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Internet and Information Technology ITC202

Lecture 1 - History of computing.

Dr. Eng. Youssef Ntefeh

Course Overview

- This course contains an introduction to information technology and computing systems.
- The history and theory of information systems.
- practical application of technologies.
- The student will be introduced to computer software, hardware, and networking technologies.
- An introduction to the latest version of Microsoft Office.

Course Topics

- History of computing.
- Introduction to information technology.
- System and application software.
- MS Word.
- MS Excel.
- MS PowerPoint.
- Common web services and tools.

Learning Outcomes

- Using Technology Effectively.
- Understanding the Computers Parts.
- Application Software: Programs That Let You Work.
- Introduction to Word, Excel, and PowerPoint.
- Using the Internet and Web's Resources.
- Protecting Your Digital Data and Devices.

Course Staff



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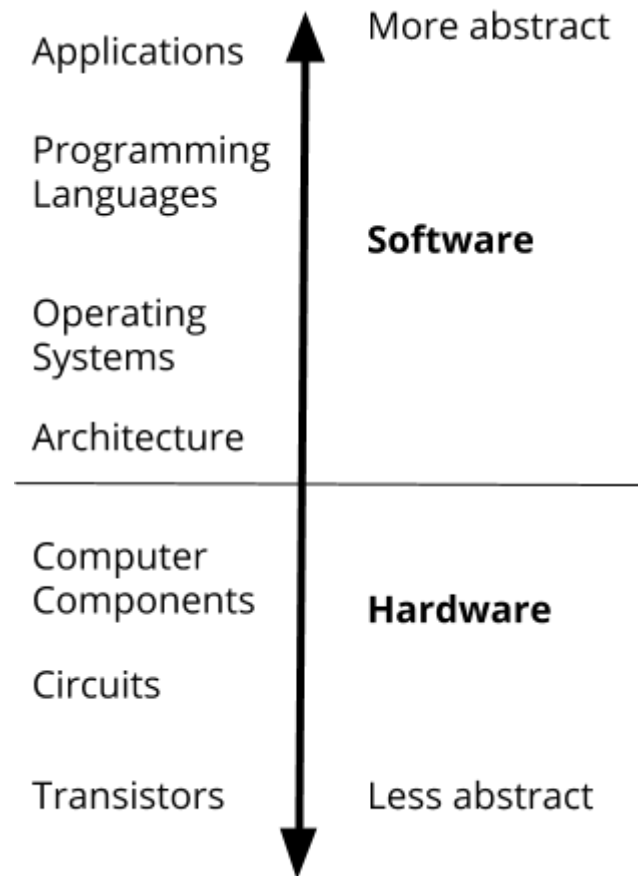
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Introduction to Computers



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Applications

- Any program you run on your computer

- Microsoft Word.



- Google Chrome.



- Note application.

- .exe (Windows) or .app (Mac) file.



- Can use without knowing how it works behind the scenes (**abstraction**).
- Programs are written in **code**, the next layer of abstraction.

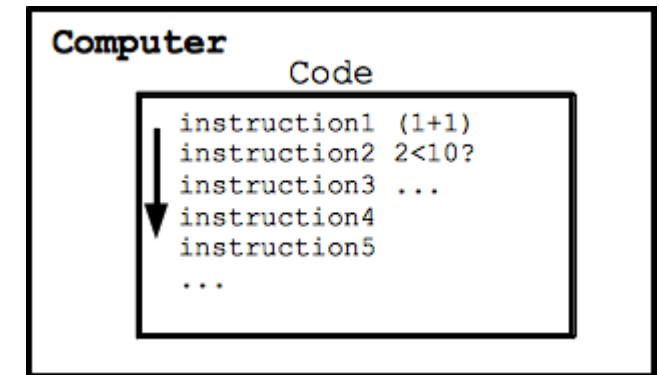
Pros and cons

- **Strengths of Computers:**
- Very fast (billions of operations per second).
- Very accurate.
- **Weaknesses of Computers:**
- Literal.
- Only simple operations.
 - Addition.
 - Comparison.
 - Equality.
- No insight.



Introduction to Code: How Computers Work

- Code is a series of instructions.
- Each instruction is an operation.
- Computer follows each instruction, one after another.
- Programs are comprised of millions of instructions.



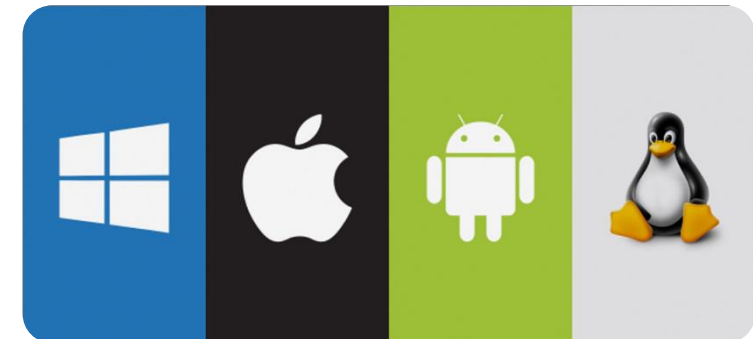
Programming Languages

- Code is written in a **programming language**.
- Gives the "rules" (syntax and commands) for the code.
- What programming languages have you heard of?
- Each has strengths and weaknesses and specializations (just like human languages).
- High-level (closer to how humans think) vs. low-level (closer to computers, but much faster).



