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>producability</td>
<td>manufacturing time</td>
</tr>
<tr>
<td>food safe</td>
<td>FDA approved mat'l's.</td>
</tr>
<tr>
<td>Atkins diet-friendly</td>
<td>carbohydrate content</td>
</tr>
</tbody>
</table>
Attributes and specifications

mini quiz: identifying the egg

- Yeet, sugar blood test, chocolate casting set, rubber tires, foodsafe packing peanuts, invisalign, couch
- Pam, oil, coffee, cheese, carrot, marshmallows x2, potato, potato chip, apple, diet cake mix/batter, edible utensil
- Cookie maker, temperature detector, cooking thermometer, rice cooker, oven, coffee grinder, easy bake oven, microwave

writing good specifications is challenging very important in product development teams

EGGcellent students: May W, Charlotte F, Erika M, Heather N, Marwa A
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>
and now!

another mini quiz

list the 4 components of a well structured specification!
Mockup review
7:15-10:00 PM, Thursday October 17

key criteria
  - thoughtfulness about, clarity, and vision for the opportunity
  - identification and resolution of critical issues/risks
  - execution of mockups/models/simulations

review take-home message
  - informed decision best option for a successful product!
Mockup review
7:15-10:00 PM, Thursday October 17

three 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
Mockup review
7:15-10:00 PM, Thursday October 18

presentation to the class  (4 min/section in 34-101, no models or questions)

2 minutes per idea, on time!
Mockup review
issues to cover (in 2 minutes)

what is the design concept?
clear overall opportunity/definition/vision/design 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 product 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?
Mockup review

issues to cover (in 2 minutes)

key risks
major issues identified
what you chose to address and why
lessons learned and identification of unresolved challenges
Mockup review

part 2

testing in Pappalardo  (four 10 minute rotations, 5 min/concept)
product contracts mounted in team area

scheduler for contract plotting help will be posted

not a repeat of 34-101!
Mockup review
part 3

concept video  (2 minutes per video, one take!)
online review form, summarize your mockup

not a repeat of 34-101!
Mockup review
7:15-10:00 PM, Thursday October 17

key criteria
thoughtfulness about, clarity, and vision for the opportunity
degree of resolution on critical issues/risks
appropriateness of mockups/models/simulations

three 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

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, use your models, what do you want to learn?
plan the content for your 2 minute mockup demonstration video
Mockup review
presentation
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, use your models, what do you want to learn?
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remember the longer-term goal — learn and design an impactful product
be sure there are folks taking notes at the review
Mockup review

**timeline**

before the review

2:40-5:10 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

scheduler to upload slides will be posted
Mockup review

demo locations, presentation order

special demonstration needs/locations by the end of Tuesday

extra Pappalardo hours on home page

no lecture Wednesday

let me know concept names and order by 9 PM Wednesday
Mockup review

realigned sections

pink    blue?
yellow
purple
silver
orange
red
green
Mockup review
more info and pointers on the course website