Hall of Fame or Shame

Hall of Fame or Shame

- Good
  - Aesthetic and minimalist design
- Bad
  - What does Google actually do?
  - What should be typed into the text box?
  - Google Search? I’m Feeling Lucky?
  - Where is Help?

Affordance

- "A property in which the physical characteristics of an object or environment influence its function."
  - **Round** wheels are better suited than square wheels for **rolling**.
  - (Desktop) Metaphor
    - *Three dimensional buttons on a computer screen*
  - Encourage intended function
  - Discourage improper use

- Make it inconceivable that the design could function or be used otherwise

Mapping

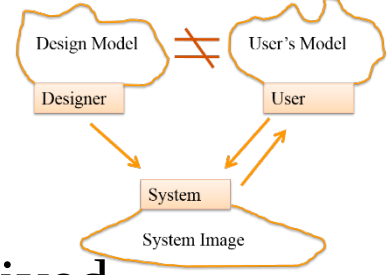
- “A relationship between controls and their movements or effects”
  - Control-effect relationship
  - Control-display relationship
  - Stimulus-response compatibility

  - Good mapping for greater ease of use
  - Effect corresponds to expectation?

  - Avoid one control-multiple effect relationship
    - *Visually distinct modes to **indicate** the current function*

  - Consider social/cultural conventions
    - *Down to turn it on in UK*

Mental Model



- "Representations of systems and environments derived from experience"

- System model: mental models of **how systems work**
- Interaction model : mental models of **how people interact with systems**
  - Personal use of the system
  - Lab testing (e.g. Focus groups and Usability testing)
  - Direct observation
    - *What about a design that is not yet available?*

  - Create an interaction experience that draws from common mental model

    Or
  - Have people learn a new model (clear and consistent)

- Conceptual Model

Interaction Model for Conventional Brakes

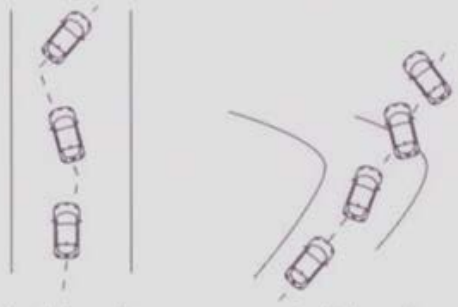
On slick surfaces...

- depress the brake pedal smoothly
- pump brakes to prevent brakes from locking up
- do not steer while braking, except to counter-steer
- noise and vibration are signs that something is wrong

INCORRECT INTERACTION

slamming brakes/steering while braking

Car will take a longer time to stop and will not make the turn

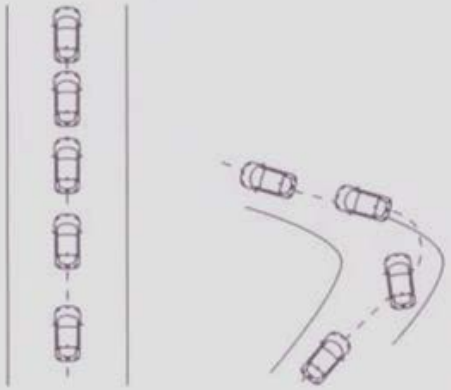


wet, slick surface wet, slick surface

CORRECT INTERACTION

pumping brakes

Car will take a shorter time to stop and may make the turn



wet, slick surface wet, slick surface

Interaction Model for ABS Brakes

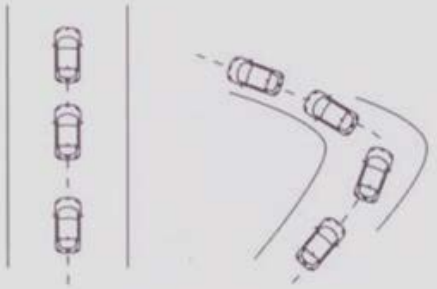
On slick surfaces...

