

USLifts
Model Chairlift
CS 121
2/23/2023
Ryan Potter & Matt Zuk

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Introduction

Our final project will be an operational model chairlift complete with status LEDs and a working bull wheel. The dual towers will be handcrafted out of bamboo sticks and contain a bull wheel on the top to rotate the chairs. To make a steady bullwheel, we are using an LED light strip wheel mounted on a stick. This will be rotated by a motor contained in the base of the tower which will move the wheel and in turn the string. Our program would make the motor slow while a chair is entering the docking port to allow the passenger to board the chair at a safe rate of speed. The whole model will function until turned off by the raspberry pi user, or the safety sensor is tripped. The safety sensor will be glued near the top of the tower, close to the chairs, to represent the authentic safety sensor on an operation chairlift that would stop the ride if a passenger missed the dismount.

The entire project will be operated based on a program written on the raspberry pi that will be able to turn the model on and off while also controlling a status light on each of the towers. These LED lights will turn green for operational and red for inoperational. These will also be at the top of the tower to represent low fly lights that would be on a real chairlift for airplanes to avoid.

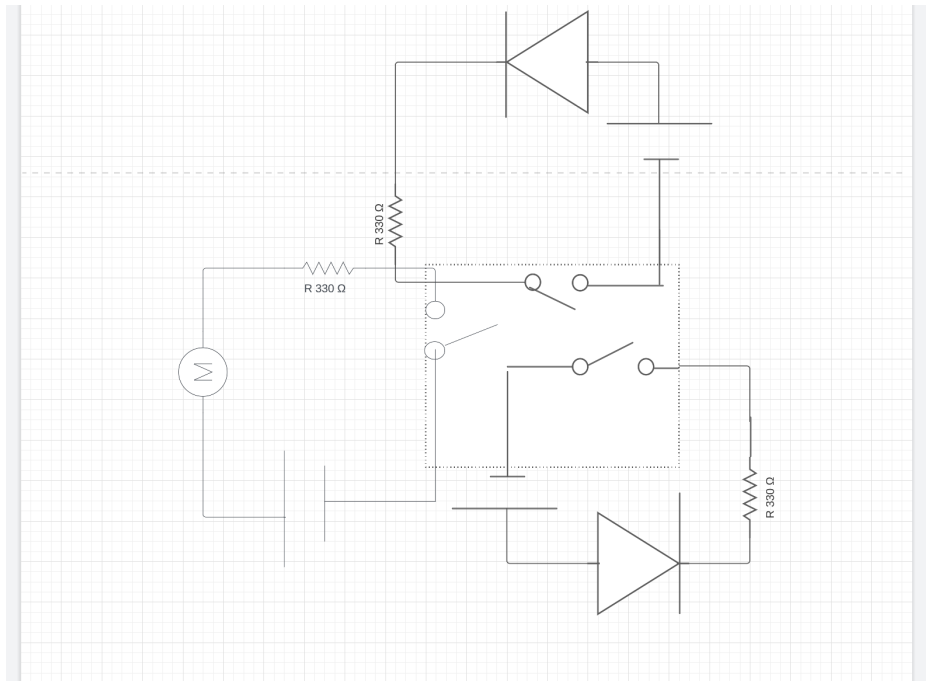
Definitions

Bull wheel → Wheel at the top of a chairlift that rotates the lines

Lift station → Location where people board the chairs to ride up the mountain

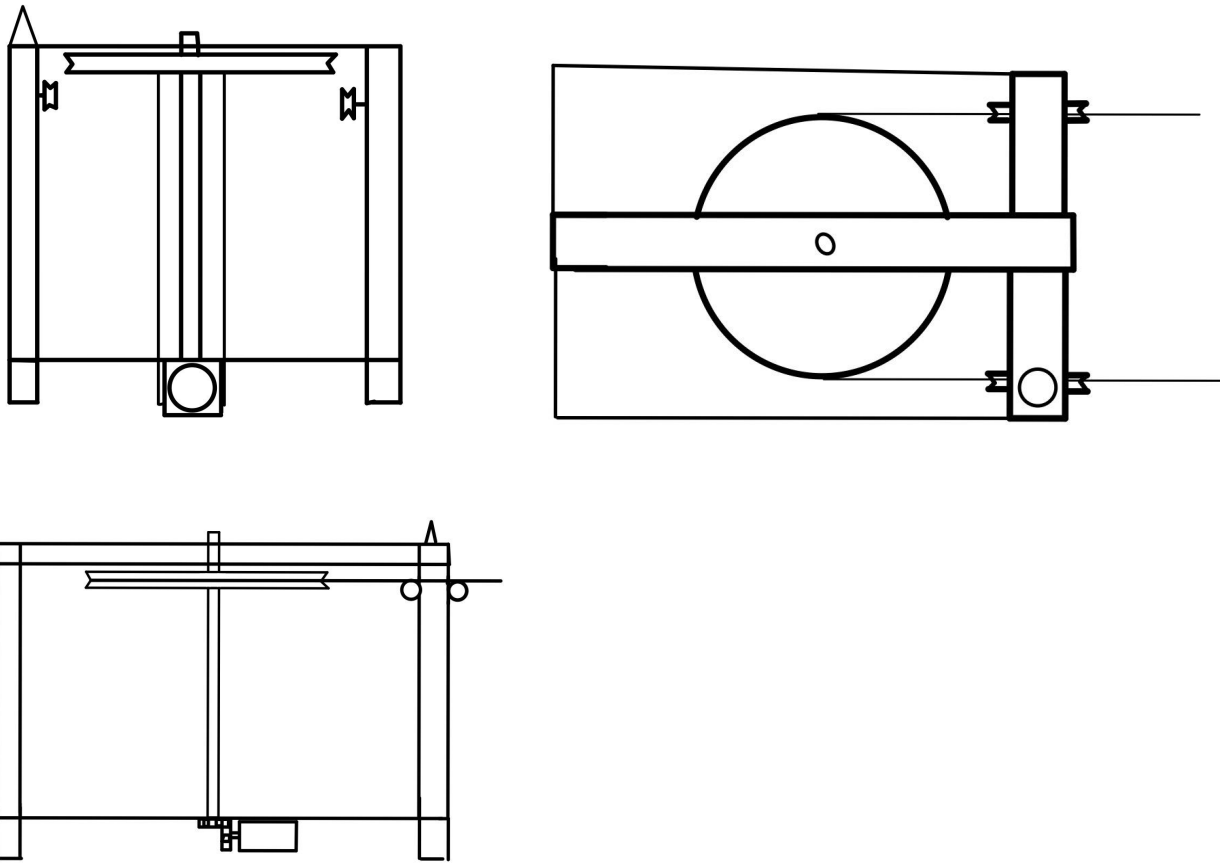
Project Detail

Electrical Work:



This lucid chart depiction of our electrical work shows the wiring between the raspberry pi, the two LEDS we will be using, and the motor to power the rotation of the lift. While some of the wires may need to be extended or multiple circuit boards may need to be used in order to situate everything in the right location, this is the main idea behind the electrical work.

The LEDS will each be connected to their own circuit board atop both towers to maximize both light and to accommodate wiring. The motor will also be connected to one of the circuit boards, inside the tower, and power a shaft that rotates the wheel on top of the tower. The entire model will be powered by this wheel turning the rope and bringing the chair lifts up the hill.



These illustrations depict the future stations of our upcoming chairlift in a detailed and precise manner, serving as blueprint representations of their physical design. The front view, positioned on the top left, provides an easily discernible overview of the station's width, the LED status light located on the top left, and the cable's support wheels. Meanwhile, the top right diagram showcases a bird's-eye view of the station, highlighting the lateral support system and the strategic placement of the bull wheel. Lastly, the bottom diagram presents a side view of the station, offering a clear demonstration of the interconnection between the bull wheel and the motor via two gears. This angle also reveals the concave design of the bull wheel, which enhances the lift system's security by ensuring the cable remains firmly attached.

