MECE.104 Engineering Design Tools (EDT)
Team Homework Assignment #7
This assignment is concerned with preparations for building your Chime Machine, now that you have completed your full design through a detailed CAD model. Submit a single pdf to the appropriate Assignment dropbox that addresses the following components.

1. Table

Iris Bassin	Christina Cao	Haylee Southcott
30% - Met Monday - Turned in the document	35% - Met Monday - Figured out final chime configuration and updated CAD model	35% - Met Monday - Set up the document. - Typed most team answers (not including question 5)

2. Work Breakdown: complete the following table to assign primary and secondary responsibilities for the various categories of work that will be essential for the build as shown. Note that the categories listed with a question mark should be changed to identify the specific task or item to which you are referring. Those team members that you designate as primarily and secondarily responsible will have immediate "control" of the item in question, but every team member is expected to be aware of, and somehow contribute to, all aspects of the project. Everyone on the team shares equal responsibility for the success or failure of the outcome!

Category	Primary (enter names)	Secondary (enter names)
CAD model maintenance	Iris	Haylee
Arduino code creation & maintenance	Iris	Haylee
Laser cutting & processing	Iris	Christina
3D print design & creation	Christina	Iris
Structural design & construction	Haylee	Iris
Component and/or design testing	Christina	Haylee
Subassembly #1? (Frame)	Haylee	Christina
Subassembly #2? (Conveyer	Christina	Iris

Belt and Components)		
Drilling Hang Positions in Chimes	Haylee	Christina
Cutting Frame Wood	Christina	Haylee

3. Risk Register: complete the following table of risks that you anticipate during your build. These are the things—features, functions, outcomes—that most concern you, in the sense that you are uncertain if they will work as desired. Are there components that you are unsure how to make with the materials available? Are there functionalities that you are unsure of how to program in the Arduino? Be specific in your descriptions. Severity, likelihood and corresponding risk level are all defined at the bottom of the table. **You must include at least 3 risks.**

Risk #	Description of Risk	Severity (Enter 1-10)	Likelihood (Enter 1-10)	Risk Level (Enter 1-100)
1	Tension of chimes is too much for the frame	10	5	50
2	Solenoids Moving off Path (falling off the plywood, wiggling)	4	7	28
3	Strings Slip off the Pulley	2	3	6
4	Solenoid/track does not have the right spacing from chimes (no perfectly calculated distance, unknown until tested in person)	4	8	32

(Insert more rows as needed)

Severity: on a scale of 1-10, how severe is the issue if it occurs? (1 = minimal impact, but undesired all the same; 10 = so severe that it would result in a complete failure of the project.)

Likelihood: how likely is the issue to occur? (1 = possible but pretty unlikely; 10 = almost certain to occur.)

Risk Level: this is the product of the severity and the likelihood. Thus, high values here are of the most importance to consider. (Values will range from 1-100.)

4. For the two risks with the highest risk level indicated in the register above, what would you do (or did you do) to help mitigate the risk; that is, to help reduce the likelihood and/or reduce the severity? Or, what will you do if (when) the issues actually occur?

a. Tension: We will test out the strength of the plywood before attaching the chimes permanently. If need be, we will add more plywood on top for support.
b. Solenoid/Track Spacing: We would need to detach the track and move it. We will test the track spacing before finalizing the design by using clamps.
c. Solenoids moving off the path: We would add a backboard or track (will need to relocate popsicle sticks on the solenoids).
d. Strings slip off pulley: We would extend the sides of 3D-printed wheel using circular plywood board cutouts or some other method.

5. What is your general plan of attack for building your Chime Machine? What parts or components or subassemblies will you build first? Why? What testing and so forth will you do along the way to make sure things are working properly? How do these plans match with the Work Breakdown above, and the various risks you identified in the Risk Register? If you find that you need to redesign parts or subassemblies, what process will you follow to generate new designs, and how will you make the final decisions? How will you integrate programming with the structural build? That is, will you wait until you have finished building to start programming the machine, or do you plan to begin programming sooner?

Primary:
Iris
Haylee
Christina

1. Cut the wood to size
    a. Using the bandsaw in the machine shop, we will cut the four wood planks lengthwise in half.
    b. We will measure and cut the pieces down to the right dimensions.
2. Put Holes in the Chimes
    a. We will drill holes into each chime at its optimal hold position.
3. 3D Print wheels
4. Add holes to poplar wood

Steps 1-3 can be done in any order/not in succession since they do not impact each other

5. Assemble the main frame
    a. *Note: monitor structural strength throughout the building and testing to ensure that it does not fall apart, add temporary supports as needed
6. Check for issues, and redesign if needed
7. Laser Cut Plywood (wait until now so that we can add any additional pieces that may be needed)

8. Add motor pieces and consider the belt and pulley system assembly (make sure that the spacing is right)
9. Add lower plywood
10. Add one side of Chimes
    a. Check for risk of chimes tension being too much
11. Assemble belt and pulley system
    a. Includes switches
    b. Check for risk of incorrect solenoid distance
    c. Check for risk of string falling off pulley
12. Check for issues, and redesign if needed
13. Add 2nd side of chimes
14. Programming and testing
    a. May be done throughout, but test on the main design when possible
    b. List of timing between notes (controls solenoid)
    c. List of spacing of notes on motor 1 (preferably space from switch) (controls motors 1)
    d. List of spacing of notes on motor 2(preferably space from switch) (controls motors 2)
    e. Function to move solenoids based on a distance (controls motors)
    f. Function to push solenoid based on the timing
    g. Put it all together.
    h. Check for solenoid moving off path when driven by motor

Generating New Designs: Meet together, and agree on a solution together