The Operating System

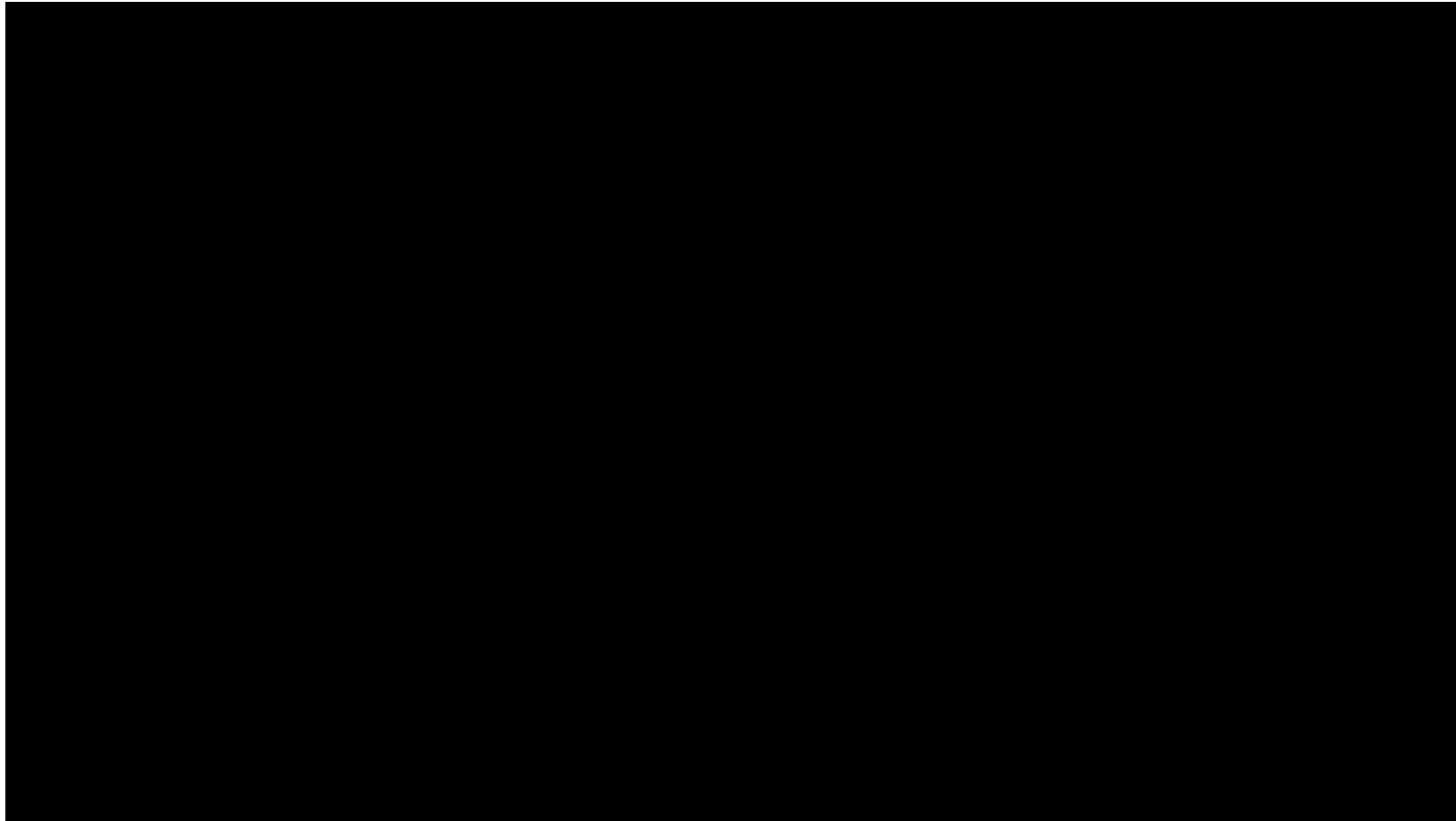
- Starts running when the computer "boots up"
- Manager/supervisor:
 - Starting/runs/stopping programs.
 - Manages all shared resources (like **memory**).
 - **No matter how a program ends, all resources must be released.**
- Can run multiple programs at once ("sandboxing").
- Allows a computer to change over time (updates).
- Other responsibilities:
 - File system.
 - Manages windows.
 - Some basic programs.



History of Computing



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History of Computer

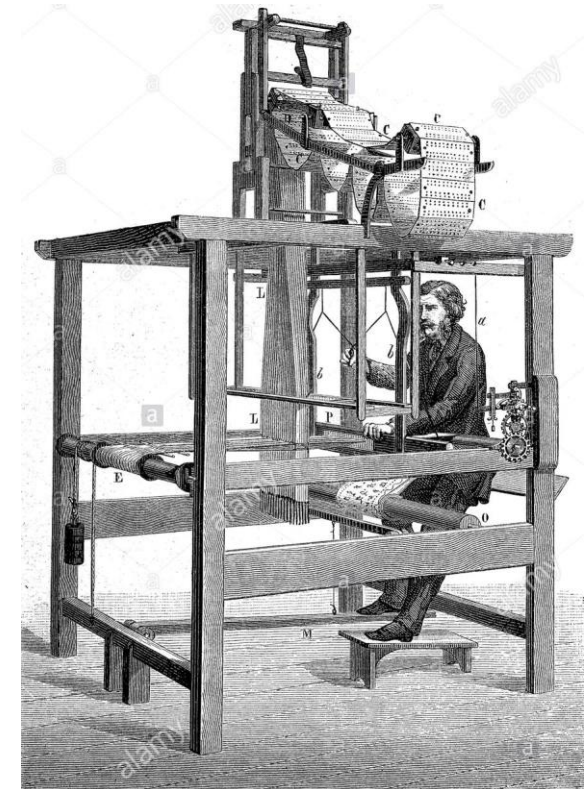
- The computer was born not for entertainment or email but out of a need to solve a serious number-crunching crisis.
- By 1880, the U.S. population had grown so large that it took more than seven years to tabulate the U.S. Census results.
- The government sought a faster way to get the job done, giving rise to punch-card based computers that took up entire rooms.

