Computers

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CS-1Q HCI

Introduction

- Logical and physical I/O devices.

- Dialogue styles:
- text; forms; menus; graphics.

- WYSIWYG, Metaphor and Direct Manipulation.

- Breakdown.

Input Devices

- Several physical devices implement a logical device.

- Text input implemented by:

– keyboards, speech recognition, handwriting, gloves.

Input Devices

- Pointing implemented by:
- mice, touch-screens, tracker balls, eye-tracking.

- Cameras also used to provide input:
- automatic facial recognition using feature extraction.

- People are themselves becoming input devices:
- *context aware* systems track the user's location.

Output Devices

- **Printed output:**
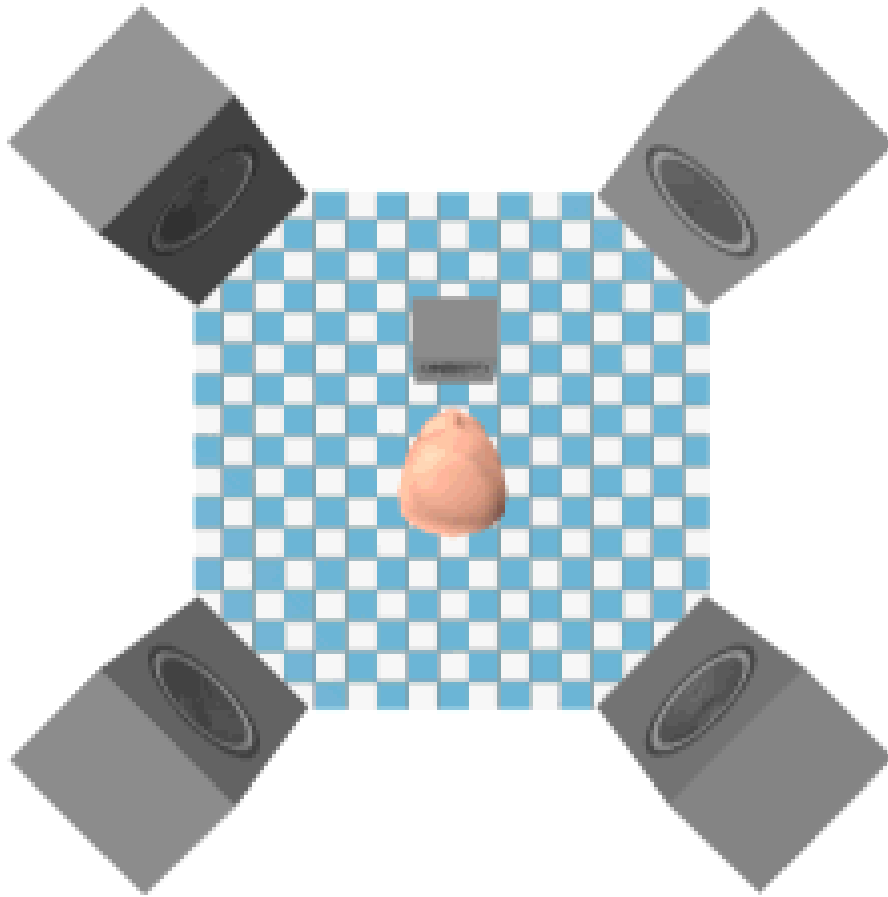- laser printers; ink-jets; impact and thermal printers.

- **Graphical output:**
- CRT or LCD displays; projectors.

Output Devices

- Audio output:
- stereo/surround speakers; headphones.

- Potential problems:
- earcons or auditory icons?
- pitch/timbre, relationship to music?

Virtual Reality

- Displays: helmet mounted or projection.

- Input devices: head and body tracking.

