What is a computer

What can they be used for?

Free Computer Help

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What is a Computer
What can they be used for?

Michael Daley

Master Degree Computer Information Systems

Worked for 38 years as a Computer Engineer for IBM & Hugh/Raytheon Missile Systems.

I became "the guy" all my

family – neighbors – ward – friend of a friend

used to call to fix and repair their computers

What is a Computer

What can they be used for?

My Number One Qualification

I am a

Computer Nerd

What is a Computer

- 1942 The first computers was developed
  - Top Secret computer to decrypting Nazi communication during World War II

- 1943 The ENIAC computer system developed
  - The ENIAC computer used vacuum tubes
  - Used 18,000 vacuum tubes
  - Weighed 30 tons

- 1976 The Intel 8088 and Zilo9g Z-80
  - These microprocessor were used to create the computers we use today
  - 1977   Apple Computers
  - 1981   IBM PC

What is a Computer

- We have seen many movies where computer were shown
  - These movie computer
    - A large panel with flashing light
    - Large spinning tape drive
    - Monitor and keyboard
- 1960 – 1980 Many people used computer for business
  - Usually, a computer monitor with keyboard connect to a main frame
  - Key punch card were used to enter data into a computer
- 1990 – Present People started to use the Personal Computer
  - Used for both Business and Personal use.

What Is A Computer

Definition

An electronic device for storing and processing data, typically in binary form, according to instructions given to it in a variable program.
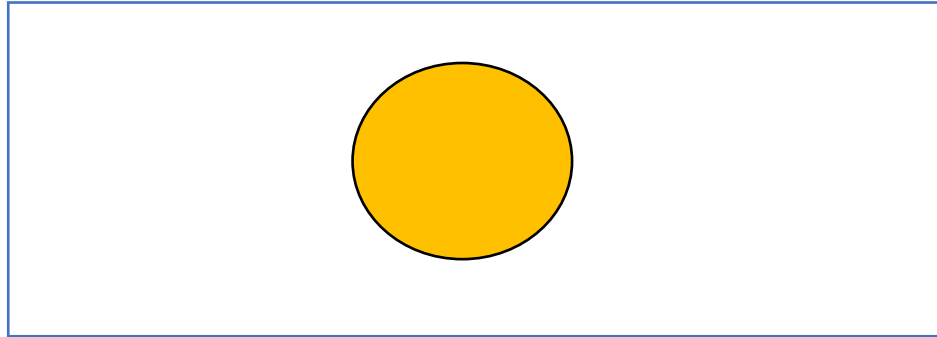
Today Personal Computer

- Electronic device - Hardware
  - CPU (**C**entral **P**rocessor **U**nit)
  - Memory
    - RAM (**R**andom **A**ccess **M**emory)
    - ROM (**R**ead **O**nly **M**emory)
  - Storage
    - Disk (Hard Disk, SSD (Solid State Device), Floppy Disk, CD, DVD, Flash)
  - Peripherals
    - Keyboard, Mouse, Printer, Scanner

