



Computer Fundamentals



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Agenda



- ▶ Introduction
- ▶ What is Computer
- ▶ How computers work
- ▶ Operating Systems

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Introduction



1

Were you able to finish
pre-class material?



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Students choose an option

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Introduction



How long did it take to
finish it?



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▶ Introduction



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What is Computer



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► What is Computer



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► What is Computer



Question:

Think outside of the box and tell me a computer not in traditional sense.



Students, write your response!

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► What is Computer



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► What is Computer



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► What is Computer



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► What is Computer



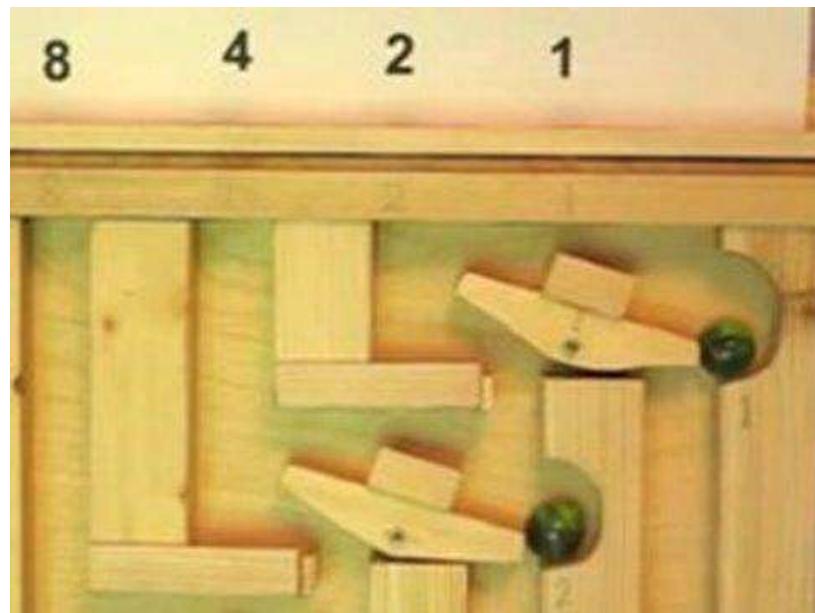
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► What is Computer



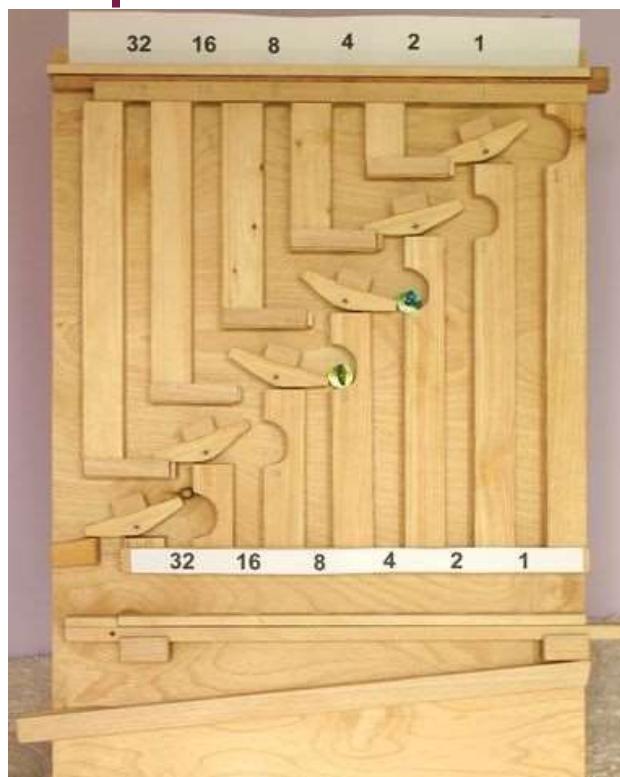
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Students browse: www.youtube.com/embed/GcDshWmhF4A

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► What is Computer



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► What is Computer



- A computer is...

a device that accepts data or **input** and **store** it to somewhere. Then **processes** this data in someway to automatically produce a **result or output**.



