Human Computer Interaction

Lecture 2:
Goals and a Brief History of HCI

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The Goals of HCI

The goals of HCI are to produce usable and safe systems, as well as functional systems. In order to produce computer systems with good usability, developers must attempt to:

- understand the factors that determine how people use technology
- develop tools and techniques to enable building suitable systems
- achieve efficient, effective, and safe interaction
- put people first

Underlying the whole theme of HCI is the belief that people using a computer system should come first. Their needs, capabilities and preferences for conducting various tasks should direct developers in the way that they design systems. People should not have to change the way that they use a system in order to fit in with it. Instead, the system should be designed to match their requirements.

User Centric Design

- In order to have a user centric product, it is necessary to take care of four aspects of the design.
  - Design **Elements** that are acceptable to the users.
  - Design **Layout** that meet users expections.
  - Help user **perceive** the system state.
  - Design **Interaction** that fulfills need of the users, by taking them to the desird " System State"

Design Issues

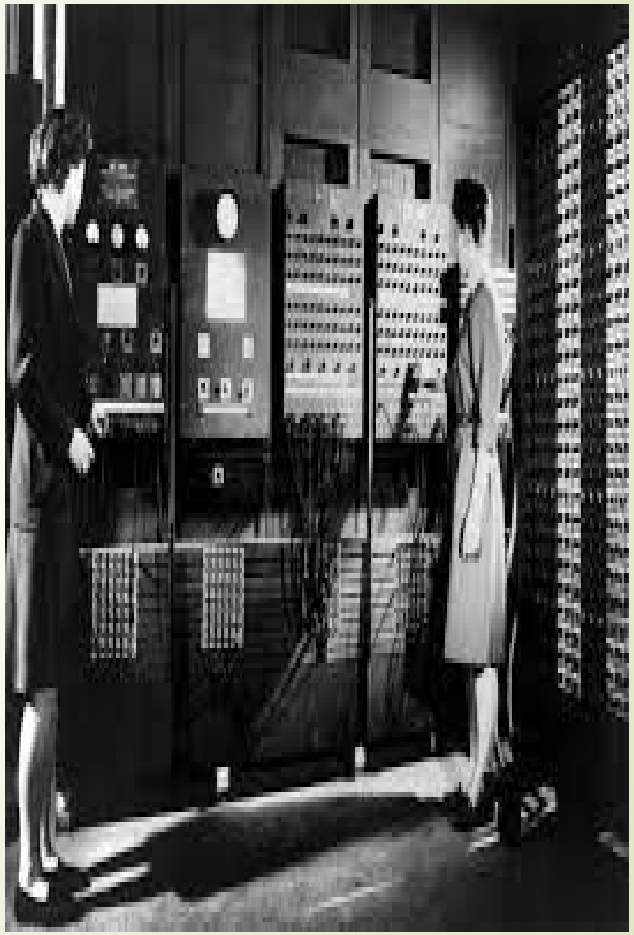
- Four issues to be consider while designing a product
  - Centrality of Human Factor
  - Interdisciplinary nature
  - Incorporating humans into design
  - Saving design time & effort through model based design.

How HCI Evolved

- From the early computers which performed batch processing, we now have come to the user-centered design, the hallmark of HCI
- There were several milestones along the way, which are mentioned in the subsequent slides

Evolution of HCI: Major Milestones

- Early computer (e.g. ENIAC, 1946)
  - Improvement in H/W technology (vacuum tube → transistor → IC) implied massive increase in computing power
  - People started to think about "how to use this power by equivalent explosion of ideas", which leads to the idea of human centered computing (J. C. R. Licklider)

