CS774 Human-Computer Interaction

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Why HCI?

- ■ User cares about the interface, not the code
- ■ Many interfaces are flawed, some deeply
- ■ Need to understand HCI so we can program well

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CS774 HCI

Prerequisite: CS 770. Human factors issues in the development of software, the use of database systems, and the design of interactive systems. Issues include: programming and command languages; menus, forms, and direct manipulation; graphical user interfaces, computer-supported cooperative work, information search and visualization; input/output devices; and display design.

Texts: Shneiderman, Norman, Java (TBN)
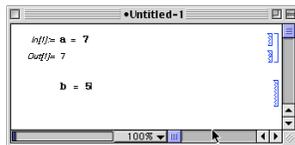

What's wrong, hear?

- How do you close the side window?
- Is it the icon?
  - Points left in direction of close
- Is in the window or other menu?
- ?????

- Answer: click the open tab
- Other tab dialogs don't do that
- Behavior not consistent with other GUIs

Software can be

– Hard to learn

– Hard to remember

– Slow to use

– Error prone

– Frustrating and unsatisfying to use

Example 1: Hard to learn

■ Mathematica - type in B = 5
■ Now what?
  – Shift-return
  – Why not option-return?
■ What are the right margin icons for, anyway?
■ BUT - you must know math
  – An interface cannot substitute for basic user knowledge

Example 2: Error prone

Gulf of Execution
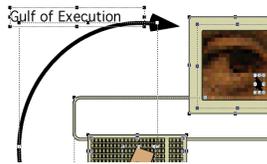
- Canvas 8 - working the mouse
- Error 1 - placing the text box
  - Click once, select box
  - Double click, edit text
  - Click twice slowly, new mode
- Error 2 - resizing arc
  - Double click, reshape mode
    How exit the mode?
  - Single click, select - which little box resizes the arc angle? In which direction?

More Examples

- UI Hall of Shame
- GUI Blooper book
- Norman's book - everyday things
  - Doors, phones, showers

- Objective in class
  - To be able to critically evaluate interfaces and diagnosis their flaws
  - Need to be specific, precise in describing the flaws and why
  - Homework - find examples for the five major flaws

Goals of User Interface Design

- Evaluate software on
  - Time to learn
  - Speed of performance
  - Rate of errors
  - Retention over time
  - Subjective satisfaction
- Apply goals in context
  - Life critical systems - no tolerance for error, even under stress
  - Industrial and commercial uses - productivity key
  - Home and entertainment - ease of use, subjective satisfaction
  - Creative systems - hard to be objective, how measure results?

Why do we get these problems?

- Programmers aren't users
  - Different goals and personalities
    - Programmers are problem solving, techno-geeks
  - Different levels of knowledge
    - Programmers think in system details
  - Programmers know the inside
    - UI reflects their choices, so of course they understand it
- Design process is flawed
  - Programmer, technology centered design
  - HCI is expensive, not budgeted or understood (fluff!)
  - HCI is hard, good intentions no protection

Human Computer Interface (HCI)

- A discipline for the
  - Design,
  - Implementation,
  - and Evaluation
  - of interactive systems for human use.

- Or …
  - User-centered software engineering
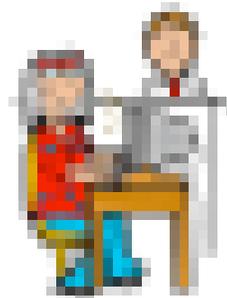
The study of HCI

- Theories of HCI
  - Human psychology - memory, perception
  - Models of HCI use - i.e., Norman's seven stages
    - Gulfs of Execution and Evaluation
  - Controlled experimentation into processes and elements
    - Turning informal experience into established principles
- Design principles
  - Pschopathology of everyday things - why HCIs fail
    - Trying to figure the reason for usability flaws
  - Principles of design - what works
  - Visual design and GUIs - using standard widgets
   - Apple User Interface Guidelines (Java, Windows, etc.)

The study of HCI : continued

- The design process
  - User-centered design
    - Watch, listen, study, survey, before design
    - Activity-centered design models instead of system-centered
  - Design with users
    - Build multiple prototypes using whatever method
    - Take prototypes to user early and often
  - Usability study
    - Formal approaches for watching and surveying users
    - Survey instruments and their development

Low fi prototype example

- Yingyuan Fang, Spring 2000 term project

- Mid-fi
  - Visual Basic
  - Hypercard
  - HTML
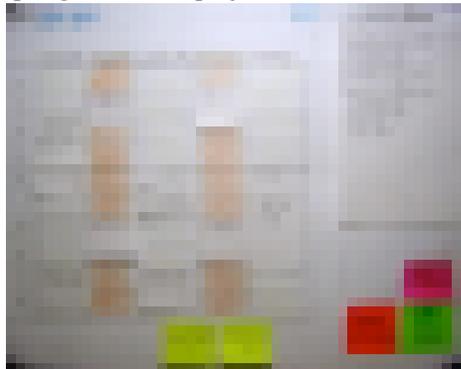
This Semester

■ HCI principles
  – Psychology of design
  – Design principles
  – Design process
  – Types of interfaces, elements of standard GUIs

■ HCI process
  – Accepted processed for design and testing of GUIs

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Things to do this semester

■ Usability studies (videotaped?)
  – Loyola web page, Groupwise, Privare, advising sheet
  – Video/photo album of flawed everyday things on campus

■ Projects
  – In class teacher's aide - randomize names to call
  – Evolutionary graphics program - evolve simple patterns

■ Research idea
  – Image registration - consistency of manual registration
  – Biology recording PDA (Dr. Derrickson)

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Java Image Registration Kit 2001
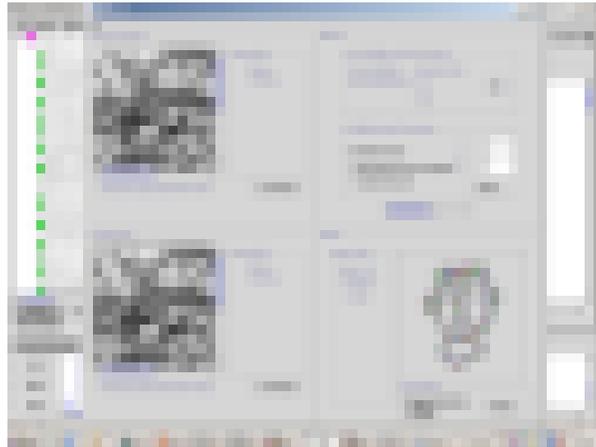
End of class review

- **What we covered:**
  - Examples of GUI bloopers
  - Goals of HCI design
  - HCI as design, implementation, evaluation
  - Course overview
  - Homework 1

End of class review

- **For next class**
  - Read Sneiderman, start Norman
  - Visit UI Hall of Shame
  - Come with an example of an interface/gadget you love
- **For Friday**
  - Do homework 1
    - Find your own examples in software and things you use

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