

Interfaces

(Rogers ch.6)

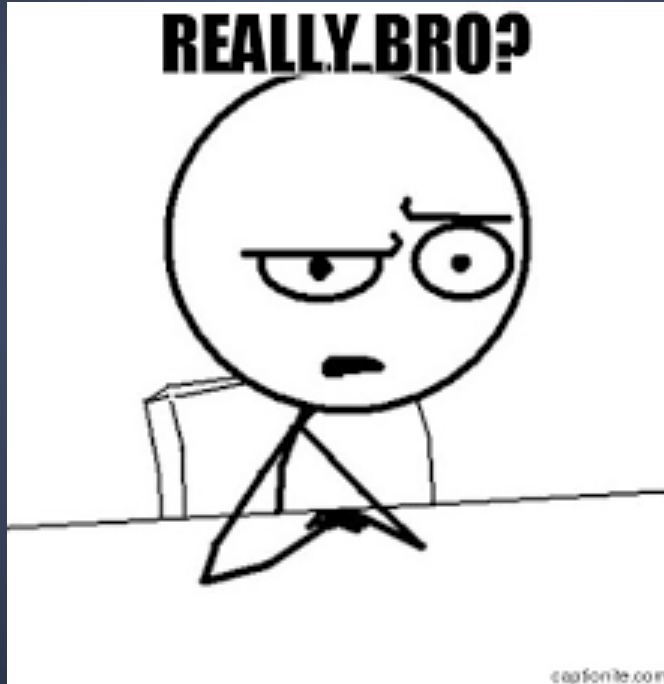
Andrea Piscitello

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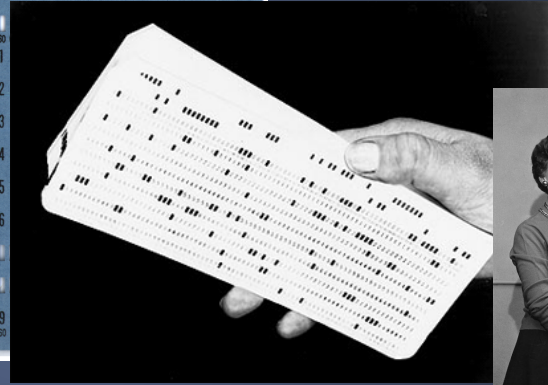
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User Interfaces



0 - Punched Cards



- Static I/O system
- Long time to produce
- Errors costs?

1 - Command Line Interface (CLI)

- First interactive interface
- Tool for experts
- Entails strong mnemonic abilities

```
Processes: 123 total, 3 running, 120 sleeping, 558 threads          08:36:09
Load avg: 1.76, 1.53, 1.49  CPU usage: 25.06% user, 22.93% sys, 55.62%idle
SharedLibs: 3908K resident, 5760K data, 0B linkedit.
MemRegions: 44714 total, 3368M resident, 77M private, 1118M shared.
PhysMem: 921M wired, 5288M active, 758M inactive, 6948M used, 1243M free.
VM: 238G vsize, 1034M framework vsize, 4797528(2) pageins, 0(0) pageouts.
Networks: packets: 581628/454M in, 462610/68M out.
Disks: 229509/3409M read, 418661/7924M written.