Today Personal Computer

- Binary form
  - Data is ether 1 or 0 (One Bit)
  - Bytes (Eight Bits)
  - Word (Sixteen Bits or Two Bytes)
- Variable Program
  - Firm Ware (BIOS, Drives)
  - Operation Systems (Windows, Mac, Chrome, Linux, Android, iOS)
  - Application Programs (Web Browser, Word Processor, Photo Editor)
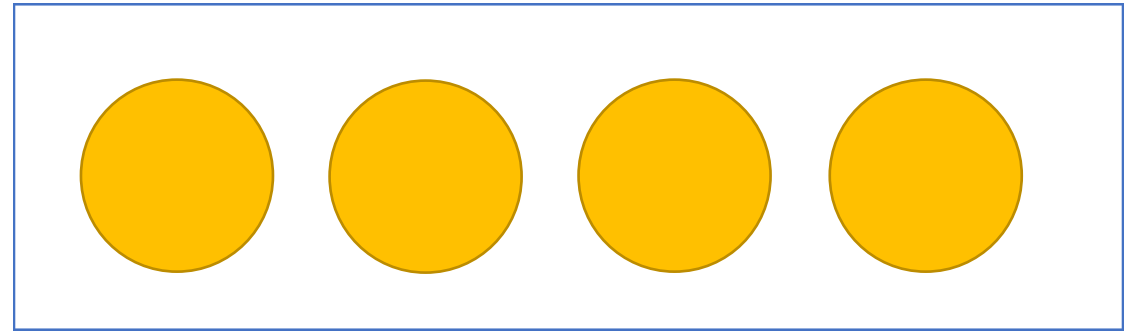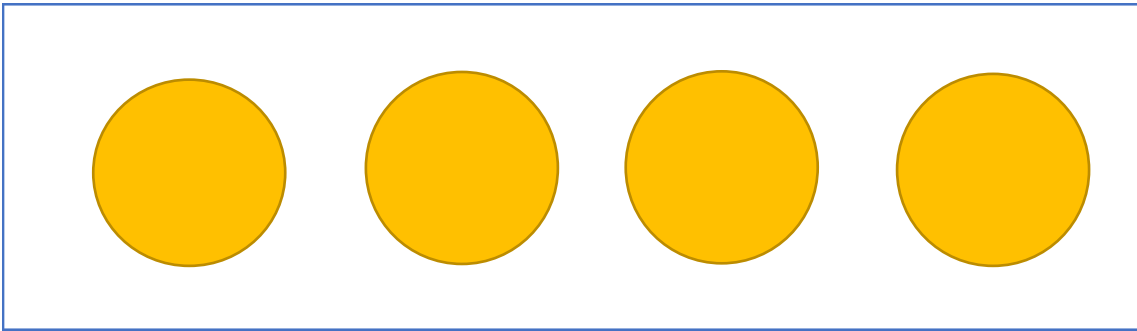 - Web Application Programs (Email, Genealogy, Social Media)

Today Personal Computer

- One Bit
  - Value from 0 - 1

Today Personal Computer

Eight Bit - One Byte
Value from 0 to 511

What is a computer

- Most computers today are 32 or 64 bits
  - 32 bits
    - Value of 0 to 4,294,967,295 or 3.2 Gigabytes
  - 64 bits
    - Value of 0 to 18,446,744,073,709,551,615

Binary Format

- Binary is 2 base numbers
  - Value is *1* or **0**
- Byte
  - 0000 0000   1111 1111   count 0 to 511
- Kilo   (k) $2\,^{\wedge}10$ 1,024
- Mega (M) $2\,^{\wedge}20$ 1,048,576
- Giga   (G) $2^{\wedge}30$ 1,073,741,824
- Tera   (T) $2^{\wedge}40$ 1,099,511,627,776

CPU (Central Processor Unit)

- The CPU Is The Brains Of Your Computer
  - Mathematic Operation
  - Decodes Data
  - Preforms each step of a program
- Measure CPU Performance
  - Processor Speed
  - Core Processors (Single Core, Dual Core, Quad Core, Six Core, Eight Core)
  - Hyperthreading (each core runs two different program streams)
  - MIPS (Million Instruction Per Second)
  - MFLOP (Million Floating point operations Per Second)

Memory

- RAM (**R**andom **A**ccess **M**emory)
  - DRAM (Dynamic RAM)   (Commonly used in most Computers)
  - SRAM (Static RAM)   (High Speed - High Cost)
- ROM (**R**ead **O**nly **M**emory)
  - **BIOS** (**B**asic **I**nput / **O**utput **S**ystem)
    - Instruction to interface with Computer
    - Boot Up Test
  - **UEFI** (**U**nified **E**xtensible **F**irmware **I**nterface)

- New Version
  - DDRAM, DDR3, DDR4, DDR5
  - PROM, EEPROM
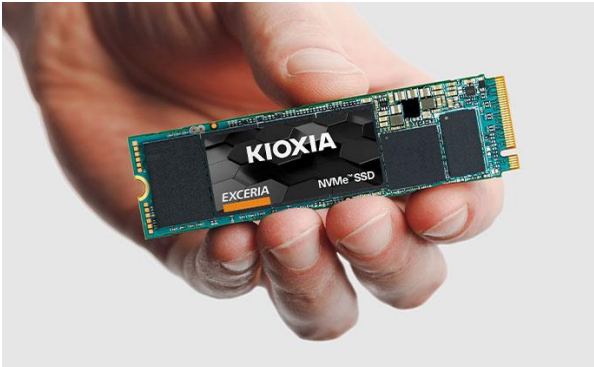
Storage

