First day quiz

- You are on a team tasked with developing new order tracking and management software for Amazon.com.
- Your goal is to deliver a high quality piece of software.
- What are the most important steps you will take?
- What are the most important principles you will follow?

Did anyone say...

- Talk to the end-users?
- Develop rough prototypes?
- Evaluate for usability?
- Design a consistent user interface?
- Provide useful feedback to users?
- Help users recover from errors?

If not, you get this...
...or this...

Where is your company's headquarters located?

(Select one answer.)

- Yes
- No
- Unsure/Don't know

...or these!

Unlike other CS classes...

- No equations (well, maybe one)
- No proofs
- No algorithms
- Multi-disciplinary
  - psychology
  - graphic design
  - industrial engineering

Definitions

- HCI: human-computer interaction
- human: characteristics of body, perception, cognition, demographics, etc. affect interaction
- computer: any interactive system with digital computation components
- interaction: communication or dialogue or collaboration between two parties
Interactive System
- interactive systems support human activity
- any device whose action follows from the actions of its user and whose action is at least partly apparent to the user
- 2-way communication

User Interface
- The visible/perceptible parts of an interactive system through which the user and system communicate

Human Factors
- human factors generally refers to:
  - psychology of system users (e.g. vision)
  - physiology of system users (e.g. ergonomics)
- this class is really introduction to HCI

Why should you study HCI?
- Myth: Interaction/UI design is the easiest part of a system, and should be done last
- Myth: Programming is the most important skill for system developers
- We want to support human activity, so design with users in mind! (UCSD)
- Technology will not be useful unless it is also usable
- Usable systems lead to more productivity and satisfaction
What are the criteria for success?

- SW Eng. goals are still important:
  - robustness
  - maintainability
  - cost
- HCI goal – usability:
  - user performance (speed, errors)
  - ease of learning, ease of use
  - user satisfaction, physical comfort

Why Usability Engineering?

- Waterfall models of development do not work
  - Too many unknowns (Brooks: No Silver Bullet)
- Need an iterative discovery-oriented process
  - But at the same time need to manage it
- Demands well-defined process with metrics
  - Specifying usability goals as objectives
  - Assessing and redesigning to meet these objectives
  - Manage usability as a quality characteristic, much like modularity or nonfunctional requirements

How Should We Measure Usability?

- Bottom line is whether the users got what they wanted, i.e., is the client satisfied
- Practically speaking, need to break this down so that we can operationalize our objectives
- Our textbook definition:
  The quality of an interactive computer system with respect to ease of learning, ease of use, and user satisfaction
  - Can the users do what they want to do in a comfortable and pleasant fashion?

History and Future of HCI

- Much of the class will consider systems that are in use today
- Class projects may speculate on emerging (but feasible) paradigms
- To understand present and future, start with the emergence of HCI
History of HCI

- Early days of computation (pre-WWII):
  - Computer as number-cruncher, black box
  - Batch processing of jobs; lack of interactivity
  - Displays almost non-existent

History of HCI (cont.)

- Vannevar Bush, 1945
  "As We May Think"
  - Vision of post-war activities, Memex
  - “…when one of these items is in view, the other can be instantly recalled merely by tapping a button”

History of HCI (cont.)

- Douglas Engelbart, 1962
  "Augmenting Human Intellect: A Conceptual Framework"
  - In 1968, workstation with a mouse, links across documents, chording keyboard

History of HCI (cont.)

- Sutherland (1965) - "Ultimate Display"
  - Data Visualization: "A display connected to a digital computer...is a looking glass into a mathematical wonderland."
  - Body Tracking: "The computer can easily sense the positions of almost any of our body muscles."
  - Realistic environments: "A chair display in such a room would be good enough to sit in. Handcuffs displayed in such a room would be confining, and a bullet displayed in such a room would be fatal."
  - Beyond reality: "There is no reason why the objects displayed by a computer have to follow ordinary rules of physical reality with which we are familiar."
History of HCI (cont.)

- Sutherland (1968) - "A head-mounted three-dimensional display"
- "Sword of Damocles"
- Precursor of modern VR, AR

- XEROX Alto and Star
  - Windows
  - Menus
  - Scrollbars
  - Pointing
  - Consistency

- Apple LISA and Mac
  - Inexpensive
  - High-quality graphics
  - 3rd party applications

History (and future) of HCI

- Large displays
- Small displays
- Peripheral displays
- Alternative I/O
- Ubiquitous computing
- Virtual environments
- Implants
- Speech recognition
- Multimedia
- Video conferencing
- Artificial intelligence
- Software agents
- Recommender systems
- ...

HCI people at VT

- Doug Bowman
- Dan Dunlap
- Roger Ehrich
- Joe Gabbard
- Denis Gracanin
- Steve Harrison
- Rex Hartson
- Deborah Hix
- Andrea Kavanaugh
- Brian Kleiner
- Scott McCrickard
- Chris North
- Manuel Pérez-Quiñones
- Francis Quek
- Tonya Smith-Jackson
- Deborah Tatar
- Woodrow Winchester