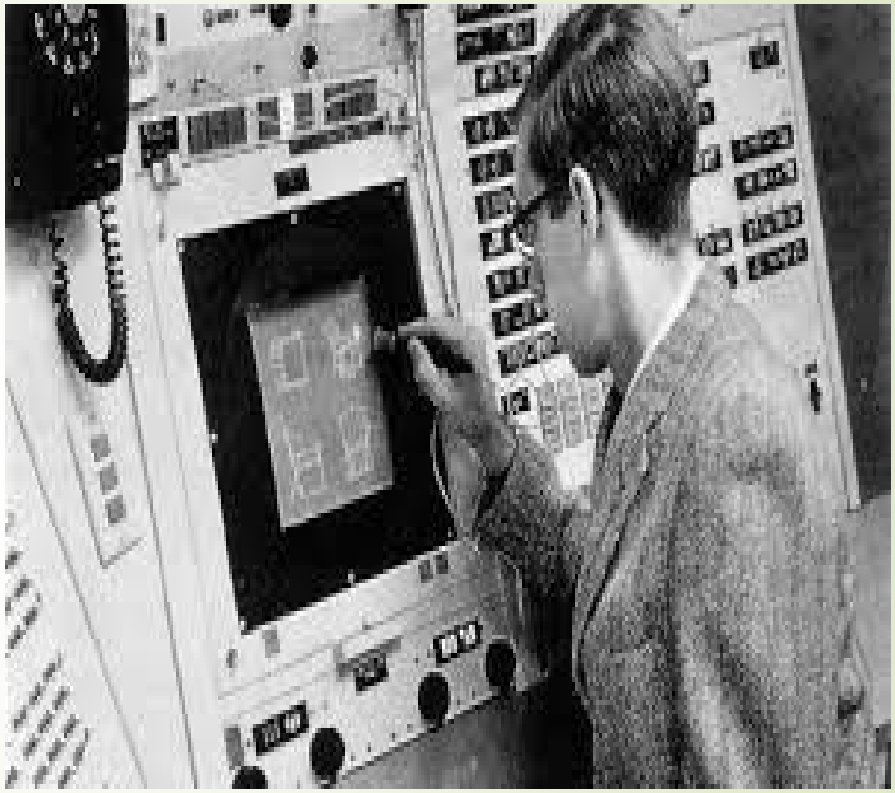


Evolution of HCI: Major Milestones

- By mid 1950's, researchers realized the need for VDU
  - Earliest application that used VDU was SAGE (semi automatic ground environment) – an air defense system of the USA air force

Evolution of HCI: Major Milestones

- The development of the Sketchpad by Ivan Sutherland (1962)
  - People started to realize that computer can be used for more than data processing (computer can be made to use more human language rather than the opposite)



Evolution of HCI: Major Milestones

- Douglas Engelbart, in his article " A conceptual framework for augmentation of man's intellect" (1963), introduced the idea of programming toolkits
  - "toolkit" concept: larger systems can be created from composition of small, well understood components

Evolution of HCI: Major Milestones

- Their group Augmentation Research Center at the SRI was responsible for many of the interaction techniques and devices that we now-a-days take for granted
  - Introduced concept of word processor, mouse
  - Designed NLS by Engelbert (oNLine System) - 1968

