Fundamentals of Human-Computer Interaction

COMPUTER SCIENCE DEPARTMENT

Usable Security and Privacy

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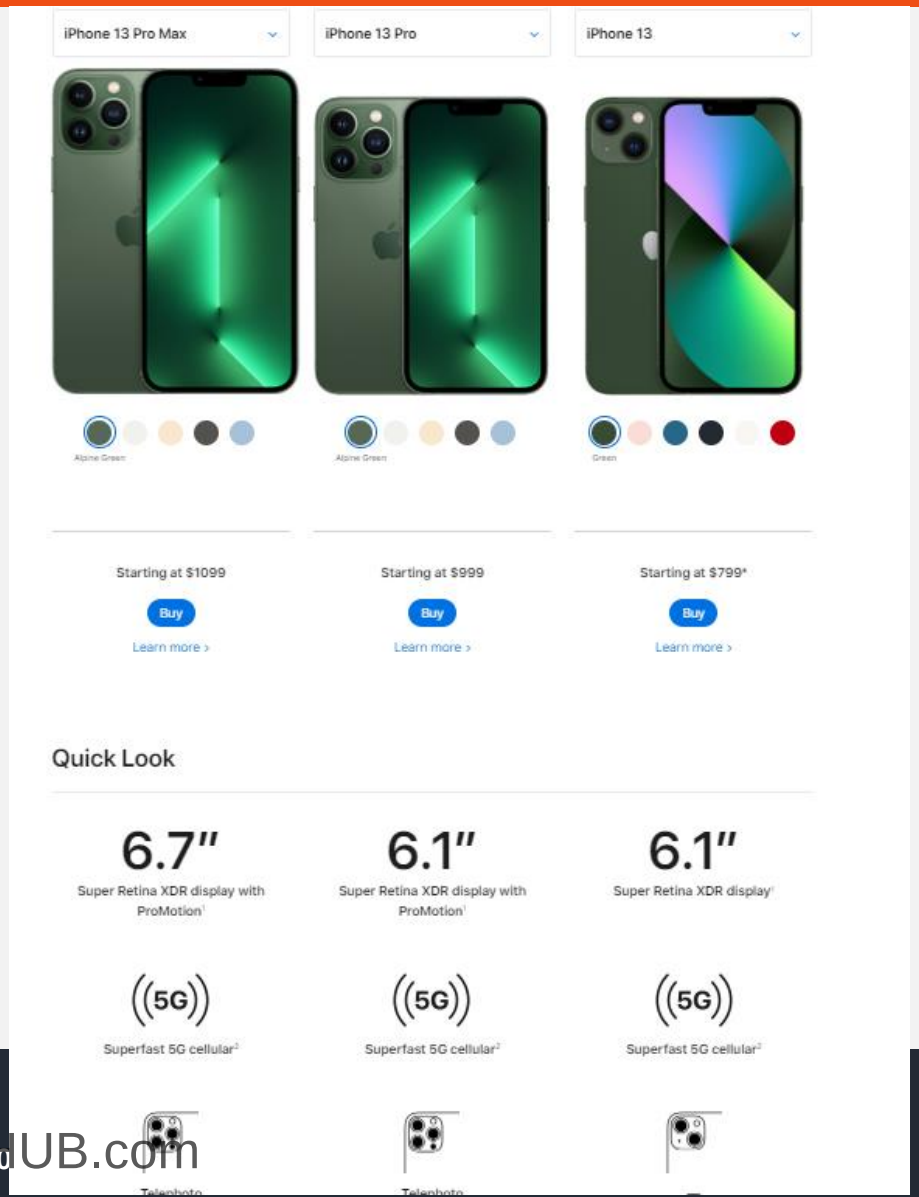
Good and Bad Design