Budget

- Labor - \$15/hr
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- Small DC Motor - \$8
- 150 Bamboo Sticks - \$16
- Red/Green LED - \$6
- Sensor(s) - \$50
- Hot Glue & Glue Gun - \$20
- String - \$8
- MISC - \$30

Estimated Labor Cost (Assuming \$15/hr for 5hr/wk for 8 weeks x2 for 2 people): \$1200

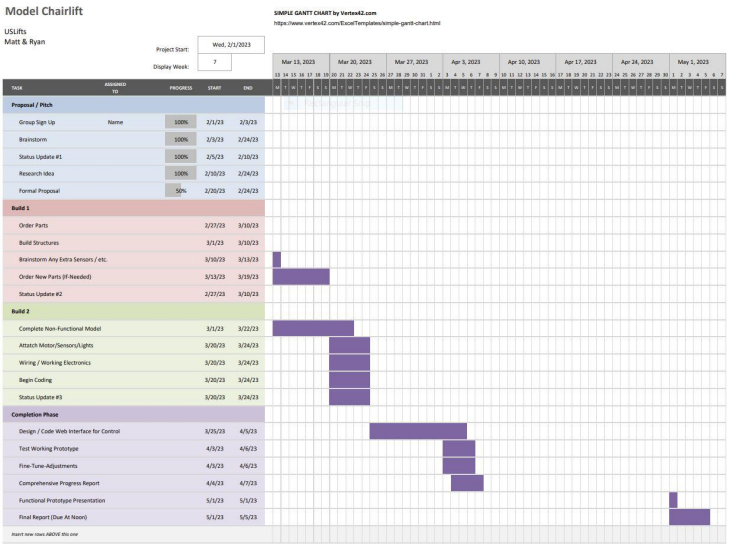
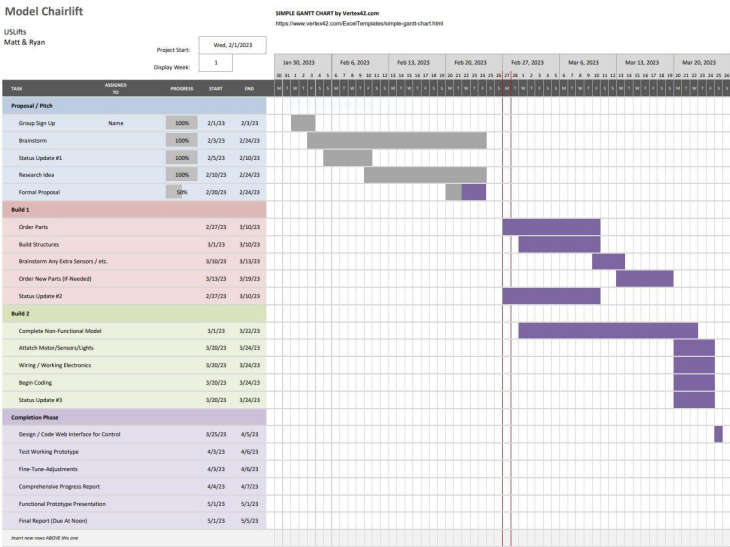
Estimated Materials Cost: ~\$150

Total Cost: \$1350

Project Plan

| Date | Name | Roll | Description | Time (hrs) |
|-----------|-------------|------------------|---|------------|
| 2/27/2023 | Ryan Potter | Project Manager | Compile Parts, troubleshoot wiring/LEDS, | 40 |
| 2/27/2023 | Matt Zuk | Network Engineer | Write script for motor, construct towers, | 40 |

Gantt Chart



Target Market

The target market for a miniature scale model chairlift project can be divided into several groups. Firstly, hobbyists and enthusiasts of model-making and miniature collectibles are likely to be interested in such a product. These individuals enjoy the process of building and displaying detailed and accurate replicas of real-life objects and would appreciate a miniature chairlift model that accurately represents the real thing.

Another potential target market for a miniature chairlift model would be individuals who are interested in skiing or snowboarding. These individuals may not necessarily be collectors of miniature models, but may be drawn to the chairlift model as a way to display their passion for skiing or snowboarding in their home or office. Additionally, ski resorts or ski shops may be interested in purchasing the miniature chairlift model as a gift or promotional item for their customers. Overall, the target market for a miniature scale model chairlift project includes hobbyists, enthusiasts, skiers/snowboarders, and ski industry professionals.

References

Inspiration: Passumpsic Valley Resort. (n.d.). Instagram. Retrieved February 23, 2023, from <https://www.instagram.com/passumpsic.valley.resort/>