Interface Programming

CIS3149

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# Introduction

# Task One - *CHRONOLOGY OF HUMAN COMPUTER INTERACTION (HCI)*

## Introduction

The intention of this task is to outline how human computer interaction (HCI) have evolved throughout their lifespan. HCI is exactly what the name suggests, it is the method in which the user interacts with the computer. The methods of application within the HCI field have expanded tremendously over time as Shneiderman is put forth in Rodgers’ (2012). Carrol (2009) stating that HCI grew in popularity on conjunction with the emergence of personal computing towards the latter stages of the 1970’s.

## Timeline

HCI has improved massively since the inception of computers from the earlier form of calculator to computer-to-computer interaction as demonstrated in the more modern programming usable interface (PUI).

The first believed computer was the calculating clock built by Wilhelm Schickard in 1623 [REFERENCE <https://www.britannica.com/technology/Calculating-Clock>]. This calculator worked using 9 wooden slats comprising of numbers as well as 6 cylinders spanning the front of the machine with Napier’s logs laid over top [REFERENCE <http://ds-wordpress.haverford.edu/bitbybit/bit-by-bit-contents/chapter-one/1-6-shickards-calculating-clock/>]. Napier’s log is an early mathematical logarithm that focused on the idea of geometric progression [REFERENCE <https://www.open.edu/openlearn/science-maths-technology/mathematics-statistics/john-napier/content-section-5>], which upon application to this early form of calculator would provide reason for the given output.

In 1920, Thomas de Colmar progressed the calculator by inventing and producing the Arithmometer, which would become the first calculator to be mass produced, with production being maintained for 90 years [REFERENCE <https://www.britannica.com/technology/Arithmometer>].

The Jacquard loom punch card machine was a revolutionary step in computing as this machine allowed detailed patterns to be etched into fabrics and mass produced for the first time in history. The use of binary for this machine opened many doors for similar methods to be used and expanded upon going forward, which would become apparent when IBM released the IBM computer card in 1928. This improved punch card system would include 45 columns and 12 punch positions which would allow for much larger stores of data as well as the use in more complex tasks due to the ability to write lines of code [REFERENCE <https://www.ibm.com/history/punched-card>].

In 1945, Mauchly and Eckert created the ENIAC (Electronic Numerical Integrator and Computer). This revolutionary machine was the first general-purpose electronic computer [REFERENCE <https://www.seas.upenn.edu/about/history-heritage/eniac/>], taking up a 1,500 square foot room and consisted of over 70,000 resistors, 17,000 vacuum tubes, and 10,000 capacitors. The primary focus of this machine was to calculate artillery range tables however, the flexibility of the machine meant it was capable of being reprogramed for many other uses [REFERENCE <https://www.hp.com/ca-en/shop/offer.aspx?p=computer-history-all-about-the-eniac>].

Another machine that was developed during the second World War was the Enigma Machine. This infamous deciphering machine was integral to the war efforts against the Axis of Power as through the use of this machine, the British were able to decipher German communications in order to counteract any plans they were making on the war front. The Enigma machines settings gave 15 quadrillion possible solutions however by the end of the war “the British were reading 10 percent of all German Enigma communications” [REFERENCE <https://www.cia.gov/legacy/museum/artifact/enigma-machine/>].

In 1945, 30 years before the invention of the personal computer and 50 years before the advent of the world wide web [REFERENCE <https://lemelson.mit.edu/resources/vannevar-bush>], Vannevar Bush put forth the idea of a device in which “an individual stores all his books, records and communications which is mechanized so that it may be consulted with exceeding speed and flexibility” [REFERENCE <https://www.theatlantic.com/magazine/archive/1945/07/as-we-may-think/303881/>]. This machine which he coined the “Memex” would be a revolutionary method of supplementing one’s memory as they suddenly became able to store and retrieve data in a way that was never previously possible. Whilst the implementation of this method in the present is vastly different that the technology available at the time, the principle of the idea is vital to how the world operates on a day-to-day basis.

Time sharing was an idea put forth to allow multiple users to access a computer system without interrupting each other. This idea was put forth by John Backus in 1955, who theorised that the large computers could be used as several small ones [REFERENCE <https://www.ibm.com/history/time-sharing>]. This theory would be put into practice in the early 1960’s as IBM incorporated keyboards and individual terminals to allow many people to work without interruption [REFERENCE <http://jmc.stanford.edu/computing-science/timesharing.html>].

The first interactive computer graphics program “Sketchpad,” was designed but Ivan Sutherland in the early 1960’s. This program allowed users to “visualise and control program functions” which would become a foundation of computer graphics and operating system interfaces [REFERENCE <https://www.britannica.com/technology/Sketchpad>]. Rodden and Blackwell (2003) [REFERENCE <https://www.cl.cam.ac.uk/techreports/UCAM-CL-TR-574.pdf>], claim the Sketchpad had a long standing effect on how computers were perceived and had massive impact on a multitude of new evolutions including some of the current market leaders Macintosh and Windows. Sutherland (1963) claimed in his doctoral thesis that the Sketchpad allows for communications between man and machine to be slowed down tremendously as they become able to use line drawings instead of written statements [REFERENCE <https://dl.acm.org/doi/10.1145/1461551.1461591>].

One of the most impactful inventions to take place within the computer industry was completed by Douglas Englelbart with the invention of the mouse. Engelbart’s computer mouse, originally patented as the “X-Y Position Indicator for a Display System” [REFERENCE <https://www.sri.com/hoi/computer-mouse-and-interactive-computing/>], consisted of a block of wood with a pair of metal wheels underneath that would track the X and Y movement of the mouse and a button(s) on top. Engelbart’s original vision for the project was to “broaden the connection between humans and computers” [REFERENCE <https://dougengelbart.org/content/view/162/>]. The mouse was so revolutionary that many personal computer systems still use a mouse as a primary form of control, although a much more refined and efficient model. Engelbart’s inventions did not stop with just the computer mouse, he also revolutionised the use of a keyboard, which before hand operated similarly to a type writer, to include the ability to delete keys also known as the backspace. He also implemented the copy and paste function and the ability to save files independently. Also, he showcased the ability to drag and move items within a list as well as the use of hypertext to link to other datasets [REFERENCE <https://www.smithsonianmag.com/innovation/douglas-engelbart-invented-future-180967498/>]. Not only did Engelbart innovate computing to a level that had rarely been seen, he announced all of these revolutionary ideas within one single demonstration referred to as the “Mother of All Demos” where he announced his oN-Line System (NLS) [REFERENCE <https://dougengelbart.org/content/view/155/#1>].

Alan Kay was one of the pioneers that pushed computers towards a household item. His idea was to create a smaller computer that were easy enough for children to operate. He released a mock up design of a computer that was a flat panel display with a stylus, similar to a modern-day tablet [REFERENCE <https://amturing.acm.org/award_winners/kay_3972189.cfm>]. Whilst Kay did not manage to bring forth his vision into reality due to limited technology, his idea was eventually brought into fruition.

In 1965, Ted Nelson invented a model for creating and using linked context which he coined “hypertext” [REFERENCE <https://www.computinghistory.org.uk/det/1818/ted-nelson/>]. This hypertext changed how information could be stored and accessed as for the first time, it allowed for data to be linked other data very easily. He also coined the term “hypermedia,” which has the same premise, except for the linking data would be elements such as graphics, video, and sound [REFERENCE <https://www.w3.org/WhatIs.html>]. This idea is a vital part of how people manoeuvre the internet in the present, through the use of “hyperlinks” that link to other websites.

In 1975, IBM released their first portable computer the IBM 5100, which weighed 50 pounds and cost $18,000, which would equate to over $100,000 dollars in 2025 adjusted for inflation [REFERENCE <https://historyofinformation.com/detail.php?id=924>]. The “high cost and lack of interfacing capability” ([REFERENCE <https://www.obsoletecomputermuseum.org/ibm5100/>]) lead this to pale in comparison to the IBM 5150 Personal Computer which was released just 6 years later in 1981. Whilst IBM had made a name by creating a shipping all of their own products, in order to match the given timeline and cost scale, they purchased Intel’s 8088 chip and used Microsoft’s operating system. This allowed them to release their PC within the year as James Cortada (2019 cited in IBM, n.d. [REFERENCE <https://www.ibm.com/history/personal-computer>]) claimed “the PC market was moving too quickly” to take normal means at risk of falling behind competitors. The computer was so well received that TIME magazine announced it as “Machine of the Year” replacing the annual “Man of the Year” and remains the only machine ever to win the award [REFERENCE <https://techland.time.com/2013/01/04/times-machine-of-the-year-30-years-later/>].

WIMP is a graphical user interface invented at Xerox Parc and stands for Windows, Icons, Menus and Pointers [REFERENCE <https://www.teach-ict.com/as_a2_ict_new/ocr/AS_G061/312_software_hardware/user_interfaces/miniweb/pg12.htm>]. The WIMP system was popularised by the Apple Macintosh and has since been co-opted by many others including being used for the Windows operating system [REFERENCE <https://www.interaction-design.org/literature/book/the-glossary-of-human-computer-interaction/wimp>]. One of the main benefits of the WIMP system is that it is very beginner friendly as it a WYSIWYG (What You See Is What You Get) software, meaning that there will be no changes in visuals upon configuring an output, such as printing from a text editor [REFERENCE <https://www.spiceworks.com/tech/tech-general/articles/wysiwyg-meaning-and-characteristics/>].

The Xerox Alto was a personal computer not like any others upon its release in 1973. Many of the qualities that are taken for granted in current computers were available with this computer starting with a high-resolution screen, keyboard, and mouse. However, more than 50 years ago, these were far from a staple for a household to have. Another aspect which set the Alto apart from the others of its kind it that much like the computers of today, this PC was built as a tower computer to be kept under a desk with all the peripherals, mouse, keyboard and monitor, to be kept above [REFERENCE <https://spectrum.ieee.org/xerox-alto>].

## Evaluation

# Task Two

## Introduction

## Background Research

## Evaluation

# Task Three

## Introduction

## Background Research

## Evaluation

# Task Four

## Introduction

## Background Research

## Evaluation

# Task Five

## Introduction

## Background Research

## Evaluation

# Conclusion

# References

<https://www.interaction-design.org/literature/topics/human-computer-interaction?srsltid=AfmBOopeE9jtiMMEQQHCqdMDCzpEqwcrD6Ldtvmn0oyPlMCzY4qNh6Pm> {NOT IMPLEMENTED, FIND A QUOTE TO USE FOR HCI DEFINITION}.

<https://ieeexplore.ieee.org/xpl/ebooks/bookPdfWithBanner.jsp?fileName=6812917.pdf&bkn=6812916&pdfType=book>

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