- depress the brake pedal fast and hard
- do not pump brakes
- steer while braking
- noise and vibration are signs that the system is operating properly

CORRECT INTERACTION

slamming brakes/steering while braking

Car will properly stop and make the turn



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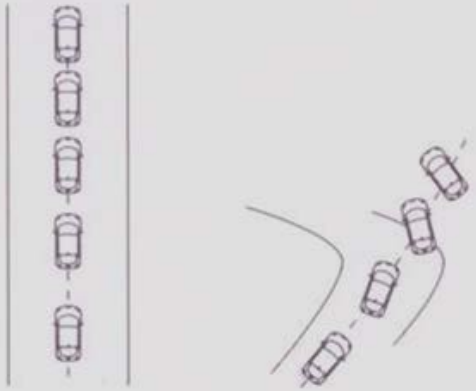

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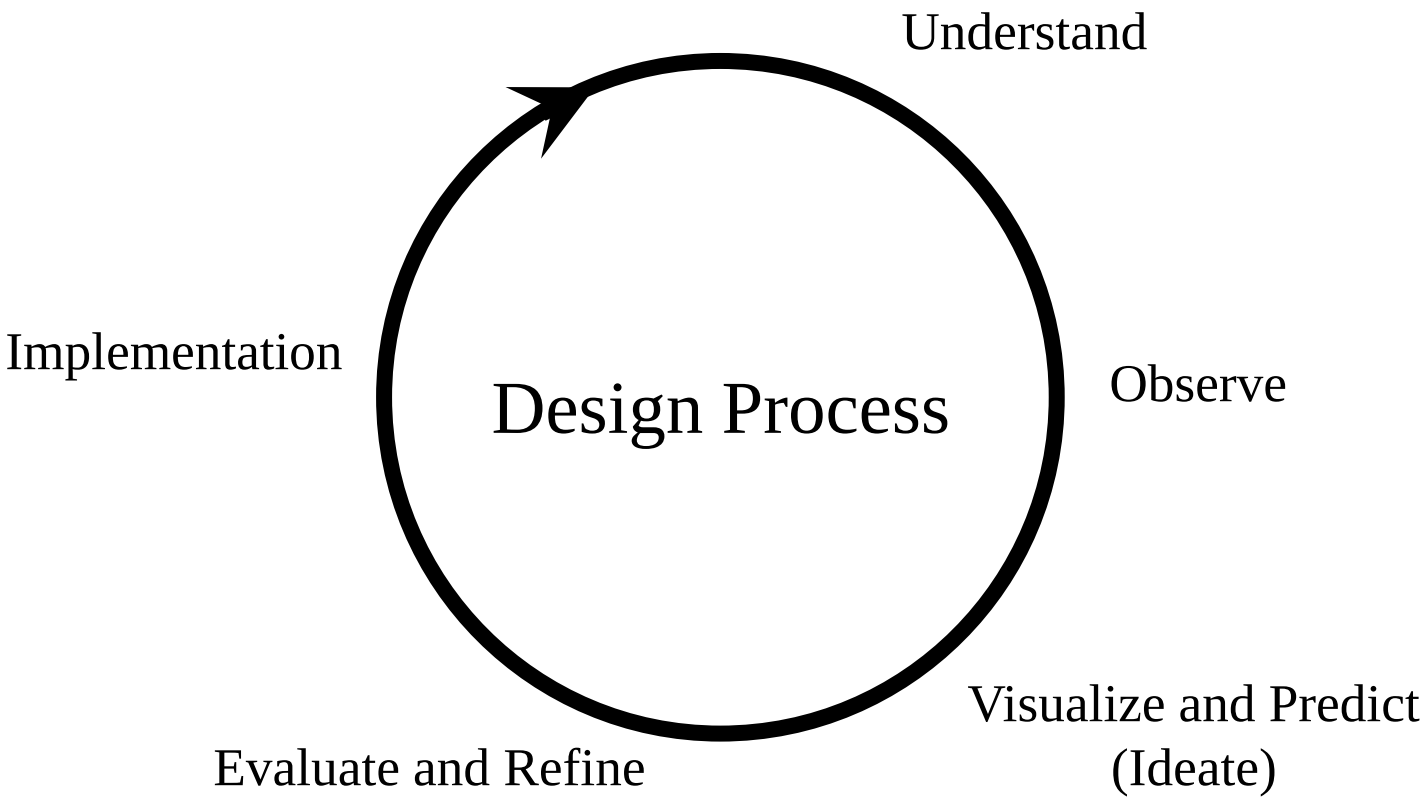
The IDEO Design Process