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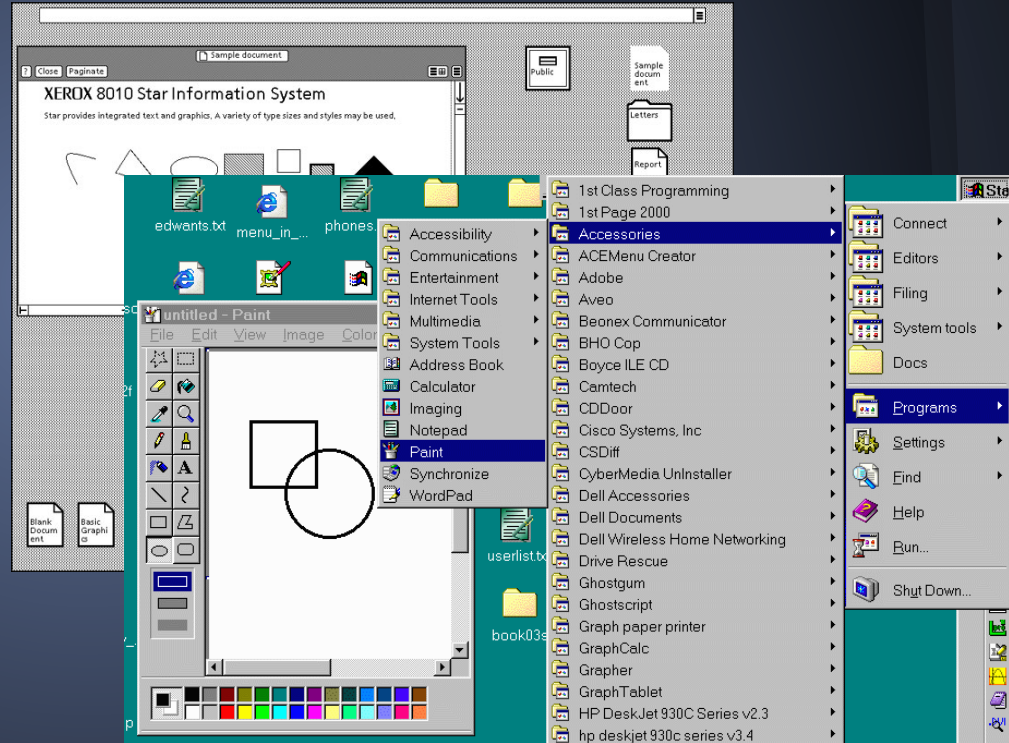
PID	COMMAND	XCPU	TIME	#TH	#WQ	#PDR	#HREG	RPRVT	RSHRD	RSIZE
1477	top	12.9	00:01.38	1/1	0	24	33	1428K+	244K	1998K+
1466	cvmsComp_i38	0.0	00:00.04	1	0	18	36	1116K	9528K	5760K
1463	bash	0.0	00:00.00	1	0	17	25	296K	856K	968K
1462	login	0.0	00:00.01	1	0	22	62	616K	3200K	2448K
1459	cvmsComp_x86	0.0	00:00.03	1	0	18	34	1592K	9528K	6220K
1456	Cathode	8077	00:10.88	5	2	127	267	28M+	92M+	65M+
1454	launchd	0.0	00:00.00	2	0	37	46	236K	428K	660K
1482	quicklookd	0.0	00:00.48	6	2	88	156	21M-	17M	58M-
1451	ocspd	0.0	00:00.01	2						
1450	mdworker	0.0	00:00.06	3						
1294	Google Chrom	0.3	00:42.07	4						
1267	DashboardCli	0.0	00:01.27	5						
1266	DashboardCli	0.0	00:02.39	5						
1192	Google Chrom	8.8	00:10.10	4						
1014	dd	0.0	00:00.00	1						

**OH YOU PREFER THE CMD
LINE**

**WHY DON'T YOU TELL US HOW
THE 80'S ARE TREATING YOU**

2 - Graphic User Interface (GUI)

- It unlocked computer for everyone: Personal Computers
- Windows
- Icons
- Menus
- Pointing devices

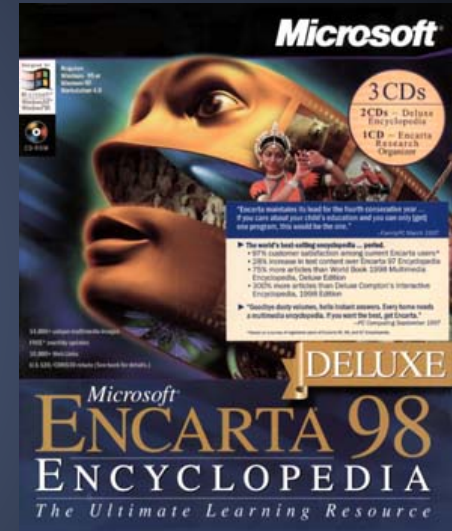


3 - Multimedia

Extensive use of multimedia contents:

- Pictures
- Sounds
- Videos

Simulations and demonstration for training, educational and entertainment purposes.