- Many usability issues:
- most systems lack force feedback;
- stresses on body holding a 3D position;
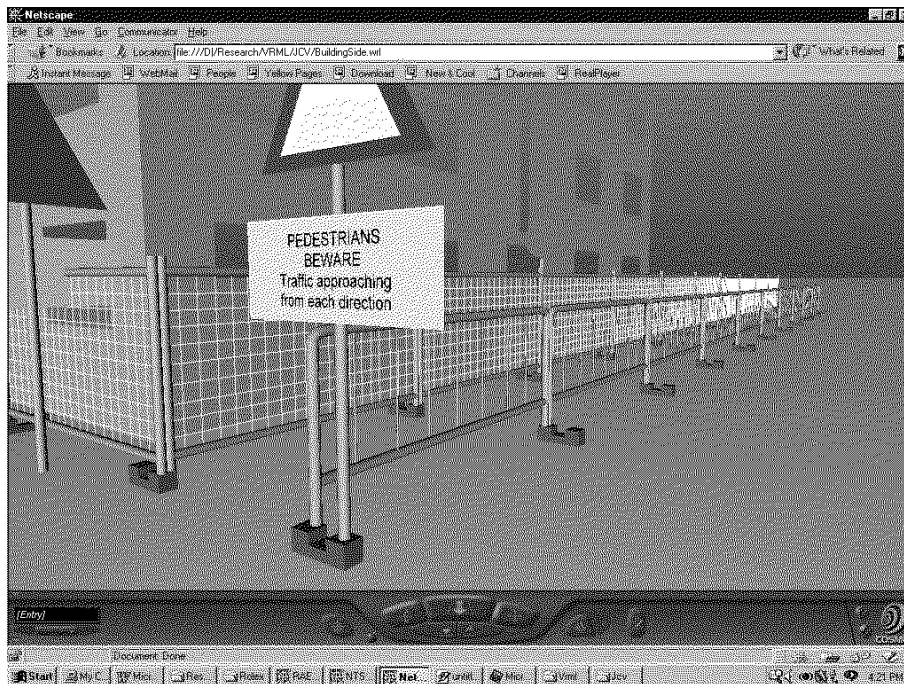- parallax problems and nausea.

Virtual Reality

- • Force feedback or *haptics*:
- joysticks; motor-driven feedback; The Bed;
- some of these are input and output devices.

- • Financial expense, relaibility etc.

Desktop Virtual Reality

- Technologies:
- QuicktimeVR;
- Virtual Reality Markup Language;
- DirectX and Spatial Audio.

- Many usability issues:
- 3D spatial positioning with 2D devices;
- navigation and way-finding is hard;
- animation of environments requires scripts;
- VRML 'face plant'.

Dialogue Styles

- *Dialogue styles*:
– manner in which information is presented and received.

- The most common are:
– Text (embedded systems, phones);
– Forms ($B2B$ systems, call centres);
– Menus (desktop systems, some web interfaces);
– Graphics (desktop, palmtops, the web).

- Most interfaces now mix all of these styles;
– but proportions vary depending on users.

Text

- *Fonts*:
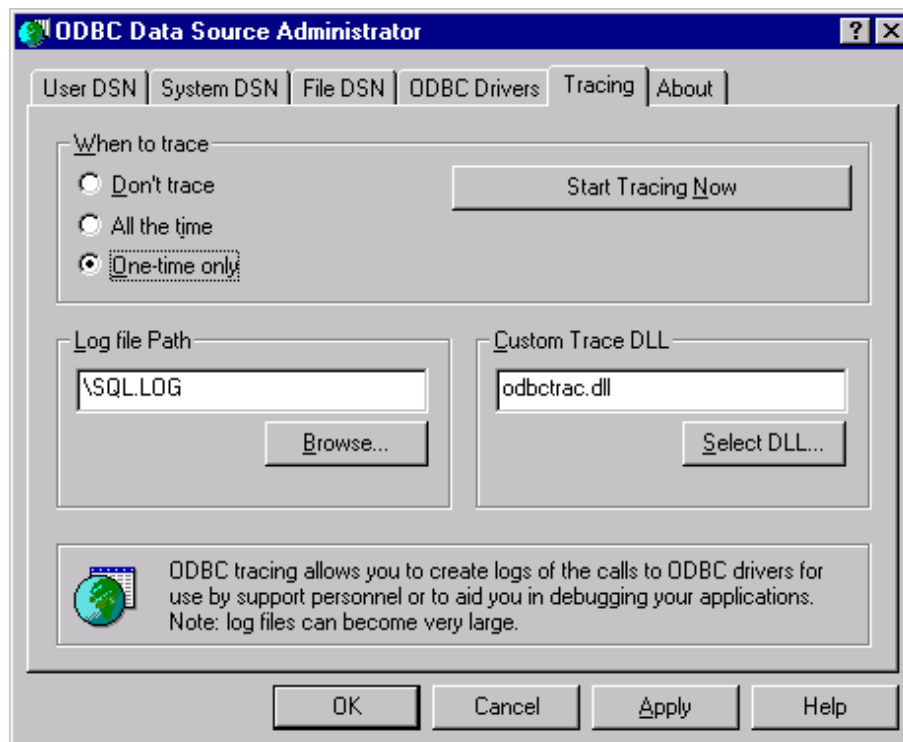- describe the shape of a character;
- serif vs sans-serif.

