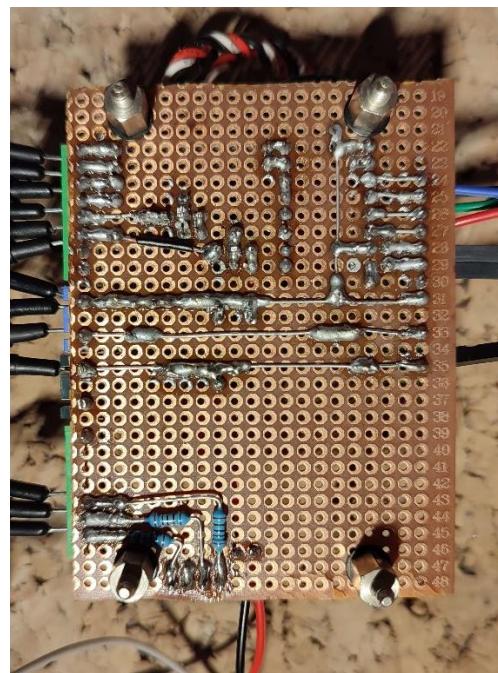
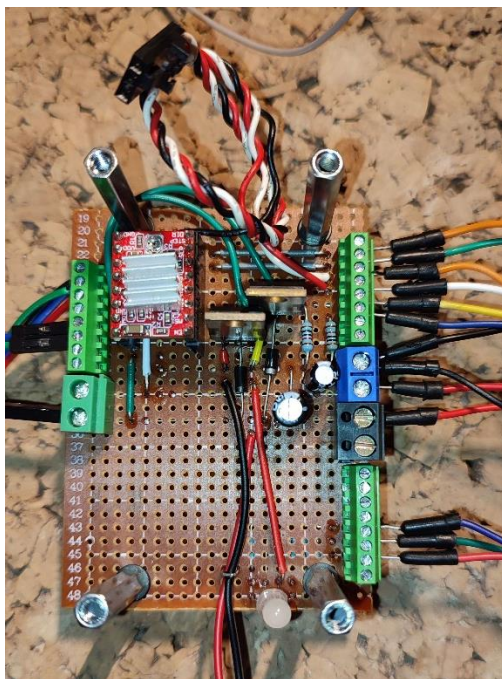


Report Session 8

Before the session:

During the last session I started thinking about a layout for my prototype PCB, so I finished it and then started weld everything. I took a long time because it was my first time welding a PCB prototype, I've done some mistake when welding (wrong pins welded together, RGB led got a little bit too much current and had to be replaced). During the welding process I repeatedly tested the resistance with an ohmmeter to ensure that no nearby pins were connected and could lead to short circuit. This whole process took me a little bit more than 15h and I think that designing a PCB and ordering it could have been faster and more reliable. Of course, this process got me some experience and was fun to do. Also, I can still adjust and add components what would not have been possible with a PCB ordered on the internet.



On this first image above, we can see the top side of the PCB I welded, on the left side we have all the outputs going to the components on the robot and on the right side there are all the inputs going directly to the Arduino card. The cables welded onto the PCB at the top and bottom are the for the H-bridge controlling the DC motor for the lift.

Legend:

1. Stepper controller.
2. Relays for the electro valve and pump.
3. 12V, 5V and ground connection.
4. Load capacitor.

5. RGB indicator led.

On the second image we can see the bottom side of the PCB, the tree lines in the center going from one side to the other are the 12V, 5V and ground connection. This centered disposition allows better understanding of the circuit and disposition of the components. To connect pins spaced apart I used resistor pins. In the bottom we can see tree resistors used for the RGB led (that has a common anode), they are on the bottom of the PCB because I bent them in the wrong direction in the first place (small mistake ...).

After finishing welding everything I started trying everything one by one and slowly everything together. I worked perfectly!

I now started experimenting on the OLED screen and the two time of flight (TOF) sensors that communicate on the I2C bus. First one TOF sensors works perfectly alone, two also with the example code provided by the Adafruit_VL53L0 library. The OLED screen was a bit harder to use. I first couldn't display something on it after searching I've found out that it was due to the `invertDisplay()` function used in an example code I was using. This function inverts the colors of all the pixels on the screen, and even after calling this function again to come back to normal it didn't seem to work. I was trying to write black on black. I solved this problem by a "`clearDisplay()`" after inverting it.

I then tried to add the screen to the two TOF captors circuit and then started the problems. Nothing worked anymore I tried different things nothing could help.

During the session:

We finally come to the session; I started by drilling a hole to let the cables from the limit switches pass through the frame. I then remembered that the stepper was moving by its own when there was no signal given. I quickly figured out that it was due to the command pin acting as an antenna when there was no command given (high or low).

I then started by writing the layout of the cables and pins because I wanted to disconnect everything and add the connectors that will help us connect and disconnect the upper and lower part of the robot.

I then came back to the I2C problem, after asking a teacher for help I found out that I was missing pullup resistors between the SDA/SCL and 5V. I added them and tried to make the sensors and the screen work together. I faced huge connection problems between my computer and the Arduino, the code was taking way long to upload and failed very often. I finally disconnected everything, rebooted my pc and started again with this time better results. But new problem, the sensors were very difficult to connect. At the end of the lesson, I had tof sensor working and the screen (separately).