4 - Virtual Reality (VR)

“The illusion of participation in a synthetic environment rather than external observation of such an environment”

-Gigante, 1993

- Joysticks
- CAVE, IMAX, Head-mounted
- First Person Perspective, Videogames
- Physics laws



6. Websites

Primary Design Goals:

- Aesthetically pleasing
- Usable
- Easy to maintain



Websites contd.

- Became popular in 2000's.
- Technologies such as PHP, Dreamweaver, Flash, HTML5 made websites very accessible
- Key Points in designing a website from user point of view:
 - Where am I?
 - What's here?
 - Where do I go?
 - How do I go?



7. Consumer Electronics and Appliances

- Objects of everyday use
- Get things done in a short period of time
- Example:
 - Washing Machine
 - Mobile phone
 - MP3 player
 - Digital Clock



8. Mobile Devices

- Pervasive devices
- Variety of Uses:
 - Business tool to clinch deals
 - Relationship tool to speak to people
 - Entertainment tool etc.
- Handheld devices more common amongst people
 - Portable
 - Small in size
 - On - demand access



Mobile Devices contd.

“[the iPhone] has replaced part of my memory, storing phone numbers and addresses that I once would have taxed my brain with. It harbors my desires: I call up a memo with the names of my favorite dishes when I need to order at a local restaurant. I use it to calculate, when I need to figure out bills and tips. It is a tremendous resource in an argument, with Google ever present to help settle disputes ... I even daydream on the iPhone, idly calling up words and images when my concentration slips.(Chalmers, 2008)”



9. Speech

- Voice user interface
- A person talks with a system that has a spoken language application, like a train timetable, a travel planner, or a phone service.
- Early applications in 1990's - earned reputation for mishearing.
- Sophisticated technologies have developed to improve voice quality



Speech contd.

- New Technologies closely model real world behavior.
- Barge-in feature to interrupt voice interface system and proceed with response.



- Dialogues can be constructed based on user's requirement.
- More prone to error - leads to frustration

10. Pen



- Enable people to write, draw, select, and move objects at an interface using lightpens or styluses that capitalize on the well-honed drawing and writing skills
- Used to interact with tablets and large displays, instead of mouse or keyboard input, for selecting items and supporting freehand sketching
- Works by recognizing a special non-repeating dot pattern that is printed on the paper. The non-repeating nature of the pattern means that the pen is able to determine which page is being written on, and where on the page the pen is.

Pen



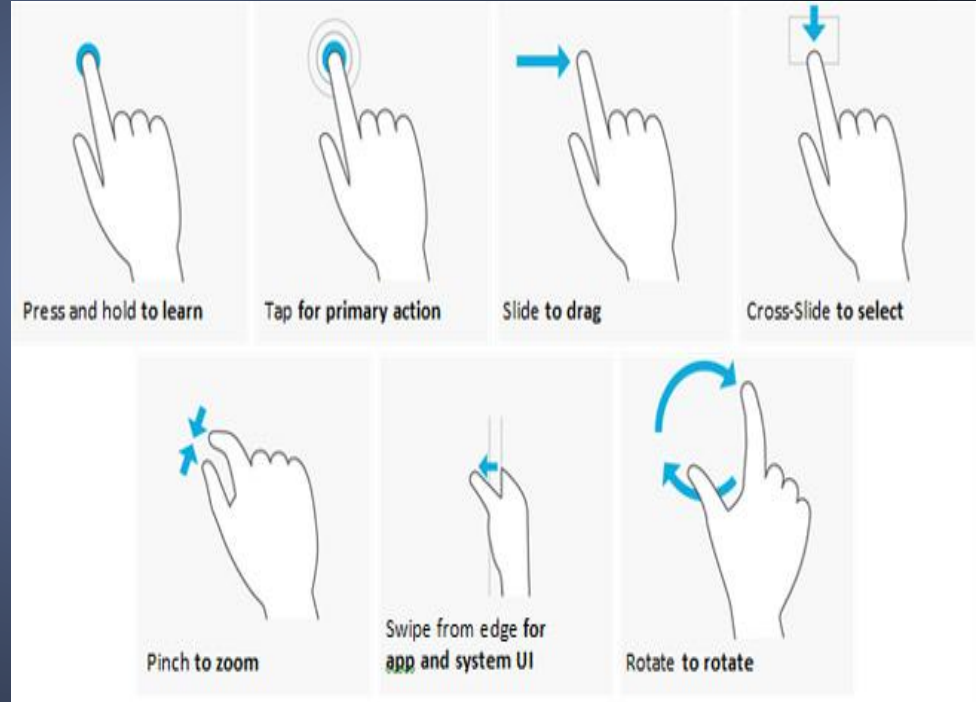
- Can transfer data that has been stored in the pen via Bluetooth or USB port to a PC.