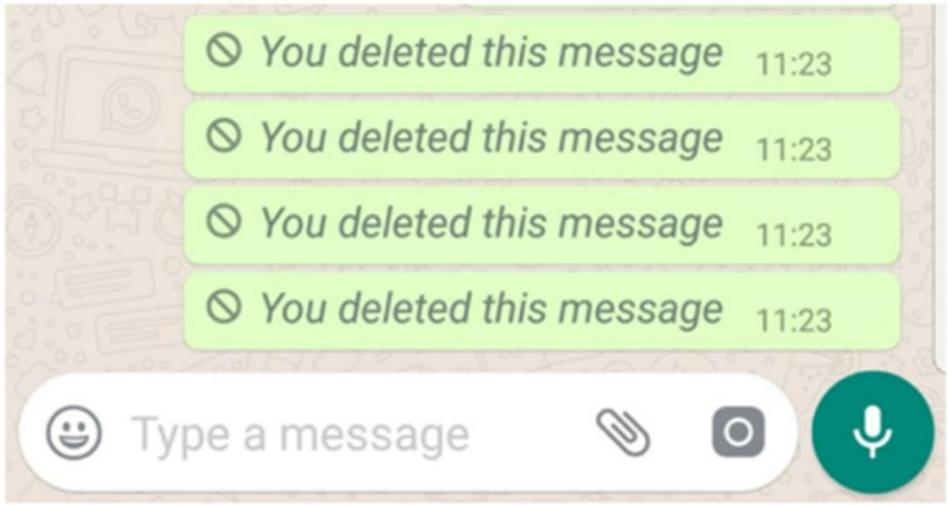


https://www.apple.com/iphone/compare/

Compare iPhone models

- Three items from a particular product category.
- Product images, along with their corresponding prices chosen by the users, are presented below each item.
- information is displayed in a logical sequence as the user scrolls down.

Good and Bad Design



Whatsapp Deleted Message Feature

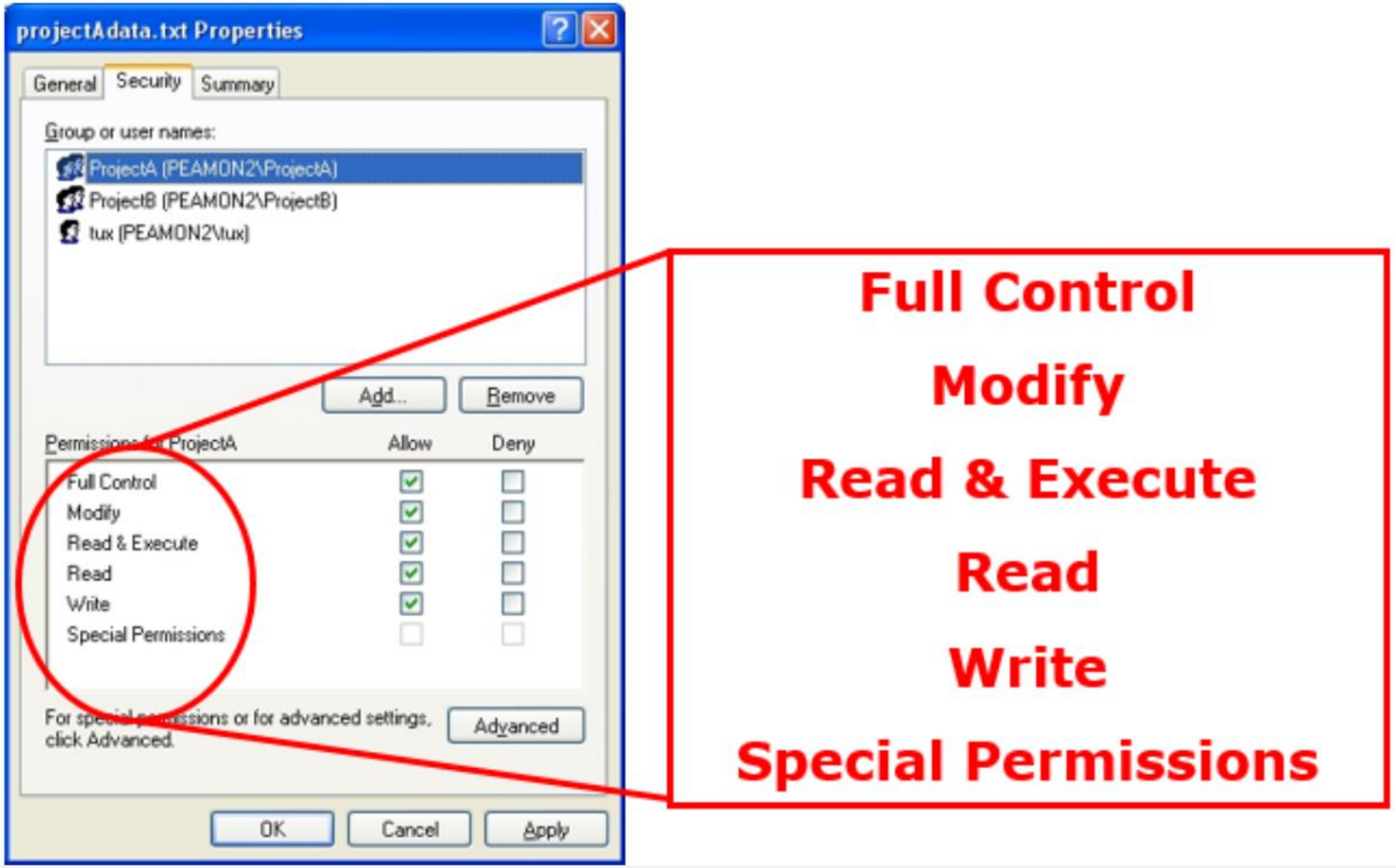
- You draft a personal message for your close friend and accidentally send it to somebody else.
- You want to delete the message and not let the person know.