2 How Computers Work

► How Computers Work

- So how does computers work?
- Let's shop on Apple.com

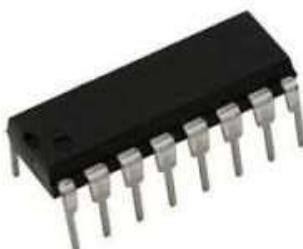


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► How Computers Work

- CHIPS AND TRANSISTORS



1956 Nobel Prize in Physics

- Semi-conductor
- Cheap
- Small
- Very low sensitivity
- Very low energy consumption

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► How Computers Work



**Central Processing Unit
(Brain of the Computer)**

**4.6 GHz = 4.6 Billion cycles
per second**

► How Computers Work



DATE	CPU	Number of transistors
1972	Intel 8008	3,500
1982	Intel 80286	134,000
1993	Pentium	3,100,000
2000	Pentium 4	42,000,000
2012	Quad-Core + GPU Core i7	1,400,000,000



► How Computers Work

RAM (Random Access Memory)

- Temporary
- Fast
- Expensive



► How Computers Work

Hard Drive

- Moving Parts
- Slow
- Cheap
- Vulnerable



► How Computers Work

Hard Disk Drive (HDD) vs SSD vs NVMe



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► How Computers Work



Performance Summary:

Hard Drive: 103 MB/sec read, 96 MB/sec write speed
SSD Drive: 558 MB/sec read, 532 MB/sec write speed
M.2 Drive: 2591 MB/sec read, 1544 MB/sec write speed

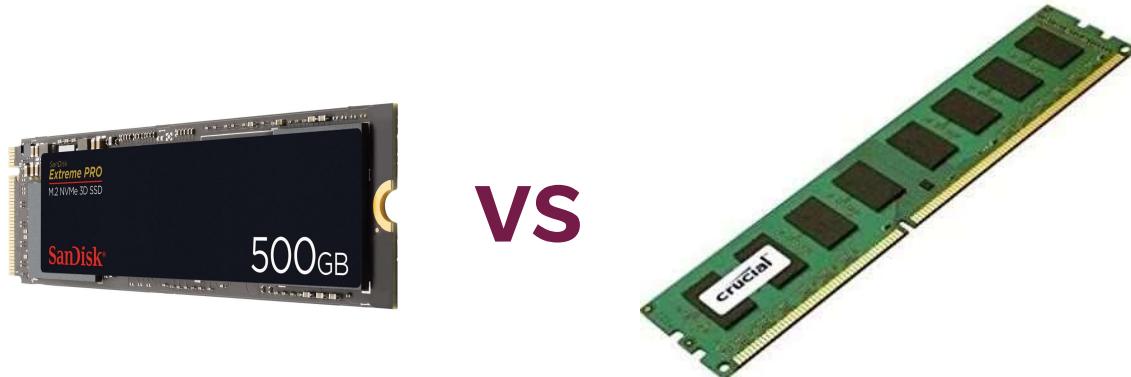
In Read Performance:
SSD is 5x Faster than HDD
M.2 is 5x Faster than SSD
M.2 is 25x Faster than HDD

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► How Computers Work

Question: How about NVMe vs RAM?

