



# Engineering Assignment Coversheet

Student Number(s)

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Group Code (if applicable):

14

Please note that you:

- Must keep a full copy of your submission for this assignment
- Must staple this assignment
- Must NOT use binders or plastic folders except for large assignments

Assignment Title:	Assignment 1 task 2.2 Warman Controller
Subject Number:	MCEN 30021
Subject Name:	Mechanical system Design
Student Name:	Yun Zhou Feng / Bowen Zhang / ZeTing Huang / HaoNan Liu
Lecturer/Tutor:	Darrell / Haydar
Due Date:	19. Sep. 2020

## For Late Assignments Only

Has an extension been granted? Yes / No (circle)

A per-day late penalty may apply if you submit this assignment after the due date/extension. Please check with your Department/coordinator for further information.

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Plagiarism is the act of representing as one's own original work the creative works of another, without appropriate acknowledgment of the author or source.

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Plagiarism and collusion constitute cheating. Disciplinary action will be taken against students who engage in plagiarism and collusion as outlined in University policy. Proven involvement in plagiarism or collusion may be recorded on my academic file in accordance with Statute 13.1.18.

## STUDENT DECLARATION

Please sign below to indicate that you understand the following statements:

I declare that:

- This assignment is my own original work, except where I have appropriately cited the original source.
- This assignment has not previously been submitted for assessment in this or any other subject.

For the purposes of assessment, I give the assessor of this assignment the permission to:

- Reproduce this assignment and provide a copy to another member of staff; and
- Take steps to authenticate the assignment, including communicating a copy of this assignment to a checking service (which may retain a copy of the assignment on its database for future plagiarism checking).

Student signature Yun Zhou Feng Date 19. 09. 2020

## Task 2.2 Short Report

Subject: MCEN30021 Mechanical Design  
Assignment #1 Task #2.2: Warman Controller  
Team Number: Team #14  
Team member names and student ID numbers:

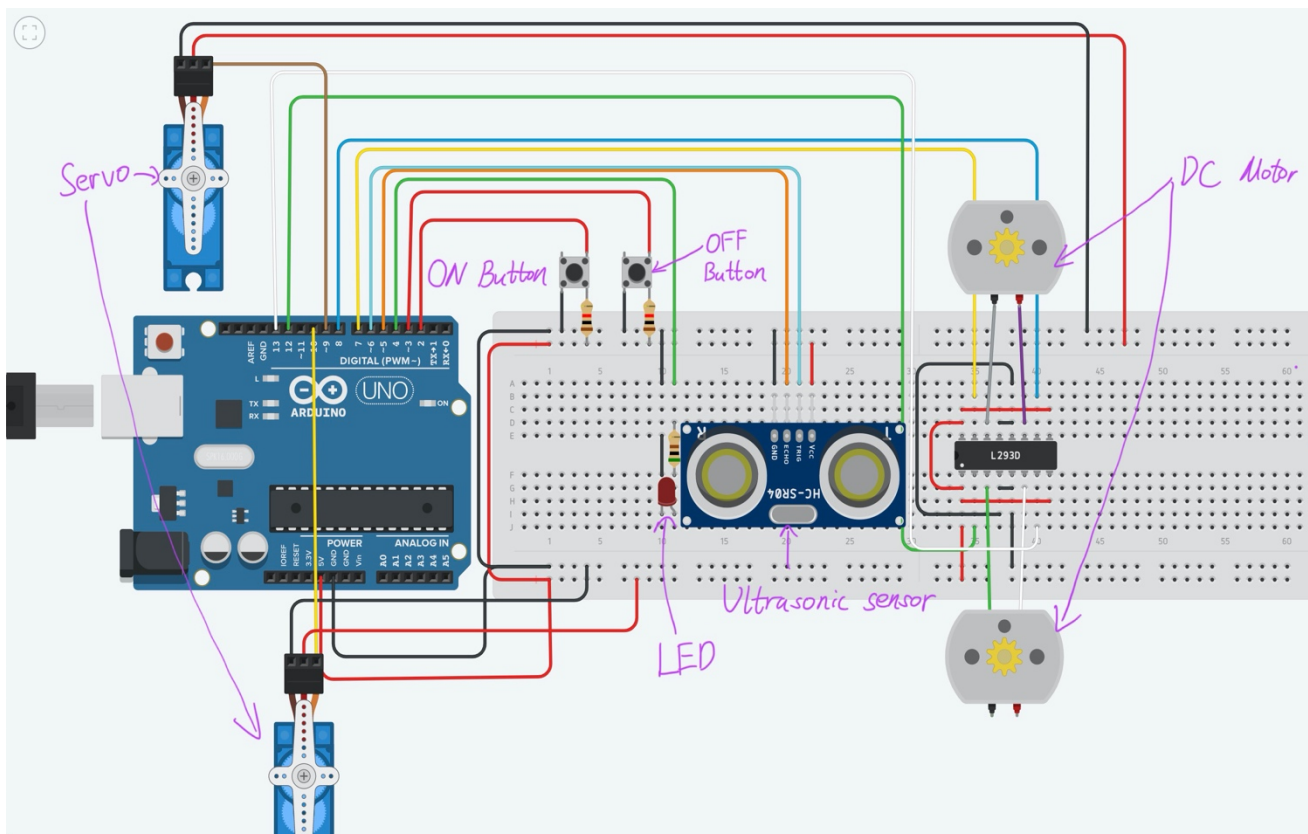
Zeting Huang: 1033306  
Yunzhou Feng: 1008707  
Bowen Zhang: 1067748  
Haonan Liu: 918506

