

# Habib University



Dhanani School of Science and Engineering

## Microcontrollers & Interfacing

**EE 375L-T1/T2**

**Team:** Circuit Cruiser

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# Intro

Milestone number: Milestone 2

## Objectives

**Mechanical and electronic structure:** to implement functionality mechanisms of the robot in hardware. The requirements include linear motion, 360 rotation, loading and unloading mechanism, and integration of basic electronics. Detailed report of the implemented hardware will be mentioned in this report, accompanied with all views and pictures of the robot.

## Stance

Implementing the basic mechanisms as required by the project in hardware is the basic step into making the project. Before we can design codes, we need to have a model ready so it's all ready for code uploading and testing. By Week 13 which is this week, we have implemented the crucial hardware part as part of the project progress.

# Images of Robot

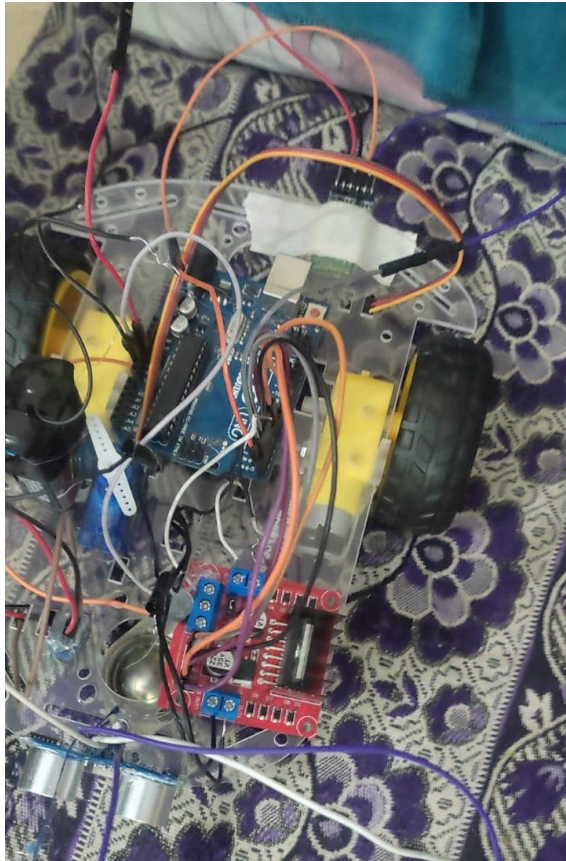


Figure 1: Top view of Robot

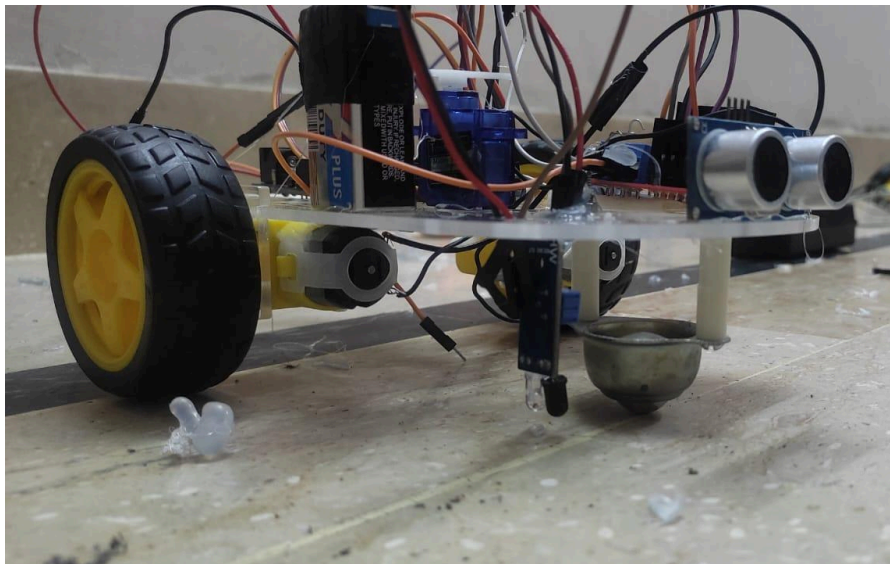


Figure 2: Side view of Robot

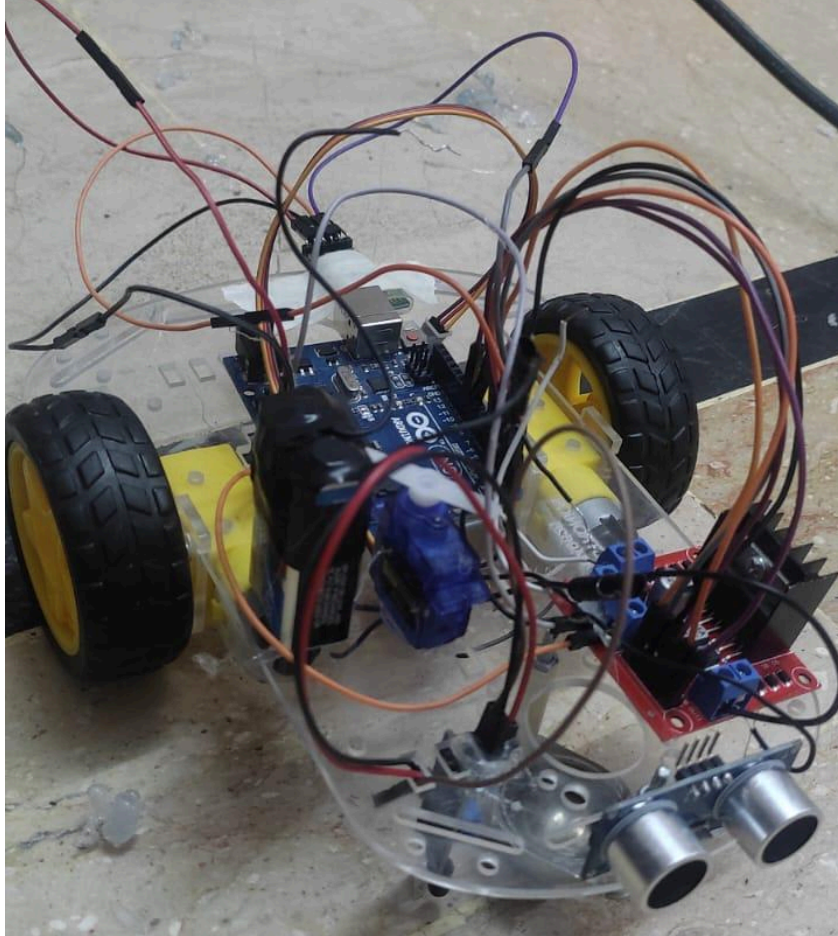


Figure 3: General view of robot

## Explanation of functionality

### Linear motion

The robot chassis came along with two wheels attached to the side. When both the motors will run simultaneously as a result of the program, the robot will be able to do a linear motion provided the hardware works perfectly.

### 360 rotation

As we can control both the wheels, if we chose to move only one wheel at a time and keep the other stationery, the robot will move in an angle. Depending on the speed of the motor motion

(which will be determined in the code in a future milestone), we can determine the seconds it would take for the robot to do a 360 rotation (and more).

## loading and unloading

The robot model contains two plastic arms attached with the help of two servos. When the arms move up, they will have a ball in between them and hence it will be loaded. Similarly, when the arms drop down or servo operates in the opposite direction, the ball will be unloaded.