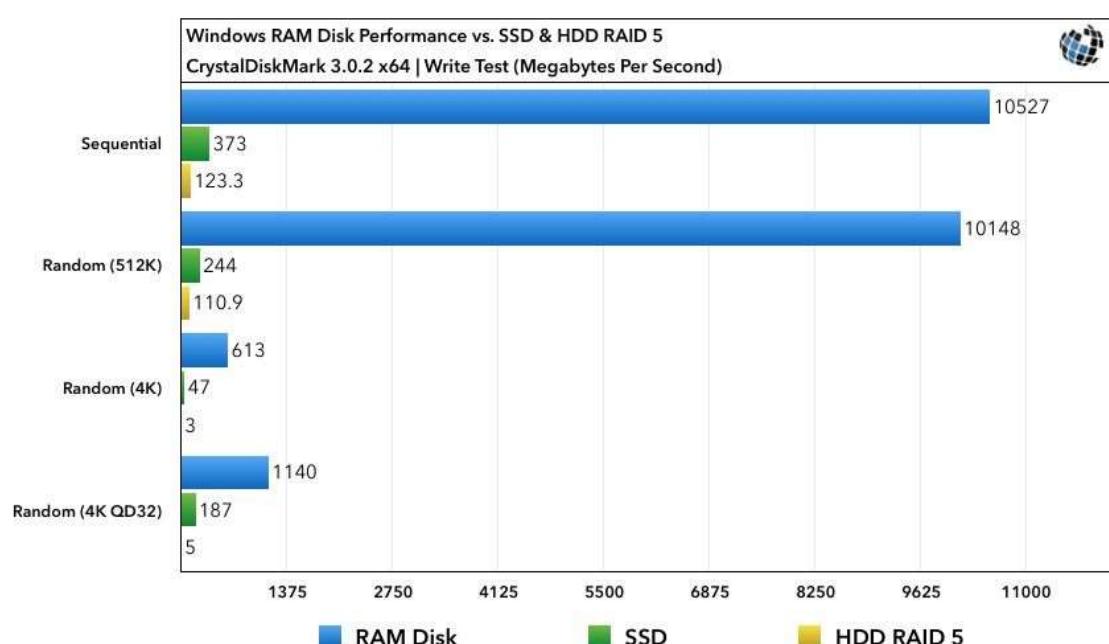


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► How Computers Work



► How Computers Work



GPU (Graphical Processing Unit)



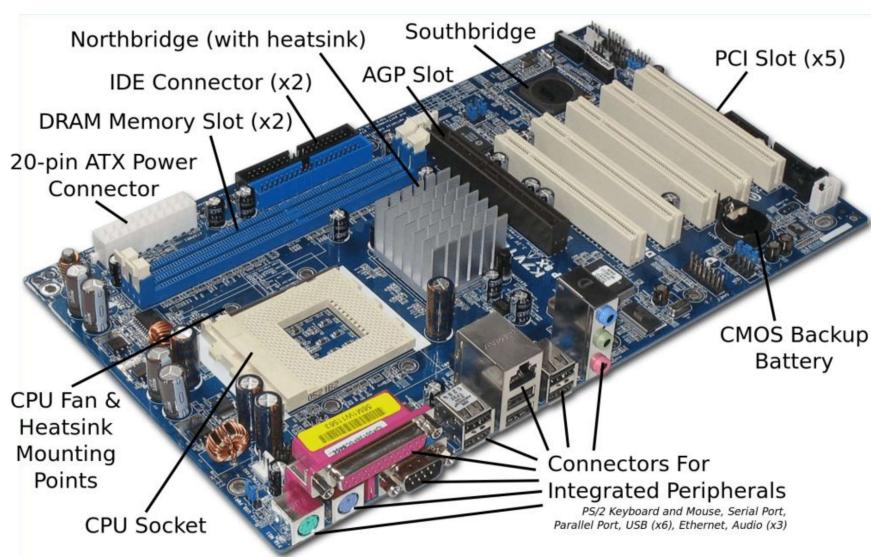
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► How Computers Work



Mainboard or Logic Board



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► How Computers Work



Hard Drive vs RAM

Hard Drive



RAM



CPU



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► How Computers Work



Input and Output Devices



Students, write your response!

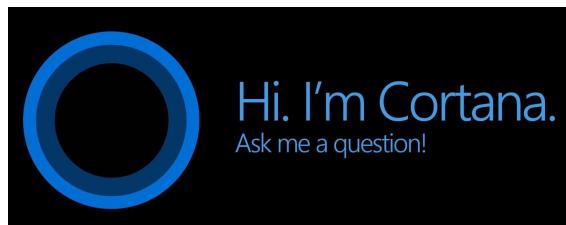
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► How Computers Work



???

