1.1 Abstraction

Notebook: How Computers Work [CM1030]

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Cornell Notes	**Topic:** 1.1 Abstraction	Course: BSc Computer Science
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Essential Question:

- What is abstraction in terms of computer science?

Questions/Cues:

- What is a simple hierarchy of a computer process?
- What is the measurement for Computer Speed?
- How is Computer Memory measured?
- What is Abstraction?
- What is the most basic abstraction that we used to represent data on a computer?
- How is a computer picture represented?
- What is notional machine?
- What is a Central Processing Unit or CPU?
- What is RAM?
- What is the basics of how a Computer works?

Notes

- Modern webpage
    - Web Browser Application
        - Operating System
            - Computers
                - Central Processing Unit (CPU)/Main Microchip
                    - Quantum Processes in Semiconductors

- Comp Speed = Gigahertz, 1 GHz = about a billion math operations per sec
- Memory measured in GB (Gigabytes)
- Abstraction = representation of key features, without unnecessary details
    - Ie. In Eng drawing, simple diagram to extract important features of mechanism
- Abstraction (Comp Sci Terms) = simplified representation of thinking; piece of software with other competing tech, emphasizes key details without distracting complexity.
- Basic Abstraction is to represent data on Comp as numbers

- Comp Pic = grid of tiny squares or pixels (short for picture elements); pixels have colour. Mixing together 3 color values in lights Red, Green, Blue. Color on screen can be rep'ed by 3 #'s RGB values.
- Higher Tier (simpler understanding) = more "layers" of abstraction
- Layers of Abstractions = something simpler to understand built-in to ongoing complexities underneath
- Abstraction of Comp Actions = Notional Machine
- Notional Machine = simplified version of how comp prog works
- CPU (Core of Comp) = chip to do all calculation on comp, run instructions which make up comp progs or code.
- Memory of Comp = Random Access Memory or RAM, where Comp stores all data it's working on.
- Data from Memory $\longrightarrow$ CPU $\longrightarrow$ Write back to Memory

Summary

In this week, we learned the basics of a computer process, how Computer Speed and Memory is measured. Furthermore, we've learned how abstraction is vital to our understanding of computers, what abstraction is ie. a picture on a computer, and layers of abstraction are built-in to understand ongoing complexities underneath as a way of representation. On the other hand, we also learned how abstraction can not only be used as representation but as a way to showcase the actions of a computer or a notional machine. In closing, we also touched on how the basics of how computers works with components such as CPU and RAM working together in sync.