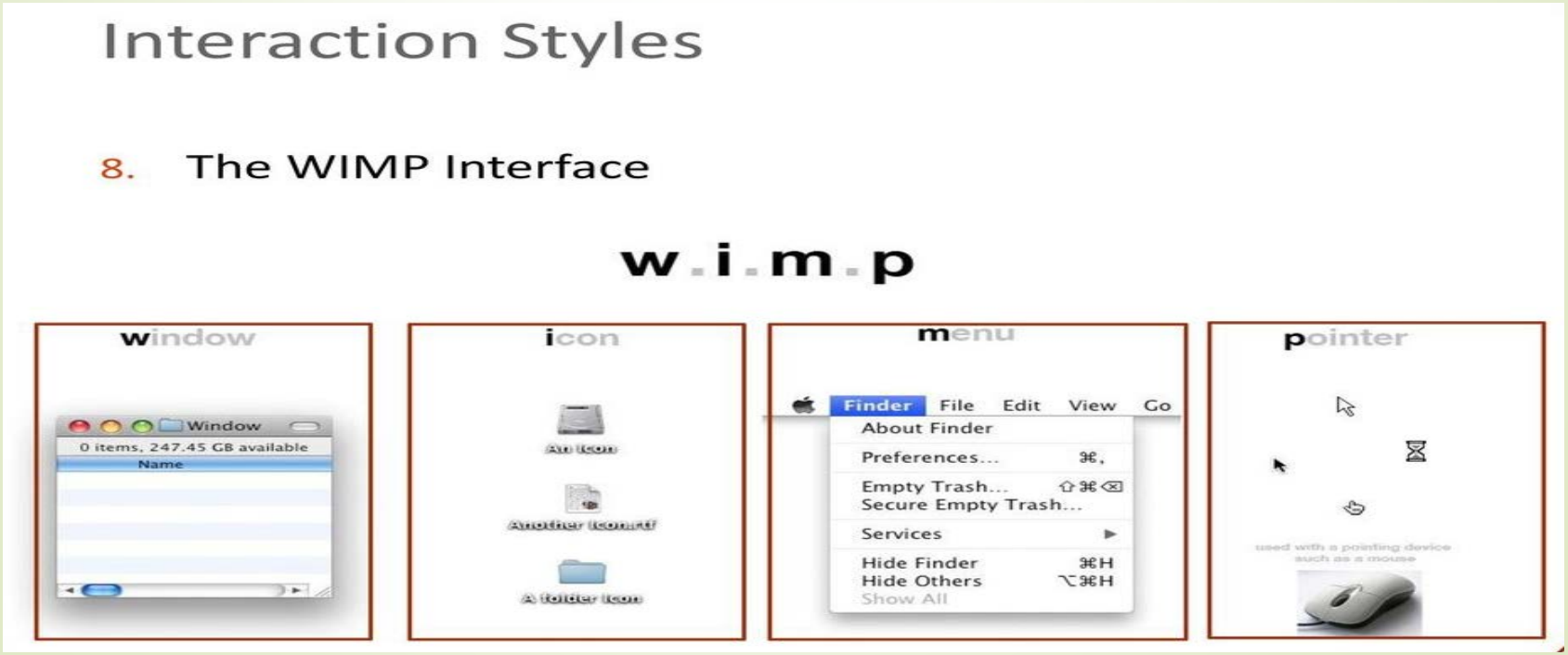
Evolution of HCI: Major Milestones

- The idea of personal computer
  - Allan Kay (1970's) thought of Dynabook – influenced by Engelbart as well as Seymour Papert's LOGO
  - Developed "smalltalk" (a visually based programming environment) at Xerox PARC

Figure 26.2. Mock-up of a future Dynabook.

Evolution of HCI: Major Milestones

- Windows and WIMP interfaces
  - Humans are able to think about more than one thing at a time
    - In accomplishing some tasks, they frequently interrupt their current train of thought and switch to some other piece of work



Evolution of HCI: Major Milestones

- Windows and WIMP interfaces
  - Sequential interaction to complete task is not suitable for this behavior
  - WINDOW system and WIMP interaction developed to take care of this
    - 8010 star information system – Xerox, 1981
    - Many common ideas with NLS and Xerox PARC alto

Evolution of HCI: Major Milestones

- The idea of *metaphor* (i.e., representing abstract actions/objects in terms of known artifacts)
  - Xerox star and alto were the first systems to use the concept of metaphors
  - Use of metaphor increases *affordance* which leads to *naturalness* of the interface.

Evolution of HCI: Major Milestones

- Direct Manipulation
  - Ben Shneiderman coined the term in 1982
  - First successful use of the idea in Apple Mac PC (1984)
  - Common GUI operations (move, drag etc)
    - Reduces the chances for syntactic errors, learning for command line interfaces
  - WYSIWYG (What You See Is What You Get)

Evolution of HCI: Major Milestones

- Hypertext
  - The idea was first articulated by Vannevar Bush (1945) in ”As we may think”
    - The Memex system
  - Ted Nelson coined the term hypertext (mid 1960’s) to denote the non-linear structure of text (in the context of reading)
    - Related terms: hypermedia (1980’s)/multimedia

Evolution of HCI: Major Milestones

- Multimodality (late 1980's)
  - Relies on multiple human communication channel simultaneously for input and output

    Multimodality refers to the interplay between different representational modes, for instance, between images and written/spoken word. Multimodal representations mediate the sociocultural ways in which these modes are combined in the communication process

Evolution of HCI: Major Milestones

- Computer supported cooperative work (CSCW)- 1990's
- **Computer-supported cooperative work** (CSCW) consists of software tools and technology that **supports** a group of individuals **working** on projects at different sites. It is based on the principle of group coordination and collaborative activities **supported** through **computer** systems.
  - Computer networks in 1960's
  - Society/sociology comes into picture
  - Groupware (CSCW systems built to support users working in a group)
  - Computer mediated communication

Evolution of HCI: Major Milestones

- www
  - Tim Berners – Lee (CERN, 1989) was the inventor of the most popular application layer protocol (which we used synonymously with networks)
  - The year 1991 saw the first text based browser
  - The first graphical browser (Mosaic) came in 1993

Evolution of HCI: Major Milestones

- Ubiquitous computing – the most active research area in HCI now
  - The field originated from Mark Weiser's vision, Xerox PARC, late 1980's
  - Sensor based/context aware computing (1990's)
  - Also known as pervasive computing