

## COSC 480 – Miniproject #3 Fall 13

**Objective:** Create a computer-controlled catapult!

**Implementation Details:** For this project, your task is to design and implement a computer-controlled catapult. This means that you have to accomplish two separate goals:

- 1.) Build a catapult. You should create it out of wood or other cheap, readily available (but sturdy) material. This can be a trebuchet, or a classic catapult, your choice. It should be able to fire a ping-pong ball.
- 2.) Create the controller for the catapult. This controller should allow for input of target distance (from 6 to 30 feet) and also simple angle/tension input.

The key here is to get everything to mesh and work together. Keep in mind that you will not need a lot of tension to fire a ping-pong ball, so don't go nuts and potentially put yourself and others in danger by creating a rig that has abilities far and beyond what's necessary. You may use either Arduino or Raspberry Pi, your choice.

**Documentation:** For documentation, you will create a specification document for your implementation. This document should have 5 sections: introduction, including what this implementation is designed to do; parts list (include part numbers if available) for your implementation; a discussion of any faults or flaws in your implementation; a wrap-up specifically noting how it accomplishes the targeted design and what challenges you and your team ran in to as part of this implementation. In addition, you must provide electronic schematics of your implemented design. There are several programs that will assist you in creating your design (my personal favorite is Fritzing). You may not turn in hand drawn diagrams.

**Expectations:** Your project will need to be neat, concise, well documented (see documentation above) and above all, correct (in both design and implementation). Messy implementations with unnecessary "tricks" will have point deductions assessed. Your design, implementation, and demonstration are worth 65 points, and your documentation is worth 35 points. Points will be awarded for efficiency and creativity in design, but your focus should primarily be in designing and implementing a working prototype that hits all of the requirements under "Implementation Details."

**Demonstration:** During the class period on the due date, you will demonstrate your implementation to me. I will ask questions on the implementation to the group and to specific members to ensure that everyone understands how the implementation works. As you expect, your grade will be heavily influenced by your team's ability to demonstrate the target function or functions.

You must work in teams of four for this assignment.

**Safety Caveat:** Be very careful as you are testing your prototypes. Complete testing in an open space and use appropriate safety gear. Any injuries or property damage will result in a failing grade on this project.

**Learning Targets:** electronics prototyping, "physics", siege weapon design.

**DUE:** Demonstrations in-class on 10/18, documentation due via Blackboard by 11:59pm 10/18.