Reverse engineering

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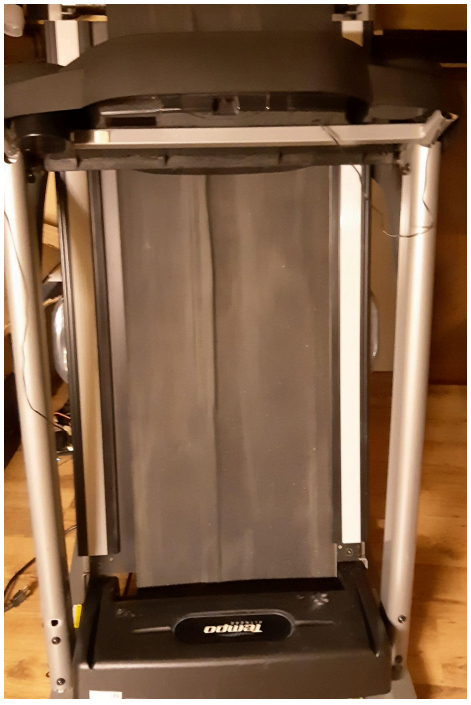
Levis-Quebec-canada.
VEX VRC 2023-2024
Pointe-Levy

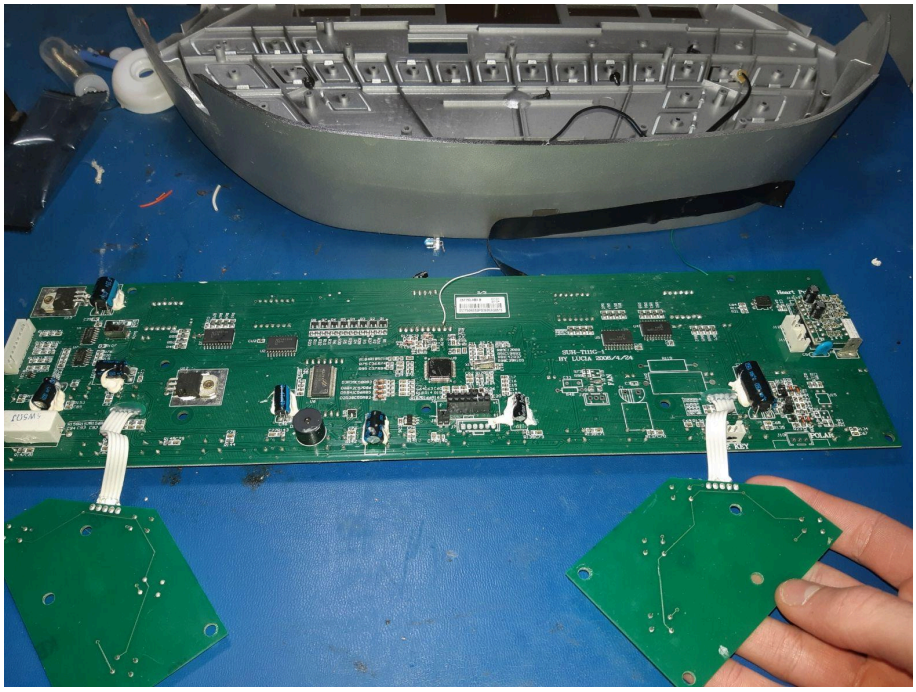


Introduction

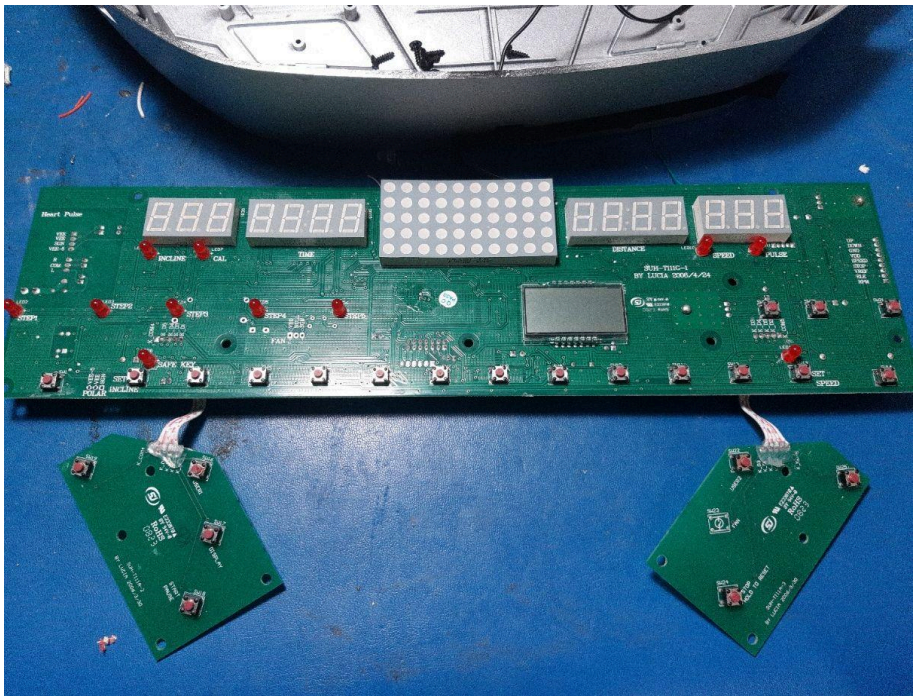
At first, we thought about disassembling an automatic transmission from a car but somebody gave us a treadmill. So we decided to take it because it has more electronic inside it and we would recycle something that wasn't used anymore.

- In the treadmill there is resistors (more than-119),
- capacitors (more than a hundred (7-bigs) (3-470µf 16-volts) (1-470µf 25-volts)(1-470µf 50-volts) (2- 100µf 10-volts),
- 2-voltage regulators L7805CV,
- 1-buzzer,
- 4-chips 71FC5HK 20-pins,
- 1-lcd chip 40-pins ,
- 1-microchip 64-pins,
- 1-pcb board for heart pulse,
- 10-red leds,
- 24-buttons,
- 1-lcd screen,
- 2 4-digits 7-segments displays,
- 2 3-digits 7-segments displays,
- 2-heart pulses analysers,
- 1-DC motor 90-volts (5700-rpm),
- 1-elevation system,
- 1-power supply.