## basic electronics

The robot has an ultrasonic sensor at the front of it, to detect an obstacle. We can calculate the distance between the sensor and an object and implement our obstacle detection on our desired value of a distance. An arduino is attached to the heart of the chassis as this is the main microcontroller which will run our project; it will transfer all the software into hardware. More basic electronics are implemented in the robot.

## Milestone 1 replica

We have made the robot with its respective basic electronics almost like the design we proposed in milestone 1. However, we added additional features like ultrasonic sensor which was difficult to implement on CAD. While the overall base structure remains the same, we have added more functionality and mechanisms.

## Sustainability

We used the items issued to us by the university as part of this project. Additionally, we just used glue in a moderate amount. Any additional temporary or permanent plastic support items like arms, etc will be made from leftover stuff in the Engineering Workshop.

## Task division

Aamaina: collecting necessary hardware needed to implement robot, hardware design

Abdullah: Hardware design

Fatima: Milestone report

## Milestone 2 summary

Progress: In milestone 1, we devised a detailed plan of the structure of the robot, pointing out exactly how we'll implement the hardware, and what additional components need to be acquired. In this milestone, we brought the plans of milestone 1 to real life by attaining the components and attaching them to the robot.

Key achievement: Hardware model of robot is ready

Feedback on working for the project: We would have devised better results if we started working on the project a little earlier. Due to pre-Eid workload, a lot of work got piled up and we had to rush this. We faced some hardware acquisition challenges in which the batteries we required were not available in the university inventory/we were not able to get them on short notice. We had to buy them on our own.

Before going towards the hardware designing of the project, we should have tested each component properly and separately. We faced the issue of our arduino not working. We have requested the respective course faculty to provide us with a replacement of the arduino.

Remarks: We would like to have implemented it with more time and more pre-planning. Excited to proceed to the next stage of the project.