

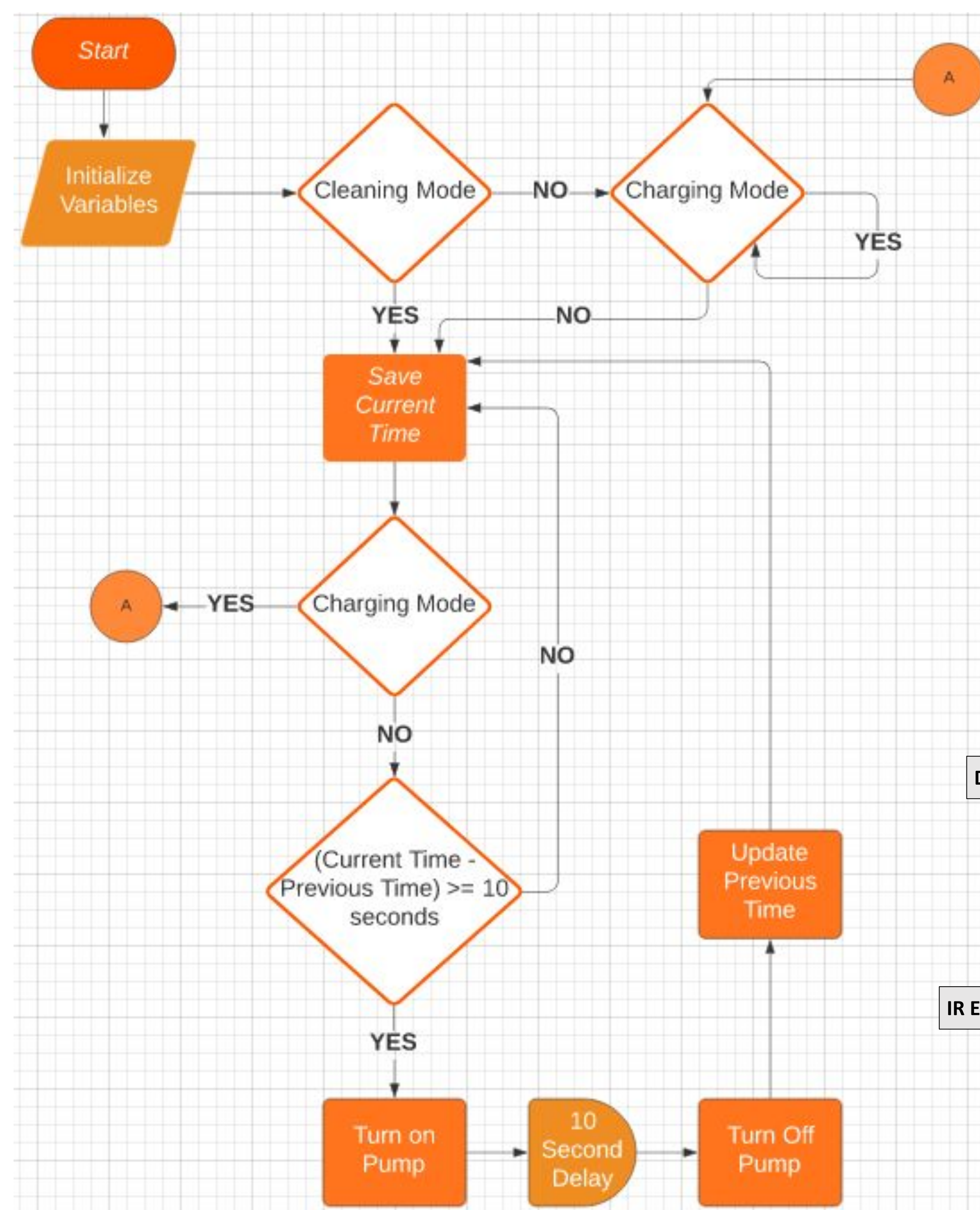
## Our Mission

Our mission at Autonomous Cleaning Robot is to provide a fully automatic robot that can clean and disinfect any smooth horizontal surfaces in both public areas and people's home to help stop the Covid-19 pandemic.

