Computer fundamentals

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Computer
-> instrucation execution and store information
-> Common Operating Machine Purposely Used for Technological and Educational Research

Computer history:
- Abacus
- Pascaline
- Difference engine
- Analytical engine
- Census tabulator (punch cards) -> ims
- Turing machine
- Colasses (vacuum tubes boolean)
- Eniac
- Edvac (1000 instractions per second)
  - cobol programming lunguage (assembly to machine code)
  - transistors
  - Intrgrated circuit
  - Gui, mouse, floppy disk, dram
  - Basic language
  - C language

Types:
     mini computer (single circuit board)
     MainFrame computer (speed, storage, manage work load 100 people, commercial organizations)
     Micro computer(personal computer,phone, mobile, lap)
     Super computer (scientific research)
     Embadded computer (atm machine, cars)

Components:
     Input -> keyboard,mouse, printer
     Output -> monitor, microphone, touch screen
     CPU -> registers, cache, alu, control unit.
     Memory -> ram, rom,ect..

Types of memory:

Primary	RAM in memory, main memory SRAM fast,costly cache,stroage buffer flipflop(high and low), 6 transistor DRAM slower, refersh capasitor and transistor 8ms SCRAM synchronous DRAM clock or ram and system synchronized DDR(double data rate)
Secondary	ROM permanent MROM mask PROM programmable EPROM erasable programmable uv EEPROM electrically erasable programmable Flash Memory " block of data can be erased at once(ssd
tertiary	

Storage devices:
Hard disk (HDD)   magnetic, rotate 7200 rPM
SSD (flash memory , floating gate transistors)
Cd,dvd

Cloud storage	data center	Types

	Aws, assure, google cloud
	
	  • Iaas
	  • Paas
		• Public
		• Private
		• Hybrid

		• Saas	

Working:
Cup -> read the instruction from the ram using control bus, address bus, data bus
        Instruction cycle -> Fetch, decode(cu), execute(alu), store(mu)

Keyboard -> multiple layers, key presses->signal passed to the pcb(printed circuit board) ->microprocessors, resistors, capacitors, or sensors)

Scanner -> light reflected from the document is send to the light sensitive sensor then the light pattern is converted into electrical signal and converted into digital

1. System Software
- **Operating System (OS)**: Windows, Linux, macOS, Android.
- **Compiler**: GCC, Javac, Python Interpreter.
- **Utility Software**:
    - **BIOS**
    - **Compression Software**
    - **Backup Software**
    - **Antivirus Software**
    - **File Manager**.

2. Application Software
- **General-Purpose Software**: MS Word, Chrome, VLC Media Player.
- **Specific-Purpose Software**:
    - Photoshop
    - AutoCAD

Operation system: manages the resources, interface between user and hardware

User -> shell -OS -kernal <- Resources
Application -> System call -> kernal
Kernal -> Api -> application

        Components:
                Shell (between user and os)
                Kernal (between os and hardware)
                        System call, io management, memory management

        Types:
            - **Batch** – Payroll processing systems where salaries are calculated and processed in bulk at a scheduled time.
            - **Time Sharing** – Shared hosting services where multiple users run programs on the same server concurrently.
            - **Distributed** – Google Drive, where data is stored and processed across multiple servers.
            - **Network** – Email servers like Microsoft Exchange, allowing multiple users to send and receive emails over a network.
            - **Real-time** – Air traffic control systems, where immediate response is critical for flight management.
            - **Multiprogramming** – A banking system where ATMs handle multiple user transactions at the same time.
            - **Multitasking** – A personal computer running a web browser, music player, and text editor simultaneously.

        Multiprogramming vs multitasking
        Context switching   context switching and time sharing

         Interrupt:
         System call:(software triggers an interrupt)
            - Process creation and management
            - Main memory management
            - File management
            - Ect..

BIOS -> video card, cpu , ram, keyboard, mouse.
        And Load os

Drivers:
Monitor os send the instruction to GPU graphics processing unit send signals to the monitor
Speaker   audio driver (digital to analogue)
Printer printer driver

working
- **Translate Commands**
- **Enable Compatibility**
- **Optimize Performance**
- **Handle Errors**