- Allow users to quickly and easily annotate existing documents, such as spreadsheets, presentations, and diagrams
- Problems:
 - flow of interaction can be more easily interrupted
 - Users often have to move their arms long distances and sometimes have to ask others to get out of the way so they can select a command
 - Difficulty in producing different thickness for lines

11- Touch

Rely on Finger tips rather than mouse clicks

Tabletops and cell phones support a range of more dynamic finger tip actions such as:

- Swiping
- Flicking
- Pinching
- Pushing
- Tapping



Touch-Research and Design Issues

- Touch can be faster than scrolling and clicking.
- But, could be cumbersome, error prone and slower to type on a virtual keyboard.
- One solution: swipe across the virtual keyboard rather than tapping on it.
 - results in faster typing
 - reduces error rate



12-Air Based Gestures

- Sony's EyeToy: uses a motion sensitive camera plugged to its playstation
- Nintendo's Wii gaming console: introduced Wiimote which used accelerometers for gesture recognition
- Microsoft's XBox: similar to EyeToy with speech commands enabled



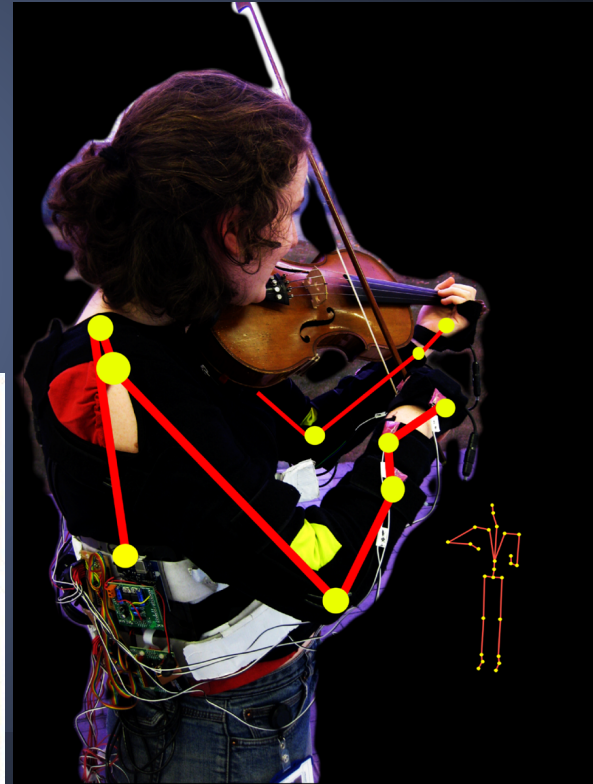
Research & Design issues

- Key issue: how computer recognises and delineates the gestures
- Differentiate a deliberate gesture and an unconscious gesture
- Another key issue: whether it is appropriate to hold the controller device or have controller free gestures



13-Haptic

- Applies vibrations & forces to a person using actuators embedded in clothings or devices
- Eg: MusicJacket, huggy pajama
- Issue: how much pressure?



14-Multimodal

- Uses multiple modalities such as: touch, sight, sound, speech
- Different inputs/outputs may be used simultaneously
- Eg: using voice commands and gestures to move across a virtual environment
- Issue: much harder to accomplish than single modality systems



15-Shareable

- Designed for more than one person to use
- Provide multiple input by collocated groups
- Egs: SmartBoards, tabletops like Microsoft Surface, DiamondTouch tabletop.