- Disk Drive
  - Flash Memory
    - Flash Disk, Jump Drive, USB Drive
    - SSD (**S**olid **S**tate **D**rive)
    - M.2 SSD
  - Disk Drive (Hard Disk)
  - Removeable Media
    - Floppy Drive, CD (Compact Disk), DVD (Digital Video Disk), Blu Ray
- Tape Drive
- External Storage
- Online Storage

Choosing Computer Storage
Solid State Device

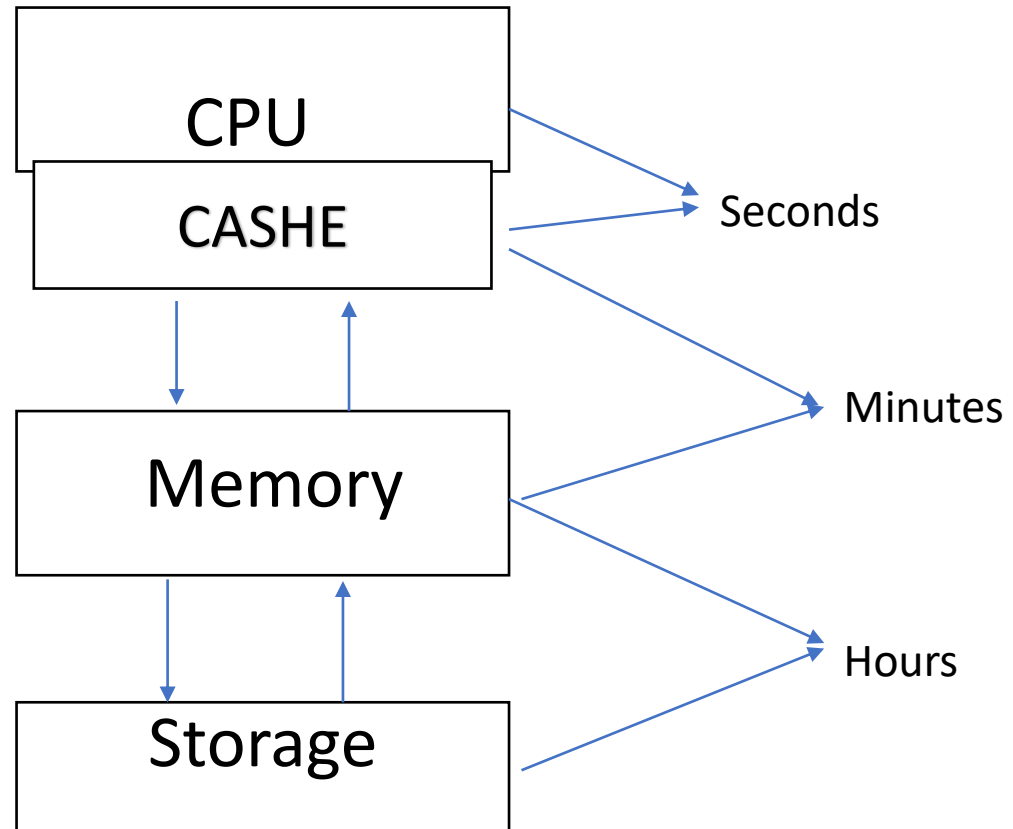| Parameters of Comparison	SSD	NVMe
Full Form	SSD stands for solid-state drive.	NVMe stands for non-volatile memory express.
Definition	SSD is a storage device that makes use of integrated circuits to store data. It works as a secondary storage device.	NVMe is an open logical-device interface specification that is used to access non-volatile storage media at high speed. It's a protocol rather than being a device.
Speed	It has the read-write speed of 600 MB per second.	It has the read-write speed of 2000 MB.
Performance	They transfer data slower than NVMe.	They transfer data 25 times faster than SSD.
Power Efficiency	SSD requires less power for their functioning.	NVMe consumes a lot of power while working as well as in their standby mode.
Security	SSD devices can be encrypted.	NVMe is more secure than SSDs as it provides industry standard security solutions.
Cost Efficiency	SSD devices are cheaper than NVMe.	It is more expensive than SSD devices.
Compatibility	SSD devices are compatible with almost every device.	NVMe does not fit SATA ports and needs an M.2 port.

