“Design is choice, and there are two places where there is room for creativity:
1) the creativity that you bring to enumerating meaningfully distinct options from which to choose,
2) the creativity that you bring to defining the criteria, or heuristics, according to which you make your choices.”

- Bill Buxton

[Quote from Buxton, Sketching User Experiences]
“Enlightened trial and error outperforms the planning of flawless intellect.”
- David Kelley

What is a Prototype?

A prototype is any representation of a design idea, regardless of medium.
A prototype is a means for examining design problems and evaluating solutions.

**Role**: does the design support activities and tasks?

**Look and feel**: What is the style and form of the design?
Implementation: How will the design be built or deployed?

Integration

Implementation

Look and feel

Sketching

Information Architecture
### Feasibility Tests

```cpp
(const IntList& oldList)
{
    register long n = oldList.size;
    if (n != size) setSize(n);
    register int* newPtr = &values[n];
    register int* oldPtr = &oldList.values[n];
    while (n--) *newPtr = -*oldPtr;
    return *this;
}
```
Video Prototypes

Experience
A **prototype** is
an instantiation of a **design hypothesis**.
a means to **communicate ideas and intent**.
a vehicle for **evaluating design ideas**.

Multiple audiences — intended users, design teams, and supporting organizations.
Prototypes for the Microsoft mouse
From Moggridge
Designing Interactions, Ch2

Testing Multiple Alternatives

Tohidi et al, CHI 2006
Tohidi et al, 2006

Three prototypes for house climate control
Research subjects split into four groups
Evaluate only prototype 1, 2 or 3
Evaluate all three prototypes
What will be the effect on ... overall scores?
number of positive / negative comments?
suggestions for improvement?

Serial vs. Parallel Prototyping

The results of Tohidi et al. suggest benefits for the quality of feedback received when users compare across multiple prototypes.
Might exploring multiple alternatives in parallel improve the quality of design outcomes? (... and how might we measure “outcome quality” in the first place?)
These questions were examined in design research experiments by Steven Dow et al.

Task: Design an Advertisement

Dow et al.
In both conditions, expert feedback (on theme, layout, composition, and other features) was provided between iterations.

Measuring Outcome Quality

Click-through rate (clicks per impression)
- Parallel ads had higher rate (445 vs. 398 clicks per million impressions, $p < 0.05$)

Time on client website (in seconds)
- Parallel ads may lead to more time on site (28 sec vs. 21 sec, $p = 0.076$ n.s.)

Expert ratings (by design professionals)
- Parallel ads rated higher (24 vs. 22, $p < 0.05$)

Parallel ads more diverse
(similarity score 2.78 vs. 3.18, $p < 0.001$)

[Buxton, Sketching User Experiences]
P4: Course Project

Iteratively design, prototype, and evaluate a new application using gesture-based input.

P4 Milestones

W5  Team Formation & Initial Prototyping
W6  Wizard-of-Oz Testing
W7  Functional Prototype I
W8  User Testing
W9  Functional Prototype II
W10 Demo & Presentation
    Final Project Presentations

Each week has a project milestone.

P4 Course Project

Team Formation

Form a team, name your team, choose roles.

Example Team Roles

Manager: coordinate team, manage web
Design Lead: design UI, push creative ideas
Evaluation Lead: design & conduct user tests
Dev Lead: manage code, devise algorithms

Create a new website for your project.
Send the URL to cs247@cs by Thur 1pm.
**Choose an Application Area**

Think carefully about your choice of application area. Build on your P3 insights. Brainstorm a variety of areas and user needs as needed.

- What needs or experiences will you address?
- Is a gesture-based UI needed & appropriate?
- Why wouldn’t another approach do as well?
- Can you conduct meaningful evaluations?

Post a 1 paragraph description of your intended application area and corresponding user need.

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**P4 Prototyping**

Consider multiple alternatives. Start with rapid methods then move towards higher fidelity.

For each instance, ask: what am I trying to learn and/or communicate with this prototype?

To what degree are you exploring the role, look & feel or implementation of your design?

Post prototypes to team page by 1pm Tue 2/12. **Wizard of Oz testing** in studio next Thur, 2/14.

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**P4 Prototyping**

Wizard-of-Oz Prototyping

To prototype an interactive system by using human operators to simulate machine behavior.
How to make a WOz Prototype

Map out scenarios and application flow: what should happen in response to user behavior?

Build interface “skeletons” (minimal autonomy)

Develop “hooks” for wizard input
Where and how the wizard will provide input (e.g., selecting next screen, entering text, recognizing speech or gestures); Must be possible to replace later with computer

Rehearse wizard role with team mates. The wizard should be able to perform the task.

Tradeoffs in Wizard of Oz

Advantages
• Fast (faster), cheaper and more iterative prototypes
• Create multiple variations
• Identifies bugs and problems with current design
• Places the user at the center of development
• Can envision challenging-to-build applications
• Designers learn by wizarding

Disadvantages
• Simulations may misrepresent otherwise imperfect tech
• May simulate technologies that do not exist
• Wizards may need training and can be inconsistent
• Playing the wizard can be exhausting
• Some features (and limitations) can’t be simulated
• May be inappropriate for certain venues (e.g., home)