The control panel



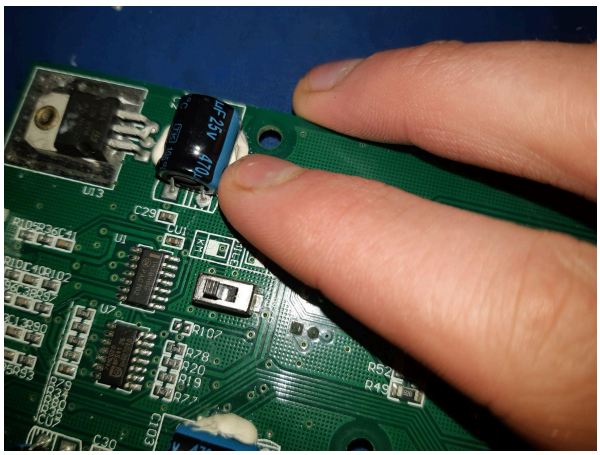
Back



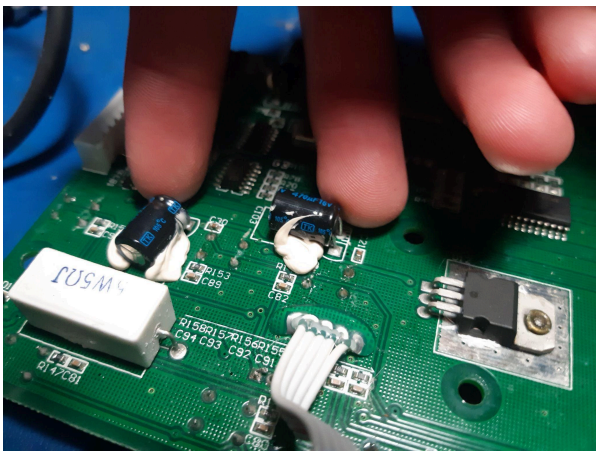
top

Capacitor

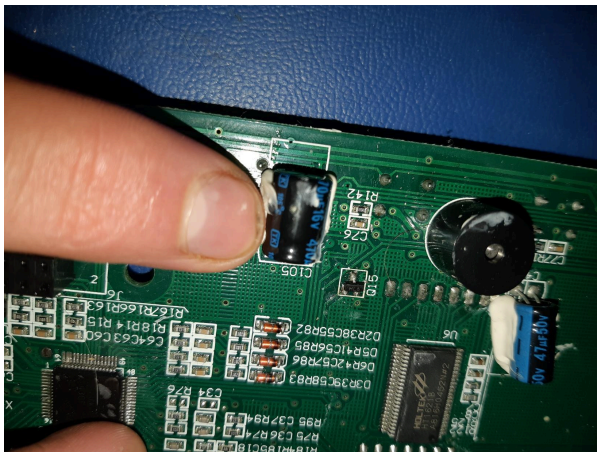
The capacitors are a sort electric storage and release it to make the whole circuit starts faster. So when you push the power button, it won't take a long time to start up. They are used to start the motor faster.
Those one are only the biggest. 1



