

## IAT 106 Final Project Week 8 – Initial Design of Your ABM

### Description

In this week's lab, you will create an ABM using the sketching techniques you have developed.

As you progress through this lab and conceive ideas, remember that you will eventually be modelling your design using OnShape. So be creative but keep your design expectations realistic.

The project mantra is **KEEP IT SIMPLE**. A design should delight with both what it does and the simplicity by which it does it.

### In-Lab Activities

#### 1. In-Lab ONSHAPE Quiz (60 min)

#### 2. In the labs form a breakout group of 4 students each (150 min)

After a small 10 minutes break, TAs will divide you into small breakout groups of 4 students each. In your breakout session, discuss your designs with the rest of the group members one by one and give feedback to each other. Please be respectful to each other's ideas and provide constructive criticism to improve ideas. Students are encouraged to explore alternative designs before settling on the final solution.

With your group, create a design for an ABM that incorporates at least two distinct mechanical motions **Read the restriction guidelines from the ABM Introduction Document or at the end of this document before continuing**. Spend at least 30 minutes creating sketches of the animated machine. Following the machine design, sketch the mechanical components that you will use to animate the machine. This portion of the design is iterative; you will almost certainly need to revise your sketches as you create the machine.

Your TA will provide feedback using which you will refine your design over the next week for homework (see Week 8 evaluation form for grading criteria). Remember, although your ABM was created by you and will improve based on the feedback from your peers, you as the designer and the conceiver of the original idea must be able to explain it in detail how it functions.

### **Restrictions on ABM Design**

- The machine must be under 40 cm length, 40 cm depth, 40 cm height. Smaller is better.
- The resultant motion or output should be inspired by Nature (human, animals, wind, water, plants etc.).
- Machine should be actuated by hand usually through a manual crank.
- ABM should have at least one kind of linkage mechanism.
- ABM must have at least two mechanically distinct motions.

## HOME WORK (due at the beginning of next lab)

Based on the feedback received from your TA, each individual must revise and produce initial set of sketches of their ABM. A set of sketches include the multi-view diagram (Note that a multi-view drawing is considered one sketch), isometric sketch and detailed blowup drawings wherever needed to explain the mechanism. The sketches should include annotations describing the motion of the moving parts. The sketches should capture the overall shape and movement of the machine with annotations, such that they allow the readers to understand how the machine will work. The annotated sketches should show how the mechanisms is brought together inside a housing as an assembly to achieve the overall desired motion.

### 3. Oral presentations Next Week:

In week 09, each student, using their sketches and concept will give a 5-minute presentation outlining the following:

- Introduce ABM name and descriptor;
- Discuss the design of the animated machine;
- Explain the motivation for the design; and,
- Describe the workings of the mechanical components.

Your goal is to convince the class and TA that your proposed design is possible. After each presentation, the TA will provide feedback and the other groups will ask questions.

### Sketchbook

This is a design project: you are inventing and prototyping a new machine. Good designers sketch. Bad ones often do not. For this project (and hopefully every future design project you ever undertake) you will keep and use a sketchbook. This need not be expensive: you can staple together blank sheets of paper if you wish. But you need to use it to record your ideas. You will show your sketchbook to your TA every week in the labs, who will give you advice on how you can improve it. Improvement will count in the evaluations!

### Assessment Rubric for next week

Item	Due	Individual or Team	Criteria	Activity Mark	Part Mark	Total
First Set of Design Sketches	before next lab	individual			<b>40</b>	
			Mechanical parts (function)	15		
			Housing Design (Form)	15		
			Integration of mechanical parts with housing (Integration of form and function)	10		
Oral presentation	during lab	individual			<b>10</b>	
			communication	10		
<b>TOTAL</b>						<b>50</b>