2.000 Homework # 1: Disposable Camera

Name:_____ **Weight: 60 pts**

Explain how the camera works (~ 2 hrs)

Cover the five "Fs"

Recognizing details will help you find important information For example:

Why is this one color and that another color?	Hint… Fabrication
Why does this wire go there?	Hint… Flows
Why is this made of plastic and that out of metal?	Hint… Function, fabrication and physics
Why is this one piece instead of two pieces?	Hint.... Fabrication

These were "gimmes", you should look for others to help you.

This is a complicated device, do not be discouraged

Grading:

Function	4 pts	
Form	10 pts	
Flows	2 pts each	10 max
Physics	2 pts each	10 max
Fabrication	2 pts each	06 max
Explanation	10 pts	
Reassembly (so it works)	10 pts (bring to next class)	

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1. UHTW-I: FUNCTION [4 pts]

What is the function of a camera (see class notes on proper way to define function)

2. UHTW-II: FORM [10 pts]

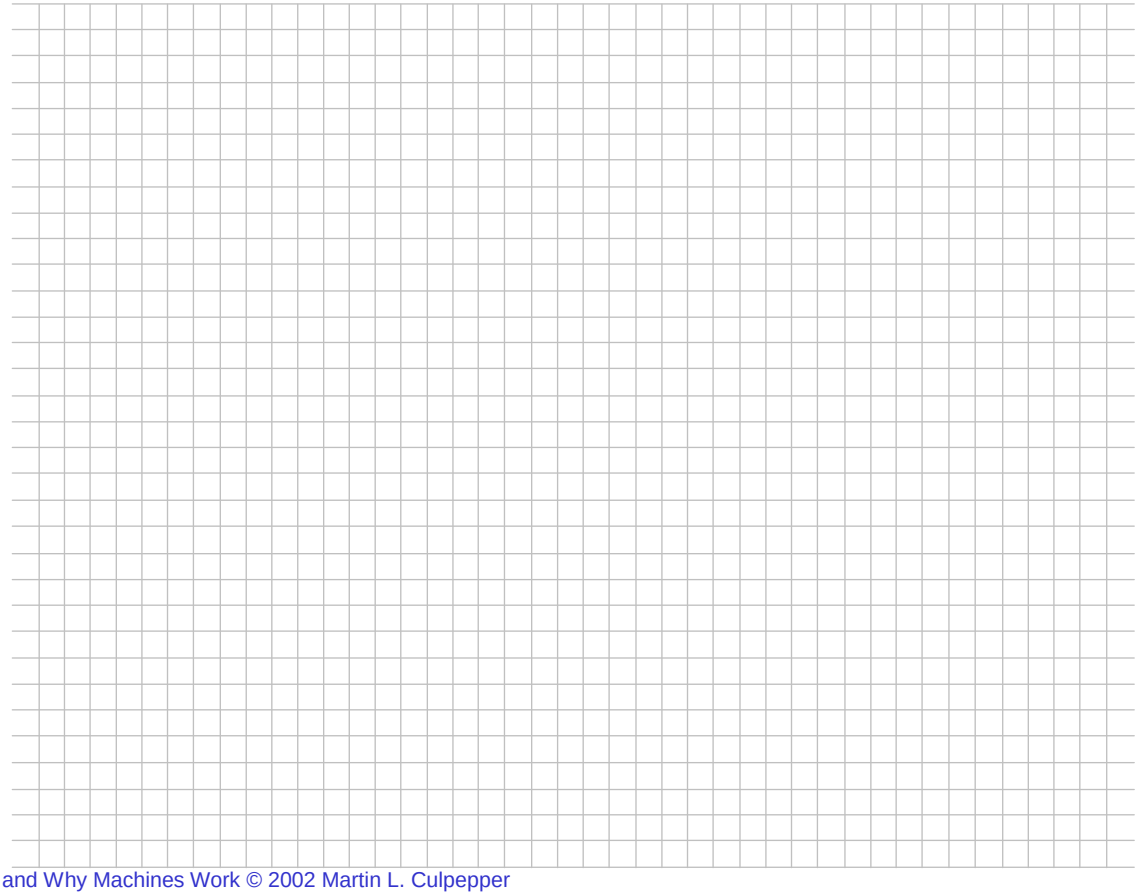
Directions:

Sketch the camera in enough detail to explain how it works. You might want to number your sketches and provide notes that you can reference in subsequent sections of your work. You are free to add sketches to this page as you continue through the homework AND you may sketch on subsequent pages if you like. Sketching does not have to be artistic. We expect to see oblique and orthographic (front, top, right side(s), back) views. Make sure to attach these sheets

Grading:

Size (1) Proportion (2) Likeness (4) Notes/Expl.(1) Guidelines (2)

Orthographic sketch paper (more is available on the web)