- On WhatsApp, when you try to delete your message for everyone, it hides the content of the message but presents both sides with a “message deleted” message. Informing the recipient that the sender has deleted a message defeats the purpose of deleting it in the first place

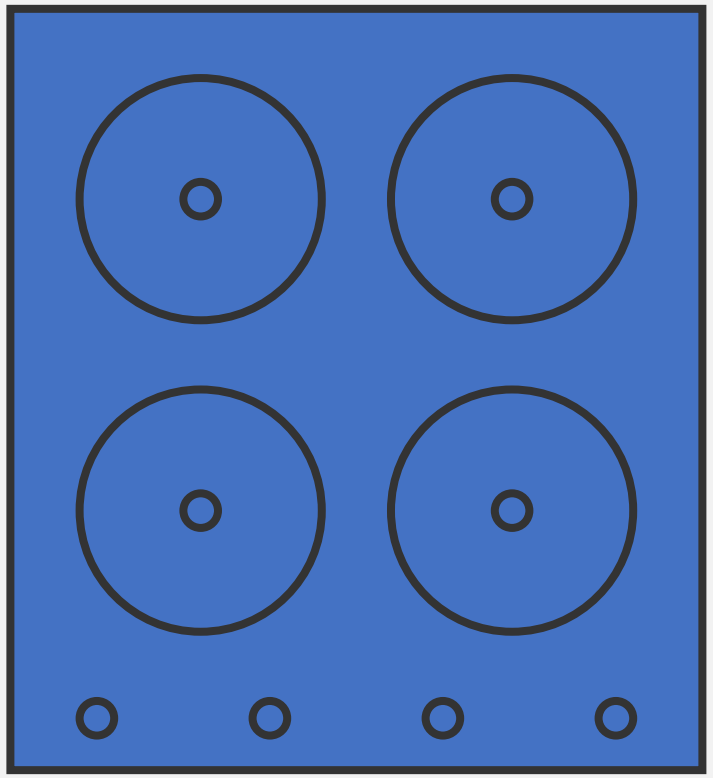
A feature that defeats its purpose is a bad feature.

Good and Bad Design

Good and Bad Design



Good and Bad Design



What human-computer interaction is?

- **Commonly abbreviated as HCI.**
- **Is the study of how people interact with technology.**

Average user working with

- A desktop or laptop computer
- Mobile devices (smart phones, and tablets)
- Sensors (a Fitbit)

Why is HCI Important?

- HCI is a very important field. When humans and computers fail to interact properly the results can be everything from annoying to deadly.

1. Bad user interfaces cost:
   - money (reduced profits)
     - WiFi Alliance estimates 30% of boxes are returned because people can't set them up correctly resulting in financial loss.
   - Reputation of organization
   - Time
   - Lives (see next slide)

Why is HCI Important?

- In extreme instances lives have been lost due to poor design. The "Therac-25 was a radiation therapy machine . . . It was involved with at least six known accidents between 1985 and 1987, in which patients were given massive overdoses of radiation, which were in some cases on the order of tens of thousands of rads. At least five patients died of the overdoses."

https://en.wikipedia.org/wiki/Therac-25

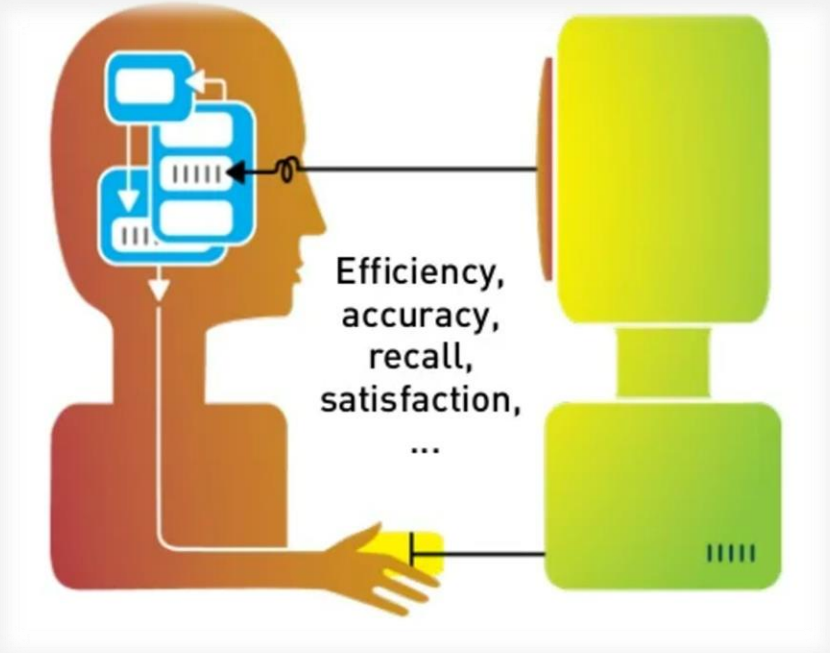
Why is HCI Important?

3. Privacy and Security
   - phishing scams
   - accidental disclosures (ex. location info, cookies)
   - difficulty diagnosing the situation (intrusion detection)
   - Intentionally circumventing security mechanisms

4. User interfaces hard to get right
   - people are unpredictable
   - intuition of designers often wrong
   - need good design methods

What human-computer interaction is?

- Understand the people, the technology, and the two fit together.



HCI: People side

- The end-user of a program
- Other people in the organization

- Understand both the **psychological** and **cognitive abilities** of users.
  - ➢ Avoid overtaxing people by requiring them to do things they cannot do cognitively or that are difficult.

HCI: Technology side

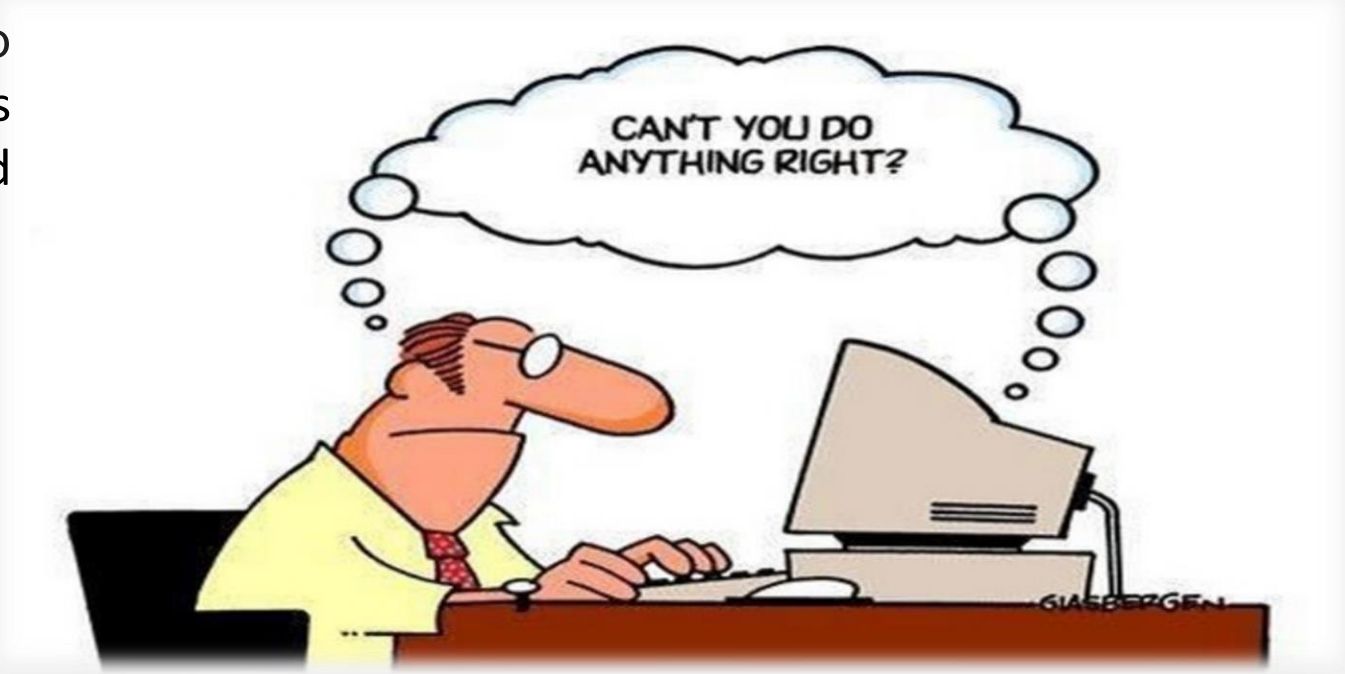
- The hardware and the software
  - Microwaves, mobile phones, cars

- Design and evaluation of technology.

HCI: People and Technology (Interaction)

- The user tells the computer what they want (input).
- The computer communicates results (output).

Ex: The human gives the computer input such as giving a cell phone the number to call. The computer returns output such as displaying that the person has been called and activating the speaker and microphone.



Our goal

Make sure that people aren't working any harder than necessary to use the technology that we've designed.

- Understand **users**, **tasks**, and **Context**.

Our goal

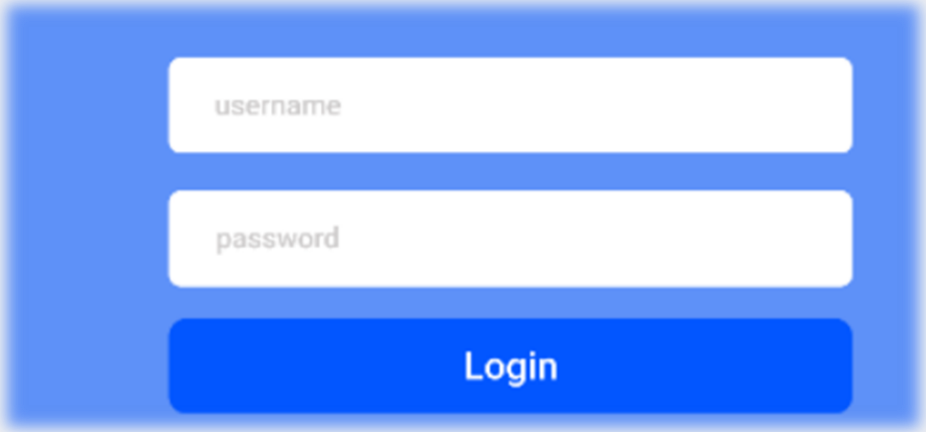
Users

Anyone from children up to elderly adults and it can be people working alone or working in teams

Our goal

The tasks

Things that people are trying to accomplish with the system, and can be something as easy as **logging in**, to something as complex **as analyzing a large data set**.