History of Computer

- Today, we carry more computing power on our smartphones than was available in these early models.
- The following brief history of computing is a timeline of how computers evolved from their humble beginnings to the machines of today that surf the Internet, play games and stream multimedia in addition to crunching numbers.

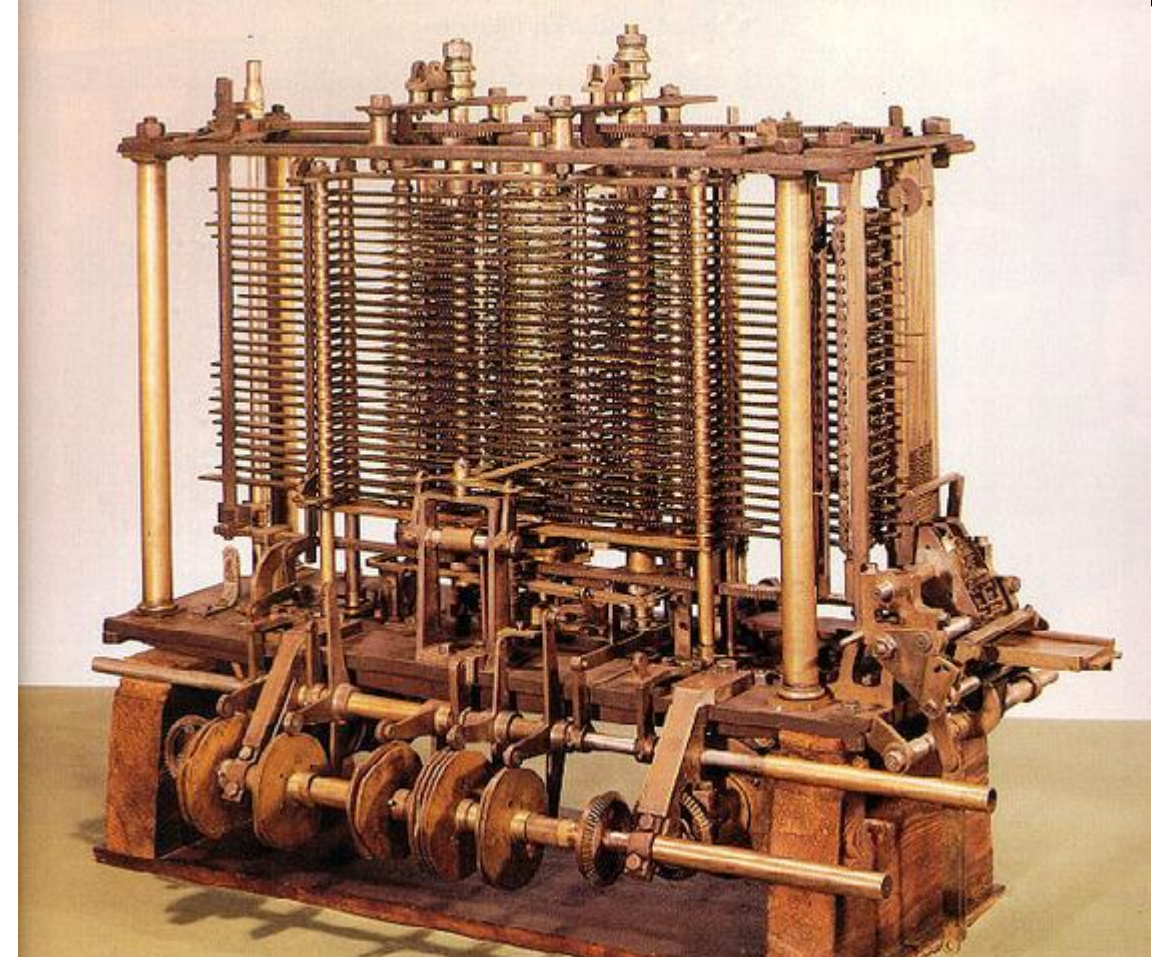
History of Computer

- **1801:** In France, Joseph Marie Jacquard invents a loom that uses punched wooden cards to automatically weave fabric designs. Early computers would use similar punch cards.