David Kelley TED Talk

Founder of the design firm IDEO and the Stanford d.school

The IDEO Design Process

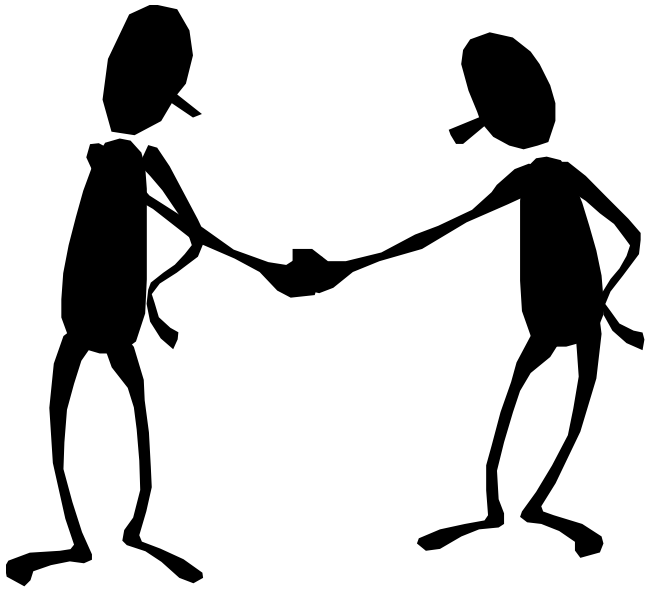
- **Understand the problem area**
  - why do we need a new design and how to come up with one
  - produce a small set of key ideas, general orientation
- **Observe potential users and customers**
  - fictitious character maps
  - know the (potential users)
- **Visualize and predict**
  - brainstorm, sketching, prototyping
  - detailed scenarios or storyboards
  - depict the interactions between users and the new device (design)
- **Evaluate and refine**
  - user testing, feedback
  - iterative, spiral development model
- **Implement**

System Centered Design

- What can be built easily on this platform?
- What can I create from the available tools?
- What do I as a programmer find interesting to work on?

User Centered Design

- Design is based upon a user's
  - Abilities and real needs
  - Context
  - Work
  - Tasks



Golden rule of interface design:

"Know The User"

User Centered Design

- ... is based on **understanding the domain of work or play** in which people are engaged and in which they interact with computers, and programming computers to facilitate human action. ...

