What is an Operating System?

- The most important program that runs on your computer. It manages all other programs on the machine.

- Every PC has to have one to run other applications or programs. It's the first thing "loaded".

Operating System

- It performs basic tasks, such as:
  - **Recognizing input** from the keyboard or mouse,
  - **Sending output** to the monitor,

Operating System

- Keeping track of files and directories on the disk, and
- Controlling peripheral devices such as disk drives and printers.

Is There More Than One Type of OS?

- Generally, there are four types, based on the **type of computer they control** and the **sort of applications they support**.

1. Single-user, single task

This type manages the computer so that one user can effectively do one

Types of Operating Systems

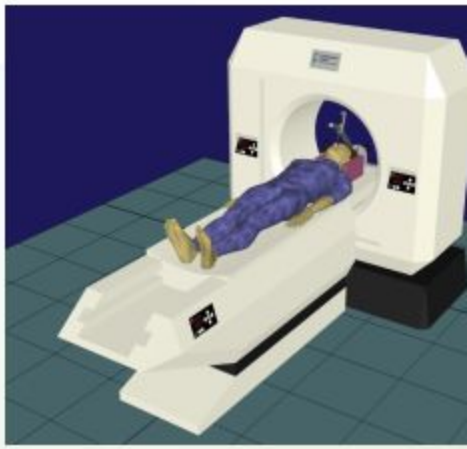
2. Multi-user, multi-task

Allows two or more users to run programs at the same time. Some operating systems permit hundreds or even thousands of concurrent users.

Mainframe

Types of Operating Systems

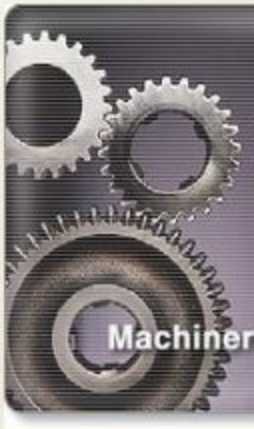
3. Real Time Operating Systems



RTOS are used to control machinery, scientific instruments, and industrial systems.

There is typically very little user-interface capability.

Resources are managed so that a ***particular operation executes precisely the same every time***.



Types of Operating Systems

4. Single-user, Multi-tasking

This is the type of operating system most desktops and laptops use today.

Microsoft's Windows and *Apple's MacOS* are both examples of operating systems that will let a single user have several programs in operation at the same time.

Microsoft Windows

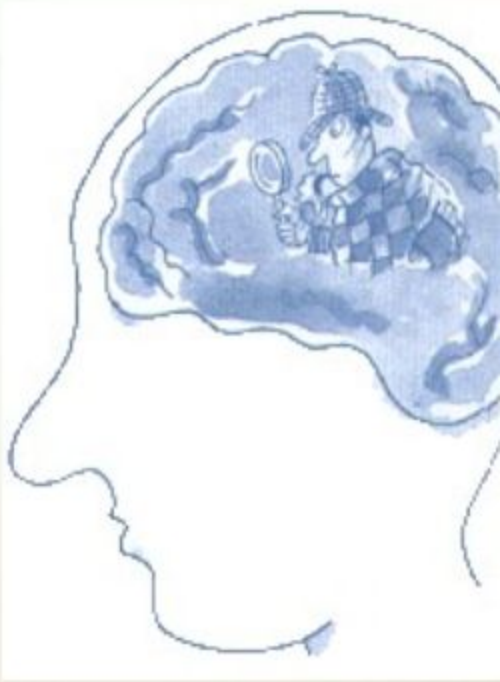
Mac OS

OS's Manage Applications

- Operating systems provide a software platform on top of which other "application" programs can run.
  - The application programs must be written to run on a particular operating system.
  - So, your choice of operating system determines what application software you can run.

Operating System Functions

- Besides managing hardware and software resources on the system, the OS must manage resources and memory.



- There are two broad tasks to be accomplished.