Choosing Computer Storage

Comparison Between Hard Drives, SSD and NVMe

	Hard Drive	SATA SSD	NVMe SSD
Interface Type	SATA-III	SATA-III	PCIe Gen 3.0 x4, NVMe 1.3
Read/Write Speeds	Around 130 MB/s	Around 500 MB/s	3,500 MB/s
IOPS	Up to 100 IOPS	Up to 100,000 IOPS	Up to 500,000 IOPS
Reliability (MTBF)	About 50,000 Hours	1.5 Million Hours	1.5 Million Hours
Available Capacities	500GB - 12TB	250GB - 4TB	250GB - 2TB
Hot-Swap Capable	✓	✓	No - U.2 Format Only
Average 500GB Drive Price	$40.00	$65.00	$100.00
S.M.A.R.T Support	✓	✓	✓
PassMark Benchmark Score	1040	4737	21,975

Graphics Processor

- Imbedded Graphics
  - Shares memory with the CPU
  - Available on most computers
  - Built into Newer CPU chip set.
- Graphics Card
  - Has its own memory
  - Will give you high resolution.
  - Can process pictures and videos on the Graphics Card
  - Require PCI Express slots on mother board
  - Cost run from $50 to $900

Computer Diagram

Computer Operating System

OS (Operating System)
    Windows (Microsoft)
        Win 7, 8, 8.5
        Win 10
        Win 11
    Mac (Apple)
    Linux
        Debian, Ubuntu, Mint, Fedora, Red Hat
    Chrome OS (Google)
        Chrome Books
    Android (Table / Phone)
    iOS   (Table / Phone)

Variable Program

- Installed Programs and Applications
  - Office Applications
  - Word Processors
  - Games
  - Pictures and Video Editors
  - Art and Graphics
  - Programs and Applications Development
  - Music Editors/ Players
  - Anti–Virus and Anti-Malware
  - ????

Variable Program

- Online or Web Programs and Applications
  - Office Applications
  - Word Processors
  - Games
  - Pictures and Video Editors
  - Art and Graphics
  - Music Editors/ Players
  - Genealogy
  - Banking and Financing
  - Home Security
  - Hobbies
  - Internet of Things
  - ?????

What is a Computer?

- The standard recognized Computers
  - Desktop
  - Laptop
  - Tablet
  - Cellphone
- What commonly used devices that can be defined as computers.
  - Smart TV
  - Navigation Devices (GPS)
  - Personal Assistance
    - Google Assistance   (Hey Google)
    - Apple Siri   (Siri)
    - Amazon Echo Dot   (Alexa)

Internet

- What use would a computer be with out the Internet
  - Before the Internet
    - Type letters and reports to send by mail
    - Play a game on computer
  - After the Internet
    - Email
    - Web application
      - Genealogy
      - Online Banking
      - News
      - Sharing sights
        - Cooking and Craft Idea
    - ?????

Internet of Things

- ## What is IoT
  - ### Smart Devices have a Linux computer chip
    - Connect to the internet through Wi-Fi
    - Uses internet connection to communicate to other smart devices
- ## Well known devices most of us know
  - Smart Doorbells
  - Home Thermostat
  - Smart watch and fitness trackers
  - Security Light / Camera / Alarms
  - Security Fire or Flood Alarms
  - Electronic Assistance
  - Video conferencing or chates

Internet of Things

- Less well-known devices
  - Light Bulbs
  - Door Lock
  - Appliances
    - Stove
    - Refrigerator
    - Iron
  - Yard Watering Timer
  - Open or close Blinds or Curtains
  - ???

What are We using Our Computers For

- Hubble Space Telescope
- Hobbles
  - Raspberry Pi
  - Arduino
- Monitor Stock and Bonds
- Online Class or Training
- 3 D printers
- Laser Etching or Engraving

Question ?

- Ideas
- Share your own experiences
- Ask how you might try to accomplish a project
- Looking for new Ideas

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