VG100 Introduction To Engineering

Project 1 Bridge Crane Manual

Group 3 Trinity

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1 Introduction

1.1 About Us and Campus

Figure 1: Our team

We are TRINITY (Figure Figure **??**), a team of freshmen from University of Michigan-Shanghai Jiao Tong University Joint Institute (UM-SJTU JI), which is located in the campus of Shanghai Jiao Tong University (Figure **??**). People in the photo are Xie Shuxiang, Zhu Boying, Ma Kerui, Wang Ren and Guo Chengzhang, and our group leader is Xie Shuxiang. Joint Institute is well-known for its unique way of helping students develop the ability of cooperation and innovation. As a result, students here have various projects and activities to attend to broaden their horizons.

Figure 2

1.2 Course and Project Information

VG100 is a course about Introduction to Engineering. It is a mandatory course for all freshmen in JI. According to Professor Shen Yanfeng, the course not only convey fundamental knowledge of

engineering, but also help students learn how to solve a realistic problem. Besides, the technical communication part strengthens students' ability of taking part in teamwork, which is of great importance for engineers.

The first project students should accomplish in VG100 is to make a bridge-crane system. It should be able to allow a cart to pull a cup of water up, travel forward on the bridge to the other side, and put down the cup of water on the designated place (Figure 1.3).

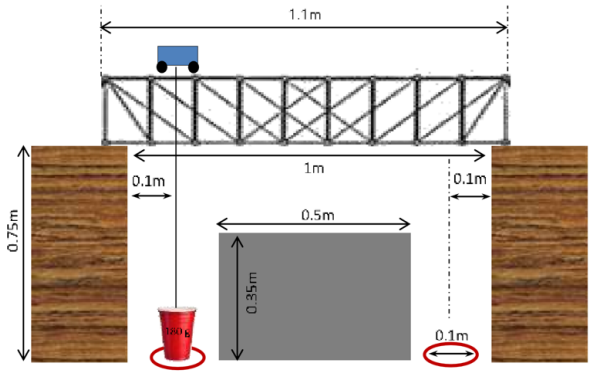

Figure 3

The following list from the professor shows the specific requirement of Project 1. Mechanism: Any method that can achieve the above task will be acceptable. Breaking any of these rules will result in failing project 1. Bridge length: >= 1.1m Bridge width: <= 0.2 m Bridge Material: printing paper (80g size A4) and non-toxic, white wood glue (brand: LongMa). Any additional material violates the rule! Maximum Mass of the bridge: 200g Maximum length of the cart: 0.1 m Power Supply: Maximum two portable Power Supply (for each battery Voltage $\leq$ 12V) Motor specifications: < 12V. Central Control Circuit: Arduino series (Required for Programming & Can Be Omitted)

1.3 Race Performance

(This part will be completed later)

2 Design Overview

2.1 Bridge

2.2 Cart

2.3 Overall

3 Materials & Tools

3.1 Materials

3.2 Tools

4 Instructions

4.1 Bridge

4.2 Cart

5 Improvements

6 Appendix

6.1 Access to Materials

6.2 Arduino Control Code