## Introduction

Currently the cleaning of the table under publics, like in restaurants, heavily depends on human labors, this results in difficulties to quantifies the effectiveness of the disinfection of the table surface, which is critical under the era of global pandemic. The virus can be transmitted from surfaces to people. **Autonomous Cleaning Robot** is a project at UCI to design and manufacture an autonomous robot that can clean tables at restaurants.

## Cleaning System



### Distribution System:

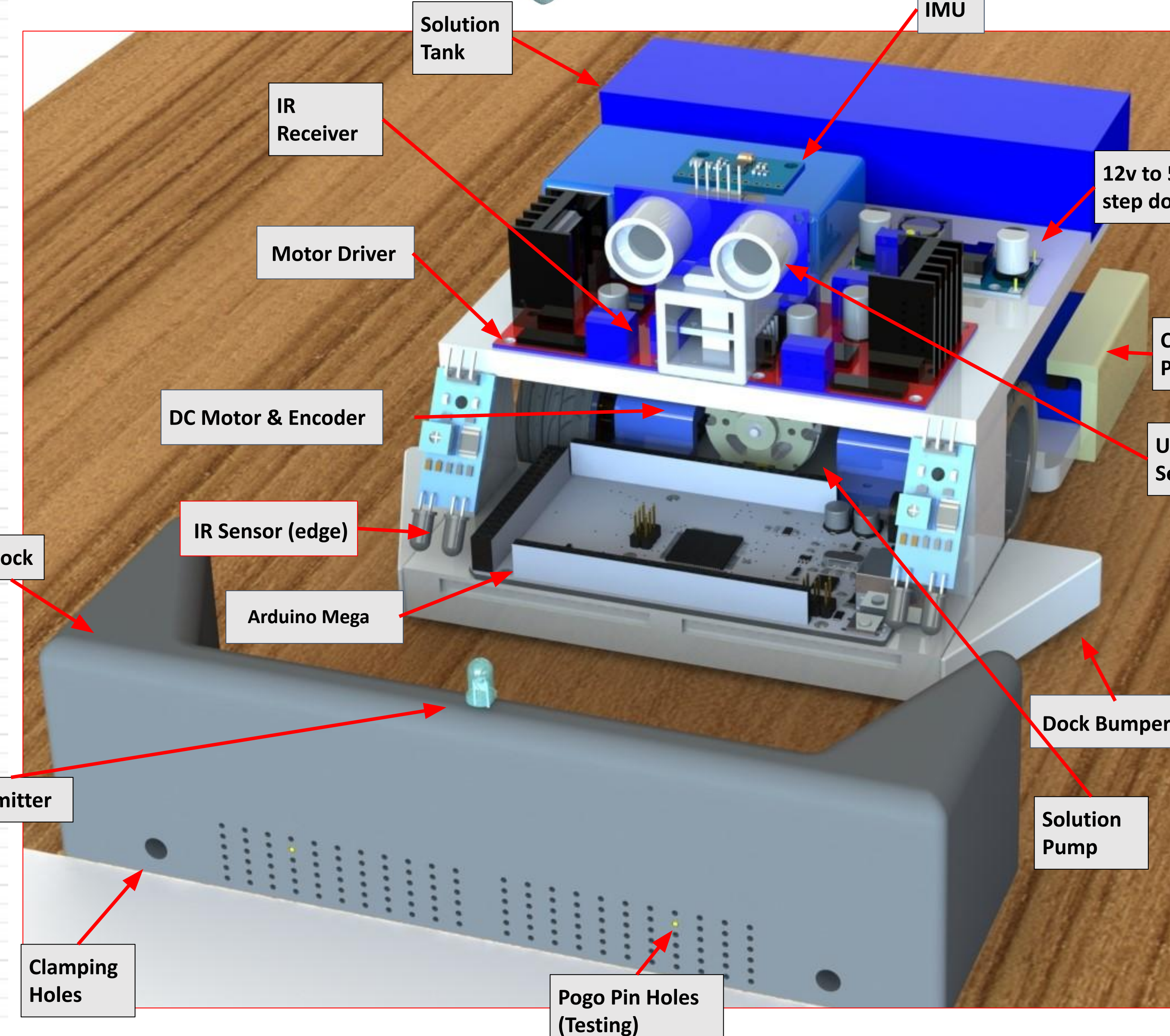
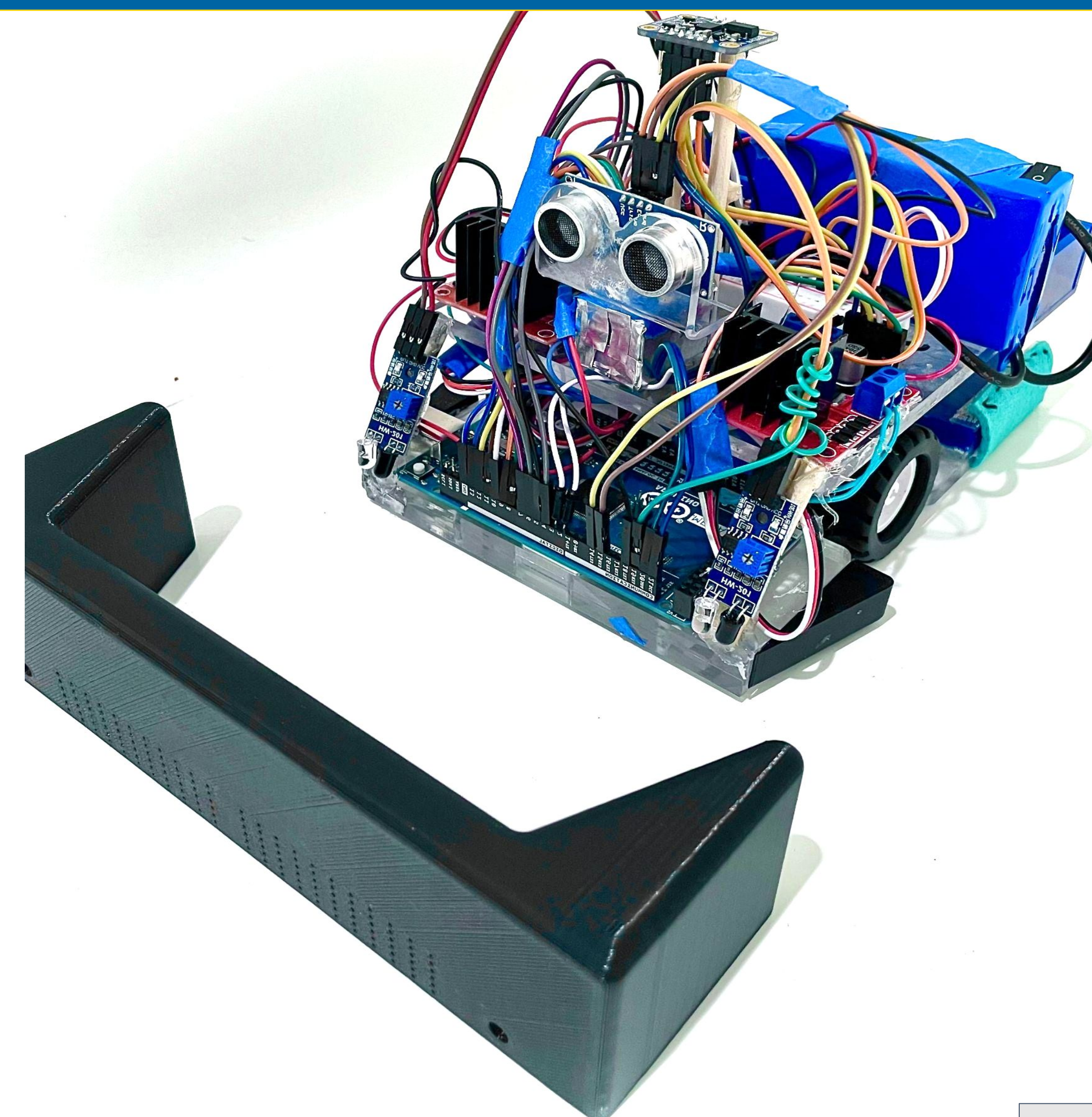
- Reservoir 1 filled with cleaning solution
- Solution pumped to reservoir 2
- Solution drips onto cleaning pad through the baseplate holes