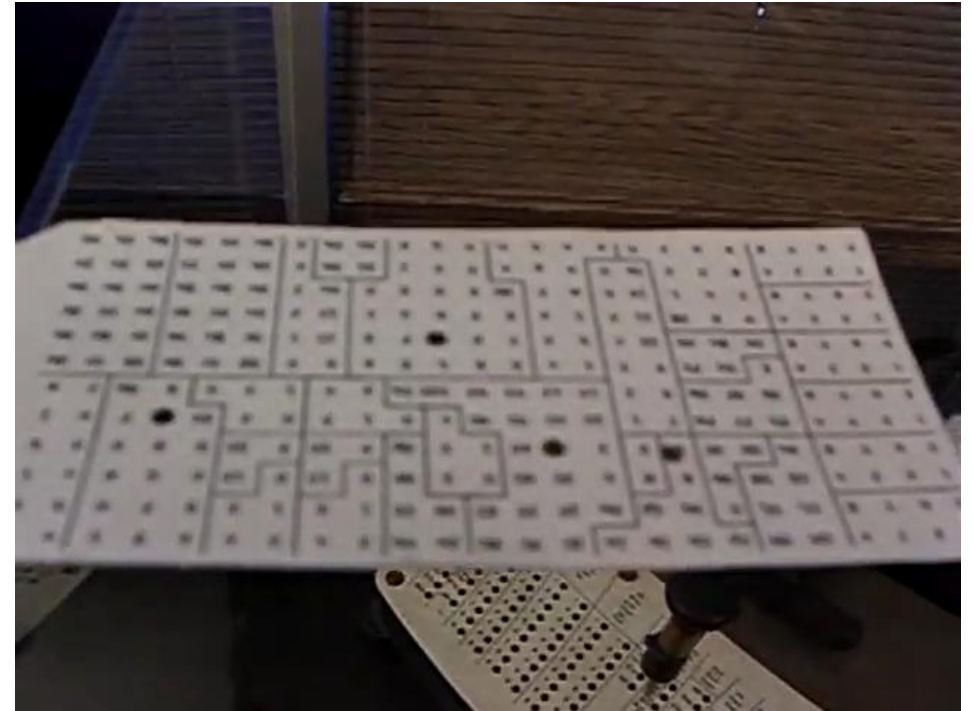
History of Computer

- **1822:** English mathematician Charles Babbage conceives of a steam-driven calculating machine that would be able to compute tables of numbers. The project, funded by the English government, is a failure. More than a century later, however, the world's first computer was actually built.



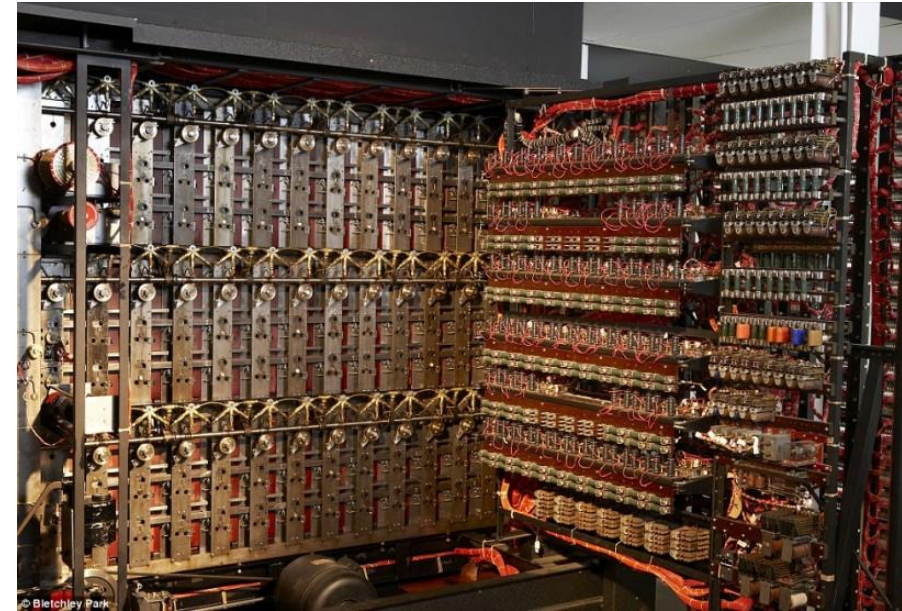
History of Computer

- **1890:** Herman Hollerith designs a punch card system to calculate the 1880 census, accomplishing the task in just three years and saving the government \$5 million. He establishes a company that would ultimately become IBM.



History of Computer

- **1936:** Alan Turing 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.

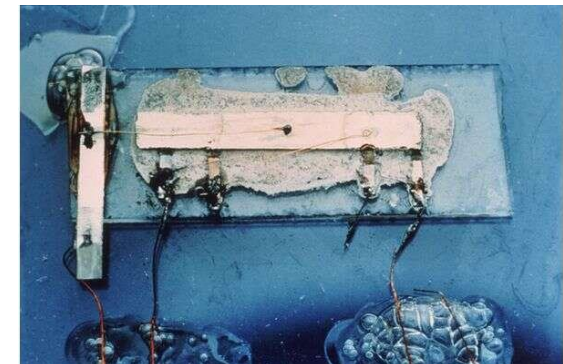
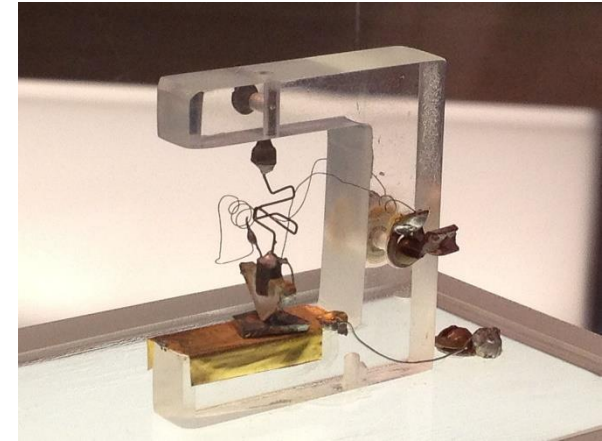


History of Computer

- **1943-1944:** 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.
- **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.

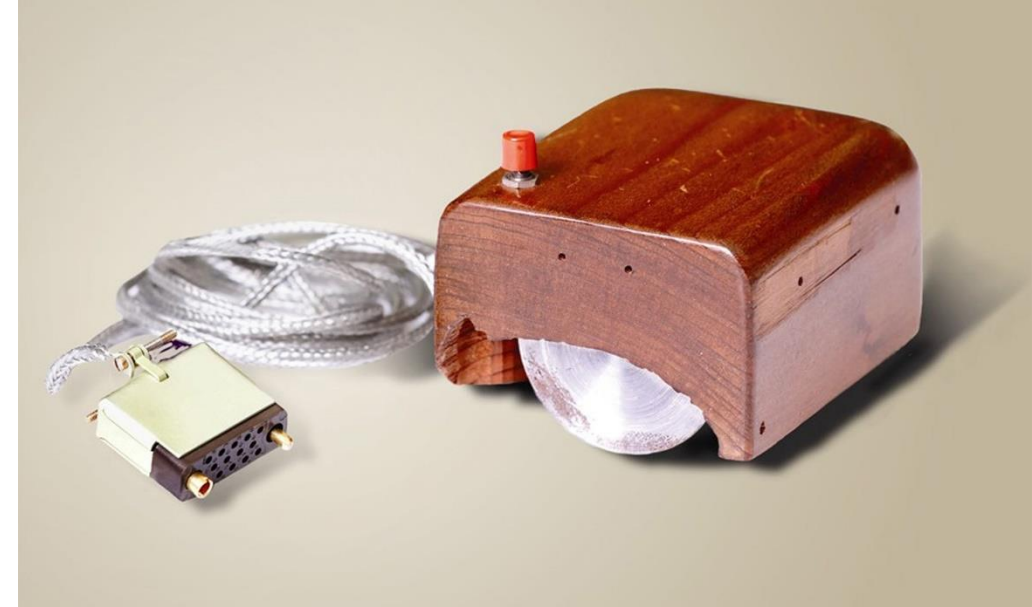
History of Computer

- **1947:** William Shockley, John Bardeen and Walter Brattain of Bell Laboratories invent the transistor. They discovered how to make an electric switch with solid materials and no need for a vacuum.
- **1958:** Jack Kilby and Robert Noyce unveil the integrated circuit, known as the computer chip. Kilby was awarded the Nobel Prize in Physics in 2000 for his work.



History of Computer

- **1964:** Douglas Engelbart shows a prototype of the modern computer, with a mouse and a graphical user interface (GUI). This marks the evolution of the computer from a specialized machine for scientists and mathematicians to technology that is more accessible to the general public.



History of Computer

- **1976:** Steve Jobs and Steve Wozniak start Apple Computers on April Fool's Day and roll out the Apple I, the first computer with a single-circuit board, according to Stanford University.



History of Computer

- **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 Symbolic Computer Company, a small computer manufacturer, registers Symbolics.com. More than two years later, only 100 dot-coms had been registered.
- **1996:** Sergey Brin and Larry Page develop the Google search engine at Stanford University.



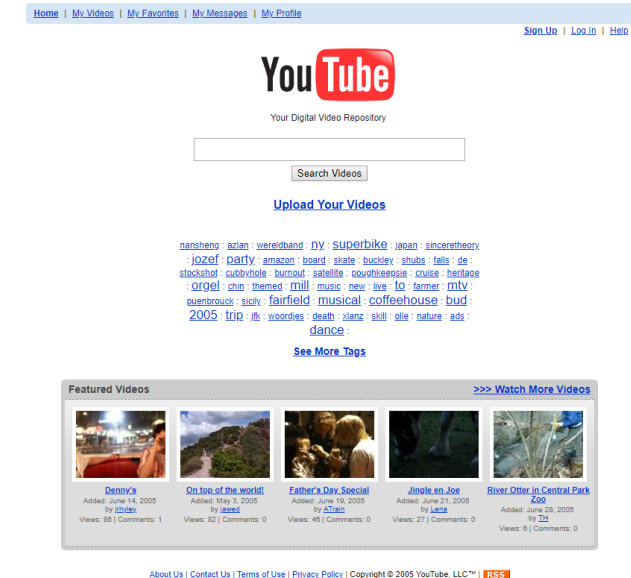
History of Computer

- **1999:** The term Wi-Fi becomes part of the computing language and users begin connecting to the Internet without wires.
- **2004:** Mozilla's Firefox 1.0 challenges Microsoft's Internet Explorer, the dominant Web browser. Facebook, a social networking site, launches.



History of Computer

- **2005:** YouTube, a video sharing service, is founded. Google acquires Android, a Linux-based mobile phone operating system.
- **2007:** The iPhone brings many computer functions to the smartphone.



History of Computer

- **2009:** Microsoft launches Windows 7, which offers the ability to pin applications to the taskbar and advances in touch and handwriting recognition, among other features.
- **2010:** Apple unveils the iPad, changing the way consumers view media and jumpstarting the dormant tablet computer segment.
- **2012:** Facebook gains 1 billion users on October 4.



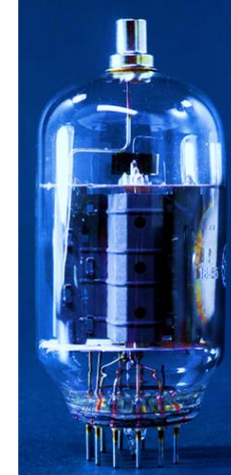
History of Computer

- **2015:** Apple releases the Apple Watch. Microsoft releases Windows 10.
- **2016:** The first reprogrammable quantum computer was created
- **2017:** The Defense Advanced Research Projects Agency (DARPA) is developing a new "Molecular Informatics" program that uses molecules as computers.



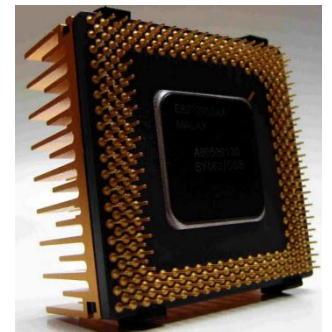
Computers Then and Now

- First-generation computers (1946-1957)
 - Enormous and powered by vacuum tubes.
 - Used a great deal of electricity, and generated a lot of heat.
 - ENIAC and UNIVAC.
- Second-generation computers (1958-1963)
 - Used transistors.
 - Computers were smaller, more powerful, cheaper, more energy-efficient, and more reliable.
 - Punch cards and magnetic tape were used to input and store data.



