

ECGR 4161/5196 LAB 7

GROUP: 29

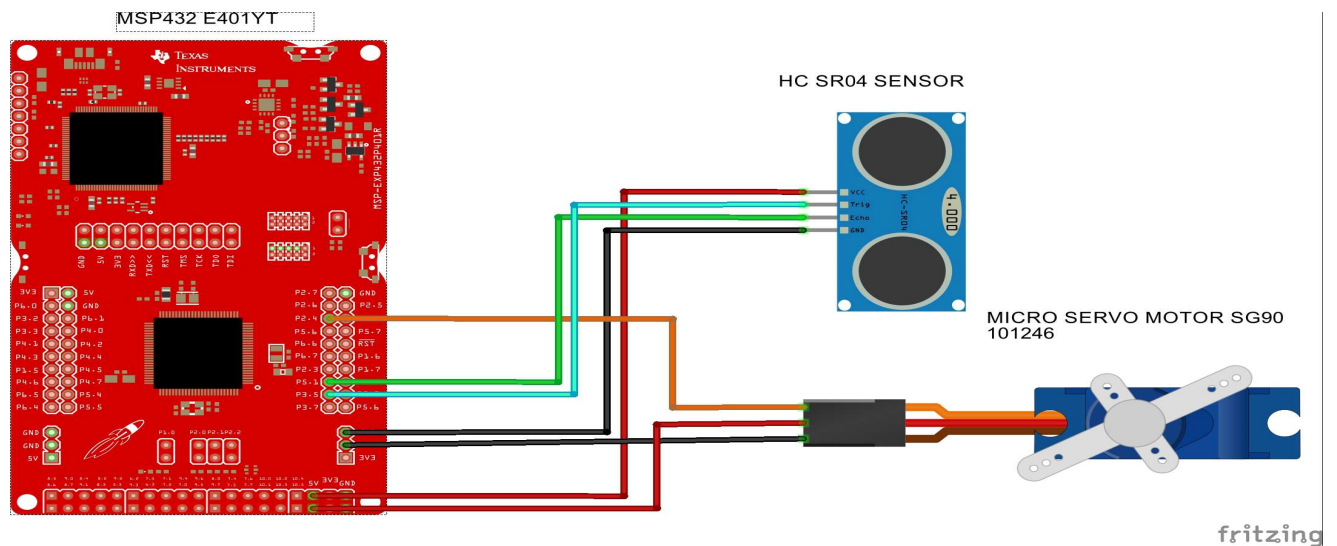
NAME: Anyaegbu Somtochukwu C. & Ajay Sankar Chundi

VIDEO LINK:

<https://drive.google.com/drive/folders/1jnGrGPWin0dR8f2PiJk7nGers88VwH9x?usp=sharing>

OBJECTIVE: The objective of this Lab is to travel as consistently to 10 cm from the wall of a 1.5 x 1.5 to 2 x 2 meter “room”. The robot should also go around two obstacles in the room.

CIRCUIT DIAGRAM:



COMMENTARY:

- **Introduction**

This is a two-part lab which is aimed at enabling students gain a practical understanding of how ultrasound sensors interfaced with a micro servo motor (SG90) and microcontroller board (MSP432) work together to enable TI RSLK bot to drive through around a polygon shaped room and avoid obstacles.

- **Materials Required**

- MSP432
- TI-RSLK
- HC-SR04 UltraSound Sensor
- Micro Servo Motor SG90
- F-M and F-F Jumper Wires
- Energia 1.8.11E23

- **Theory**

The HC-SR04 works by sending an ultrasonic pulse and then sensing it as it returns. A microcontroller () and the use of the pulseIn function is used to measure the time the pulse took to travel out, reflect off an object, and return. Knowing the speed of sound, the distance to the object can be calculated.

The servo motor uses an open loop control system to control its motion and direction. It's an open loop electro-mechanical system.

The code integrates others used in Lab 3, 4, 5 and parts of 6. The robot is to drive through a polygon shaped room while maintaining a 10cm distance from the wall. It also avoids two obstacles in real time.

- **Results**

Learned to program the robot to drive around a room autonomously. Lab 7 was completed with one main issue being the inability for the robot to drive through the room and avoid obstacles within a minute.