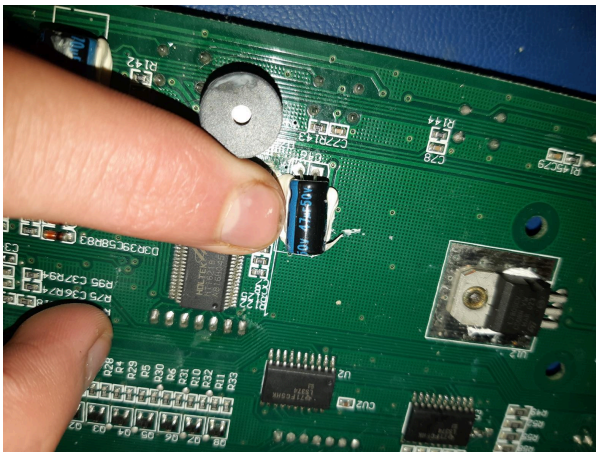
16-volts 470µf



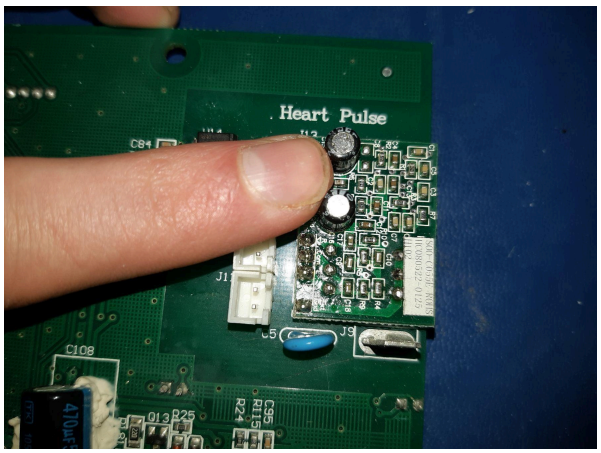
25-volts 470µf



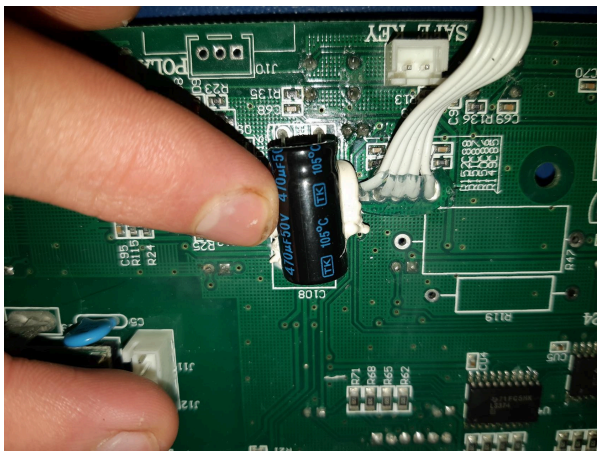
16-volts 470µf



50-volts 470µf



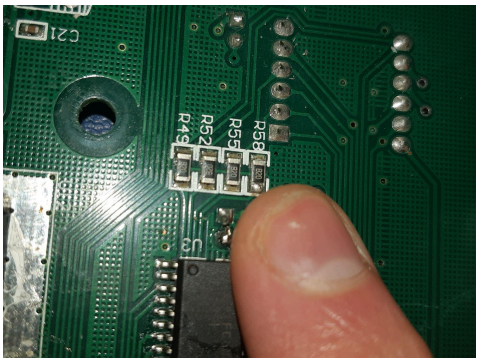
10-volts 100µf



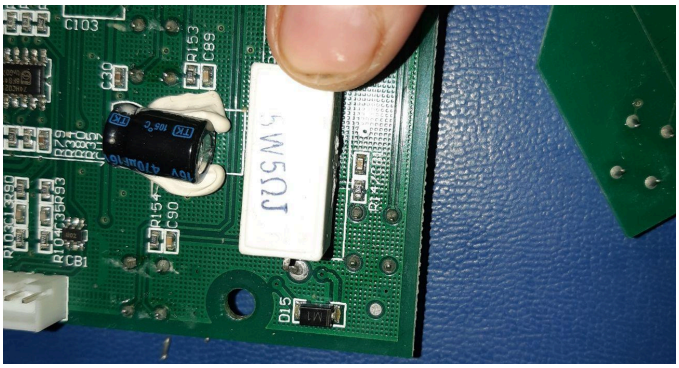
50-volts 470µf

Resistor