Elephant
Ascender line
Base line
Descender line

ELEPHANT

- *Point size*:
- determines size of a character;
- 1 point is a 72nd of an inch.

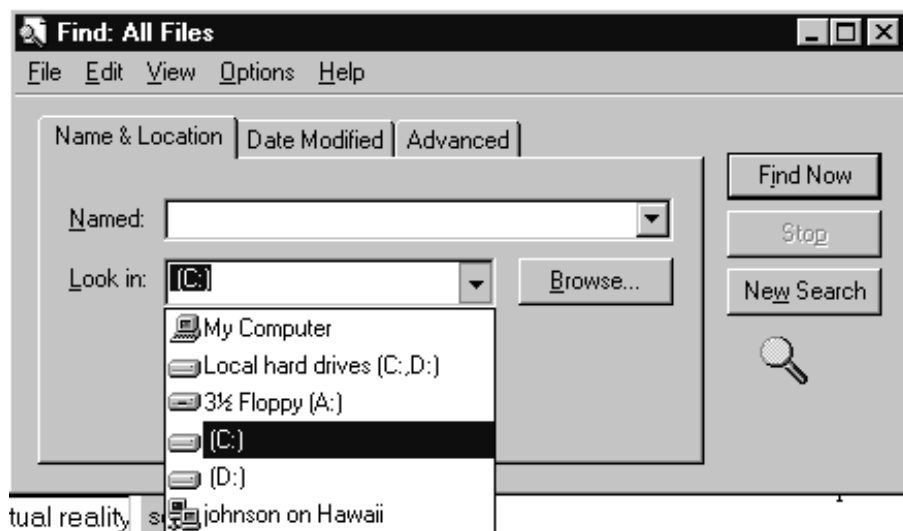- It's the RELATIVE not the absolute size.

Forms

- More advanced forms:
- automatic parsing, context-sensitive.

