Report

Name: **Ibrahim Shokry Ibrahim.**

Report: **Collision Avoidance Project.**

Topic: **Embedded System Architecting.**

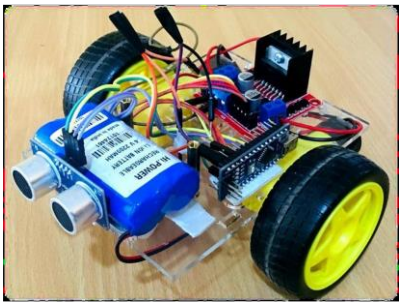
- Content:

- Case study.
- Methodology.
- Requirements.
- Space exploration / partitioning.
- System analysis.
- System design.
- System design simulation.

- Case study:

Obstacle avoiding robot:

When the distance between the obstacle and the robot is less than 50 cm the robot stops.



Assumptions:

1- System set up and shut down procedures are not modeled.

2- System maintenance is not modeled.

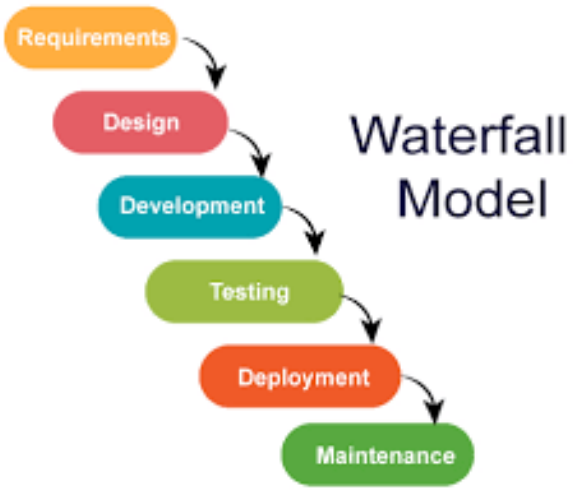
3- Ultrasonic sensor never fails.

4- The robot-motor never fails.

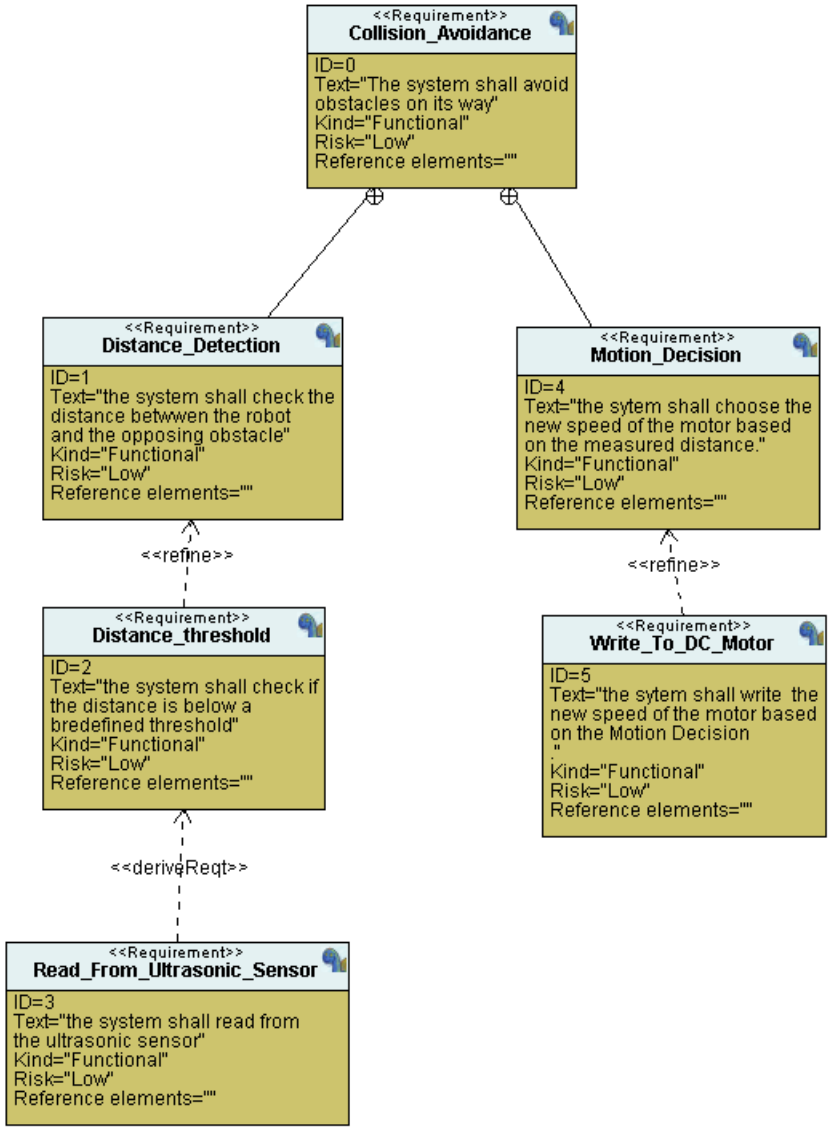
5- The system never faces cut off.

