Introduction to IT Support

History of Computing

- **Video:** From Abacus to Analytical Engine
  5 min
- **Video:** The Path to Modern Computers
  10 min
- **Reading:** Pioneers in Computing and IT
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- **Discussion Prompt:** Your History of Computing
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- **Video:** Kevin: Their career path
  1 min

Digital Logic

Computer Architecture Layer

Graded Assessments

Pioneers in Computing and IT

Computer technology has come a long way since the first computer was invented. Along the way, many people from diverse backgrounds contributed inventions and innovations that helped us get to where we are today with modern computers. Without these individuals, information technology would not be where it is today.

Early Computer Pioneers

Ada Lovelace

Ada Lovelace was born in 1815 to Anna Milbanke and the poet Lord Byron. Her mother Anna Milbanke educated her to excel in mathematics. When Lovelace was still young, she was shown the Difference Engine (a mechanical calculator developed by Charles Babbage) and published a set of notes which contained the first computer algorithm for the Difference Engine in 1843. Lovelace posited at the time that computers would eventually be used outside of mathematics for things like composing music and made predictions about how technology would influence society.

Alan Turing

Alan Turing was born in 1912. While completing his degrees, he developed the concept of the Turing machine. Turing proved that there were some yes/no mathematical questions that could never be solved computationally which defined computation and its limitations. These findings would go on to become one of the seeds of computer science and his conceptual Turing machine (so named by his Doctoral advisor) is considered a predecessor of modern computer programs. During the Second World War, Turing developed the Turing-Welchman Bombe which was used to decipher Nazi codes and intercept Nazi messages. After the war, Turing's Imitation Game (now known as the Turing test) was created as a means to evaluate the abilities of artificial intelligence.

Margaret Hamilton

Margaret Hamilton was born in 1936. While working in the meteorology department at the Massachusetts Institute of Technology, she developed software for predicting weather. Later Hamilton would go on to work on the software that was used in the NASA Apollo command and lunar modules. With her experience writing software, she wanted to ensure that this skill would get its due respect and coined the term “software engineering.” Culminating her experience working on the Apollo missions and moon landings, Hamilton formalized what she learned into a theory that would later become the Universal System Language.

Admiral Grace Hopper

Grace Hopper was born in 1906. During the Second World War, she joined the US Navy Reserve after taking a leave from her role as a mathematics professor at Vassar College. In the Navy, she was assigned the Bureau of Ships Computation Project at Harvard University where she worked on the programming team for the Mark I computer. After the war and her time at Harvard, she began working on more powerful computers and recommended that a programming language be developed that used English words rather than symbols. This concept would eventually become FLOW-MATIC the first programming language to use English words which also necessitated the invention of the first compiler (a program that translates source code into machine code). Notably, she is also credited with first using the term “computer bug” after a real bug (a moth) flew into a computer she was working on. Later in her career, she was one of the designers of COBOL, a programming language that is still in use today.

NASA and the Human Computers

The following women all worked on various NASA projects. Some even were hired as human computers. They were tasked with completing complex calculations by hand for all sorts of situations from wartime thrust-to-weight ratios to Apollo orbit trajectories. They all went on to have impressive careers in mathematics and computer science.

Annie Easley developed the energy analytics code used to analyze power technology including the technology that was used in battery technology for Centaur rockets and early hybrid vehicles

Katherine Johnson was a physicist, mathematician, and space scientist who provided the calculation for important missions like the first orbit of the Earth and the Apollo 11 moon landing.

Dorothy Vaughan was a mathematician who would eventually become the first African American supervisor of NACA (National Advisory Committee for Aeronautics which would later become NASA) and a FORTRAN expert programmer working on the Scout Launch Vehicle Program (a family of rockets that placed small satellites in orbit).

Mary Jackson was NASA’s first Black female engineer. She worked on wind tunnel and flight experiments and would go on to earn NASA’s most senior engineering title.

Melba Roy Mouton was a Head Mathematician at NASA working on Project Echo, the first experiment in passive satellite communication. At NASA, she wrote programs that calculated locations and trajectories of aircraft.

Evelyn Boyd Granville worked on multiple projects in the Apollo and Mercury programs for NASA. She worked on computer techniques related to concepts like celestial mechanics and trajectory computation.

Innovators in Modern Technology

Hedy Lamarr

Hedy Lamarr was born in 1914. A movie actress during the golden age of Hollywood, she was also a self-taught inventor. During the Second World War, she read about radio-controlled torpedoes which could potentially be jammed by enemy forces. She and a composer friend proposed and patented an idea for a frequency-hopping radio signal that used existing player piano technology. The principles of this work would eventually be used in familiar technologies like WiFI, Bluetooth, and GPS.

Guillermo Gonzalez Camarena

Guillermo Gonzalez Camarena was born in 1917. An electrical engineer, in 1940 he patented an adapter that let monochrome cameras use colors. This technology was one of the earliest forms of color television. Camarena’s system would eventually be used by NASA for the Voyager mission and made color images of Jupiter possible.

Gerald (Jerry) Lawson

Jerry Lawson was born in 1940. Working as a semiconductor engineer for the Fairchild company, he worked on a team that developed the Fairchild Channel F, a color video game console that was designed to use interchangeable game cartridges. Previously, most game systems had built-in programming. He would later be dubbed the “father of the video game cartridge” for this work.

Mark E. Dean

Mark Dean was born in 1957. An inventor and computer scientist, he is the chief engineer of the IBM team that released the IBM personal computer. He holds three of the nine patents for the PC. He and his team also created the first gigahertz computer chip and he also helped develop the color PC monitor. Along with Dennis Moeller, he developed the Industry Standard Architecture (ISA) bus which was a precursor to modern bus structures like PCI and PCI express.

Clarence “Skip” Ellis

Clarence Ellis was born in 1943. He was a computer scientist and professor who pioneered in Computer Supported Cooperative Work and Groupware. In fact, while working at Xerox PARC, he and his team developed a groupware system called OfficeTalk. For the first time, this system allowed for collaboration from a distance using ethernet. He also focused on icon-based graphical user interfaces (GUIs) that have become prevalent in modern computing.

Gladys West

Gladys West was born in 1930. A mathematician, she was hired to work for the US Navy to more accurately model the shape of the Earth. She used algorithms to account for all sorts of variations in the shape of the Earth and her model would eventually be used as the basis for the Global Positioning System (GPS).

These individuals are a few notable examples, but this is by no means a complete list!

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