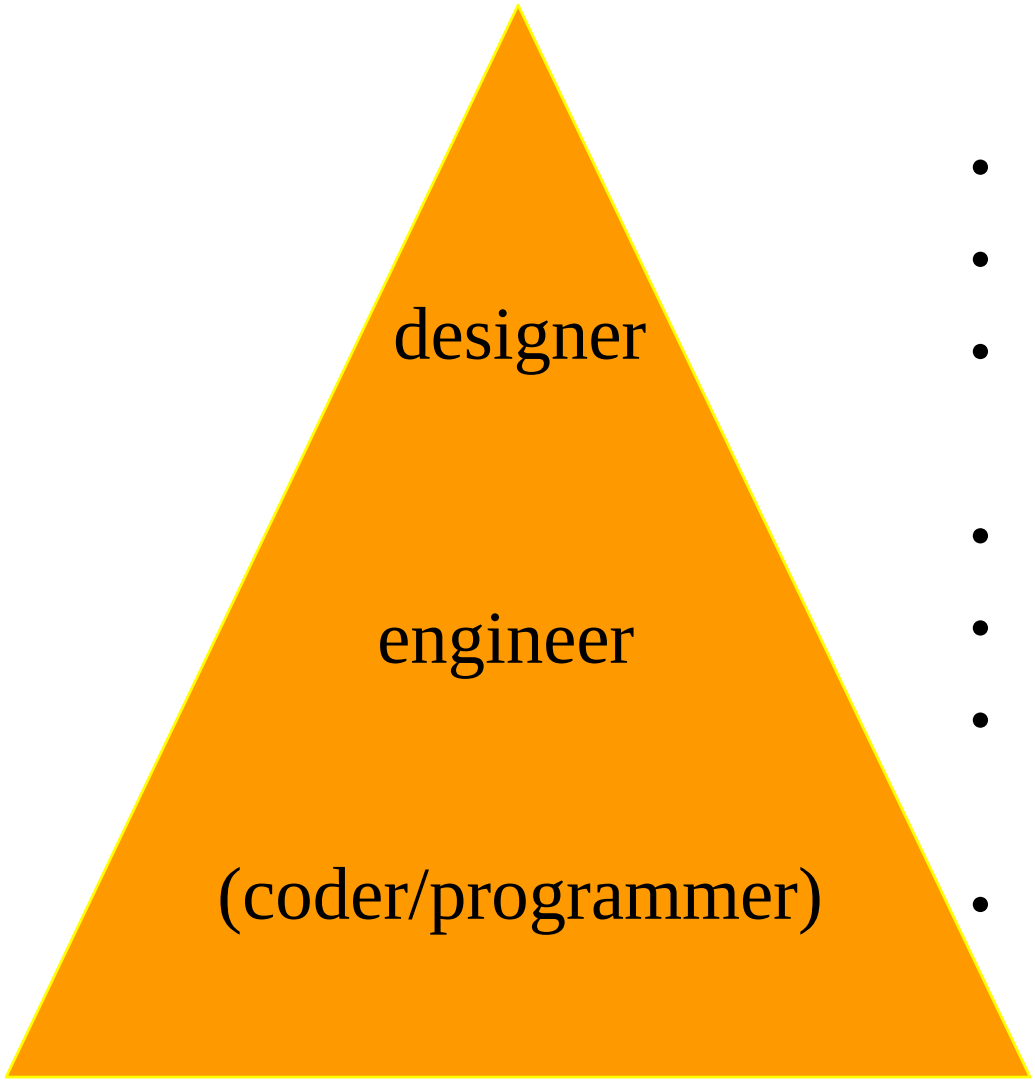
- Three assumptions
  - The result of a good design is a *satisfied customer*
  - The process of design is a *collaboration between designers and customers*. The *design evolves and adapts* to their changing concerns, and the process produces a specification as an important byproduct
  - The customer and designer are in *constant communication* during the entire process

Denning and Dargan, 196

Designer Centered Design

- The experts know best
- Users can’t see past what they know

Design Thinker: Designers Who Create



- think beyond obvious
- create beyond the problem
- open ended

- problem solving
- follow a methodology
- fix what exist

- implement as specified

Advice from Wonderland

There is no use trying, said Alice; one can't believe impossible things. I dare to say you haven't had much practice, said the Queen. When I was your age, I always did it for half an hour a day. Why, sometimes I've believed **as many as six impossible things before breakfast.**

- Lewis Carroll (Alice's Adventures in Wonderland)

