blessed are the flexible, for they shall not be bent out of shape

Michael McGriffy, MD
2.009 Product engineering processes today

critique providing constructive feedback

ethics effective teamwork, professional responsibilities
but first...
another mini quiz

list 4 design-for-manual-assembly guidelines
What's next
workflow

- **Three ideas presentation**
  September 28, during class
  3 ideas per section

- **Mockup review**
  October 22
  2 mockups per section

- **Assembly review**
  November 4 & 6
  1 assembly

- **Sketch model review**
  October 8
  3 models per section

- **Final selection**
  October 27-29
  1 concept per team

- **Technical review**
  November 16
  1 (almost) prototype

- **Final presentation**
  December 7
  1 alpha prototype
Assembly review

Overview

digital submission 11 PM, Tuesday November 3 (red, green, blue, yellow)
digital submission 11 PM, Thursday November 5 (pink, orange, purple, silver)
Images (up to 10), CAD files, list of who-did-what, product contract
product variations
storyboards, circuit designs, etc.
Assembly review

Overview

10 minute presentations/discussion
Wednesday November 4 (red, green, blue, yellow)
Friday November 6 (pink, orange, purple, silver)

project your contract (or large mounted poster)

show your most current work
not a homework assignment!

can work in pairs, everyone must contribute
no make work!
avoid meaningless detail
keep working to understand user needs
keep doing tests
2.009 Product engineering processes

design critique

an important improvement and
decision-making mechanism

self critique, design review
Self critique

introspection is suspect

don't marry an idea

synthesis and deconstruction (analysis)

no aspect of the design is arbitrary

mental role-playing

use time to develop distance

challenge yourself
design review

it’s about the product

not our egos
Role playing exercise

two design critique scenarios
Presenting in a critique

suggestions

present

listen

consider

decide and respond
Questioning in a critique

suggestions

ask

listen

consider

decide and respond if appropriate
Ego vs. ego
honest, respect viewpoints, avoid my and your
wait, wait—don’t tell me!
bluff the listener

a) VisuaLAB’s technology a hoax
b) Software piracy losses increasing
c) Engineering students less honest than humanities students
Professional ethics code
most professions have one

even pirates had them!
Ye spoil taken from a captured ship is to be distributed in equal portion.

All ye who shall plot to desert, or having deserted shall be captured, shall have ye heads split open.
Professional ethics code
most professions have one

Involution studios

Speak the Truth
We shall be honest and objective, inside and outside the firewall.
We shall be transparent, provide insight into as much of our thinking and work processes as possible.

Be Accountable
We shall be responsible designers and engineers, held accountable for our actions and commitments to the studio, clients, and society.
We shall meet our deadlines and keep our promises.

Focus and Deliver
We shall commit to creating meaningful goals to our fellow staff, projects, and clients.
We shall produce useful, usable, and beautiful solutions.

Learn, Build, and Share
We shall develop our skills throughout our careers and provide guidance and educational opportunities for our colleagues and clients.
We shall embrace change and be flexible in our processes, operations, and values.

Protect the Public
We shall hold paramount the safety, health, welfare and other rights of human beings.
Engineering ethics
What is an ethic?

a code of behavior or conduct justified according to a reasoned value system
Engineering ethics

Value system?

what is good or bad, beneficial or deleterious, according to some set of criteria (measure of worth)

personal:
resources such as energy should be purposefully used, regardless of monetary value
return policies should be used in good faith only

professional (ASME):
“engineers uphold and advance the integrity, honor, and dignity of the engineering profession by using their knowledge and skill for the enhancement of human welfare ... striving to increase the competence and prestige of the engineering profession.”

societal:
balance between privacy and security
entitlement to health care

value systems change over time
Engineering ethics
values vs. preferences

preference: *like or dislike*

I enjoy cheese with apple pie vs. cheese is an appropriate side dish for apple pie

This is a good design but I would never use it

It was a good decision to buy the camera even though I did not want to buy a camera
Professional ethics code
part 1: principles (core values)

ASME:

Engineers uphold and advance the integrity, honor and dignity of the engineering profession by:

I. using their knowledge and skill for the enhancement of human welfare;
II. being honest and impartial, and serving with fidelity the public, their employers and clients; and
III. striving to increase the competence and prestige of the engineering profession.
Professional ethics code
part 2: canons (actionable laws)

ASME:

1. Engineers shall hold paramount the safety, health and welfare of the public in the performance of their professional duties.

2. Engineers shall perform services only in the areas of their competence.

3. Engineers shall continue their professional development throughout their careers and shall provide opportunities for the professional and ethical development of those engineers under their supervision.

4. Engineers shall act in professional matters for each employer or client as faithful agents or trustees, and shall avoid conflicts of interest or the appearance of conflicts of interest.

5. Engineers shall build their professional reputation on the merit of their services and shall not compete unfairly with others.

6. Engineers shall associate only with reputable persons or organizations.

7. Engineers shall issue public statements only in an objective and truthful manner.

8. Engineers shall consider environmental impact in the performance of their professional duties.
Engineering ethics
words indicating that you need to check your code...

“no one will ever know…”
“everyone does it.”
“we can hide it.”
“destroy that document.”
“this will destroy the competition.”
“no one will get hurt.”
“well, maybe just this once…”
“we didn't have this conversation.”
“it doesn't matter how it gets done as long as it gets done.”
“if they are that stupid, they deserve to get hurt.”

from Lockheed Martin
Engineering ethics
When in doubt ask ...

are my actions legal?
what would my professional society think?
am I being fair and honest?
will my action stand the test of time?
how will I feel about myself afterwards?
how will it look in the newspaper?
will I sleep soundly tonight?
what would I tell my child to do?
how would I feel if my family, friends, and neighbors knew?
Ethical problem solving
Design a useful code of conduct for your team

principles and laws: your team’s guiding values for how to work with each other.

draft a code of ethics
(start now by collecting idea from the entire team)
up to 8 canons
submit an electronic version (word) by midnight Tuesday (2009cr@mit.edu)
you will receive feedback by Wednesday 5 PM
final edited versions due noon Thursday (drwallace)
And finally
reminders...

peer review due by 5 PM today
notebooks this week
think about what you need work on/prepare so team
can make a good, informed decision
tonight, 7 PM in Pappalardo.
Mediating design decisions. SIs, Yodas, and all