OS - Memory Storage and Managemen

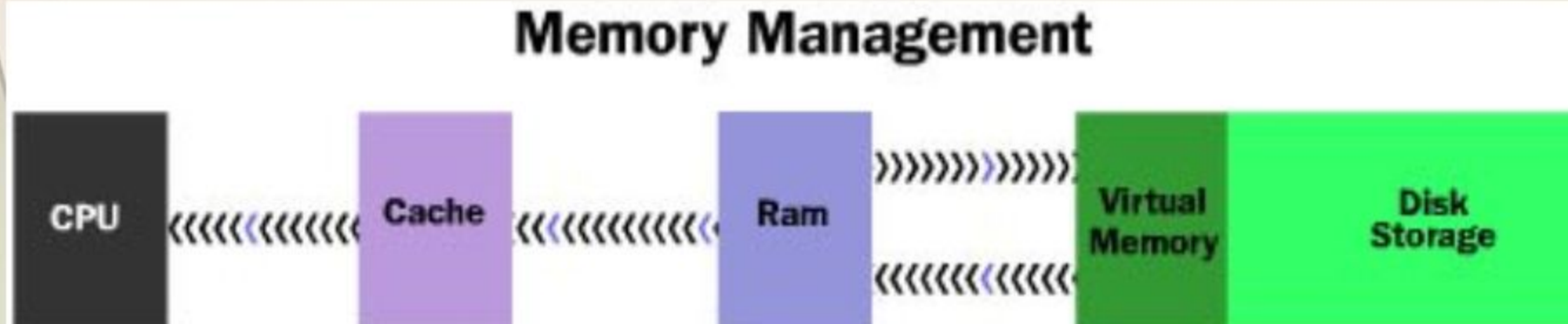
1. Each process must have enough memory in which to execute, and

   It can neither run into the memory space of another process,

   Nor be run into by another process.

OS - Memory Storage and Managemen

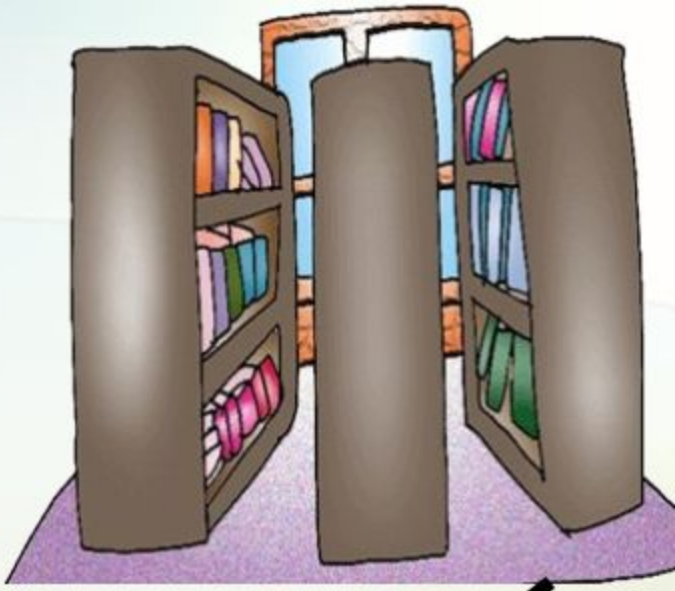
1. The different types of memory in the system must be used properly so that each process can run most effectively.



Cache Memory

- **Cache** - A section of a computer's memory which **temporarily retains recently accessed data** in order to speed up repeated access to the same data.

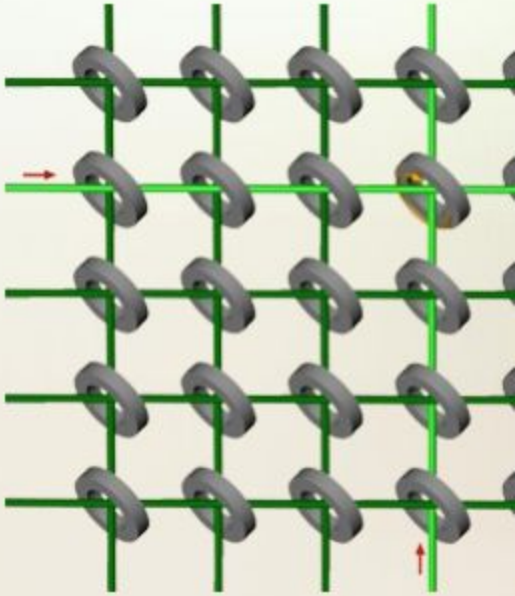
- It provides **rapid access** without having to wait for systems to load.



RAM Memory

- **Random access memory (RAM)** is the best known form of computer memory.

- RAM is considered "random access" because you can **access any memory cell directly** if you know the row and column that intersect at that cell.