- Methodology:

Since the requirements are clear and will unlikely change, the system will use a straight-forward predictive model like the waterfall model. Every step will be taken sequentially and since the system is very simple, the implementation phase will take a very short time and we will have enough time for the testing phase.



- Requirements:

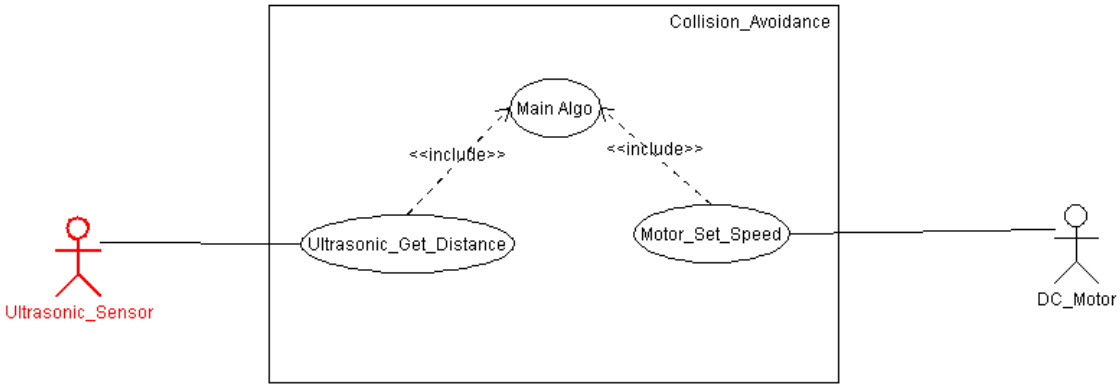


- Space exploration/partitioning:

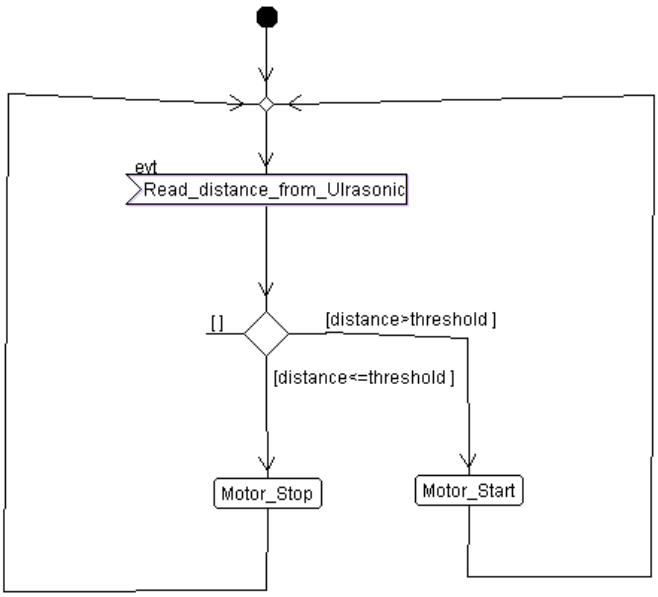
For the hardware, we have AVR Atmega32 microcontroller that will be more than enough for this application.

- System analysis:

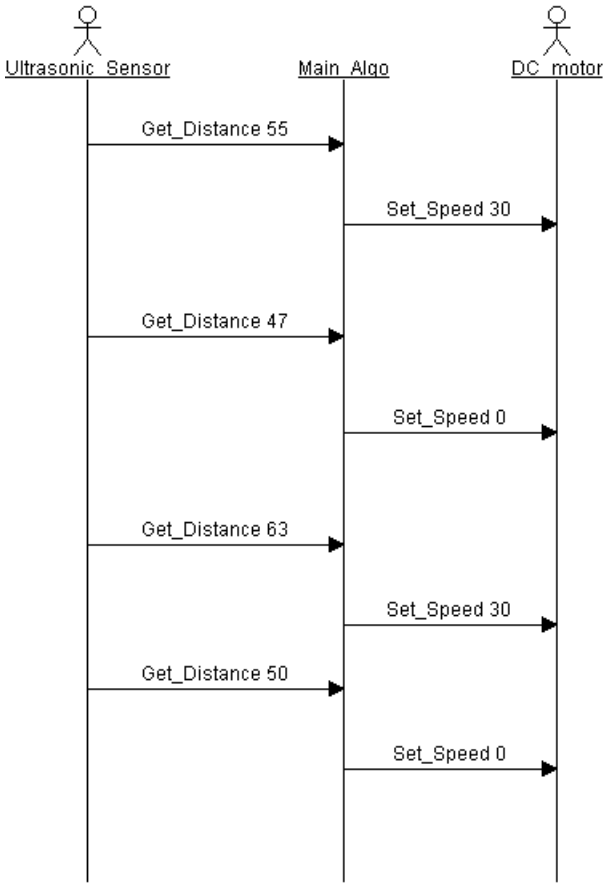
- Use case diagram:



- Activity diagram:

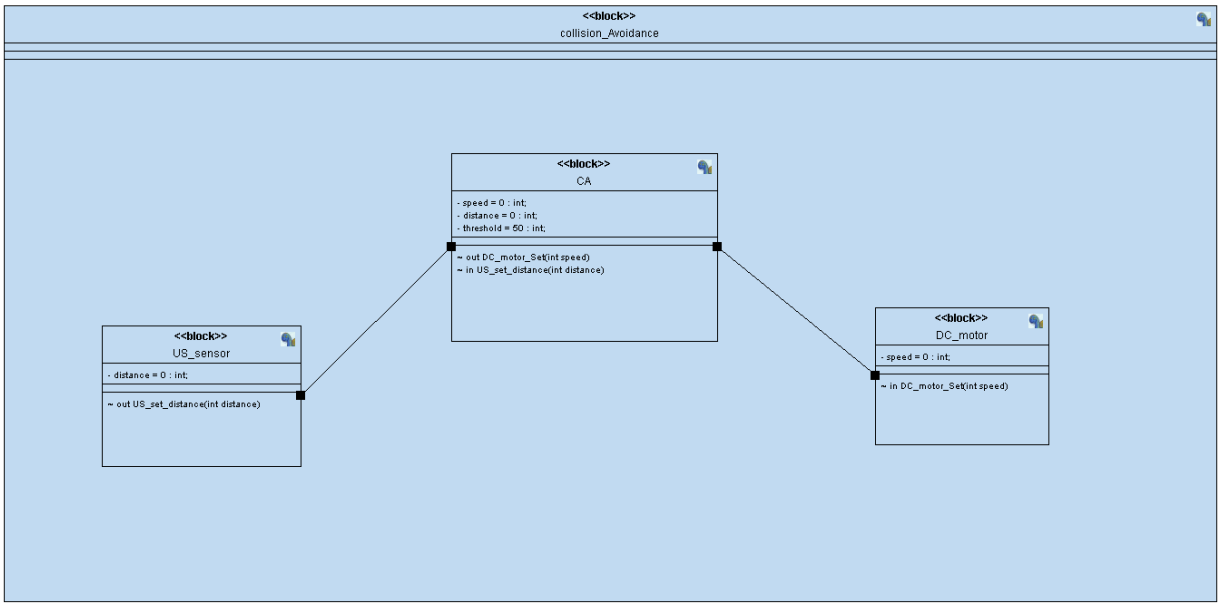


- **Sequence diagram:**

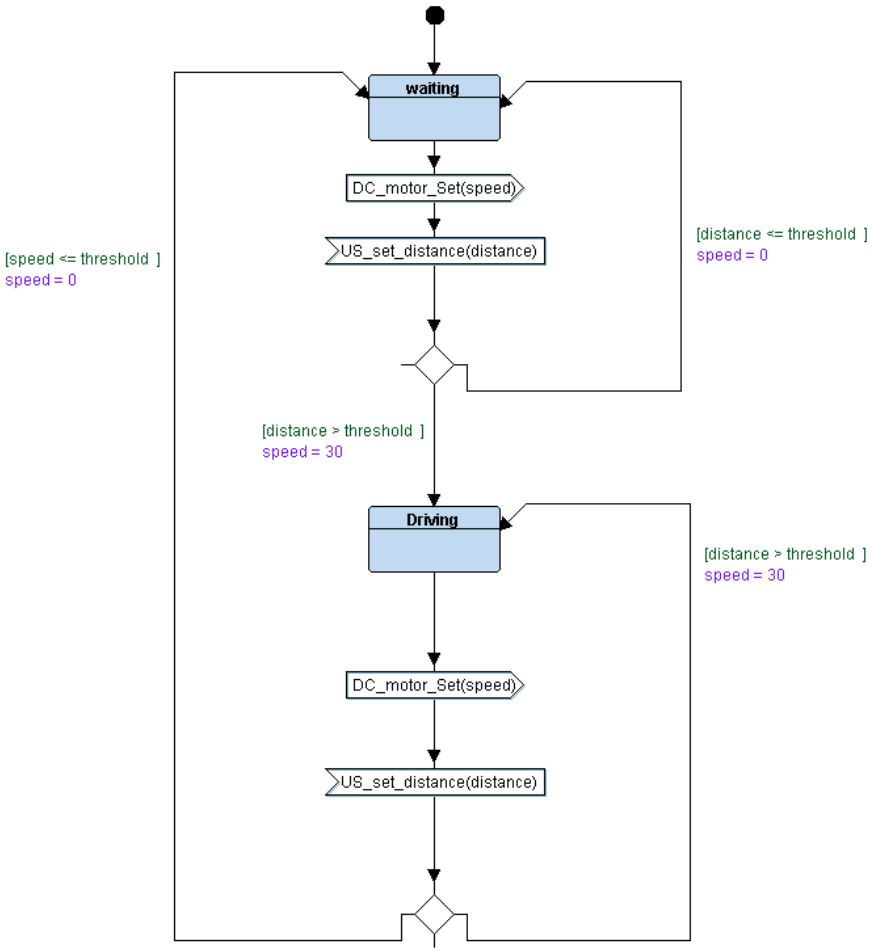


- System design:

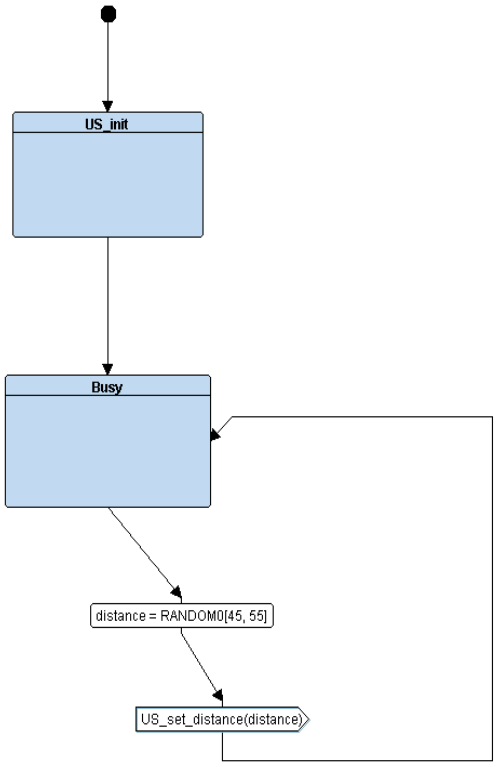
- Block diagram:



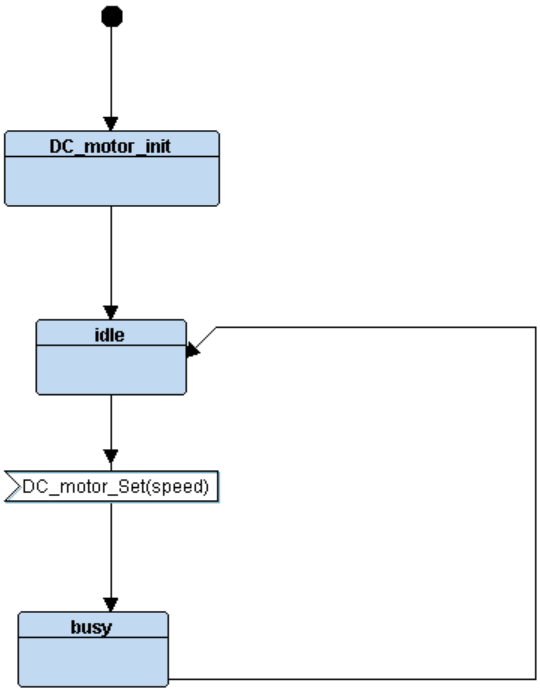
- Collision avoidance “CA” state machine:



- Ultrasonic Sensor state machine:



- DC motor state machine:



- System design simulation: