Week 001
Foundation of Interaction Design: The Computer

Week 001: Foundation of Interaction Design: The Computer

Objectives

At the end of this module you are expected to:

Cognitive: Analyze the different user populations with regard to their abilities and characteristics for using both software and hardware products.

Affective: Differentiate the design of existing user interface based on the cognitive models of target user.

Psychomotor: Understand the important aspects of implementation of human-computer interfaces.

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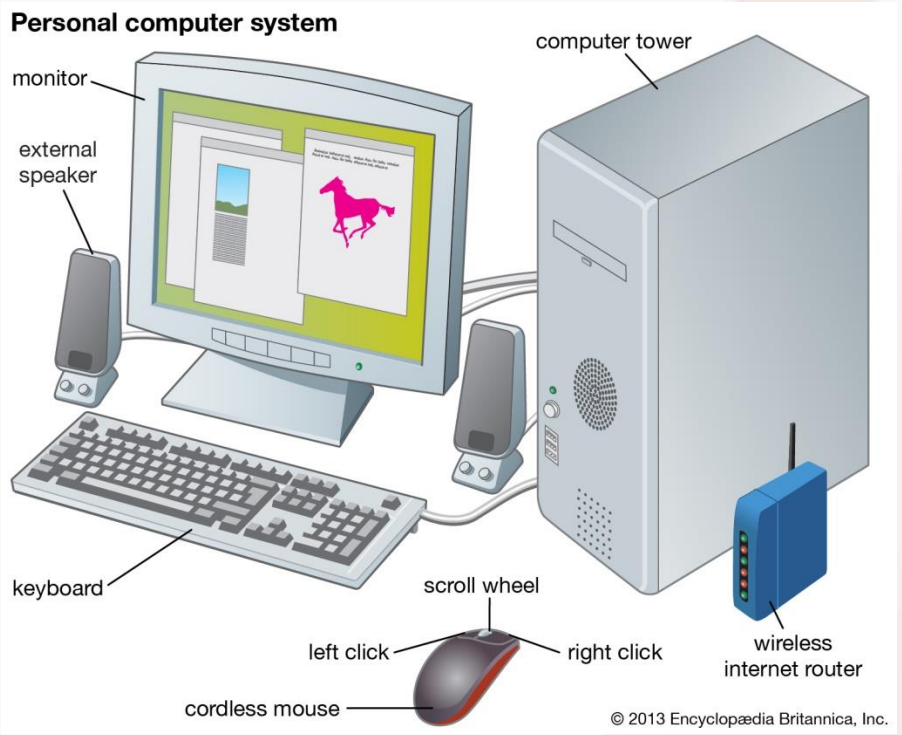
INTRODUCTION

Human Computer Interaction is the educational regulation that the majority of us believe of as UI plan.

A computer system is complete a various parts. Each of the essentials influences the interface.



https://www.britannica.com/technology/computer; OCTOBER 21, 2020

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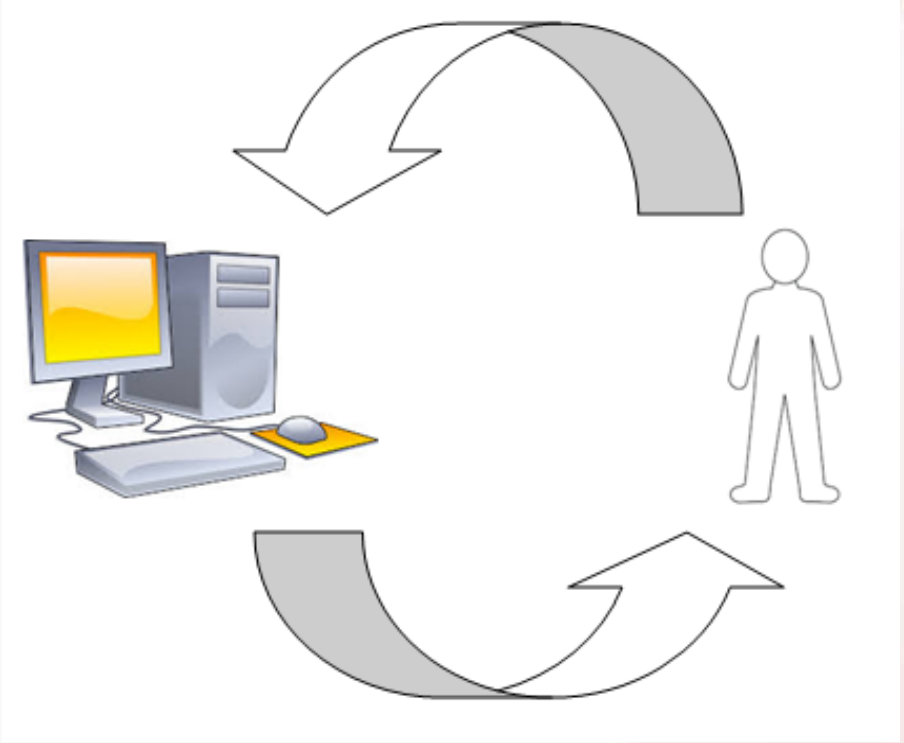
How to Interact with Computer

For better understanding of *Human Computer Interaction*. First we need to understand **COMPUTER**.

1. What are needed as input and output.
2. What computer can do?



Human outline from WebComics.net, Oct. 21, 2020
Computer outline from Wikipedia.com, Oct. 21, 2020

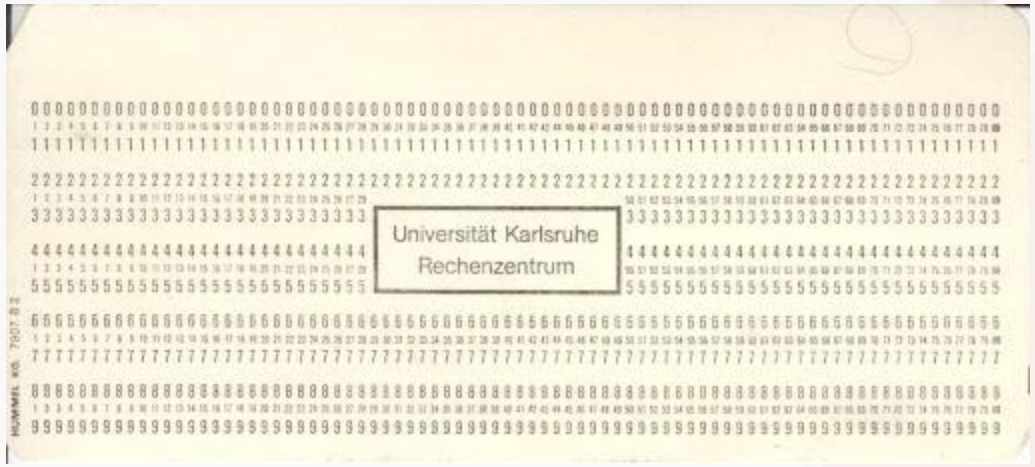
Week 001: Foundation of Interaction Design: The Computer Interactivity aspect

Before was about *batch processing*.

- ✓punched card stacks or large data files prepared
- ✓long wait ….
- ✓line printer output

Now most computing is interactive

- ✓rapid feedback
- ✓the user in control (most of the time)
- ✓doing rather than thinking …



Columbia.edu, Oct. 21, 2020

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Text Entry Device

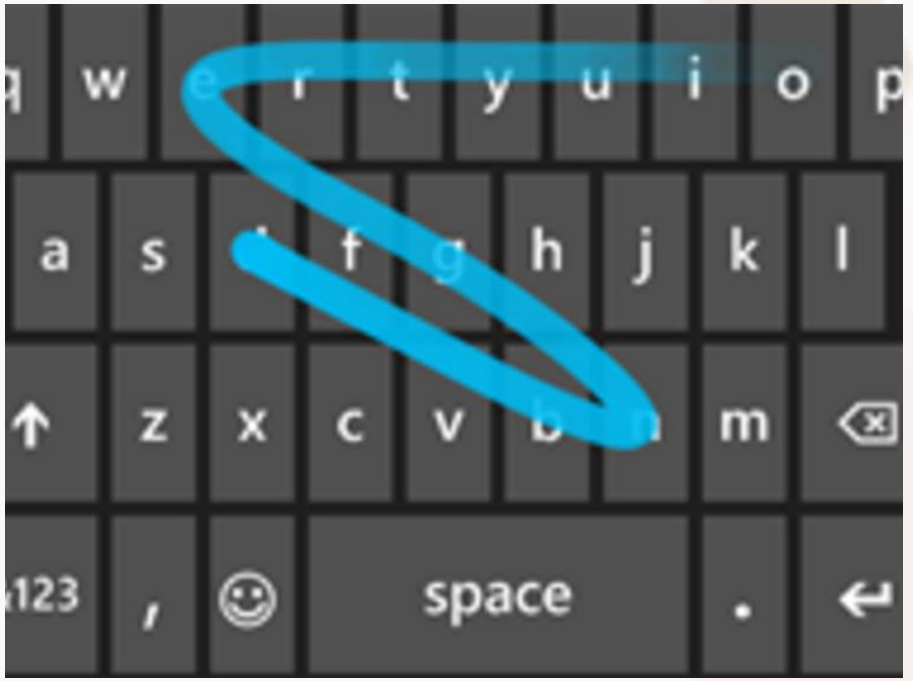
Keyboard

It is the standard layout enunciation symbols required for unlike writings and small disparity.

1. Alphabetic
2. Dvorak

✓ QWERTY produce market pressures not to change

✓Special keyboards - designs to reduce fatigue for RSI



https://www.zdnet.com/article/microsofts-new-word-flow-keyboard-is-the-best-smartphone-text-entry-system/; OCT. 21, 2020

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Handwriting recognition

Technological difficulties:

Capturing all helpful information

Natural interaction

Using a pen and a digesting tablet

https://www.apple.com/shop/product/MLA22LL/A/magic-keyboard-us-English; OCT. 21, 2020

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Speech recognition

Getting better speedily

Most doing well when:

- ✓ single user – initial training and learns peculiarities
- ✓ limited vocabulary systems

Problems with

- ✓ outside noise intrusive
- ✓ ambiguity of articulation
- ✓ huge expressions
- ✓ dissimilar lecturer

https://www.slideshare.net/AmitSharma937/speech-recognition-system-75448503; OCT. 21, 2020

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POSITIONING, POINTING AND DRAWING

Mouse (Pointing device)

1. Easy to use

   Two characteristics

   - planar movement
   - Buttons

2. Mouse located on desktop

   ✓requires physical gap

   ✓no arm exhaustion

   ✓relation association only is detectable.

https://www.powerplanetonline.com/gaming-mouse-logitech-g102-prodigy-usb-black; OCT. 21, 2020

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POSITIONING, POINTING AND DRAWING

Two methods for detecting motion

Mechanical

Ball on base of mouse rotate as mouse is shifted.

Optical

It has light emitting diode LED on bottom of the mouse.

https://www.amazon.com; OCT. 21, 2020

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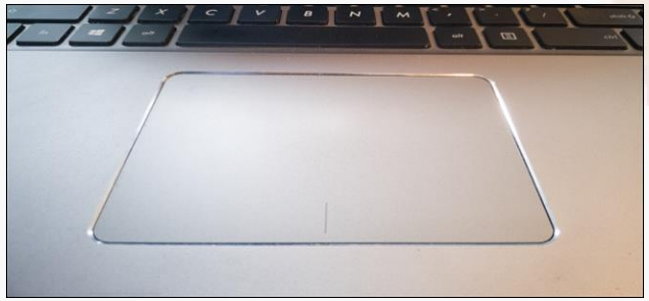
POSITIONING, POINTING AND DRAWING



Touchpad –small touch sensitive.

1. fast stroke
2. slow stroke

Trackball and thumbwheels the ball is rotated inside static housing it looks like an upside down mouse.

https://www.grainger.com/product/LOGITECH-Corded-Trackball-Mouse-6PKP2; https://www.howtogeek.com/365445/how-to-reset-a-touchpad-to-default-settings-in-windows-10/; OCT. 21, 2020

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POSITIONING, POINTING AND DRAWING

1. **Joystick and keyboard nipple -** Joystick is indirect pressure of stick.

2. **Touch-sensitive screen** - Detect the presence of finger or stylus on the screen.

https://sites.google.com/site/universaldesign4/positioning-pointing-and-drawing-1/joystick-and-keyboard-nipple; OCT. 21, 2020

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POSITIONING, POINTING AND DRAWING

1. **Stylus** - use of touch responsive plane or attractive uncovering.

2. L**ight pen –**uses light from screen to locate position.

3. **Digitizing tablet** - used for digitizing maps.

https://www.shopsmartexpress.com/item/B019PMR0JW; OCT. 21, 2020

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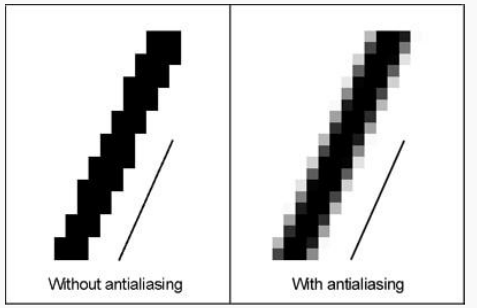
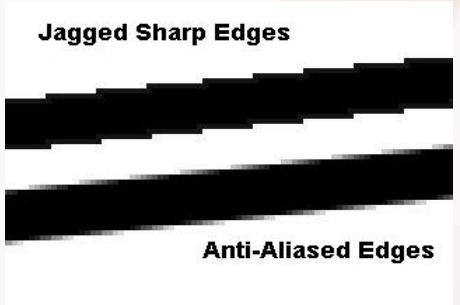
DISPLAY DEVICES

Screen is vast number of colored dots.

1. **Anti-aliasing** - make softer edges by using shades of line color.





2. **Jaggies** - discontinuities in owing to parallel raster scan procedure.

3. **Cathode ray tube** - Stream of electrons produced from electron gun.

4. **Liquid crystal displays** - Smaller, lighter, and no radiation problems.

https://www.displayninja.com/best-anti-aliasing-mode/; https://gamedevpanda.wordpress.com/2012/01/21/anti-aliasing-get-rid-of-those-jaggies/; https://newsabc.net/are-old-crt-monitors-really-better-for-gaming/; https://www.lifewire.com/what-is-liquid-crystal-display-lcd-2625913; OCT. 21, 2020

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DISPLAY DEVICES

1. **Situated displays -** displays in 'public' places it is large or small and interactive.
2. **Large displays** - used for meetings, lectures, etc.
3. **Plasma** – usually wide screen
4. **Video walls** – lots of small screens together
5. **Projected** – RGB lights or LCD projector

http://www.nick-taylor.co.uk/research/wray/; https://towardsdatascience.com/what-is-data-visualization-for-large-screen-and-how-to-implement-it-1d79cf07783; OCT. 21, 2020

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VIRTUAL REALITY AND 3D INTERACTION

Positioning in 3D space

- ✓cockpit and virtual controls
- ✓3D mouse
- ✓data glove
- ✓VR helmets
- ✓whole body tracking

3D displays

- ✓desktop VR
- ✓seeing in 3D

https://en.wikipedia.org/wiki/Virtual_reality; OCT. 21, 2020

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PAPER: PRINTING AND SCANNING

1. **Printing** - image made from small dots.
2. **Types of dot-based printers**
   dot-matrix printers
   ink-jet and bubble-jet printers
   laser
3. **Printing in the workplace**
   shop tills
   thermal printers
4. **Fonts** - the particular style of text
5. **Pitch** -
6. **Readability of text**
7. **Lowercase** and **UPPERCASE**

https://sea.pcmag.com/printers/13456/the-best-photo-printers-for-2020; OCT. 21, 2020

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PAPER: PRINTING AND SCANNING

Page Description Languages - Alternatively Use a page Description language

1. Screen and page
2. Scanners
3. Optical character recognition

https://www.bhphotovideo.com/c/product/647187-REG/Epson_B11B198011_Perfection_V600_Photo_Scanner.html; OCT. 21, 2020

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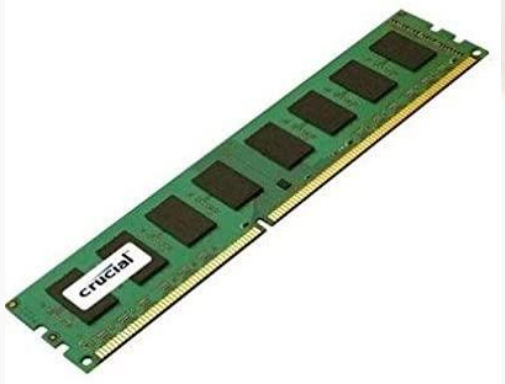
MEMORY



Short-term Memory – RAM

Random access memory (RAM)

Long-term Memory – disks

- optical disks
- magnetic disks

Speed and capacity

- some sizes (all uncompressed)

https://www.amazon.co.uk/Crucial-PC1600-CL11-Memory-Module/dp/B00BJHA8GO; https://www.thoughtco.com/definition-of-rom-958317; OCT. 21, 2020

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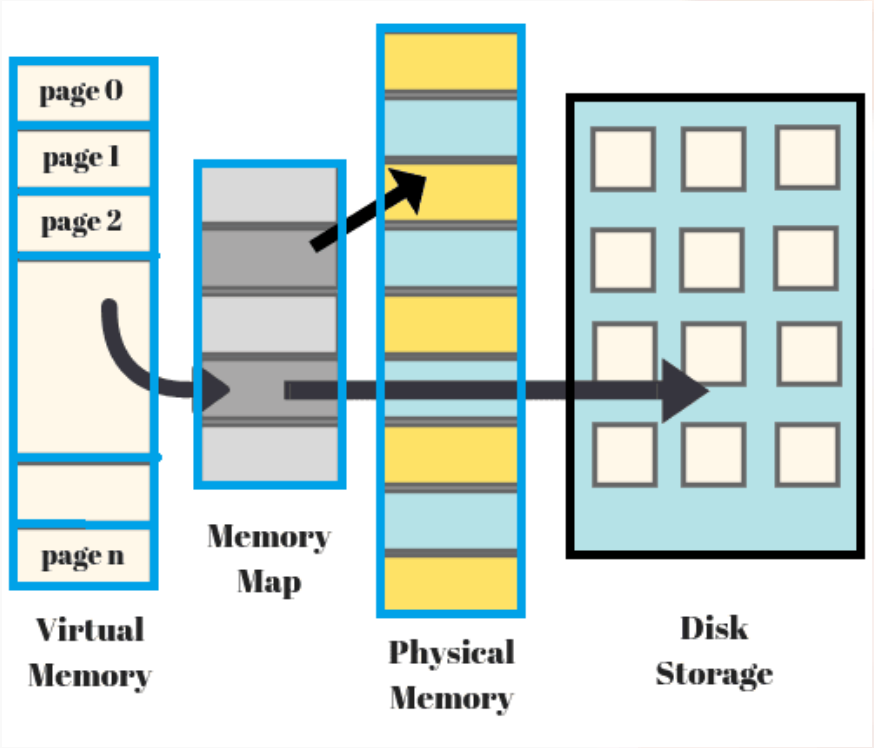
MEMORY

Virtual memory - store some programs temporarily on disk.

- ✓Images
- ✓Audio/Video

Methods of access

- ✓large information store
- ✓simple index needs exact match
- ✓forgiving systems
- ✓access without structure



http://digitalthinkerhelp.com/virtual-memory-in-os-operating-system-demand-paging/; OCT. 21, 2020

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PROCESSING AND NETWORKS

Finite processing speed - Designers be inclined to take for granted fast processors.

Limitations on interactive performance

- ✓Computation
- ✓Storage channel bound
- ✓Graphics bound
- ✓Network capacity

https://www.lboro.ac.uk/departments/mme/research/research-groups/signal-processing-networks/; OCT. 21, 2020

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MEMORY

Networked computing

Networks allow access the following:

- ✓huge memory and dispensation
- ✓other people (groupware, email)
- ✓shared resources

Issues are:

- ✓network delays – slow feedback
- ✓conflicts - many people update data
- ✓unpredictability

http://digitalthinkerhelp.com/virtual-memory-in-os-operating-system-demand-paging/; OCT. 21, 2020

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References

1. J. Preese, H. Sharp, and Y. Rogers, (2015), Interaction Design published by Wiley
Wang, Shuangbao (Paul), and Robert S. Ledley. "Introduction to Computer Architecture and Security." Computer Architecture and Security: Fundamentals of Designing Secure Computer Systems, Wiley, 2013, pp. [1]-50. Information Security Series. Gale eBooks, https://link.gale.com/apps/doc/CX6547800011/GVRL?u=phama&sid=GVRL&xid=30c28e1a; Accessed 12 Dec. 2020.
2. O'Connell, Theresa A., and Elizabeth D. Murphy. "The Usability Engineering Behind User-Centered Processes for Web Site Development Lifecycles." Human Computer Interaction Research in Web Design and Evaluation, edited by Panayiotis Zaphiris and Sri Kurniawan, Idea Group Publishing, 2007, pp. 1-21. Gale eBooks, https://link.gale.com/apps/doc/CX2557600008/GVRL?u=phama&sid=GVRL&xid=20065116; Accessed 12 Dec. 2020.
3. Jefsioutine, Marie, and John Knight. "Design Methods for Experience Design." Human Computer Interaction Research in Web Design and Evaluation, edited by Panayiotis Zaphiris and Sri Kurniawan, Idea Group Publishing, 2007, pp. 130-147. Gale eBooks, https://link.gale.com/apps/doc/CX2557600015/GVRL?u=phama&sid=GVRL&xid=e86105f; Accessed 12 Dec. 2020.