

STEP 8 - PROBLEMS

- Our power supply needs more than 5V to give the circuit 5V and even then it always gives a little less. Even if I connect it to 12V (which is above its capacity) it still doesn't give 5V. In our circuit this small decrease in potential is very significant, as a lot of potential is lost throughout the circuit.
- One small problem encountered that is easily solved is that the power supply has a button that must be pressed to let the power flow. On the other hand, the cable that connects to the power supply and the plug has a positive and a negative and only works in one position.
- A rather serious problem for the development of the initial idea of operation was that when testing the homemade conductive paint with the fingers and closing the circuit, **each person drove differently and therefore the potential drop was completely different**. As a solution to the problem we were presented with two options: that only one person would test and operate the circuit (thus being able to program its conductivity), or that we would not conduct the current through the people but through a soldered wire (which is more constant in conductivity). Then, we also observed another problem, which was that depending on how much of the finger touched the paint (or **the force applied to it when touching it**), **the potential drop also varied**. Therefore, it was decided to modify the original design and choose to conduct through a wire and to think of some metallic object to close and open the circuits.
- A problem observed during the construction of the prototype was **the poor electrical conductivity of the pins** from their tip to their shell. We were able to solve the problem by adding solder inside.
- Regarding the programming of the code, we realized that **when the lever was on top of a pin of the robot, the other pins also detected potential**, and this varied depending on its proximity to the lever (possibly due to electrostatics). The solution was to look through the Arduino monitor how much potential each thumbtack detected in each different position of the lever and enter those minimum values as conditions to execute the code. At this point we had big problems because as the circuit was modified or resoldered, each variation in the length of the wire or the amount of solder added to the wire changed the value of the potential drop of each thumbtack. For this reason we recommend having the final circuit before proceeding to program this part of the code.
- As the pins were chosen as an element to close and open the circuit, therefore as an electrical conductor, **it was very difficult to keep the potential drop stable due to the spherical surface** that makes them slip. The solution was to sand their surface in order to create a flatter area to keep them in their position without having to hold them and thus stabilise the potential drop.
- A major problem with the conductivity of the system was that **3V was lost between the pin and the paint in contact**. As a functional solution, a piece of wire soldered from the pin to the paint was added. As we encountered this problem when the whole structure was already assembled, the options for solutions were limited, so perhaps it should have been taken into account from the original design to connect the paint directly to the power supply and not run it through a drawing pin.