The resistors reduce the amperage. In this circuit they are used for the chips, leds, 7 segments displays and lcd screens. They are used to protect almost everything.
2 different type of resistor. 2

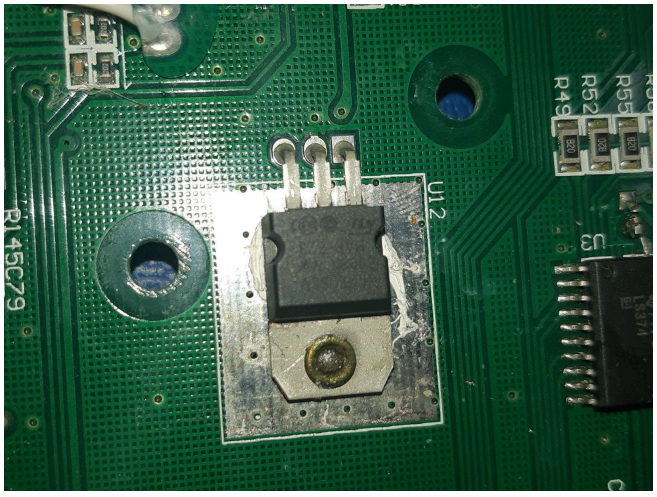


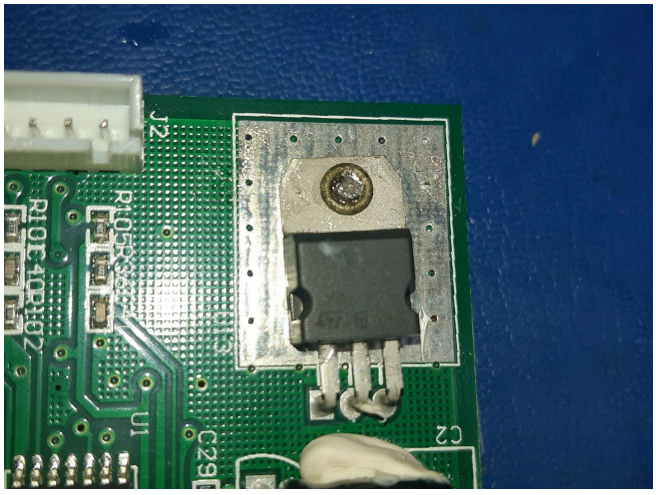
Two type of resistor inside it.



Voltage regulator

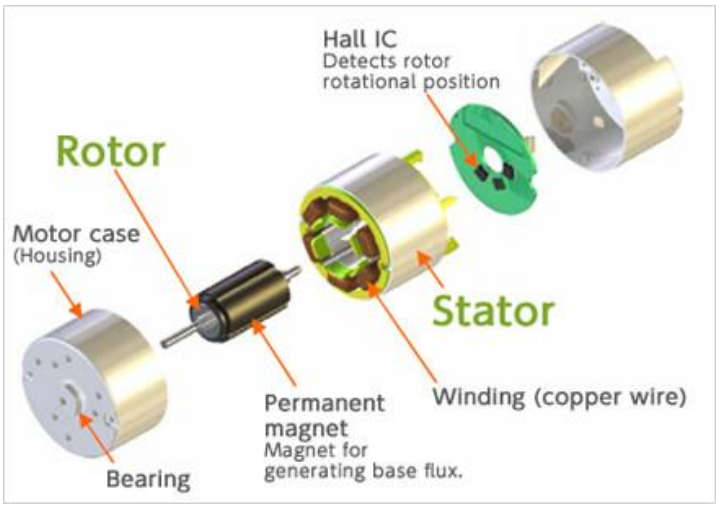
These one are used to regulate the voltage inside the circuit. They take between 7-37 volts and their maximum temperature is 125°C. Their output is a fixed 5 volts. They are used to make sure the components don't need a resistor with too much ohms because it makes a lot of heat.3





Motor

To make it turn you need a rotor and a stator. The rotor is an permanent magnet. The stator is an electromagnet that changes its polarity with a comutator. It is making the shaft turning. The image below is there to point where the pieces are.



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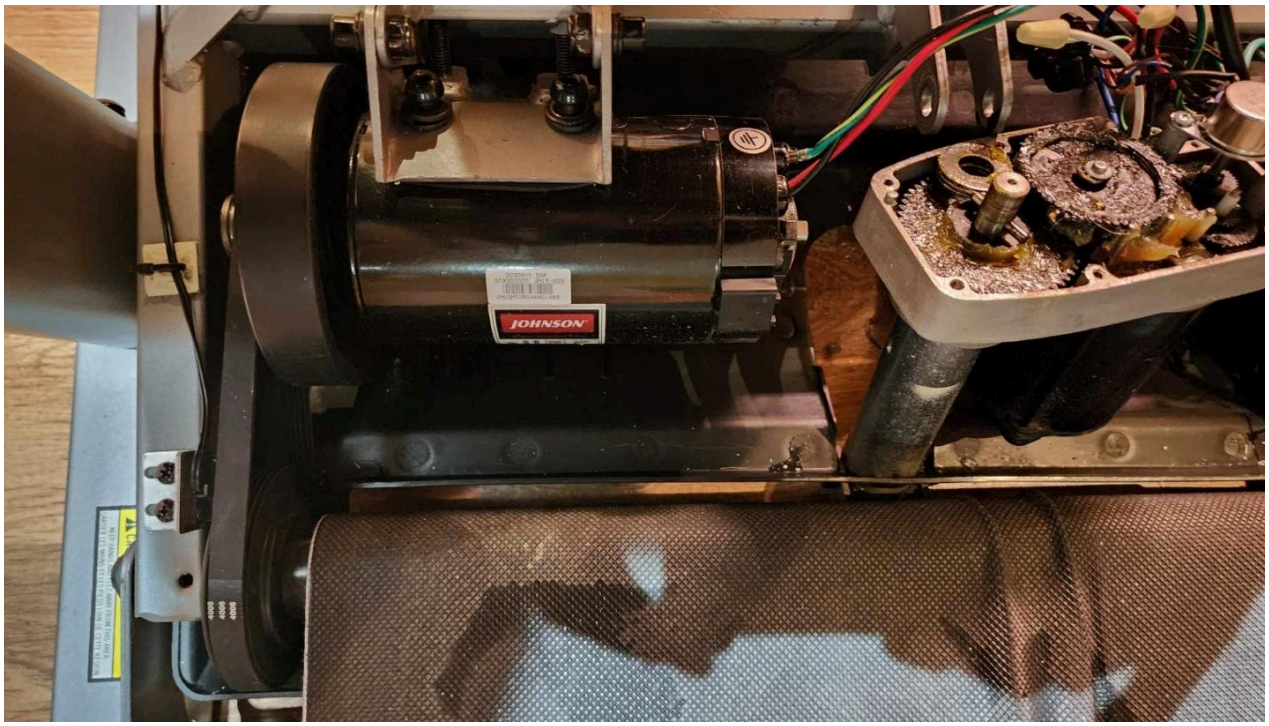
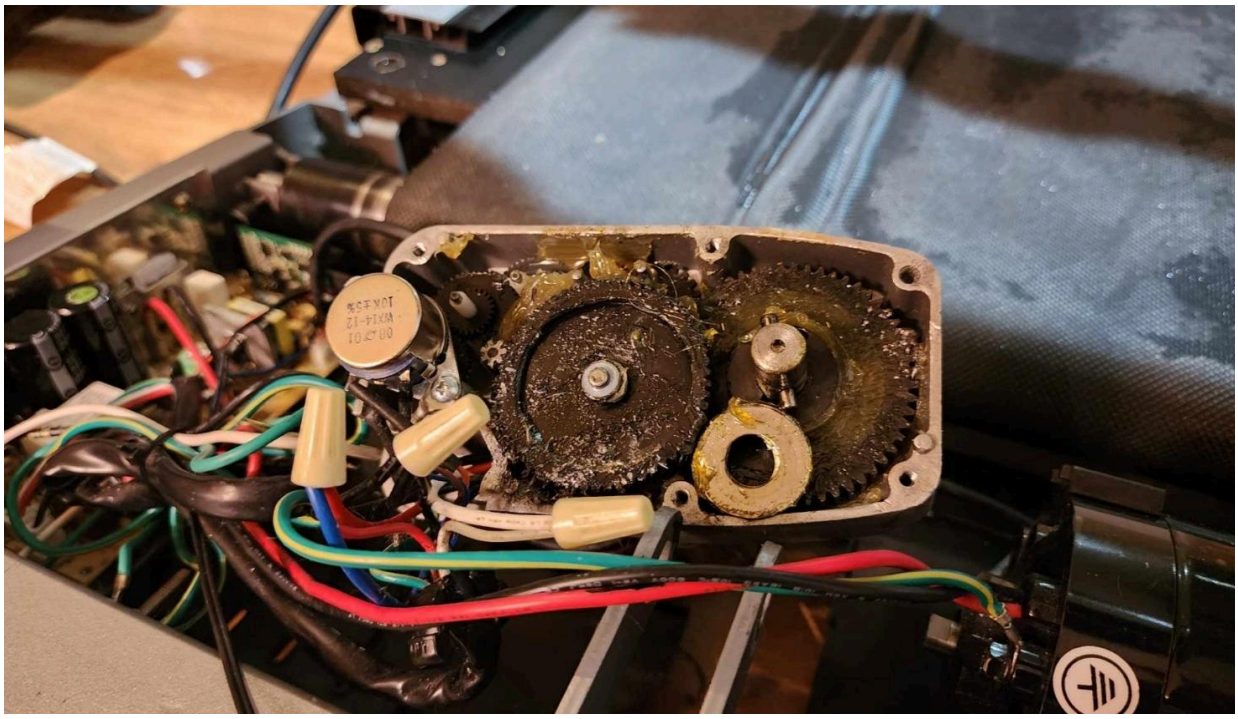


Elevation system

It is using gears because it is easier and cheaper. It’s making the treadmill go up or go down when you push the button.

This is how it is inside the elevation system.



Disassemble

This is the step I went through during the disassembling process. I started with the bottom and went up to the panel control. The flowchart explains how I disassemble the treadmill to understand how it’s working.

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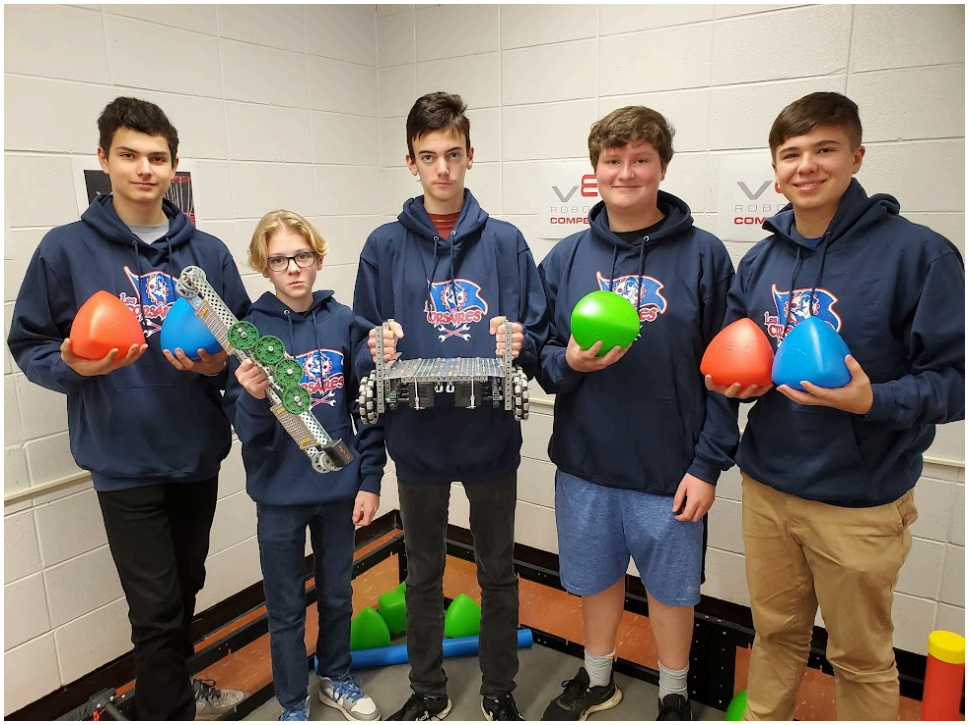
conclusion

In conclusion, I learned that engineering is way easier this way and companies always do it the simplest way because at first, I thought the elevation system was a hydrolic system. However, it was grease and gears.

Credit

Section		
Capacitor 1	electronics.howstuffworks.com/capacitor.htm#pt2	11 january 2024 8:20 pm GMT-5
Resistor 2	proto-pic.co.uk/what-is-a-resistor-how-does-i 20resistor%20works%20by%20restricting,m %20conductive%20material%20longer.	11 january 2024 8:24 pm GMT-5
Voltage regulator 3	/www.electronicsforu.com/technology-ctronics/7805-ic-voltage-regulator	20 december 2023 6:15 pm GTM-5
Motor 4	rush.com/intro-dc-motors/	29 january 2024 8:16 pm CMT-5
Lucid chart 5	ww.lucidchart.com/pages/landing?utm_sou nedium=cpc&utm_campaign=_chart_en_us and_exact_&km_CPC_CampaignId=145796 dGroupID=57044764032&km_CPC_Keywor CPC_MatchType=e&km_CPC_ExtensionID= k=g&km_CPC_AdPosition=&km_CPC_Cre 28&km_CPC_TargetID=kwd-33511936169& 9000241&km_CPC_Device=c&km_CPC_pl C_target=&gad_source=1&gclid=CjwKCAiA TWGQSFH4eMBkBT7ShyFTtIEUwPOI3nhD YhSexLoSXhoCOKwQAvD_BwE	19 december 2023 6:30 GMT-5



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