Computers Then and Now

- Third-generation computers (1964-1970)
 - Used integrated circuits (ICs).
 - Keyboards and monitors introduced.
- Fourth-generation computers (1971-present)
 - Use microprocessors.
 - IBM PC, Apple Macintosh.
 - Use keyboards, mice, monitors, and printers.
 - Use magnetic disks, flash memory, and optical disks for storage.
 - Computer networks, wireless technologies, Internet introduced.



Computers Then and Now

- Fifth-generation (now and the future)
 - Infancy stage.
 - No precise classification.
 - May be based on artificial intelligence (AI).
 - Likely use voice and touch input.
 - May be based on optical computers and utilize nanotechnology.



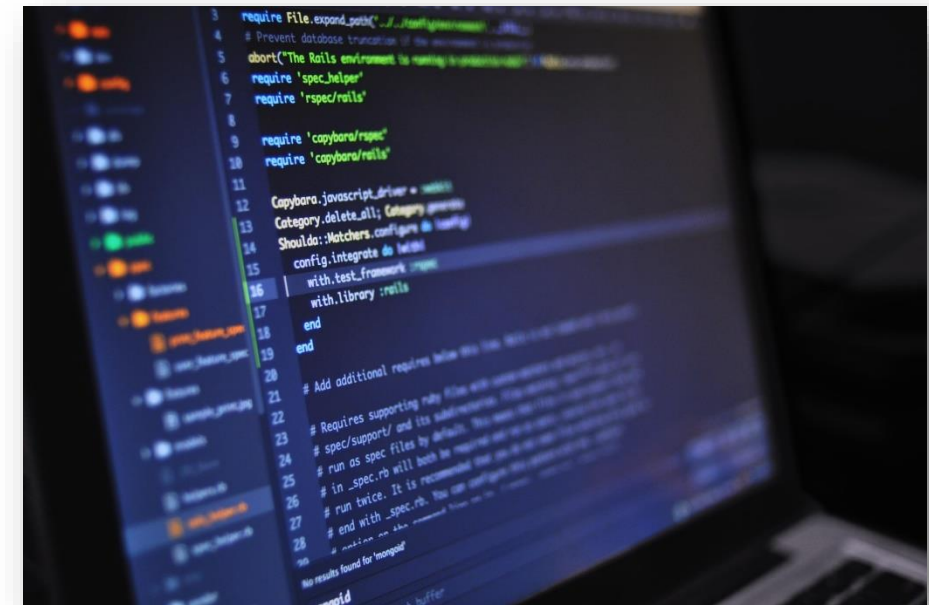
Hardware

- **Hardware** refers to the physical parts of the computer.
 - Internal hardware
 - Located inside the main box (system unit) of the computer.
 - External hardware
 - Located outside the system unit.
 - Connect to the computer via a wired or wireless connection.



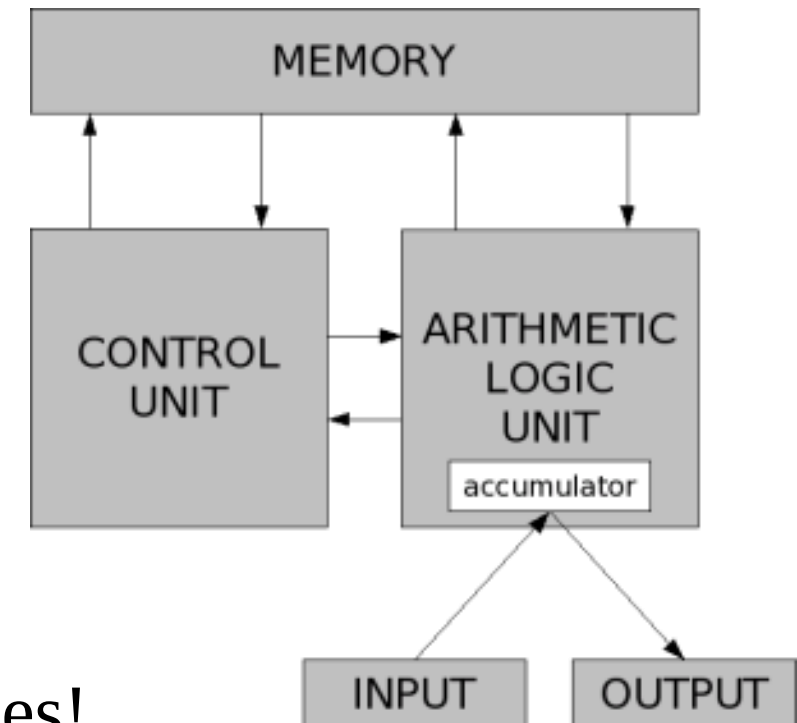
Software

- **Software** refers to the set(s) of instructions given to the computer to execute one or more tasks.
 - Software is sometimes referred to as programs.
 - E.g., Microsoft Office, Firefox.



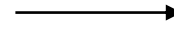
The Von Neumann Architecture

- This describes how a conceptual computing device works:
 - Memory stores data and instructions.
 - Control Unit (CU) obtains and executes instructions.
 - Arithmetic Logic Unit (ALU) does calculations.
 - Input is process of getting data into machine.
 - Output is process of obtaining data from machine.
- Most modern computers are Von Neumann machines!



Parts of a Modern Computer 1/2

Monitor: for displaying output



System Unit: CPU, Memory,
Hard drive,...



Keyboard and Mouse: for input



Parts of a Modern Computer 2/2

- **Central Processing Unit (CPU):** microchip that performs core computation. It usually contains the ALU and CU.
- **Memory (primary storage):** microchips that store data which can be accessed while computer is switched on.
 - **Random Access Memory (RAM)** is volatile and modifiable.
 - **Read-Only Memory (ROM)** cannot be changed.

Parts of a Modern Computer 2/2

- **Hard drive (secondary storage):** store data on magnetic discs permanently i.e., the data is not lost when the computer is switched off.
- **Input/Output devices:** transfers data from operator to machine and vice versa.

How hard drive work



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WINDOWS DESKTOP
Provides the backdrop for icons, windows, and other objects.

ICONS
Represent folders, documents, or other items that can be opened.

WINDOWS
Rectangular areas containing programs, documents, or other data.

DIALOG BOX
Displayed when needed to request information from the user.

MENU BAR
Opens menus that can be used to issue commands.

TOOLBAR
Contains buttons or icons that can be used to issue commands.

START BUTTON
Opens the Start menu that is used to launch programs.

TASKBAR TOOLBAR
Contains icons that can start programs.

TASKBAR BUTTONS
Correspond to open windows; can be used to change the active window.

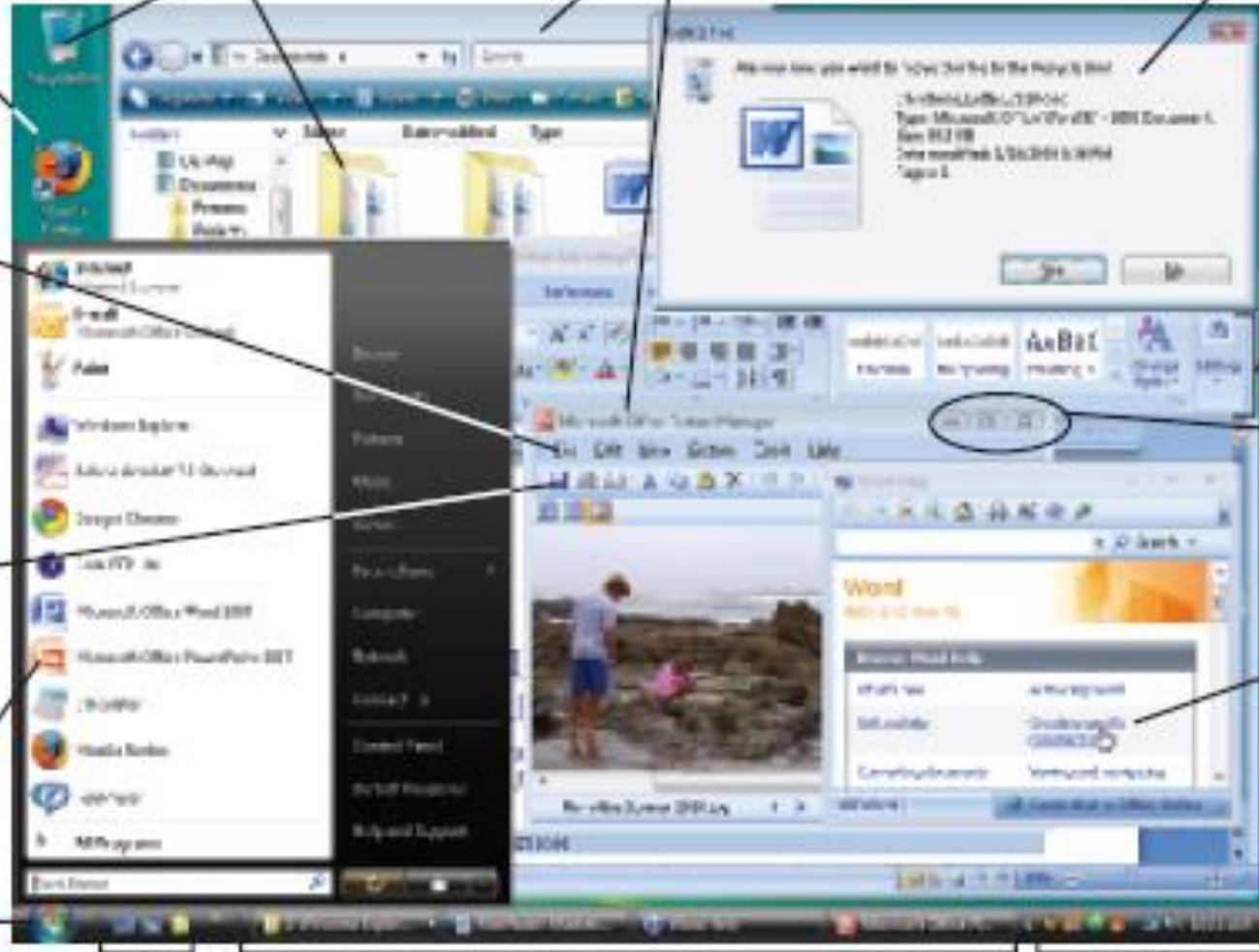
SYSTEM TRAY
Shows the clock and other indicators.

RIBBON
Replaces menus and toolbars in some programs.

SIZING BUTTONS
Minimize, maximize, or close a window.

HYPERLINK
Issues a command to the computer when clicked.

TASKBAR
Usually located at the bottom of the desktop.



Application Software

- Application software: Performs specific tasks or applications
 - Creating letters, budgets, etc.
 - Managing inventory and customer databases.
 - Editing photographs.
 - Scheduling appointments.
 - Viewing Web pages.
 - Sending and receiving e-mail.
 - Recording / playing CDs/DVDs.
 - Designing homes.
 - Playing games.

Computers in the Home

- **Convergence**

- The computer has become the central part of home entertainment.
- Dual-mode mobile phones.

- **Wireless networking**

- Computers can be used in nearly any location.

- **Smart appliances**

- Traditional appliances with built-in computer or communication technology.

- **Smart homes**

- Household tasks are monitored and controlled by a main computer in the house.

Computers in Education

- Many students today have access to computers either in a classroom or a computer lab.
- Colleges and universities are even more integrated.
 - Wireless hotspots allow usage of personal laptops to connect to the college network.
 - Some colleges require a computer for enrollment.
- Distance learning
 - Students participate from locations other than the traditional classroom setting using computers and Internet access.