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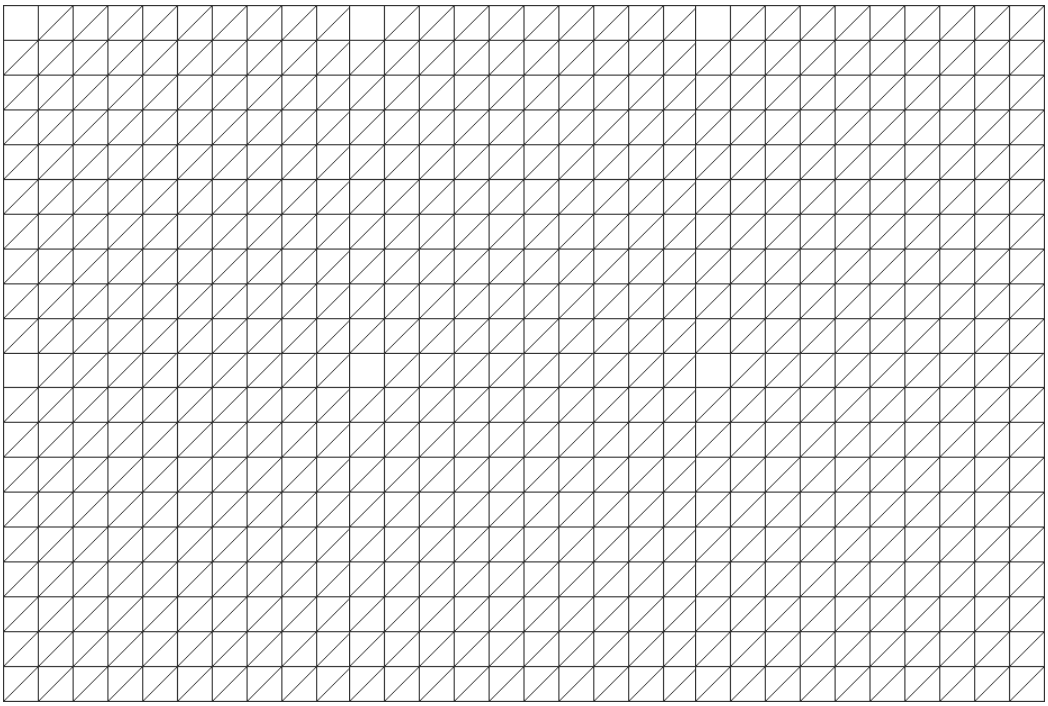
2. UHTW-II: FORM Cont.

Oblique sketch paper (more is available on the web)



Blank sketch space (attach additional sheets if needed)

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3. UHTW-III: FLOWS [2pts each]

Identify the type (Energy/Power, Mass, Information, etc….) of flows into, out of, and inside of the machine. You should be able to get five.

FLOW	FROM/THRU/TO	DESCRIPTION

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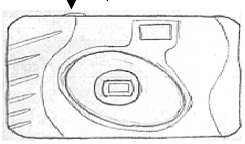
4. UHTW-IV: PHYSICS [2pts each]

Explain the physics that can be used to model the machine. No credit if you don't relate the form and/or flow(s) to the physics. Answers are 2 pts each.

Bad answer: $E = \int F \cdot dx$ Force is applied through a distance

Good answer: $E_{in\text{-}button} = \int F_{button} \cdot dx_{button}$ User does work on button when presses to take picture



Dominant Physics (models behavior that dominates machine function)		
Sketch/Flow	**Equation**	**How sketch/physics relate**
Limiting Physics (what limits the performance of the machine, i.e. strength)		
Sketch/Flow	**Equation**	**How sketch/physics relate**

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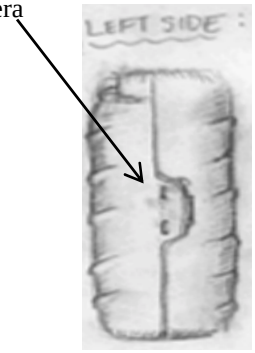
5. UHTW-V: FABRICATION [2 pts each, 6 pts max]

We understand you have limited knowledge of manufacturing (how things are made), but you can still use your common sense to speculate on how something was made. Does it look like it was molded? Was some sort of tool used to machine/shape it (i.e. did the tool leave any marks)? How/what holds it together? Do the best you can, we'll learn more about this in future lectures.

Part	Process(es)	Clues	Material(s)/Notes
Camera shell	Snap fit assembly	Snap fits on side of camera 	Plastic probably used to keep cost/weight low Assembly probably done by human hands, would be hard for robot to grab onto irregularly shaped pieces Snap fit makes it easy for a person to assemble, no screws, bolts, etc…

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6. EXPLANATION [10 pts]

Please explain how the camera takes a picture. Start with pushing the button, finish with winding the film for the next picture. What are the steps? What happens inside the machine? You might want to reference your sketches, flows, physics, and other info you provided earlier. You might want to make new sketches (attach additional pages if necessary).

7. UHTW – VERIFICATION [10 pts]

Bring your camera to class on due date. We need to verify that it works.

2.000 skill/career development survey [10 pts]

Name: _____

HANDS-ON EXPERIENCE

Check the following that you have used or have experience with:

Design experience

☐ **Project where you designed and built a solution. If yes, what did you build?** _____

Tools:

☐ **Ratchet** ☐ **Torque wrench** ☐ **Soldering iron**

☐ **Power drill** ☐ **Circular saw** ☐ **Cordless Screwdriver**

Automotive experience

☐ **Changing a tire on a car** ☐ **Worked on the mechanical portions of a car**

Take apart experience

☐ **Taken something apart to learn how it worked? If yes, what?** _____

Manufacturing processes

☐ **Casting** ☐ **Soldering** ☐ **Lathe** ☐ **Mill**

CAREER DEVELOPMENT

Check the three top majors you are considering for a career choice.

☐ **Civil & Environmental Engineering** ☐ **Mechanical Engineering**

☐ **Materials Science & Engineering** ☐ **Electrical Engineering & Computer Science**

☐ **Aeronautics & Astronautics** ☐ **Biology**

☐ **Chemical Engineering** ☐ **Management**

Are you less likely to choose Electrical or Computer engineering since the Dot-com boom has fizzled?

☐ **Yes** ☐ **No**

Do you have a current resume that you would give to potential employers?

☐ **Yes** ☐ **No**