### Implementation:

- Cleaning Pad
- Reservoir lid
- Cleaning solution
- Pump code



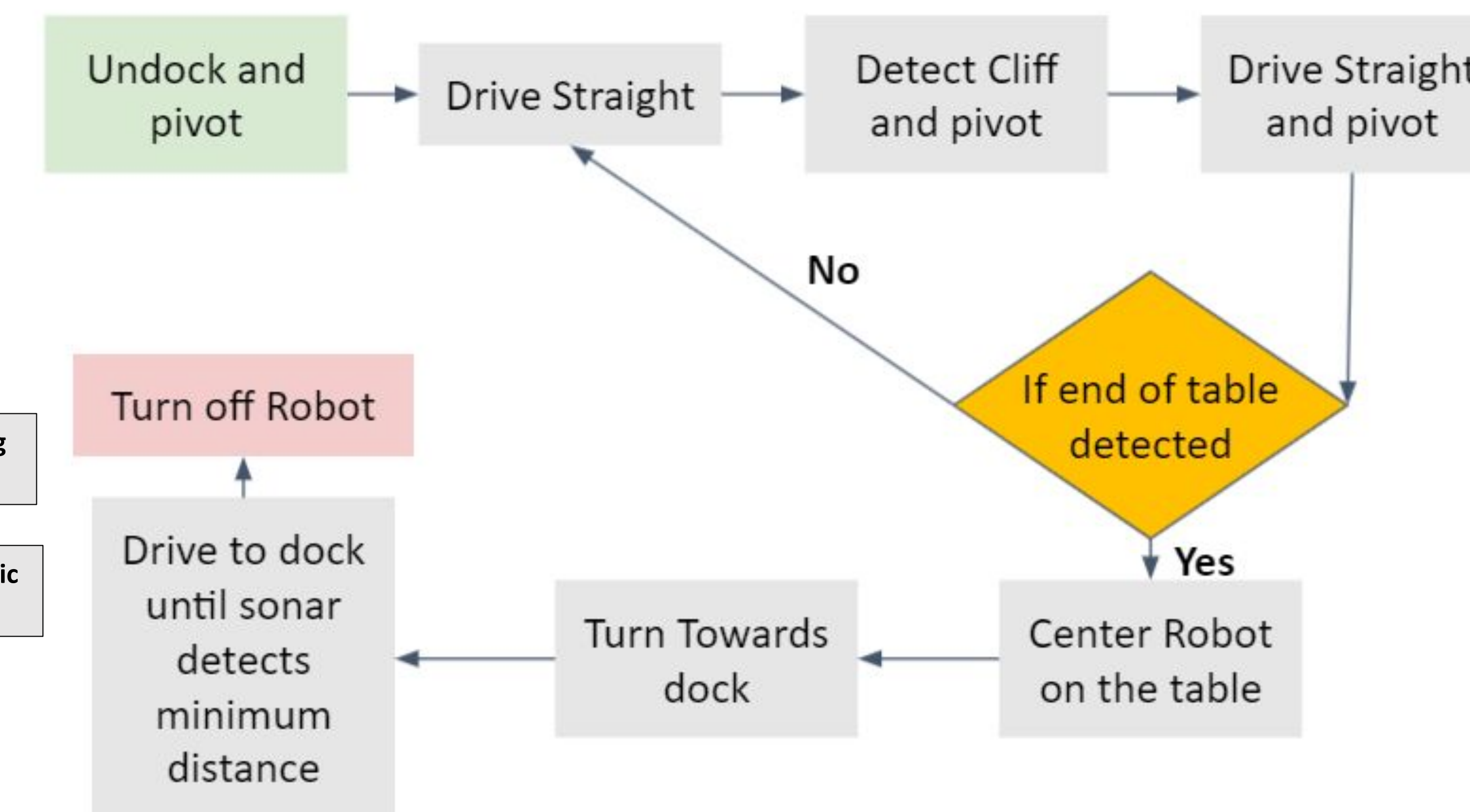