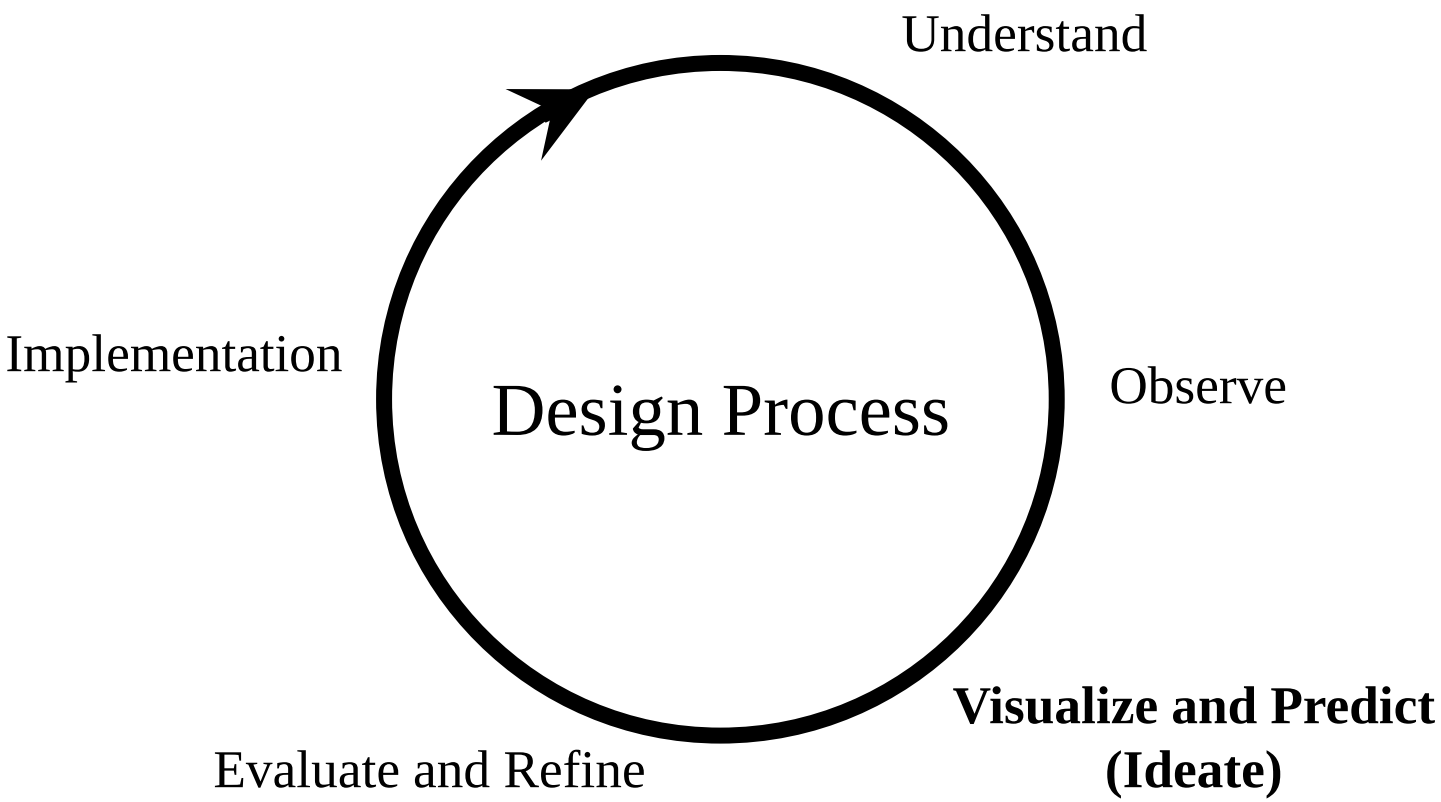
Understanding: gathering user's knowledge

- Contextual Inquiry
- Real persons with real constraints
- Tools
  - Notepad
  - Camera
  - Tape recorder
  - Video

Conducting an interview

- Typical topics to explore
  - What is the problem at hand?
  - How is it addressed now?
  - What are the limitation of the current practice?
  - Who, when, where and why will they use the system?
  - What will they do with it?
  - Could you show me?
- Listen to users!
  - Do not comment on what is possible or not!
  - Do not force your views!
  - Users are always right!
  - Be sure to have clear communication channel!

