Project 2 Script:

Hussein:

Hello my name is Hussein Bazzi and my partners are Alfarook Saleh and Marissa Proctor. In this project, we built upon our previous GUI to make it capable of automatically calculating the period of a pendulum swing and plotting a model of the swing. First, all plotted swing can now be derived and graphed, and from there we can find the period by measuring the time between every other zero. We also added a new 4th data set that can be measured and saved for a more accurate model.

Marissa:

Hi, I’m Marissa and I will be explaining how to create the model of the pendulum using the GUI. The user will input the lengths of the strings used for each data set and its corresponding period from average period shown below the 2nd half plot. The user has the option to choose the order of the model, either 1st, 2nd or 3rd, and the numerical method used to obtain the model. The required inputs will be displayed and validated while any unnecessary inputs will disappear according to what level order and method is chosen to prevent user error. Once the inputs are in place, these coefficients can be recorded and loaded back into place. The GUI can also calculate the estimated gravitational constant from the input data and compare it to the ideal gravitational constant from the theory of pendulums. The data we collected is sometimes near the correct gravitational constant and has a low percent error, and other times far from it.

Alfarook:

Hello, I’m Alfarook and I’ll be showing the hardware implemention of this project. Physically, nothing has changed with the Arduino setup. The initialization process is still the same. However, the program can now measure and save a fourth pendulum swing. For the purposes of this video, I will be using my hand to emulate a pendulum. The program will display the pendulum swing’s derivative in black, and plot the points at which the derivative is zero. Additionally, loaded data can now display its derivative in red and plot the same points. The program is also able to record the coefficients and periods used for the Model of the pendulum swing. Here are some sample numbers that I will save and reload. Thank you.