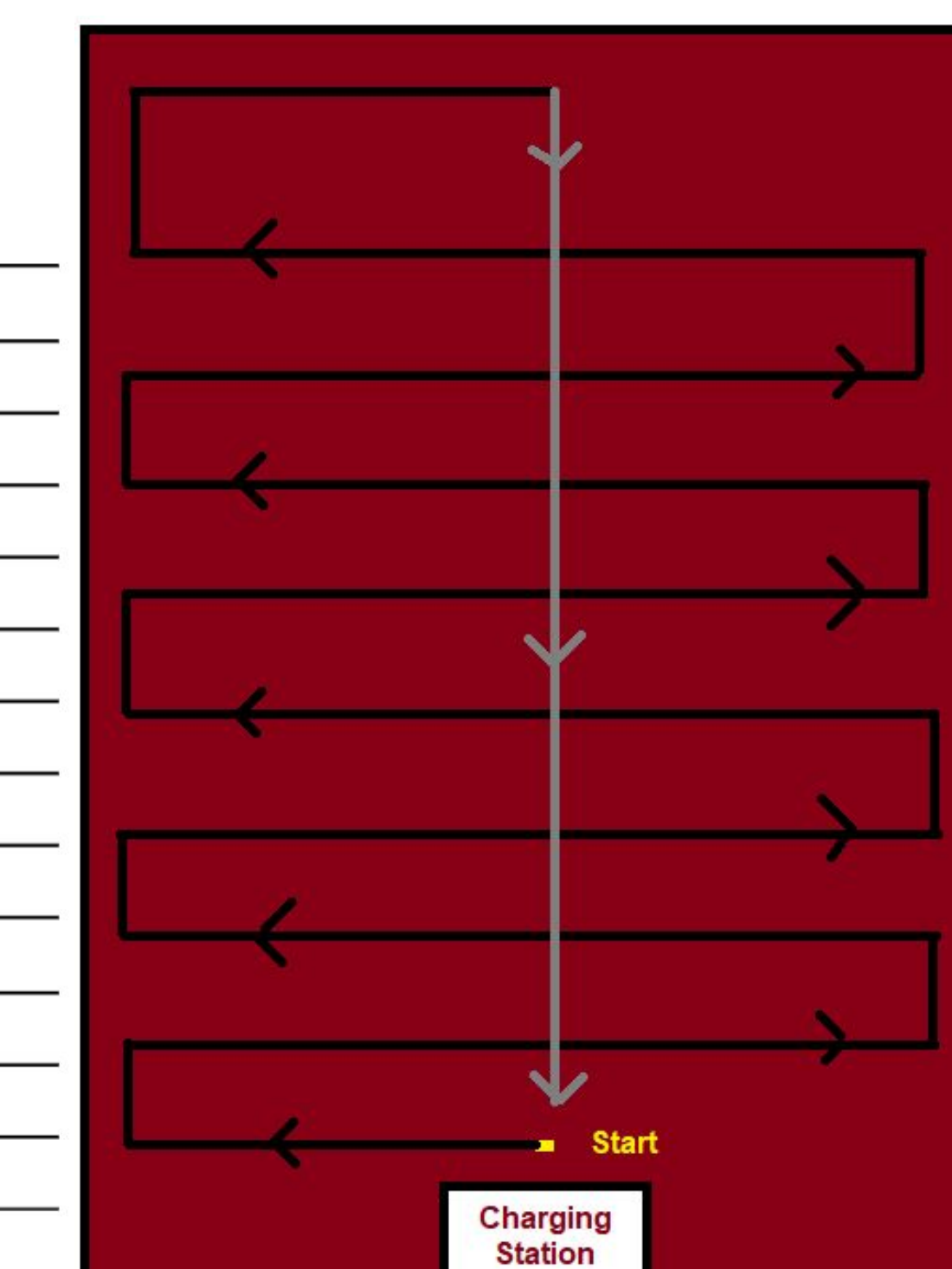
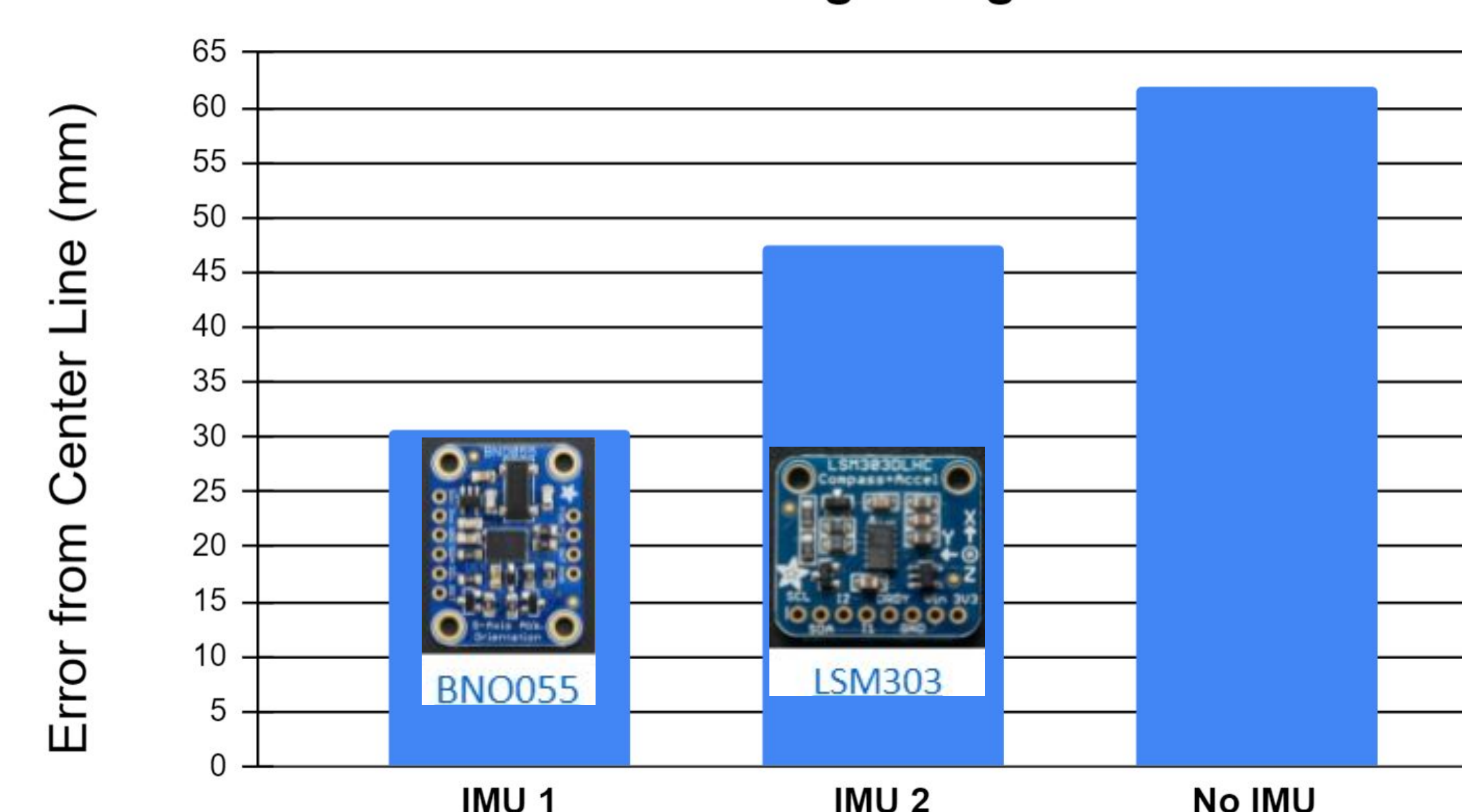
## Current Design