The IDEO Design Process



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Brainstorming

"The best way to get a good idea is to get a lot of ideas"

- Seed the brainstorm
  - Topic statement
- Get physical
- Follow the rules (IDEO)
  - Stay focused
  - One conversation at a time
  - Encourage wild ideas
  - Defer judgment
  - Build upon idea from others
- Number your ideas
- Target:
  - 100 ideas per hour

Playful rules for brainstorming

One conversation at a time

Stay focused on the topic

Encourage wild ideas

Defer judgment

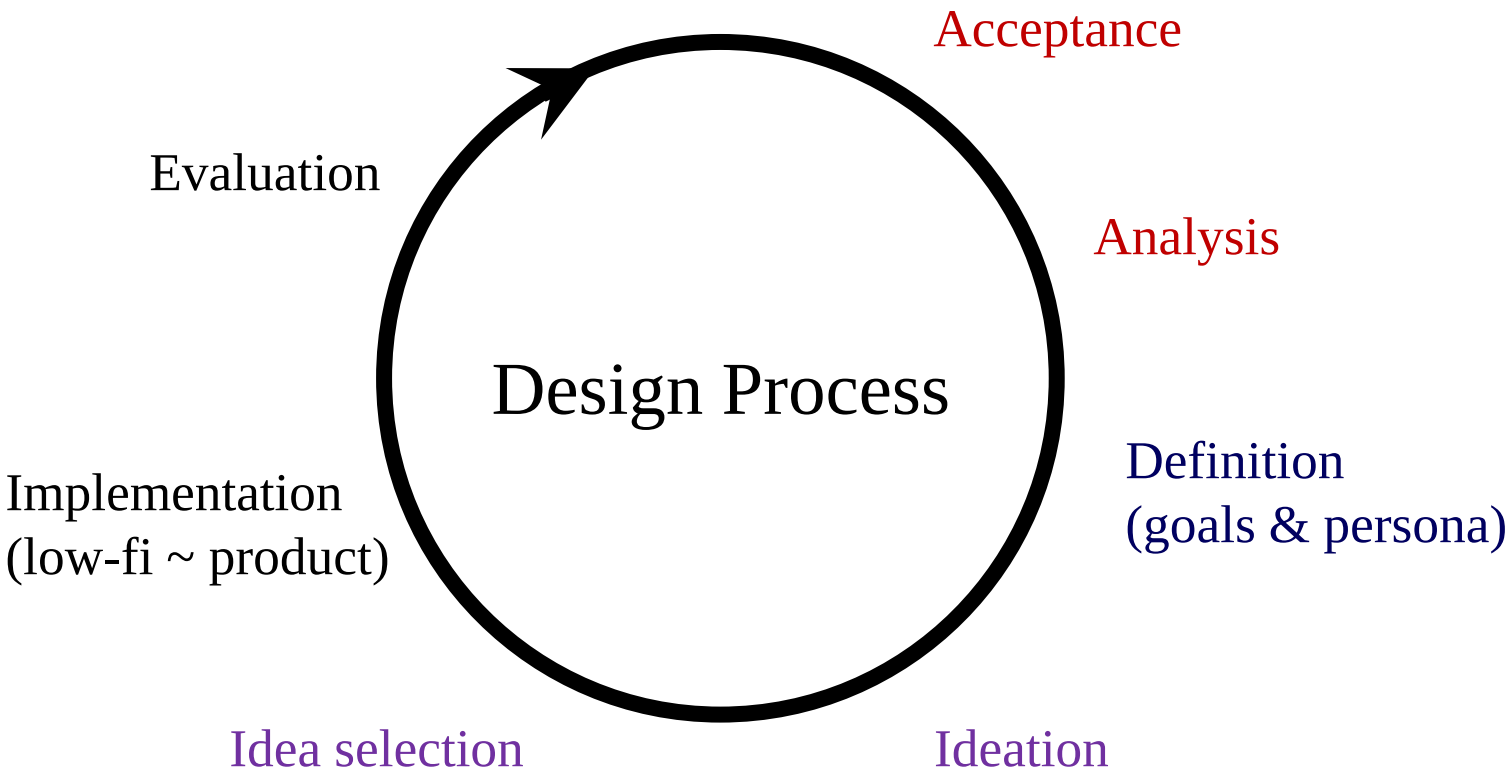
Build on the ideas of others

Be visual

Go for quantity

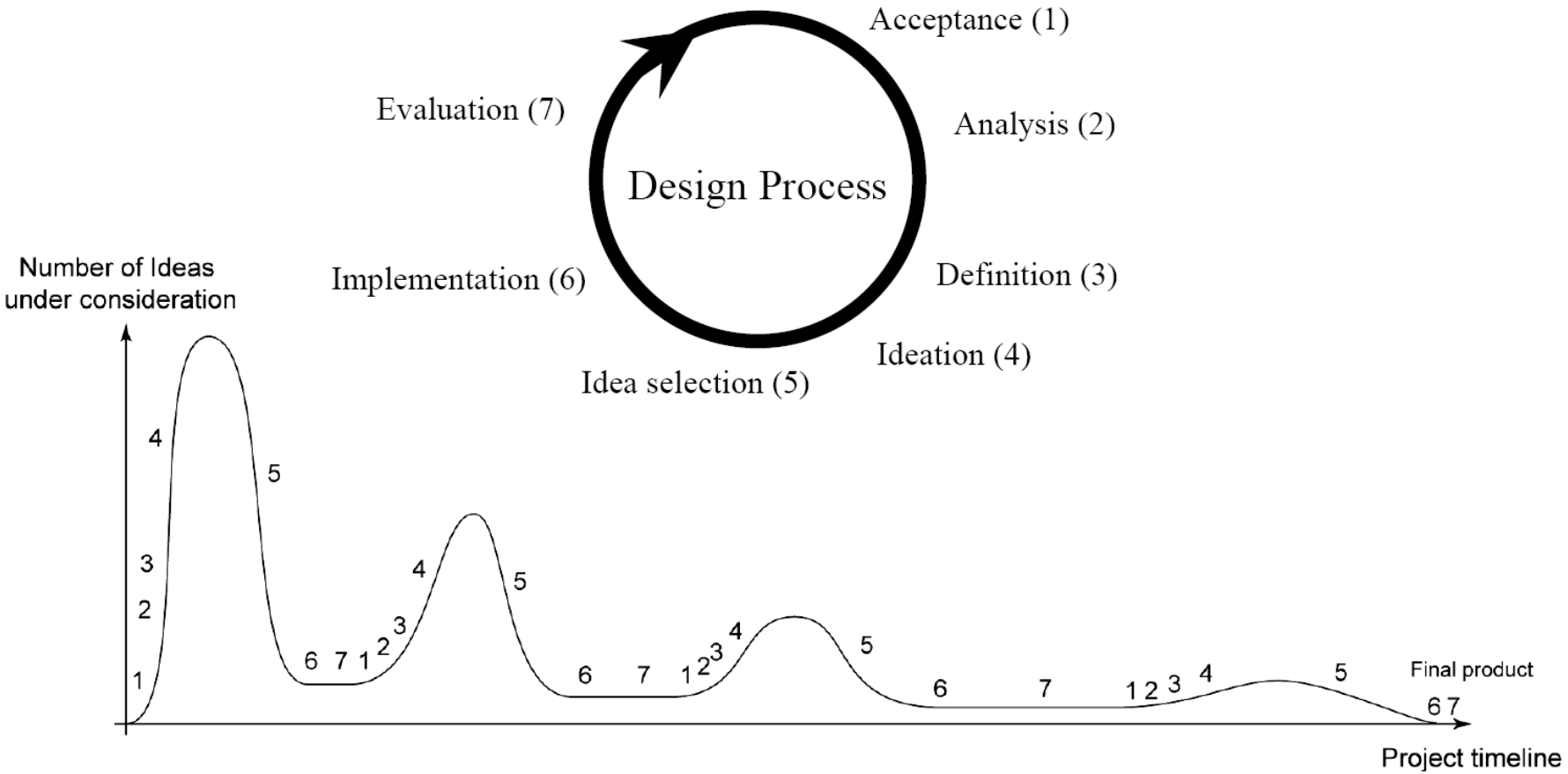
“Deep Dive” Video

- IDEO designing a shopping cart of the future



“The universal traveler”
(Koberg & Bagnall)

Cycle in the project lifespan



Note

- Arduino class schedule

Questions?