► How Computers Work



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► How Computers Work

- Virtual Reality / Augmented Reality / Mixed Reality



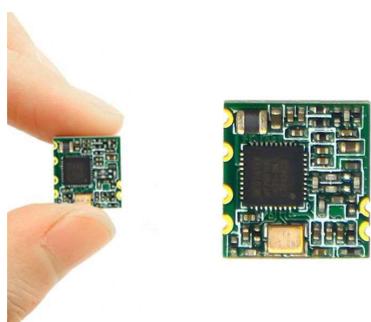
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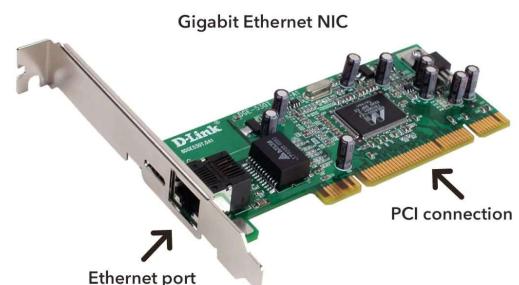
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► How Computers Work

- Communication Devices

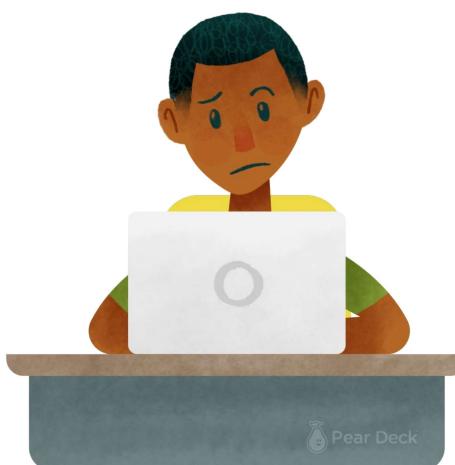


Wireless Adapter



Network Interface Card

Drag your dot to how you are feeling:



Students, drag the icon!



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► Operating Systems



► Operating Systems



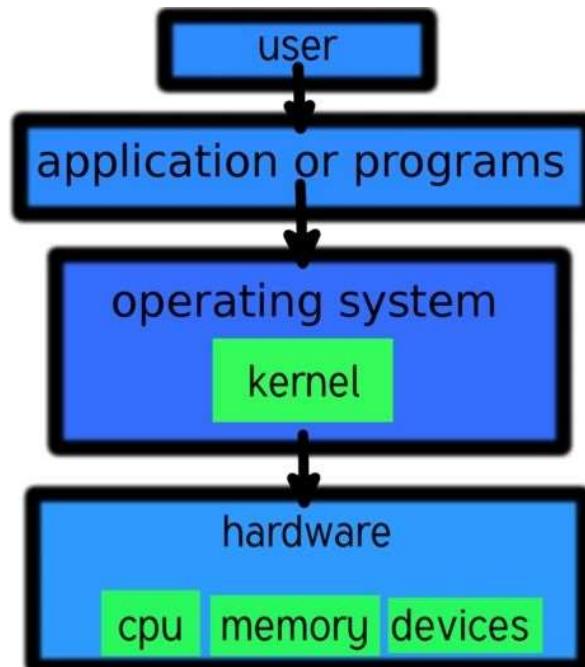
► Operating Systems



- **OPERATING SYSTEMS:**
AN OPERATING SYSTEM (OS) IS SYSTEM SOFTWARE THAT MANAGES COMPUTER HARDWARE AND SOFTWARE RESOURCES AND PROVIDES COMMON SERVICES FOR COMPUTER PROGRAMS REQUIRE AN OPERATING SYSTEM TO FUNCTION.



► Operating Systems

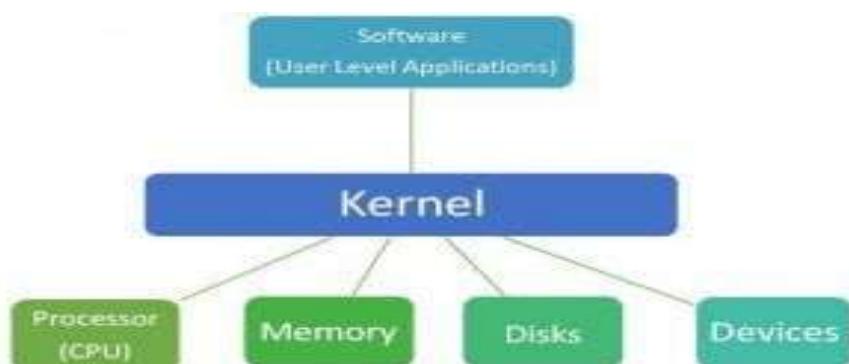


► Operating Systems



Kernel:

It connects applications to the actual processing of data. It also manages all communications between software and hardware components to ensure usability and reliability.