RAM Memory

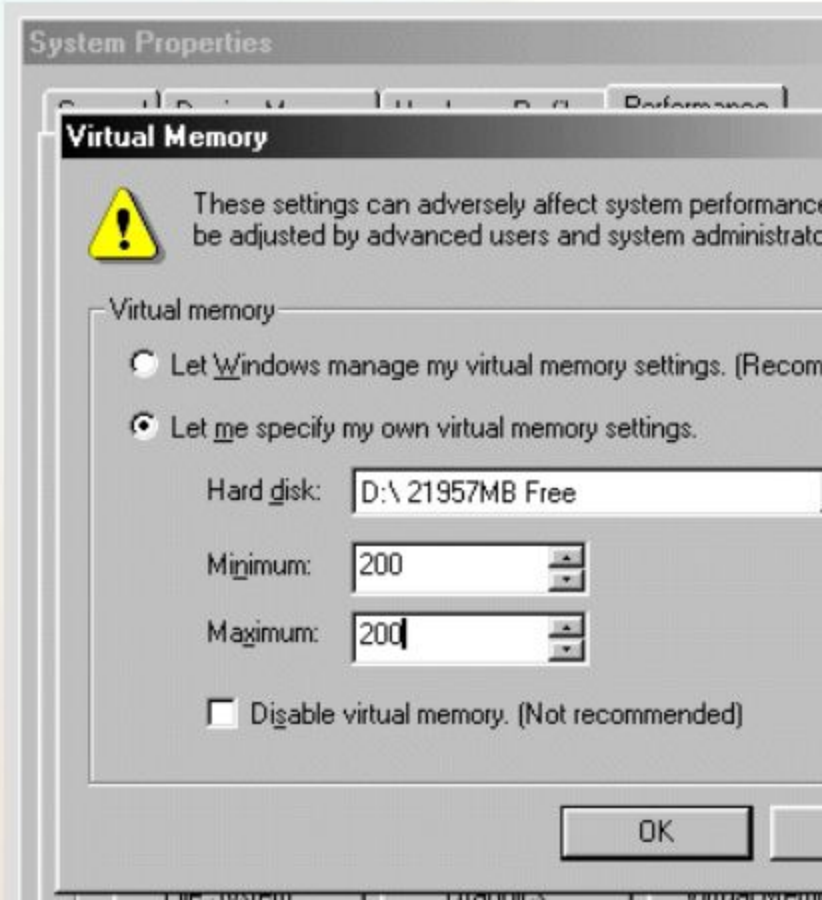
- The more RAM your computer has, the faster programs can function. The two main types are called DRAM and SRAM. SRAM is faster than DRAM, but, more expensive.

Remember, that if the power is turned off, then all data left in RAM, that has not been saved to the hard drive, is lost.

Virtual Memory

- **Virtual Memory** – a method of using **hard disk space** to provide **extra** memory. It simulates additional RAM.

- In Windows, the amount of virtual memory available, equals the amount of **free RAM** plus the amount of **disk space** allocated to the **swap**



Evolution of Operating Systems

- The evolution of operating systems is directly dependent to the development of computer systems and how users use them. Here is a quick tour of computing systems through the past fifty years in the timeline.

Early Evolution

- 1945: ENIAC, Moore School of Engineering, University of Pennsylvania.
- 1949: EDSAC and EDVAC
- 1949 BINAC - a successor to the ENIAC
- 1951: UNIVAC by Remington
- 1952: IBM 701
- 1956: The interrupt
- 1954-1957: FORTRAN was developed

Operating Systems by the late 1950s

- By the late 1950s Operating systems were well improved and started supporting following usages :
- It was able to Single stream batch processing
- It could use Common, standardized, input/output routines for device access
- Program transition capabilities to reduce the overhead of starting a new job was added
- Error recovery to clean up after a job terminated abnormally was added.
- Job control languages that allowed users to specify the job definition and resource requirements were made possible.

Operating Systems In 1960s

- 1961: The dawn of minicomputers
- 1962 Compatible Time-Sharing System (CTSS) from MIT
- 1963 Burroughs Master Control Program (MCP) for the B5000 system
- 1964: IBM System/360
- 1960s: Disks become mainstream
- 1966: Minicomputers get cheaper, more powerful, and really useful
- 1967-1968: The mouse
- 1964 and onward: Multics
- 1969: The UNIX Time-Sharing System from Bell Telephone Laboratories

Supported OS Features by 1970s

- Multi User and Multi tasking was introduced.
- Dynamic address translation hardware and Virtual machines came into picture.
- Modular architectures came into existence.
- Personal, interactive systems came into existence.

Accomplishments after 1970

- 1971: Intel announces the microprocessor
- 1972: IBM comes out with VM: the Virtual Machine Operating System
- 1973: UNIX 4th Edition is published
- 1973: Ethernet
- 1974 The Personal Computer Age begins
- 1974: Gates and Allen wrote BASIC for the Altair
- 1976: Apple II
- August 12, 1981: IBM introduces the IBM PC
- 1983 Microsoft begins work on MS-Windows
- 1984 Apple Macintosh comes out
- 1990 Microsoft Windows 3.0 comes out
- 1991 GNU/Linux
- 1992 The first Windows virus comes out
- 1993 Windows NT
- 2007: iOS
- 2008: Android OS

Conclusion

- And the research and development work still goes on, with new operating systems being developed and existing ones being improved to enhance the overall user experience while making operating systems fast and efficient like they have never been before.

Thank you for your attention!