Koya University
Faculty of Science and Health
Department of Computer science

Computer inventions

20th Century

Prepared by : Vahel Daham Omer

Supervised by : Zhawin Abdulla

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Contents

Abstract

This report examines the groundbreaking inventions in the 20th century that laid the foundation for modern computing. It explores the transformative milestones and technological breakthroughs that revolutionized the field, beginning with early mechanical calculators and progressing to the advent of digital computers. Key inventions such as the vacuum tube, transistor, integrated circuit, and microprocessor are analyzed for their critical roles in advancing computer technology.

The report also highlights pivotal moments in computing history, including the development of the ENIAC, UNIVAC, and IBM systems, which marked significant progress in both hardware and software. Additionally, it examines how these inventions paved the way for personal computing and the rise of the internet, ushering in a new era of global connectivity. The collaborative efforts of innovators during this time fundamentally reshaped industries and revolutionized the way people live and work.

Introduction

The computers in recent times have become a relevant tool, particularly in the areas of storage and dissemination of information. The ease with which the computer functions—its speed, accuracy, and readiness—has revolutionized how tasks are performed in various sectors. With the usefulness of the computer, it has become fashionable for organizations to be computerized. This means a computer department is created to serve the whole organization, and experts or professionals are employed to manage the department.

Computers are no longer just a luxury but a necessity in virtually every industry, from healthcare and education to finance and entertainment. They streamline operations, enhance productivity, and enable innovative solutions to complex problems. The rapid advancements in hardware and software technologies have made computers more accessible and affordable, further driving their adoption globally.Moreover, computers have transformed how people connect and communicate, making the world a smaller and more integrated place. Tasks that once required significant time and effort can now be completed in seconds, from analyzing large datasets to managing complex projects. Computers also play a critical role in research and development, driving innovation across all scientific disciplines.Beyond the workplace, computers are central to daily life. They enable online shopping, virtual learning, telemedicine, and social media, creating a digital ecosystem that shapes modern lifestyles. The entertainment industry, too, has seen a dramatic shift, with computers enabling gaming, content creation, and streaming platforms.

What is a Computer :

A computer is an electronic device used to store retrieve and manipulate data.A computer also defines as a programmable electromechanical device that accept instruction (program) to direct the operations of the computers. Four words can be deducted from the above definition for further illustration. Examples

- Store: To put data somewhere for safe keeping
- Retrieve: To get and bring the data back.

History of Computer :

The history of the computer dates back to the period of the scientific revolution (1543 – 1678). The calculating machine invented by Blaise Pascal in 1642 and that of Gottfried Wilhelm Leibniz marked the genesis of the application of machines in industry. These early inventions laid the groundwork for future developments in mechanical computation.

This progressed up to the period 1760 – 1830, which was the time of the industrial revolution in Great Britain, where the use of machines for production significantly altered British society and the Western world. During this period, Joseph Jacquard invented the weaving loom, a machine used in the textile industry, which became a precursor to programmable machines. The loom's punch card system inspired later developments in computing, illustrating the growing potential of machines to automate complex tasks.These early innovations, along with others from this period, set the stage for the eventual rise of the modern computer, demonstrating how technological advancements in one era often pave the way for breakthroughs in the next.

Inventions in the 20th Century :

The 20th century saw transformative inventions that laid the foundation for modern computing. Key milestones include the invention of the vacuum tube in 1904, which enabled early electronic devices, and Alan Turing's 1930s concept of the Turing Machine, which provided the theoretical basis for computing. In 1938, Konrad Zuse created the first programmable computer, the Z3. The transistor (1947) replaced vacuum tubes, making computers smaller and more efficient, while the integrated circuit (1950s) further miniaturized computers. The microprocessor (1970s) revolutionized computing by enabling the development of personal computers, sparking the digital age..

Hinton's concerns are shared by many others in the tech world. Elon Musk, the founder of Tesla and SpaceX, along with over 1,000 tech leaders, signed an open letter in 2023 urging a pause on large-scale AI experiments. The letter emphasized that AI technologies could pose profound risks to society and humanity,underscoring the need for careful consideration of the potential consequences as AI continues to advance.

These are the invention:

1.Vecum Tube (1904) : Invented by John Ambrose Fleming, the vacuum tube was a crucial development in electronics. It enabled the amplification of electrical signals and was used in early computers, radios, and televisions. Vacuum tubes were integral in the construction of the first generation of electronic computers.