Computers on the Job

- Computers have become a universal on-the-job tool for decision-making, productivity, and communication.
 - Used by all types of employees.
 - Used for access control and other security measures.
 - Use by service professionals is growing.
 - Used extensively by the military.
 - Employees in all lines of work need to continually refresh their computer skills.

Data vs. Information

- Data
 - Raw, unorganized facts.
 - Can be in the form of text, graphics, audio, or video.
- Information
 - Data that has been processed into a meaningful form.
- Information processing
 - Converting data into information.

How The Computer Works



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Summary



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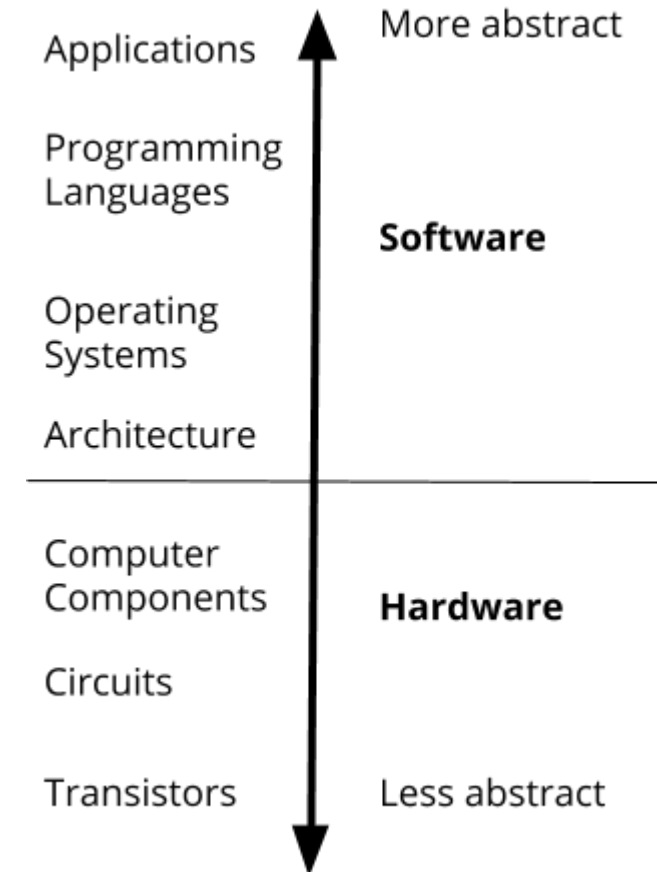
- History of Computing
- Hardware and Software
- Computers in life

Review



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- **Applications:** Any program you run on your computer.
- Programs are comprised of millions of instructions.
- **The Operating System:** Starts running when the computer boots up. Manager/supervisor Can run multiple programs at once .



Review: History

- History

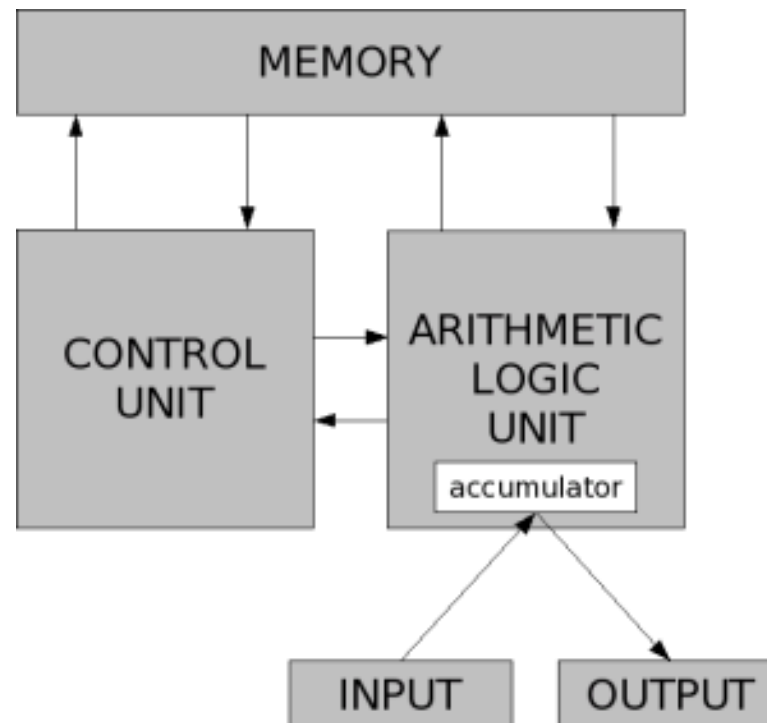
Date	event	Date	event	Date	event	Date	event
1801	loom uses punched cards	1943	ENIAC	1976	Apple I	2005	YouTube - Android
1822	steam-driven calculating machine	1946	UNIVAC	1985	first dot-com	2009	Windows 7
1890	punch card system	1947	Transistor	1996	Google	2010	iPad
1936	Alan Turing	1958	integrated circuit	1999	Wi-Fi	2012	1 billion users of Facebook
		1964	Mouse - GUI	2004	Facebook - Firefox		

Review: Generations

- Computers generations:
- First: vacuum tubes.
- Second: transistors.
- Third: ICs, Keyboards and monitors.
- Fourth: microprocessors, printers, mouse, magnetic disks, flash memory, and optical disks, wireless, Internet.
- Fifth: AI, voice and touch, optical computers.

Review: Von Neumann Architecture

- Von Neumann Architecture



- Most modern computers are Von Neumann machines.

Review: Memory

- Random Access Memory (RAM).
- Read-Only Memory (ROM).
- Hard drive.

Reference



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