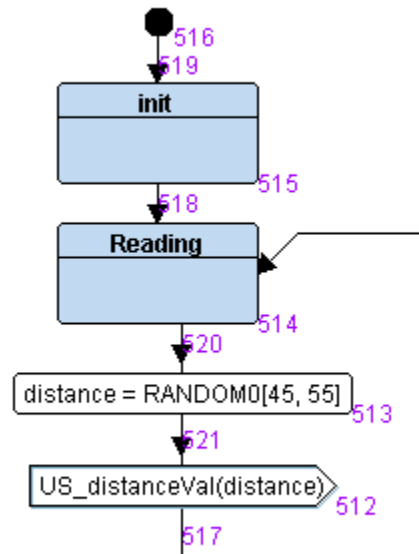
## 5-System Design:

### 1.Block Diagram:

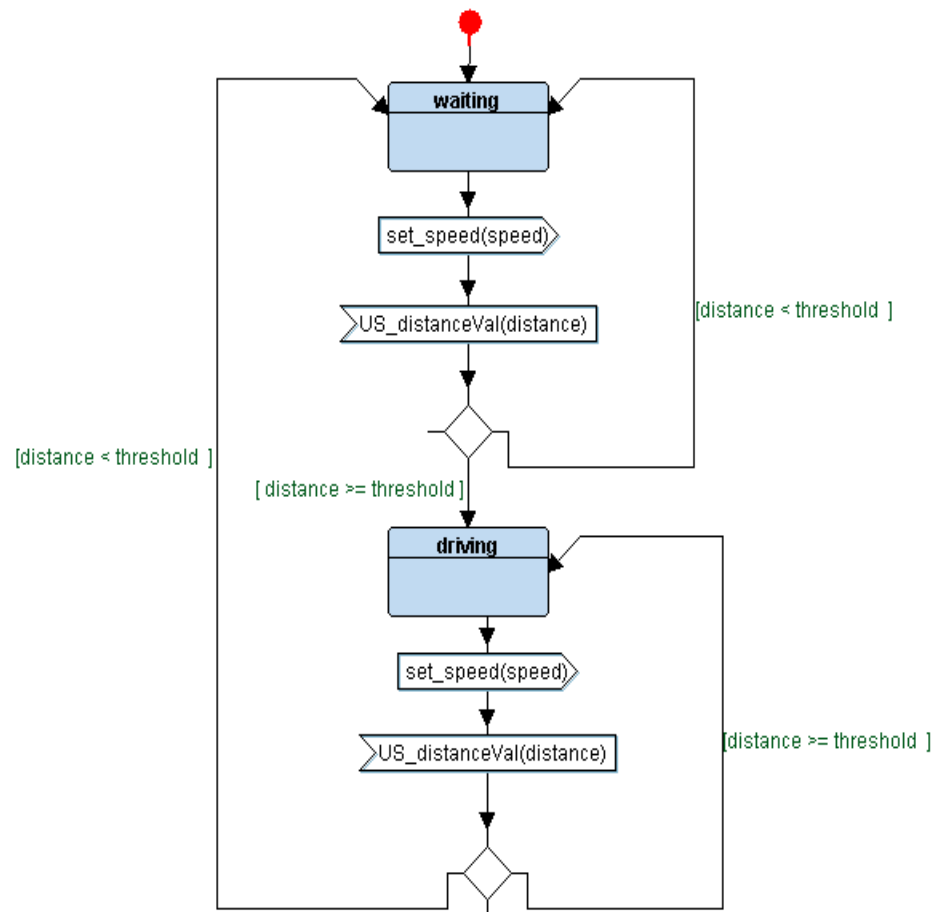


## 2.State Diagram:

### I.US\_sensor\_driver:

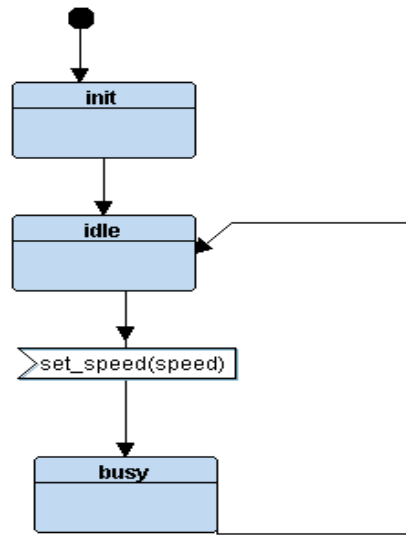


## II.Main\_alg:



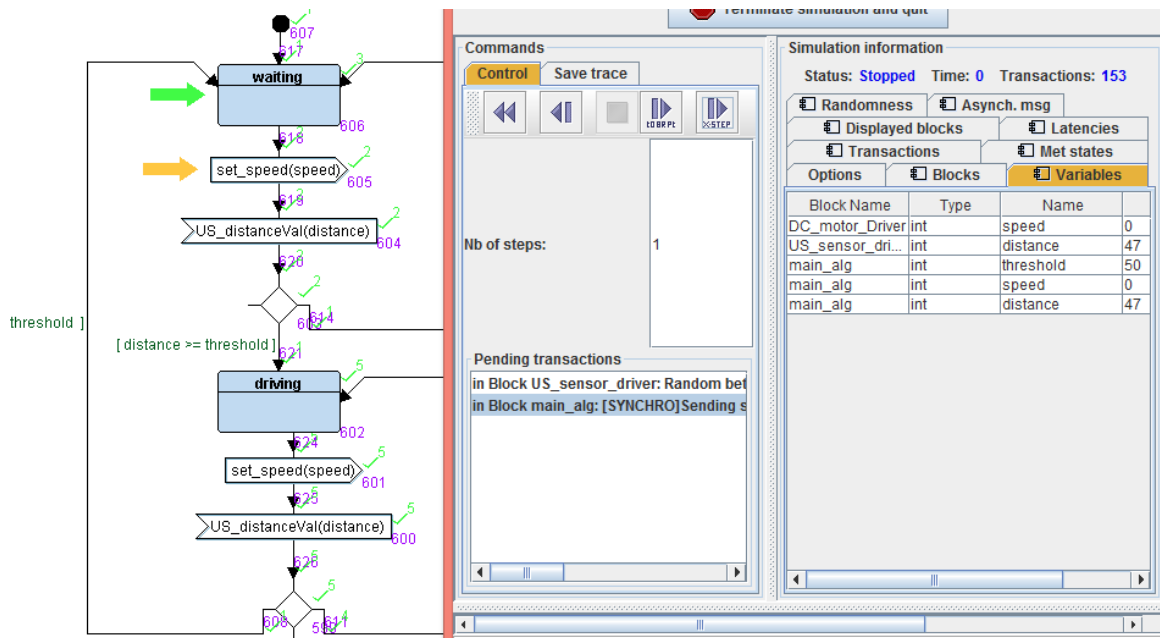


### III.DC\_motor\_driver:



## Simulation:

### 1- Distance < threshold:



### 2- Distance > threshold:

