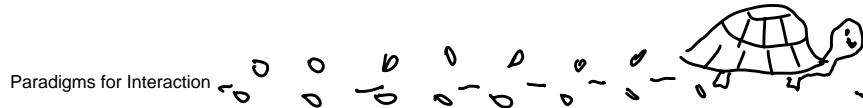


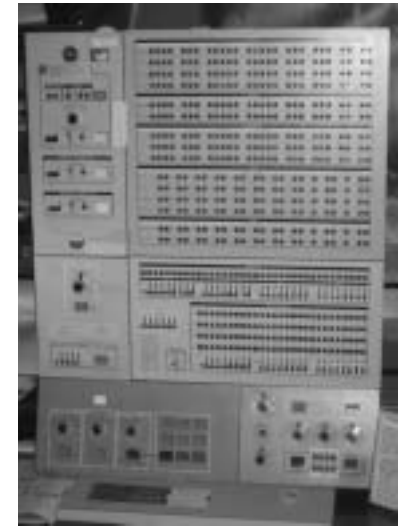
Paradigms for Interaction

- New computing technologies arrive, creating a new perception of the human-computer relationship
 - Batch processing -> Impersonal computing
 - Time sharing -> Interactive computing
 - Networking -> Community computing
 - Graphical displays -> Direct manipulation
 - Microprocessor -> Personal computing
 - WWW -> Global information
 - Ubiquitous computing -> ???

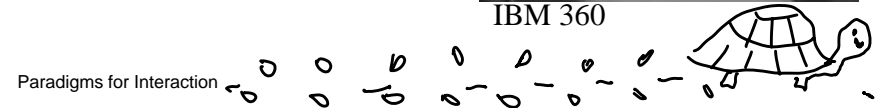


Time-sharing

- 1940s and 1950s – explosive technological growth
- 1960s – need to channel the power
- Single computer supporting multiple users



IBM 360



Video Display Units

- More suitable medium than paper
- 1962 – Sutherland's Sketchpad
- Computers for visualizing and manipulating data
- One person's contribution could drastically change the history of computing



Programming toolkits

- Engelbart at Stanford Research Institute
- 1963 – augmenting man's intellect
- 1968 NLS/Augment system demonstration
- The right programming toolkit provides building blocks to producing complex interactive systems
 - The tablet sdk makes developing for the tablet relatively easy



Personal computing

- 1970s – Papert's LOGO language for simple graphics programming by children
- A system is more powerful as it becomes easier to user
- Future of computing in small, powerful machines dedicated to the individual
- Kay at Xerox PARC
 - Smalltalk – first OO language – visual interface
 - the Dynabook as the ultimate personal computer (better than today's PDAs)

Paradigms for Interaction



Window systems and the WIMP interface

- Humans can pursue more than one task at a time
- Windows used for dialogue partitioning, to “change the topic”
- 1981 – Xerox Star first commercial windowing system
- Windows, icons, menus and pointers now familiar interaction mechanisms



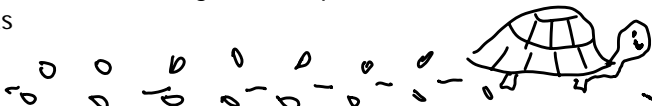
Paradigms for Interaction



Metaphor

- Relating computing to other real-world activity is effective teaching technique
- LOGO's - turtle dragging its tail
- File management on an office desktop
- Word processing as typing
- Financial analysis on spreadsheets
- Virtual reality – user inside the metaphor
- Paper - tablet
- Problems
 - Some tasks do not fit into a given metaphor
 - Cultural bias

Paradigms for Interaction

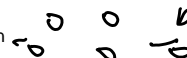


Direct(?) manipulation

- 1982 – Shneiderman describes appeal of graphically-based interaction
 - Visibility of objects
 - Incremental action and rapid feedback
 - Reversibility encourages exploration
 - Syntactic correctness of all actions
 - Replace language with action
- 1984 – Apple Macintosh
 - The model-world metaphor
 - What You See Is What You Get (WYSIWYG)



Paradigms for Interaction



More Direct Tablet

- Stylus direct onto output surface
- Inking
- Recognition



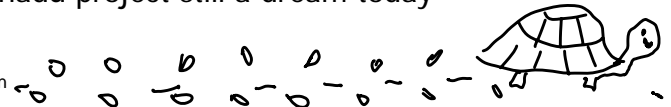
Paradigms for Interaction



Hypertext

- 1945 – Vannevar Bush and the memex
- Key to success in managing explosion of information
- Mid 1960s – Nelson describes hypertext as non-linear browsing structure
- Hypermedia and multimedia
- Nelson's Xanadu project still a dream today

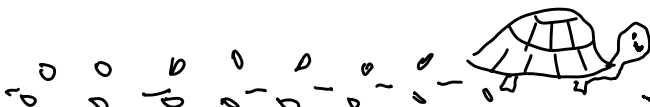
Paradigms for Interaction



Computer Supported Cooperative Work (CSCW)

- CSCW removes bias of single user / single computer system
- Can no longer neglect the social aspects
- Electronic mail is most prominent success

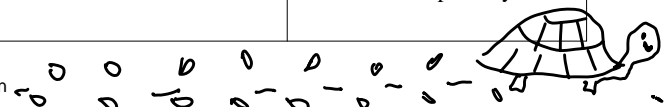
Paradigms for Interaction



Groupware Taxonomy

	Same place	Different place
Same time	<p>“Synchronous, co-located”</p> <ul style="list-style-type: none"> • Whiteboard • Lecture/tutorial • Meeting • Decision Support Systems 	<p>“Synchronous, distributed”</p> <ul style="list-style-type: none"> • ICQ/IRC chat • MS Netmeeting • (Internet) Phone • Video conferencing
Different time	<p>“Asynchronous, co-located”</p> <ul style="list-style-type: none"> • “Sticky notes”/annotations • Whiteboard, cabinet • Shared PC 	<p>“Asynchronous, distributed”</p> <ul style="list-style-type: none"> • Email, Newsgroups • ICQ message • Document repository

Paradigms for Interaction



The World Wide Web

- Hypertext, as originally realized, was a closed system
- Simple, universal protocols (e.g. HTTP) and mark-up languages (e.g. HTML) made publishing and accessing easy
- Critical mass of users lead to a complete transformation of our information economy
- Browser centric desktop



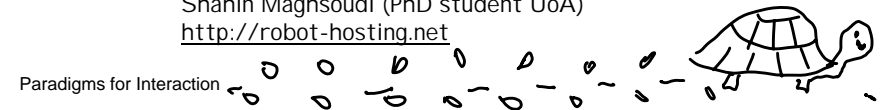
Agent-based Interfaces

- Original interfaces
- Commands given to computer
- Language-based
- Action based
- Agents - return to language by instilling proactivity and "intelligence" in command processor
- Avatars, natural language processing



Shahin Maghsoudi (PhD student UoA)

<http://robot-hosting.net>



Ubiquitous Computing

"The most profound technologies are those that disappear."
Mark Weiser, 1991

- Late 1980's: computer was very apparent
- How to make it disappear?
- Shrink and embed/distribute it in the physical world
- Design interactions that don't demand our intention



Sensor-based and Context-aware Interaction

- Humans are good at recognizing the "context" of a situation and reacting appropriately
- Automatically sensing physical phenomena (e.g., light, temp, location, identity) becoming easier
- How can we go from sensed physical measures to interactions that behave as if made "aware" of the surroundings?