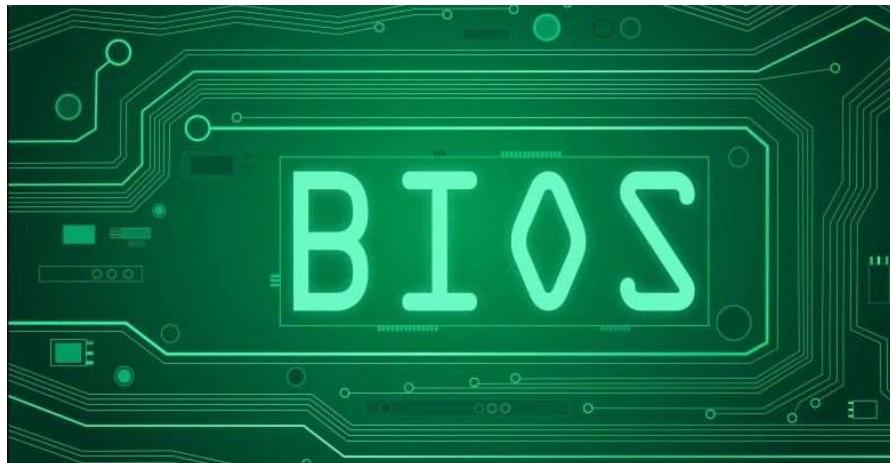


► Operating Systems



BIOS (Basic Input Output System):

It is firmware used to perform hardware initialization during the booting process (power-on startup), and to provide runtime services for operating systems and programs.



► Operating Systems



Question: What does OS manage?



Students, write your response!

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► Operating Systems



Linux



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► Operating Systems



Please write your computers and mobile phones operating system.



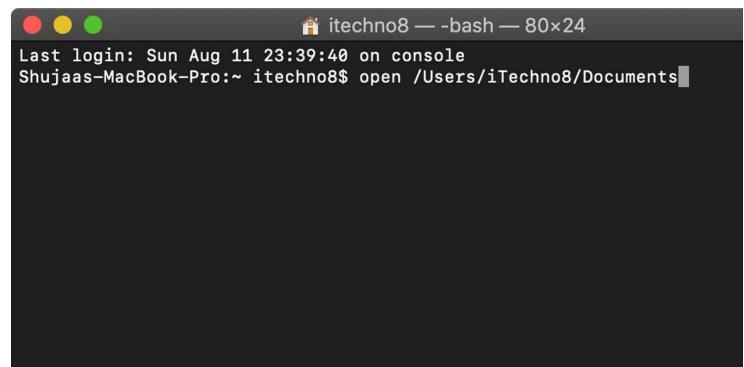
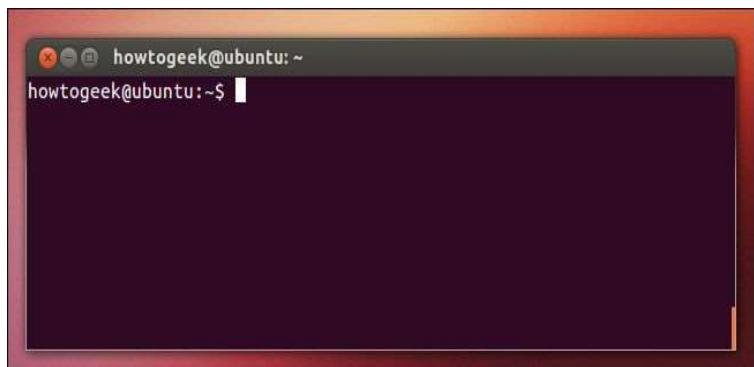
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Students, write your response!