Zoom Meeting ID: 986 242 4127 and passcode: 460067 Date: 23/09/2020 9:30am

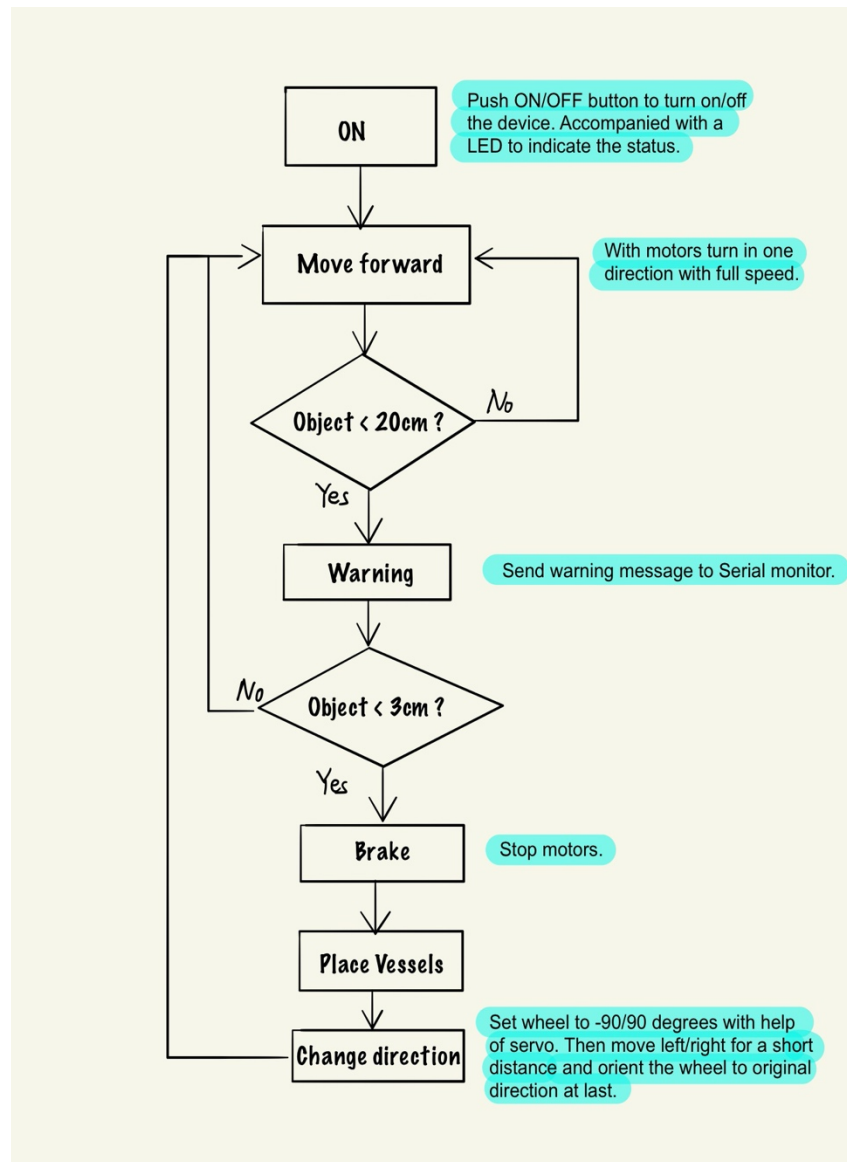
## Part A: Problem Statement

The competition requires the autonomous system to accurately locate and reach the target tubes. In this case, a controller which can coordinate the entire system including direction and speed control is necessary for achieving desired outcome. During task 2.2, the team is going to build a control system which involves three main functionalities: on/ off functionality, barrier detection and distance measurement and movement control. For on/ off functionality, the system should contain buttons to turn on and off the whole system accompanied with an LED which indicates the statement of the system. Then, the team should attempt to solve how the system can detect and report the distance of object by programming. At last, how the motor/wheel can be controlled according to the input sensor values is also the problem the team is facing.

## Part B: Circuit

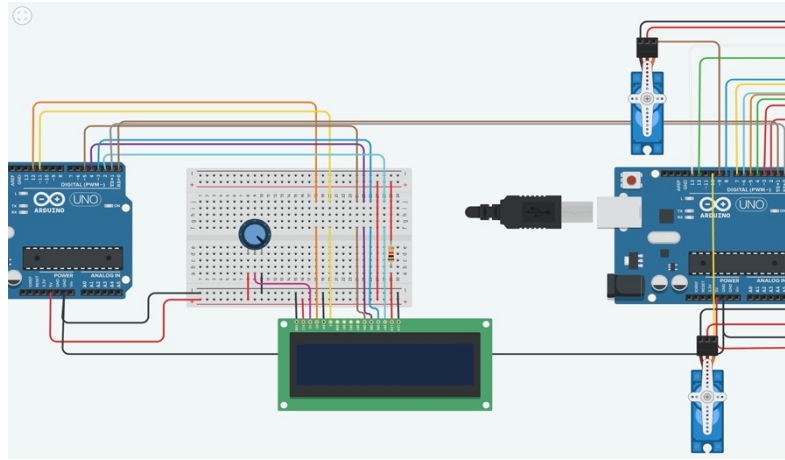


