HCI: Defined

- Human-computer interaction is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them.
HCI an Interdisciplinary Field

- **Computer science** - for ideas concerning how to design algorithms
- **Psychology** and related fields - for knowledge concerning the capabilities of human memory, motor skills, and perception; how people communicate with each other and work in groups; and social dynamics
- **Artificial intelligence** and related fields - for ideas concerning how to automate more work, or make computers that behave more like intelligent assistants
- **Computer graphics** - for ideas concerning how to output visual information
- **Design** - for example, graphic design of visual output, industrial design of mice and keyboards, etc.
Cognitive psychologists have concentrated on the learning of systems, the transfer of that learning, the mental representation of systems by humans, and human performance on such systems.

Deep Blue
History of HCI

- Stanford Research Laboratory
- Xerox PARC
- Macintosh
- Windows 3.1
- Windows 95
- Windows 97, 98, XP
- Windows Vista
Basic Interactions

- Direct Manipulation of graphical objects
- Icons
- Mouse
- Windows
Direct Manipulation of graphical objects

- visible objects on the screen are directly manipulated with a pointing device, was first demonstrated by Ivan Sutherland in Sketchpad, which was his 1963 MIT PhD thesis
ICONS

- Early system was AMBIT/G (implemented at MIT's Lincoln Labs, 1968, ARPA funded). It employed, among other interface techniques, iconic representations, gesture recognition, dynamic menus with items selected using a pointing device, selection of icons by pointing styles of interaction. David Canfield Smith coined the term "icons" in his 1975 Stanford PhD thesis
The Mouse

- The mouse was developed at Stanford Research Laboratory (now SRI) in 1965 as part of the NLS project (funding from ARPA, NASA, and Rome ADC) to be a cheap replacement for light-pens, which had been used at least since 1954. Many of the current uses of the mouse were demonstrated by Doug Engelbart as part of NLS in a movie created in 1968.

- The mouse was then made famous as a practical input device by Xerox PARC in the 1970's. It first appeared commercially as part of the Xerox Star (1981), the Three Rivers Computer Company's PERQ (1981), the Apple Lisa (1982), and Apple Macintosh (1984).
Windows

- Multiple tiled windows were demonstrated in Engelbart's NLS in 1968
- Early research at Stanford on systems like COPILOT (1974)] and at MIT with the EMACS text editor (1974) also demonstrated tiled windows
- Alan Kay proposed the idea of overlapping windows in his 1969 University of Utah PhD thesis [first appeared in 1974 in his Smalltalk system at Xerox PARC,
- Some of the first commercial uses of windows were on Lisp Machines Inc. (LMI) and Symbolics Lisp Machines (1979
- The Cedar Window Manager from Xerox PARC was the first major tiled window manager], followed soon by the Andrew window manager [32] by Carnegie Mellon University's Information Technology Center (1983, funded by IBM).
- The main commercial systems popularizing windows were the Xerox Star (1981), the Apple Lisa (1982), and most importantly the Apple Macintosh (1984).
- The early versions of the Star and Microsoft Windows were tiled, but eventually they supported overlapping windows like the Lisa and Macintosh. The X Window System, a current international standard, was developed at MIT in 1984.
Applications

- **Drawing programs**
  - William Newman's Markup (1975) was the first drawing program for Xerox PARC's Alto, followed shortly by Patrick Baudelaire's Draw which added handling of lines and curves.
  - The first computer painting program was probably Dick Shoup's "Superpaint" at PARC (1974-75).
  - Thousands of drawing programs
Text Editors

- TECO from MIT was an early screen-editor (1967) and EMACS developed from it in 1974.
- Xerox PARC's Bravo was the first WYSIWYG editor-formatter (1974).
- The first commercial WYSIWYG editors were the Star, Lisa Write and then MacWrite. For a survey of text editors
- WordPerfect, MS Word
Spreadsheet

- The initial spreadsheet was VisiCalc which was developed by Frankston and Bricklin for the Apple II while they were students at MIT and the Harvard Business School.
- The solver was based on a dependency-directed backtracking algorithm by Sussman and Stallman at the MIT AI Lab.
- LOTUS 1-2-3, EXCEL
Other Applications

- Hypertext
- Computer Aided Designs
- Video Games
- Gesture Recognition
- Multi media
- 3D
- Virtual Reality and Augmented Reality
Future of Computing

- Decreasing hardware costs leading to larger memories and faster systems.
- Miniaturization of hardware leading to portability.
- Reduction in power requirements leading to portability.
- New display technologies leading to the packaging of computational devices in new forms.
- Assimilation of computation into the environment (e.g., VCRs, microwave ovens, televisions).
- Specialized hardware leading to new functions (e.g., rapid text search).
- Increased development of network communication and distributed computing.
- Increasingly widespread use of computers, especially by people who are outside of the computing profession.
- Increasing innovation in input techniques (e.g., voice, gesture, pen), combined with lowering cost, leading to rapid computerization by people previously left out of the "computer revolution."
- Wider social concerns leading to improved access to computers by currently disadvantaged groups (e.g., young children, the physically/visually disabled, etc.).
Autonomic Computing

- Autonomic computing systems have the ability to manage themselves and dynamically adapt to change in accordance with business policies and objectives, enabling computers to identify and correct problems often before they are noticed by IT personnel.
- IBM is delivering Self-Managing Autonomic Technology solutions to help companies transform their IT infrastructures into more resilient, responsive, efficient, and secure systems that deliver significant value today.
Autonomic Computing

- Self Configuring
- Self Healing
- Self Optimizing