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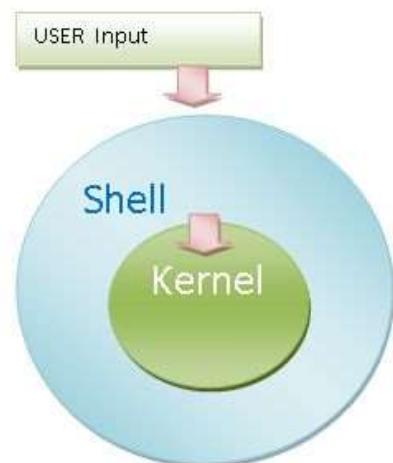
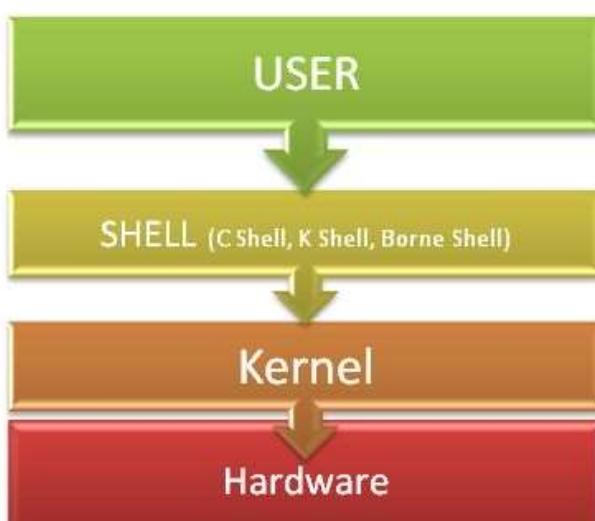
► Operating Systems

- Terminal



► Operating Systems

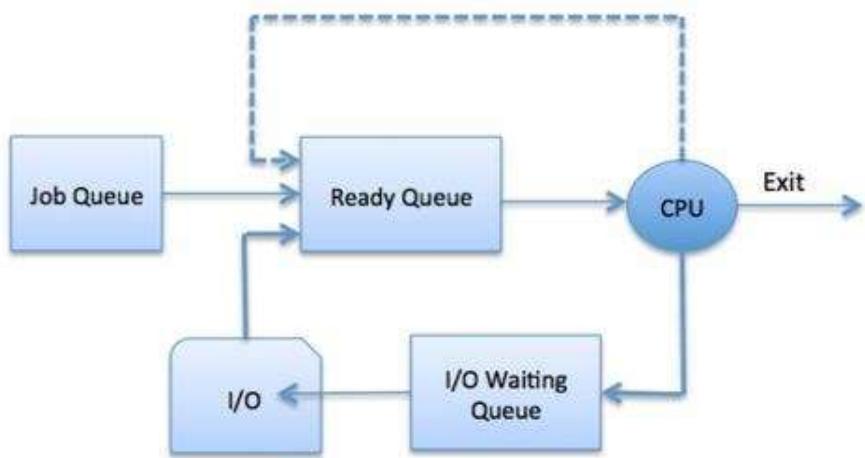
- Shell



► Operating Systems



What do you know about scheduling?



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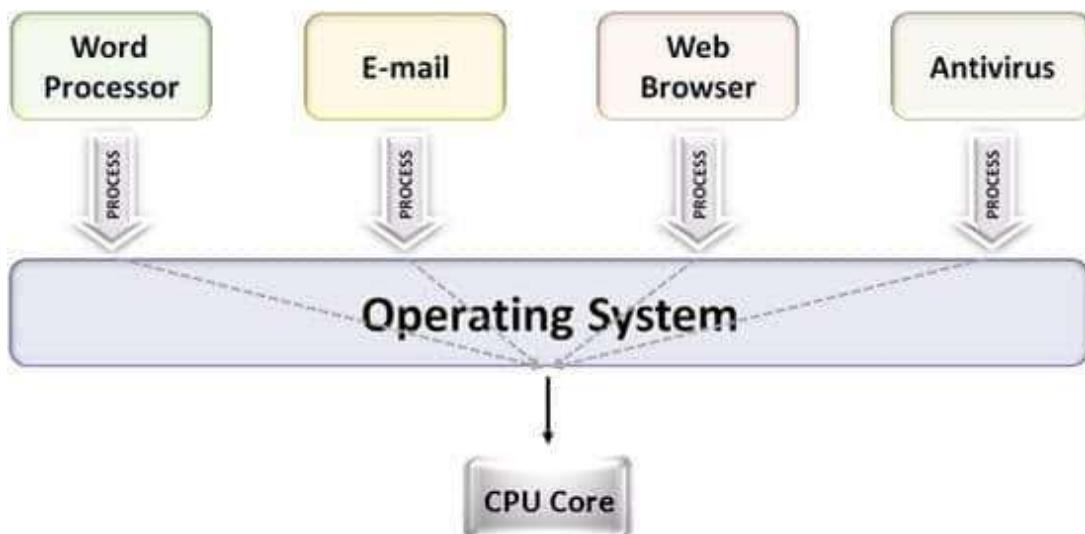
Scheduling:

- Multiprogramming
- Multiprocessing
- Multithreading

► Operating Systems



- Multiprogramming

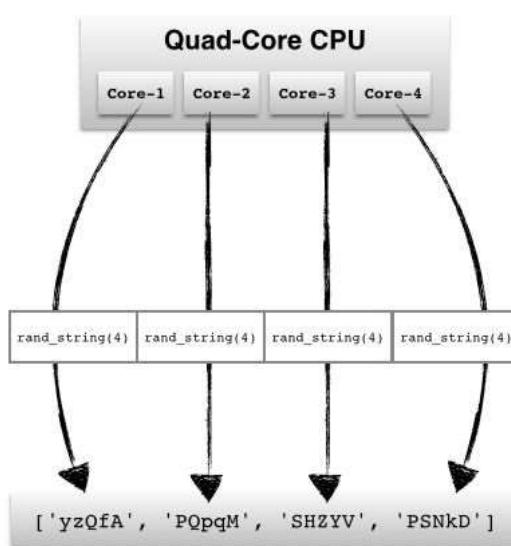


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- Multiprocessing

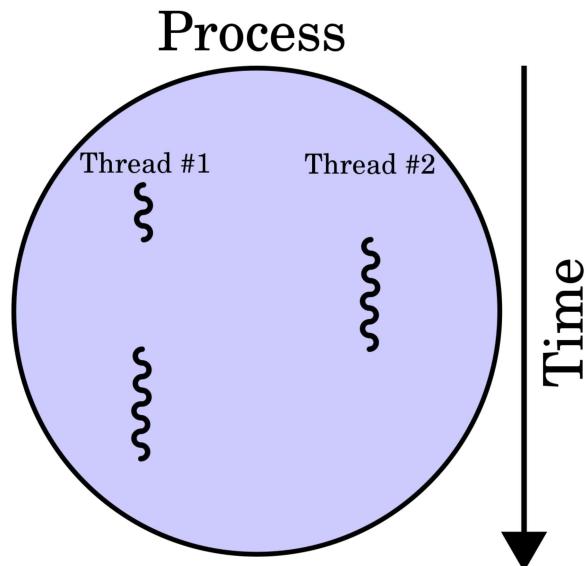
[parallel processing]



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- Multithreading



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What is the difference between processes and threads?



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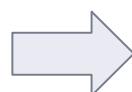
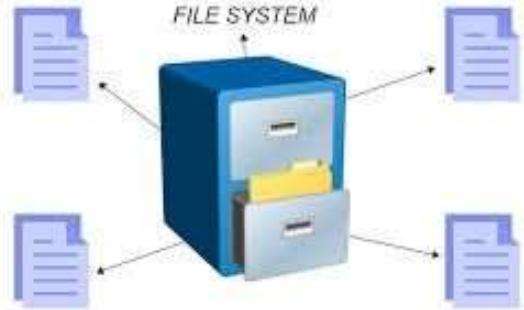
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- **Files:**

Files are spaces on your computer where data is stored.