2.The Punched Card System (1901–1920s)
The **Jacquard Loom** (from the early 19th century) inspired the use of punched cards in later computing developments. Early punched card systems, notably used by **Herman Hollerith** in the 1890s, were further refined and became the basis for early data storage and processing techniques in the 20th century.
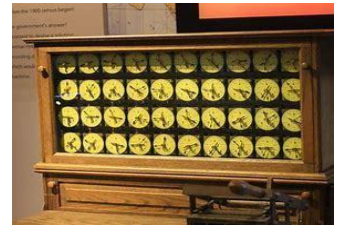
3.The Differential Analyzer (1927)
The Differential Analyzer, developed by Vannevar Bush in 1927, was one of the first machines capable of solving complex mathematical equations. It was an early analog computer used for engineering and scientific calculations, marking a significant step forward in computing machinery.
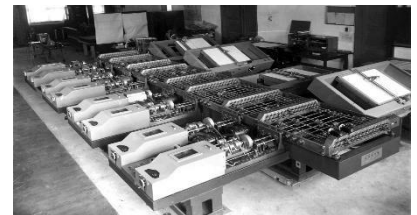
4. Alan Turing (1936) Machine : presents the notion of a universal machine, later called the Turing machine, capable of computing anything that is computable. The central concept of the modern computer was based on his ideas.

5.In 1943:

Two University of Pennsylvania professors, John Mauchly and J. Presper Eckert, build the Electronic Numerical Integrator and Calculator (ENIAC). Considered the grandfather of digital computers, it fills a 20-foot by 40-foot room and has 18,000 vacuum tubes.

6. The Electronic Numerical Integrator and Computer (1945):

ENIAC, developed by John W. Mauchly and J. Presper Eckert, was the first general-purpose electronic digital computer. It used vacuum tubes and was designed to calculate artillery firing tables for the U.S. Army.
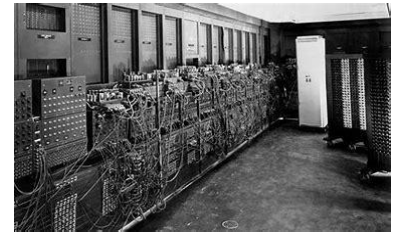
7. In 1946 :

Mauchly and Presper leave the University of Pennsylvania and receive funding from the Census Bureau to build the UNIVAC, the first commercial computer for business and government applications.

8. The Transistor (1947):

Invented by John Bardeen, Walter Brattain, and William Shockley at Bell Labs, the transistor replaced the vacuum tube, leading to smaller, faster, and more reliable computers.

## 9. Universal Automatic Computer (1951):

The UNIVAC I, designed by Mauchly and Eckert, was the first commercially produced computer in the United States and was used for a variety of applications, including business and government calculations.

10. In 1953: Grace Hopper develops the first computer language, which eventually becomes known as COBOL. Thomas Johnson Watson Jr., son of IBM CEO Thomas Johnson Watson Sr., conceives the IBM 701 EDPM to help the United Nations keep tabs on Korea during the war.

11. The Integrated Circuit (1958):

The **Integrated Circuit (IC)**, invented independently by **Jack Kilby** at Texas Instruments and **Robert Noyce** at Fairchild Semiconductor in 1958, is one of the most significant inventions in the history of computing. It revolutionized the way electronic devices, including computers, were designed, leading to a rapid reduction in size, cost, and power consumption of electronic components.
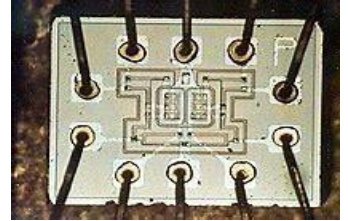
12. In 1969 :

A group of developers at Bell Labs produce UNIX, an operating system that addressed compatibility issues. Written in the C programming language, 6 UNIX was portable across multiple platforms and became the operating system of choice among mainframes at large companies and government entities. Due to the slow nature of the system, it never quite gained traction among home PC users. 1970: The newly formed Intel unveils the Intel 1103, the first Dynamic Access Memory (DRAM) chip.

13. The Microprocessor (1971):

Intel's creation of the microprocessor, led by Ted Hoff and others, revolutionized computing by integrating the central processing unit (CPU) onto a single chip, leading to the development of personal computers.
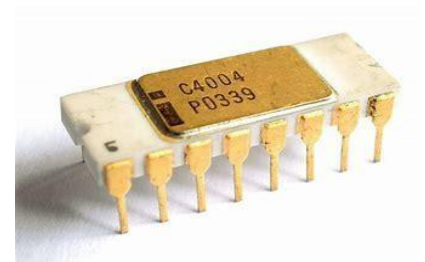
14. Personal Computers (1970s-1980s):

The **Personal Computer (PC)** revolution began in the 1970s and continued into the 1980s, marking a pivotal shift in the computing landscape. Prior to this era, computers were large, expensive machines typically found only in research institutions, universities, and large corporations. The introduction of personal computers changed this by making computing accessible to individuals and small businesses.

15. Apples Lisa (1983):

Apple's Lisa is the first personal computer with a graphical user interface (GUI). It also features a drop-down menu and icons. It flops but eventually evolves into the Macintosh. The Gavilan SC is the first portable computer with the familiar flip form factor and the first to be marketed as a "laptop." The TRS 80, introduced in 1977.

16. In (1985):

Microsoft announces Windows, according to Encyclopedia Britannica. This was the company's response to Apple's graphical user interface (GUI). Commodore unveils the Amiga 1000, which features advanced audio and video capabilities.

17. in 1985 :

The first dot-com domain name is registered on March 15, years before the World Wide Web would mark the formal beginning of Internet history. The Symbolics Computer Company, a small Massachusetts computer manufacturer, registers Symbolics.com. More than two years later, only 100 dot-coms had been registered.

18. The World Wide Web (1991):

The World Wide Web (WWW), invented by Tim Berners-Lee in 1991, revolutionized the way we interact with information and the internet. Prior to the World Wide Web, the internet existed, but it was primarily used by scientists and researchers for data transfer and communication. The web transformed the internet into an easily navigable platform for sharing and accessing a wide variety of content.

19. Gaming Computer(1994):

In the 1994, personal computers (PCs) underwent a significant transformation, not just as work tools, but as powerful gaming machines. During this time, the PC gaming industry saw a surge in popularity, largely due to advancements in hardware, graphics, and sound capabilities. As game developers harnessed the growing power of PCs, several iconic and groundbreaking games were released, transforming the PC into a centerpiece of interactive entertainment.

20. WI-FI Technology (1997-1999):

Wi-Fi, short for Wireless Fidelity, has become a ubiquitous technology that allows devices to connect to the internet and local networks wirelessly. It is essential in modern life, used in homes, businesses, airports, cafes, and virtually every public space around the world. The journey of Wi-Fi began in the 1997 and evolved rapidly over the years, enabling the wireless internet revolution. he term **Wi-Fi** becomes part of the computing language, and users begin connecting to the internet without wires. This marked a significant shift in how people accessed the internet, providing greater mobility and convenience. Public spaces such as cafes, libraries, airports, and hotels started offering Wi-Fi hotspots, making internet access more widely available and accessible. The ability to connect to the internet wirelessly revolutionized not only personal computing but also business practices, as employees could work from virtually anywhere. The increasing reliance on Wi-Fi set the stage for the continued evolution of wireless communication technologies that shape our connected world today.

My Goal This Report

The goal of this report is to explore and analyze the key inventions in computer technology during the 20th century. By tracing the evolution of computing from early mechanical devices to modern digital computers, the report aims to highlight the critical technological breakthroughs that laid the foundation for the digital age. This study will focus on key milestones such as the development of early computing machines, the introduction of the vacuum tube, the invention of the transistor, and the evolution of microprocessors. Additionally, it seeks to examine the impact of these inventions on industries, society, and the way we interact with technology today. The report will also evaluate how these innovations have influenced modern computing systems and digital networks, enabling the interconnected world we live in. Through this analysis, the report aims to provide a comprehensive understanding of how the 20th century shaped the technological landscape of the 21st century. It will also highlight the future potential and ongoing advancements in computing technologies.

Results

The 20th century witnessed groundbreaking advancements in computer technology, which collectively revolutionized industries and daily life. Key inventions like mechanical calculators, vacuum tubes, and transistors laid the foundation for the modern computing era. The development of the ENIAC and the UNIVAC, two of the first electronic general-purpose computers, demonstrated the power of automation and digital computation. The invention of the microprocessor in the 1970s by Intel significantly transformed the computer industry by enabling the production of personal computers, making computing power more accessible to the public.

In addition, the introduction of computer programming languages allowed for more complex applications and greater software development, expanding the use of computers in various industries such as business, science, and education. As these innovations advanced, so did the accessibility of computing technology, with personal computers becoming ubiquitous in households and workplaces by the late 20th century.Moreover, developments in networking and the creation of the World Wide Web in the 1990s changed the way people communicated and shared information globally, further accelerating the growth of the internet and digital technologies.Overall, the inventions of the 20th century built a robust foundation for modern computing, fostering a digital revolution that has transformed nearly every aspect of society, from communication and business to entertainment and education.

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