For Thought

“Its (the computer’s) interesting potential lay not in its ability to perform calculations but in its capacity to represent action in which humans could participate.”

Last Time

- Mindset – We (designers) are responsible for the user’s mistakes.
- Four areas of knowledge
  - Computers
  - Tasks
  - People
  - Graphic Design

Overview

- Problems
- Goals
- Motivation
- Context
- Models
- Principles

Problems

- Lack of consideration of user issues
- Hardware development (devices, speed, resolution, etc.)
- Conformance with earlier (poorer) software (qwerty)
- Feature-ism
- Matching interface to task
- Lack of understanding of the user
- Poor layout

Problems (2)

The following are windows taken from various HCIs. What problems do you see?
Goals

- Decrease users' time to learn
- Increase users' performance speed
- Decrease users' rate of errors
- Improve users' retention over time
- Improve users' "satisfaction"
Motivation

- Life-critical systems
- Industrial/Commercial use
  - An early study at ATT indicated that a 0.8 second reduction in the 15 second average time per call would save the company $40 million per year.
- Home and entertainment applications
- Exploratory systems
- Cooperative systems

Context: Systems Engineering

- Problem Identification
- Analysis
- Design
  - Among other activities at this step is task allocation (people, hardware, software, machines).
- Implementation
- Testing
- Maintenance

Models

- Norman’s model of man-device interaction
- Foley & van Dam, Four levels of interaction
- Card, Moran, & Newel, GOMS
- Card, Moran, & Newel, Keystroke
- Object Model
- Theatrical Model

Norman’s model of man-device interaction

Goal

Intention  Evaluation

Action Sequence  Interpretation

Execution  Perception

Device

Foley & van Dam, Four levels of interaction

- Conceptual Level
  - user’s mental model of the system
- Semantic Level
  - meanings conveyed by commands and display
- Syntactic Level
  - defines how units (words) are assembled into meaning sequences
- Lexical Level
  - devices and mechanisms by which the user specifies action

Card, Moran, & Newel, GOMS

- Goals and subgoals
  - tasks the user wants to accomplish
- Operators
  - elementary perceptual, motor, or cognitive acts
- Methods
  - scripts or procedures by which the user accomplishes goals
- Selection rules
  - specify controls structures for choosing among several methods
Object Model

- An object is an entity represented by a collection of data that is manipulated using a collection of operations.
- Examples
  - Document
  - Paragraph

Theatrical Model

- The “stage” is all the user sees.
- The production doesn’t “work” if the audience sees what is going on backstage.
- The “reality” is the imaginary world on the stage (the representation).
- Unlike most theatre, the users are active participants.

Theatrical Model Characteristics

- The stage is a virtual world, populated by agents (human and computer generated) and other elements in the representational context (windows, desktops, etc.).
- Technical magic is produced backstage.
- Allows representation of parallel activity.

Principles (Norman’s Golden Rules)

- Good Conceptual Model
- Visibility
- Mappings
- Feedback

Principles (Shneiderman’s HCI Principles)

- Recognize diversity
  - usage profiles
    - Novice user
    - Knowledgeable intermittent user
    - Expert frequent user
Principles (Shneiderman’s HCI Principles)

- Shneiderman’s 8 Golden Rules
  - Be consistent
  - Enable frequent users to use shortcuts
  - Offer informative feedback
  - Design dialogs to yield closure
  - Offer error prevention and simple error handling
  - Permit easy reversal of actions
  - Support user locus of control
  - Reduce short-term memory load

Homework for January 24

- Describe the worst human/device interface you have ever seen.
  - Describe the feature and why it is so bad.
  - Why the designer did it this way?
- Do this in one-half to one page of text/illustration