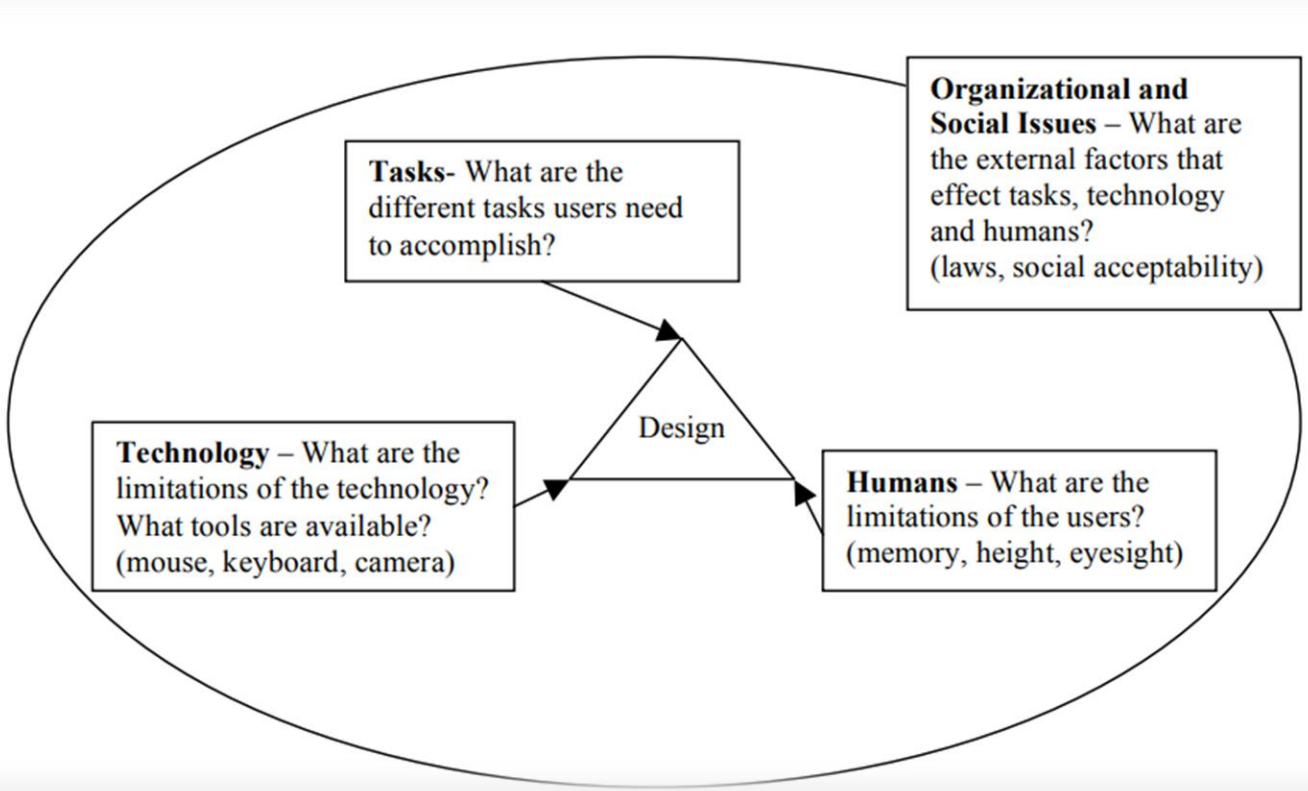
Our goal

The context

Even if we have the same users and same tasks, how they're performing those and where they're doing them can dramatically affect the systems we build.

For example if we have a soldier trying to secure a system, it makes a big difference if he's doing that in an office environment or if he's out working in the field.

HCI Approach to UI Design



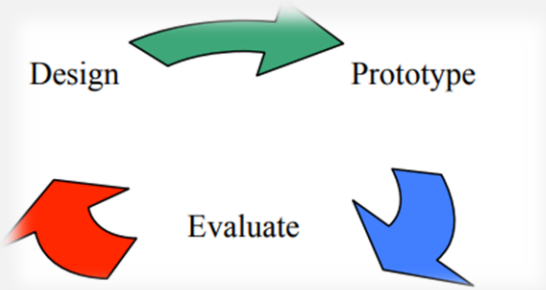
- HCI draws computer science, psychology, and design together
- Main focus is on the people using system

HCI Approach to UI Design

- **Tasks** : When looking at the design of a system we first look at **the tasks that need to be accomplished**.
- **Humans** : We also look at the humans themselves. **What are their limitations and abilities**? These limitations could be anything from **physical limitations such as eyesight or height to mental abilities** such as level of education or how many things they can remember at once.
- **Technology** : The limitations of technology also need to be considered. **What tools do we have available to us**. When designing for a PC we have a mouse and keyboard but when designing for an ATM or cell phone we have more limited tools.
- **Organizational and Social Issues :** Last but not least, we need to look at the organizational and social issues surrounding the system. Interfaces are not designed in isolation they are affected by such things as laws and social acceptability. For example users may not use security software because it makes them look paranoid.

User Interfaces

- Part of software program that allows
  - ➢user to interact with computer
  - ➢user to carry out their task
- HCI = design, prototyping, evaluation, & implementation of user interfaces (UIs)



The purpose of this slide is to introduce the chapter that discusses Usability design.

References

- Prof. Lorrie Cranor's lecture notes