## Part C: Flow-Chart



## Part D: Challenges

1. A single Arduino Uno R3 provides limited pins for connecting devices, so some of the functionalities are simplified. For instance, the LCD is replaced by serial monitor for displaying information. Although we could share connections over multiple Arduinos (as shown below), it is both complicated and time-consuming to achieve in terms of code.



(By connecting Rx interface of Arduino 1 to Tx interface of Arduino 2 and connect Tx interface of Arduino 1 to Rx interface of Arduino 2)

2. The servo motors are used to turn the wheels to the expected direction. However, each servo can only turn anti-clockwise ranging from 0 to 180 degrees, where the controller can only turn left with maximum 180 degrees. To solve this, the servo motor is horizontally placed by setting default position to be 90 degrees. In this case, it can turn both directions of maximum 90 degrees (plus or minus 90 degrees).
3. Using DC motor for direction control could be complicated. It cannot be programmed to specific angles by given input. Therefore, addition component is required. Servo motor is introduced as steering system, where the direction of wheels can be precisely controlled by input data.

## Appendix

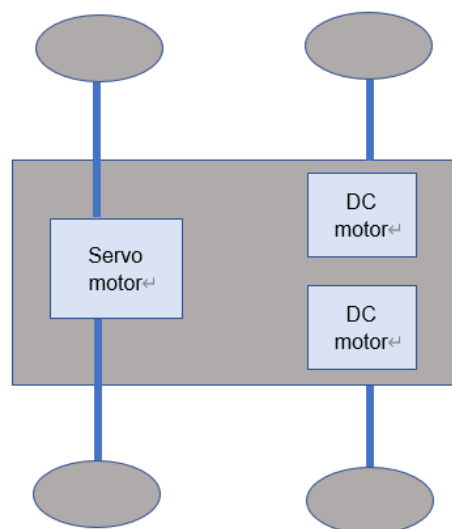


Figure 1: steering and engine of the system.