- Must provide title of the form.
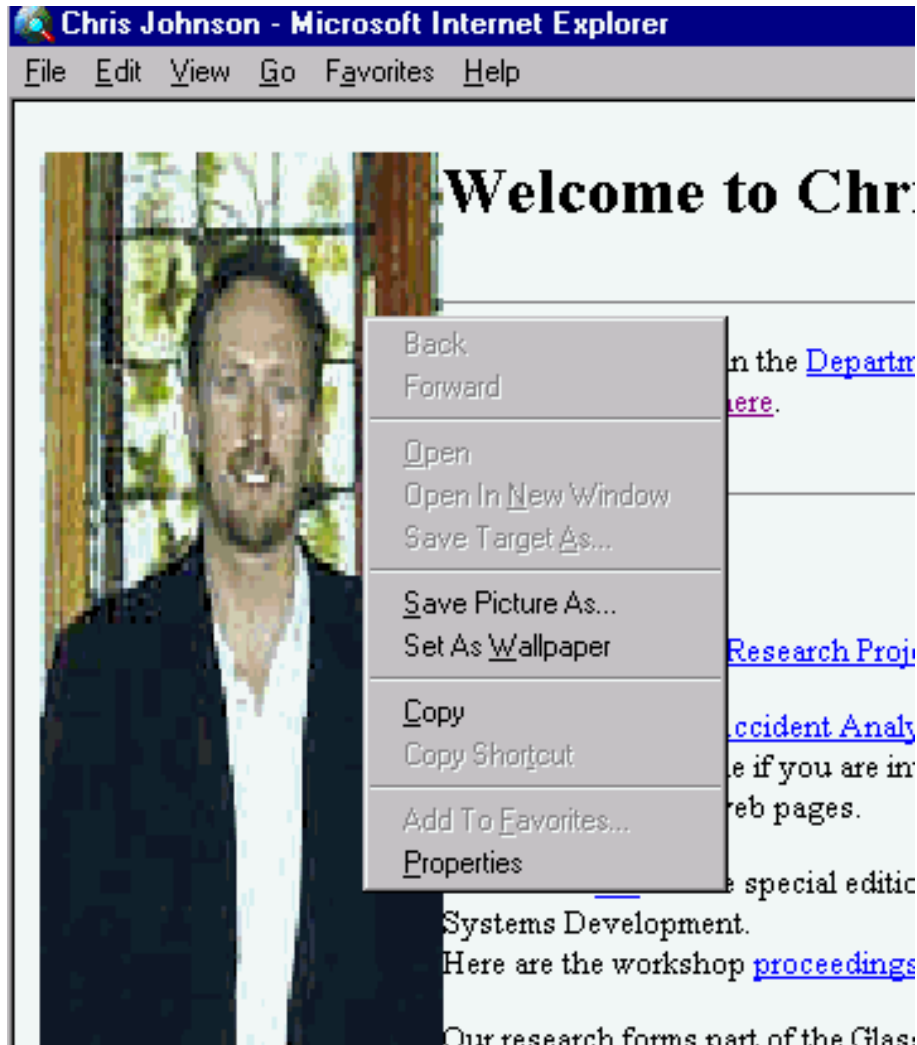
Forms

- Navigation:
- tab to move between fields;
- ENTER to submit the form.
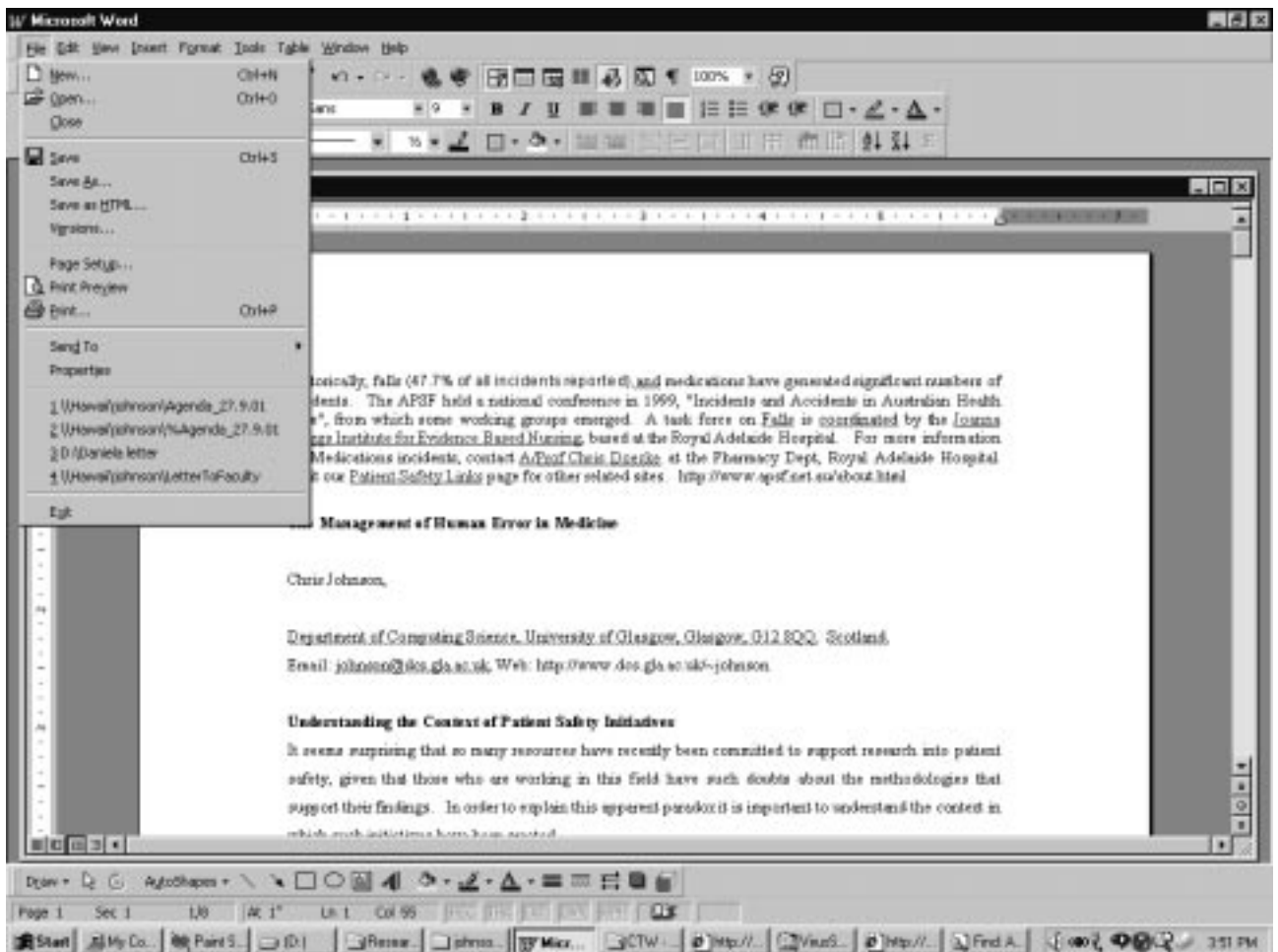

- Must provide a cancel option.

Menus

- Many different types:
- – hierarchical; pull down; tear-off; pop-up.

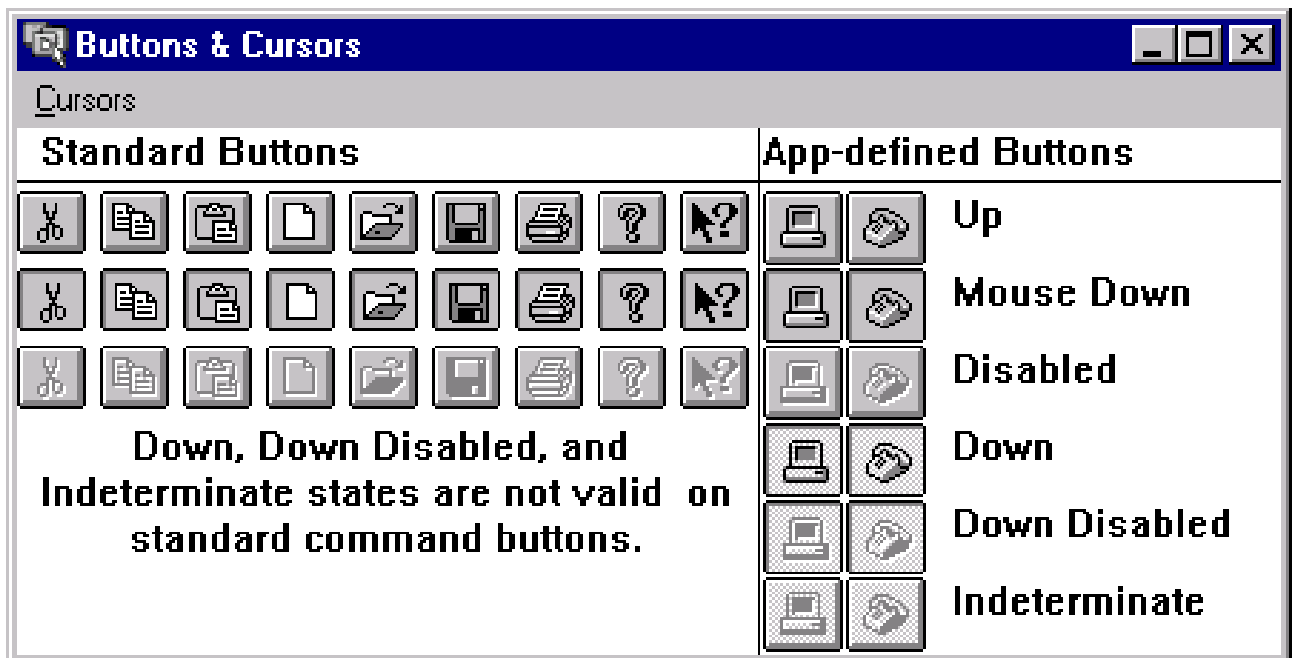- The *magic number* is 7 + or - 2.

Menus

- Low consequence options at the top.

- Dynamic menus reconfigured by item frequency.

Graphics

- Icons help to promote product identity.

- What is the *semantics* of the image?

WYSIWYG

- What you see is what you get.

\slideitem{What you see is not what you get.}

- Few systems print exactly what you see on the screen.

- Fonts on the printer differ from those on screen.

- Can be deeply frustrating...

Metaphor

- Computers rely on binary signals, people don't.

- Provide an abstract view of underlying complexity.

- Show a desktop with folders and a trash-can.

- Do not show complex path information:
`D:\ >Users\profiles\Johnson`

Direct Manipulation

- Good metaphors:

- support skill transfer;
- good metaphors reduce training requirements;
- good metaphors encourage exploration.
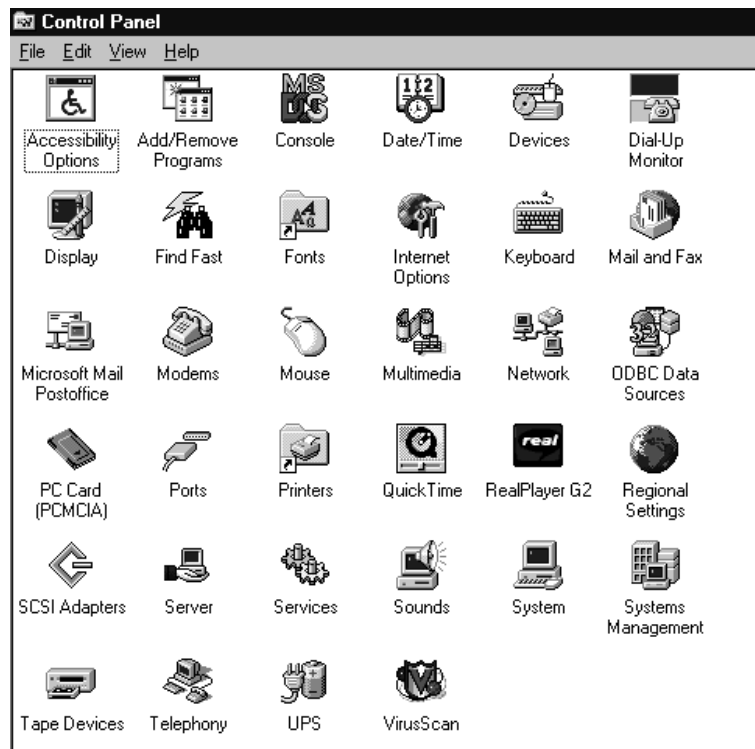
- But *direct manipulation* systems must support:
  – rapid, incremental and reversible actions.

- What happens when the metaphor breaks down?

Summary

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Further Reading

- Shneiderman on:
- interaction devices pp305-343;
- direct manipulation pp 185-228.

- Lots more, read it for open assessment!