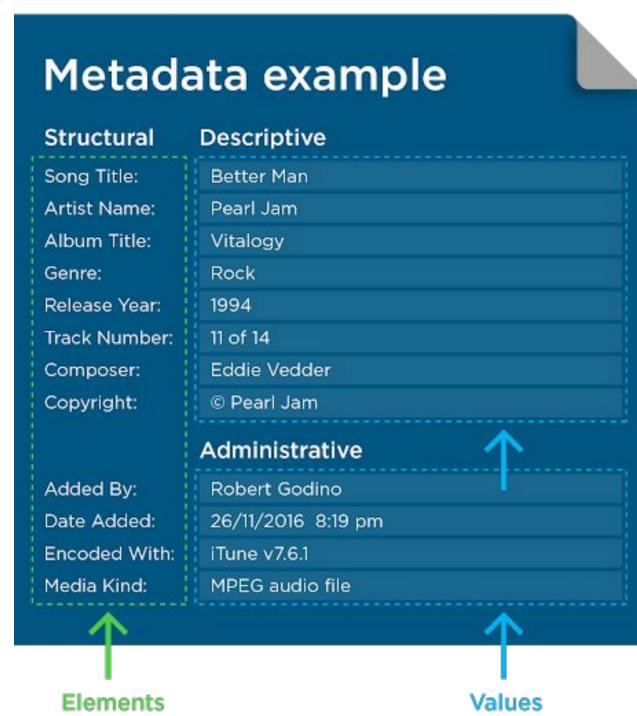
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- **Metadata**



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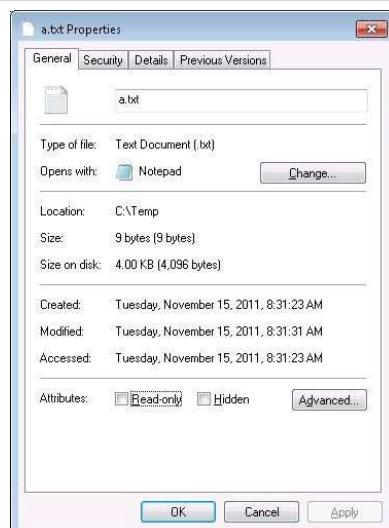
- Metadata



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- File Attributes:

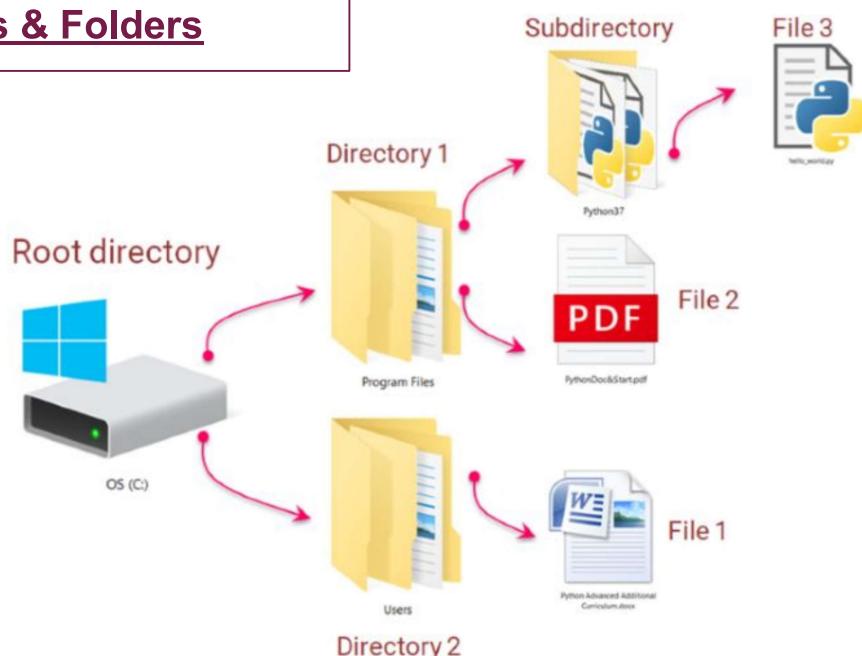
File attributes are metadata associated with computer files that define file system behavior.



► Operating Systems



- **Directories & Folders**



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Drag your dot to how you are feeling:



Keep going, I understand



I'm a little confused



Stop, I need help!



Students, drag the icon!



THANKS!

Any questions?

You can find me at:

- ▶ @raymond
- ▶ raymond@clarusway.com
- ▶ @Tomy
- ▶ tomy@clarusway.com
- ▶

