Questions?

• Broken hardware
  – Why was it not reported?

• Project Step 3 due next week

• Show and Tell due this Thursday

• PWM circuit
Evaluating your design

• Proceed in a hierarchical manner
  – Sub-system testing
    • Does the hardware design work?
  – Integration testing;
    • Are the different part of the design working together?
  – Specifications testing;
    • Does the application perform as expected (per specifications)
  – Users testing
    • Will users be able to use the system?
    • Does the system fulfill users’ goals

• An iterative approach will lead to best results
Questioning measurements

• Are they reliable?
  – Does the experiment take into account possible variations in measurement?
  • Need for testing a sample of subjects

• Are they valid?
  – Does the experiment reflects target use?
  • Were users typical?
  • Were tasks typical?
  • Was the setting realistic?
  • Was the experience biased?

• Do they make sense?
  – Setting the stage for discovery!
The participant standpoint

• Testing is a distressing experience
  – Pressure to perform
  – Feeling of inadequacy
  – Looking like a fool in front of your peers, your boss,…

(from “Paper Prototyping” by Snyder)
Treating subjects with respect

- Follow human subject protocols
  - Individual test results will be kept confidential
  - Users can stop the test at any time
  - Users are aware (and understand) the monitoring technique
  - Their performance will have not implication on their life
  - Records will be made anonymous
    - Videos

- Use standard informed consent form
  - Especially for quantitative tests
  - Be aware of legal requirements
Ethics: The Stanford prison experiment

• Was it useful?
“…that’s the most valuable kind of information that you can have - and that certainly a society needs it” (Zimbardo)

• Was it ethical?
  – Could we have gather this knowledge by other means?
Conducting a test

• Before the experiment
  – Have them read and sign the consent form
  – Explain the goal of the experiment
    • *In a way accessible to users*
    • *Be careful about the demand characteristic*
    • *Answer questions*

• During the experiment
  – Stay neutral
    • *Never indicate displeasure with users performance*

• After the experiment
  – Debrief users
    • *Inform users about the goal of the experiment*
  – Answer any questions they have
Managing subjects

• Don’t waste users time
  – Use pilot tests to debug experiments, questionnaires, etc…
  – Have everything ready before users show up

• Make users comfortable
  – Keep a relaxed atmosphere
  – Allow for breaks
  – Pace tasks correctly
  – Stop the test if it becomes too unpleasant
Direct observation method

• Observing (and recording) users interacting with the system
  – In lab or in the field
  – For a set of pre-determined tasks or through normal duties
    • Be prepared!

• Excellent at identifying gross design/interface problems

• Three general approaches:
  – simple observation
  – think-aloud
  – constructive interaction
Be prepared!

• Select the correct population
• Set objectives and Tasks
  – Realistic
  – Informative
• Apply for the IRB
  http://www.umresearch.umd.edu/IRB/
• Hardware
  – Computer, video equipment…
• Software
  – Up and running, properly debugged…
• Facilitator
  – Using a checklist might be useful
  – Practice!
Recording observations

• Need a record
  – Further analysis
  – Proofs during discussion

• Techniques
  – Paper and pencil
    • Simple to set up
      – Free form
      – Coding scheme
    • Might be biased
  – Audio/Video recording
    • More accurate
    • Time consuming to analysis
      – Encoding is a time consuming process

From “Observing the user experience” (Kuniavsky)
## Coding scheme example

- Tracking activity in the office

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<th>Time</th>
<th>Desktop activities</th>
<th>Absences</th>
<th>Interruptions</th>
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Simple observation method

• Evaluator observes users interacting
  – Sometime behind a half-silvered mirror

• Drawback
  – No insight into the user decision process or attitude
The think aloud method

• Subjects are asked to say what they are thinking/doing
  – What they believe is happening
  – What they are trying to do
  – Why they took an action

• Widely used in industry

• Drawbacks
  – Awkward/uncomfortable for subject (thinking aloud is not normal!)
  – “Thinking” about it may alter the way people perform their task
  – Hard to talk when they are concentrating on problem
The constructive interaction method

• Two people work together on a task
  – Normal conversation between the two users is monitored
    • removes awkwardness of think-aloud
  – Variant: Co-discovery learning
    • Use semi-knowledgeable “coach” and naive subject together
    • Make naive subject use the interface

• Drawback
  – Need a good team
Debriefing

• Post-observation interviews
  – Questions from your notes
  – Questions from users diary
  – Questions from a video footage

• Very important
  – Avoids erroneous reconstruction
    • *Provide many constructive suggestions*
  – Let participants understand their role in the research process
Example