2.009 Product engineering processes

“nothing is particularly hard if you divide it into small jobs”

Henry Ford
2.009 Product engineering processes today

logistics and pointers mockup review
but first …
list 4 guidelines for writing user needs

- What, Not How
- Positive, Not Negative
- Same Specificity
- Do Not Include Priority
but first …

list 4 guidelines for writing user needs
but first... attributes and specifications

<table>
<thead>
<tr>
<th>attribute</th>
<th>metric</th>
</tr>
</thead>
<tbody>
<tr>
<td>detect damage</td>
<td>defects visible</td>
</tr>
<tr>
<td>solidifies using heat</td>
<td>thermo-sets</td>
</tr>
<tr>
<td>home usability</td>
<td>curing temperature</td>
</tr>
<tr>
<td>producabiity</td>
<td>manufacturing time</td>
</tr>
<tr>
<td>food safe</td>
<td>FDA approved mat’ls.</td>
</tr>
<tr>
<td>Atkins diet-friendly</td>
<td>carbohydrate content</td>
</tr>
</tbody>
</table>
Attributes and specifications

mini quiz: identifying the egg

???
no answer
food mold
egg
food
water
kitchenware
pill
knife
food coloring
plastic container
edible food container
food container
baked/prebaked goods
jello/gelatin
household appliance

writing good specifications is challenging
very important in product development teams
and now!

another mini quiz

list the 4 components of a well structured specification!
Mockup review
7:15-10:00 PM, Thursday October 18

key criteria
- thoughtfulness of the design concept
- degree of resolution on critical issues/risks
- appropriateness of mockups/models/simulations

two components
- presentation to the entire class (4 min/section in 34-101, no models or questions)
- testing, questions in the Pappalardo lab (four 10 minute rotations, 5 min/concept)
- 2 minute video demonstration in Pappalardo for each concept

detailed schedule online, linked to home page
Mockup review

**issues to cover (in 2 minutes)**

**what is the concept?**
clear overall definition/vision for the product
scoping of major subsystems/technical elements
clear use life-cycle (how is it used), user interface
Mockup review

**issues to cover** (in 2 minutes)

- **key needs and preliminary contract**
- clear core value proposition
- logical mapping between needs, product attributes, and specs
- basis for estimated *purchase* price

who is the user and why do users care?
who is the purchaser, and why would they buy it?
who will you test with?
Needs and attributes
mockup review: preliminary product contract

Product Description: Portable electric device for lifting automobiles.

Intended Customers: Backyard mechanics.

Market: Automotive accessories.

<table>
<thead>
<tr>
<th>Customer Need</th>
<th>Product Attribute(s)</th>
<th>Engineering Specification(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can be easily transported in and out of a house.</td>
<td>Weight</td>
<td>Total weight less than 30 lbs.</td>
</tr>
<tr>
<td>Is easily stored in the home and office.</td>
<td>Size</td>
<td>Less than 14&quot; x 14&quot; x 14&quot; in smallest configuration.</td>
</tr>
<tr>
<td>Can handle most repair situations.</td>
<td>Lifting capability</td>
<td>more than 15 cycles at 1&quot; per second per charge for a 3000 lb. automobile.</td>
</tr>
<tr>
<td>Can be used on many uneven surfaces.</td>
<td>Stability</td>
<td>3000 lb vehicle raised 16 inches will not tip under 400 lb side loading. Base self-levels up to 1 inch discontinuities and 2% slopes in pavement.</td>
</tr>
</tbody>
</table>
Mockup review

issues to cover (in 2 minutes)

key risks
major issues identified
feasibility demonstrated or disproven
lessons learned and identification of unresolved challenges
Mockup review presentation

Pointers

don’t try to sell — communicate
design the presentation to be engaging
use 2+2 minutes to summarize the concepts, contract, risks, findings
in the lab, let the models speak — few scripted words
plan the content for your 2 minute mockup demonstration video
Mockup review
presentation
Mockup review
presentation

pointers
don’t try to sell — communicate
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use 2+2 minutes to summarize the concepts, contract, risks, findings
in the lab, let the models speak — few scripted words
plan the content for your 2 minute mockup demonstration video
remember the longer-term goal — design a good new product
be sure there are folks taking notes at the review
Mockup review

timeline

before the review

3:00-5:10 PM Thursday
   load slides onto presentation computer (Pappalardo)
4:45-6:45 PM: prepare team/presenting area
5:30: dinner in Pappalardo lab
6:30-7:00 PM: AV test in 34-101
7:15 PM sharp: presentations start in 34-101
Mockup review
realigned sections

yellow red and purple?
blue
pink
orange
silver
green

scheduler to upload slides will post overnight tonight
Mockup review

demo locations, order within section

special demonstration needs/locations by the end of Tuesday

let me know concept names and order by 9 PM Wednesday
Mockup review
more info and pointers on the course website