Shareable- as part of furniture



16. Tangible

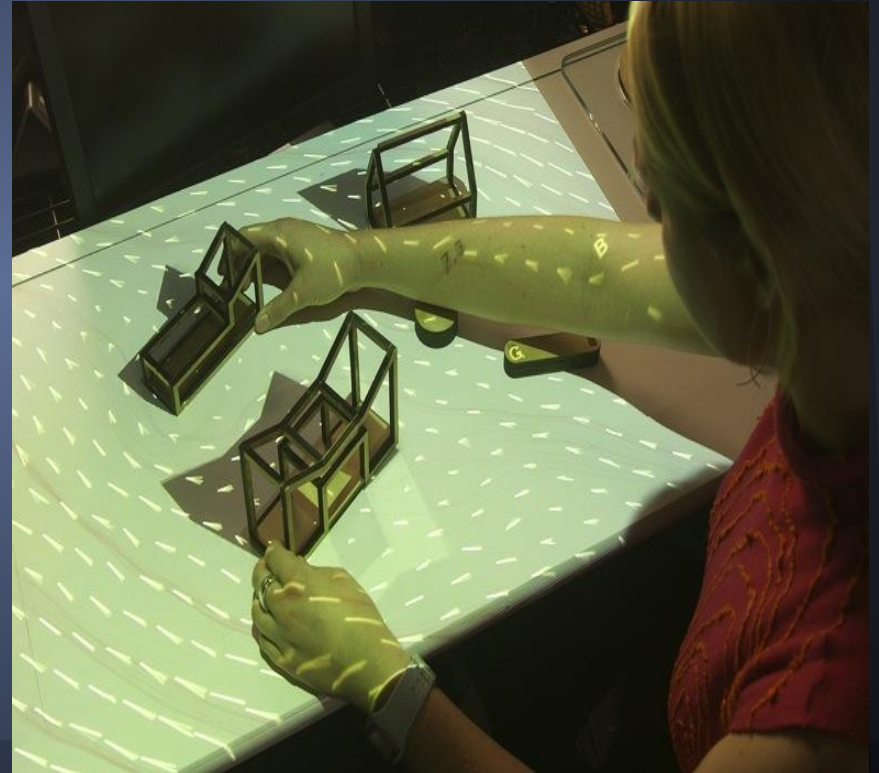
- Interface between physical world and digital model.
- Input-Human gesture
- Output-Digital Effects





Urban Planning (URP)

- Digital shadows are cast from physical models of buildings
- Used in combination with tokens for wind and shadow generating tools



17. Augmented and Mixed Reality

- Virtual representations superimposed on physical devices and objects.



Overlaid three dimensional model of a fetus on top of a mother's womb

HUD-used in airline cockpits to provide aid while flying in poor weather conditions



Larger than life installations

- Enter a 3D physical world.
- Giant model of the heart.
- Hunting of the Snark adventure game.



18. Wearable interface

History: Steve Mann donned head and eye cameras to record what he saw.



Examples

Google Glass

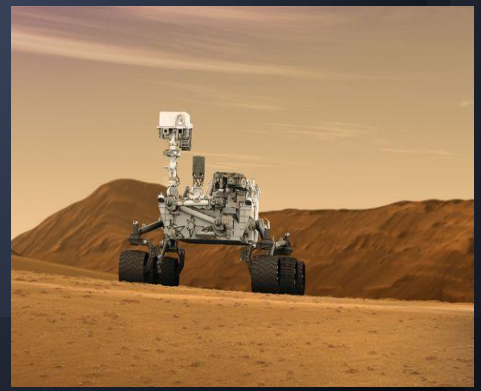


Sixth Sense



19. Robots

- Notable characters in sci-fi movies.
- manufacturing assembly lines
- search and rescue workers
- carry out missions in Mars



20. Brain-Computer interface

- Provide communication pathway between brain waves and external device
- BCI Helmets detect changes in neural functioning



Natural User Interfaces

- Interacting with the computer the same way as interacting with the physical world.
- Examples
 1. voice over feature
 2. Gesture based
 3. Touch based



Which Interface?

- Deciding which interface is better for which situation
- Factors:
 1. Reliability
 2. Social Acceptability
 3. Privacy
 4. Location