## Robot Driving

The robot navigates the table in a zigzag pattern. Controlled by Arduino Mega, the robot uses PID control with feedback from rotary encoders and an IMU. Two IR sensors detect edges and an ultrasonic sensor is used for docking and obstacle detection. Our robot can cover about 90% of the table surface, and our control loop is shown below as well as a schematic for the zig-zag pathing. Additionally, we show a comparison graph to show the improvement in driving straight using a new IMU (BNO055).

mm Off Course After Driving Straight for Four Feet



## Future Goals

### Future Robot Driving Tasks:

- Able to avoid obstacles on the table using ultrasonic sensors

### Future Charging Station Tasks:

- Waterproofing the contacts in the case of a spill
- Increasing the current output of the charger while maintaining overcharge protection

### Future Cleaning System Tasks:

- Change material type for velcro and string used to sew for greater cycle life
- Improve lid closing design
- Fine tune timer values for pump

## Charging Station

The charging station is a new addition to the ACR project, which helps the robot automatically dock and charge after cleaning the surface. The front of the robot and the front of the docking station have complimentary faces, ensuring proper alignment with the spring loaded electrical contacts (pogo pins). Each cell of the battery will charge in parallel, prolonging the battery life. On top of this the robot can sit in the dock for long periods of time due to the built in overcharge protection.