

General Items:

- ? Computer security
- ? Computer purchasing

Reading Materials:

- ?

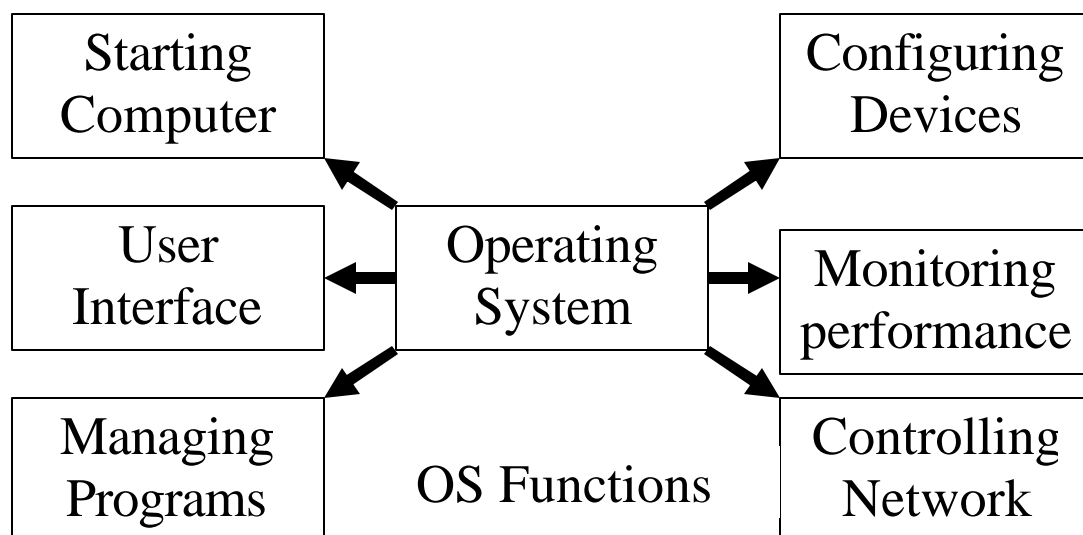
Miscellaneous:

Type of software

- System Software
 - o programs controlling the operation of the computer and devices
 - ✍ Operating system programs (platform)
 - ✍ Utility programs
- Application (perform a specific task)
 - o Graphics, Multimedia, Web page designer, Communication software
 - o Designed for a specific OS – some can be cross-platform

Operating system (OS)

- An OS is a set of programs that coordinate activities between computer hardware resources
- Also called software *platform*
- It typically resides in the hardware or ROM
- Examples: Windows XP, Mac OS X

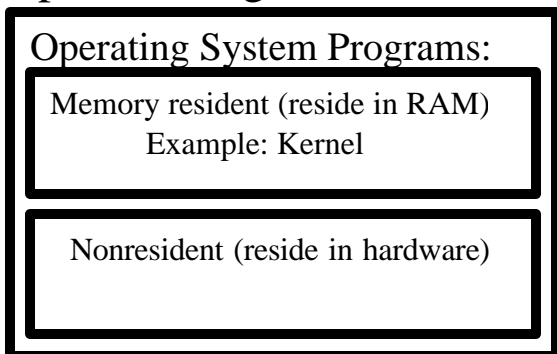


Basic idea

- Not all computers need OS
 - o hardware is fixed, same program is run at all times
- Examples: Macintosh, Windows, Unix
- Functions:
 - o Manages hardware and software resources
 - o Applications to deal with hardware
- Four types:
 - o Real time (very little user-interface capability and no end-user utilities)
 - o Single user-single task (Palm OS - DOS)
 - o Single user-multitask (Desktop)
 - o Multi user (Networking)

Computer booting (wakeup-call)

- This is one of the basic OS functions
- Bootstrap: a program that loads the OS into the RAM
- Booting: Computer *startup* or *restarting* process
 - o Cold booting or warm booting
 - o Upon booting -> OS instructions are loaded in the RAM



- o Kernel: Instructions managing memory and devices, application startups, maintains computer's clock – Core or OS

Starting a computer:

- Power up
- Processor reset, Finding the ROM BIOS chips
 - o *Basic Input/Output System* (contains startup instructions)
 - o Executes a series of tests to make sure all devices are operational (keyboard, monitor, internal busses, RAM chips, etc.)
- BIOS performs the POST: Power-on self test
 - o The result is compared with the information recorded in the CMOS chip
 - o CMOS chip maintains the information about system configuration, memory, other devices
 - o Finds new devices
 - o Detects any device errors
- BIOS starts searching for “system files” (drive A, C, CD, etc.)
 - o .COM, .DRV, .DLL, .366, etc.
 - o System files are loaded in the RAM
- The KERNEL is loaded in the memory (the operating system takes over!)
- The operating system loads the system configuration
 - o System configuration information are in REGISTRY files
- Files in the Startup Folder are executed

User Interface

Interacting with software through user interface

- Command line (command language)
- Graphical (GUI) – menu, Icons

Managing programs

- Single user/single tasking
- Single user/multitasking
 - o Foreground and background processing
- Multi users

- Multi processing (supporting two or more processors)
 - o Fault-tolerant computer (duplicated components)

Memory Management

- Used to optimize the use of RAM
 - o How to distribute data, instructions, programs in different memory locations
 - o Clearing unused memory locations
- Virtual memory
 - o Optimizing the RAM
 - o Using hardware disk as additional RAM (called **swap file**)
 - o Paging: technique of swapping items between memory and hard drive: Swap out (of RAM), Swap in (the RAM)
 - o When paging time is too long -> more RAM is required (Thrashing) – not much execution is going on!

Scheduling job

- The operating system performs operations (**jobs**) based on some order
- Serving disciplines: FCFS operations, Priority Operations
- Buffering: Waiting for available resources
- Spooling:
 - o Buffering PRINT jobs (advantage?)
 - o Jobs are QUEUED (stacked)
 - o Print spooler: a program that places jobs in the queue

Configuring devices

Device drivers are used to communicate with different devices

A device driver is a program: how the processor should communicate with a device – Print drivers (*.drv)

Installing drivers

Plug and play (computer recognizes the device)

Monitoring performance

- Operating systems can monitor system performance
- Uses a performance monitor program (resident or nonresident program?)
- Includes: Disk usage, memory usage, processor activities, number of reads and writes to a file – provides a good way to measure your system resources (need more VM?)

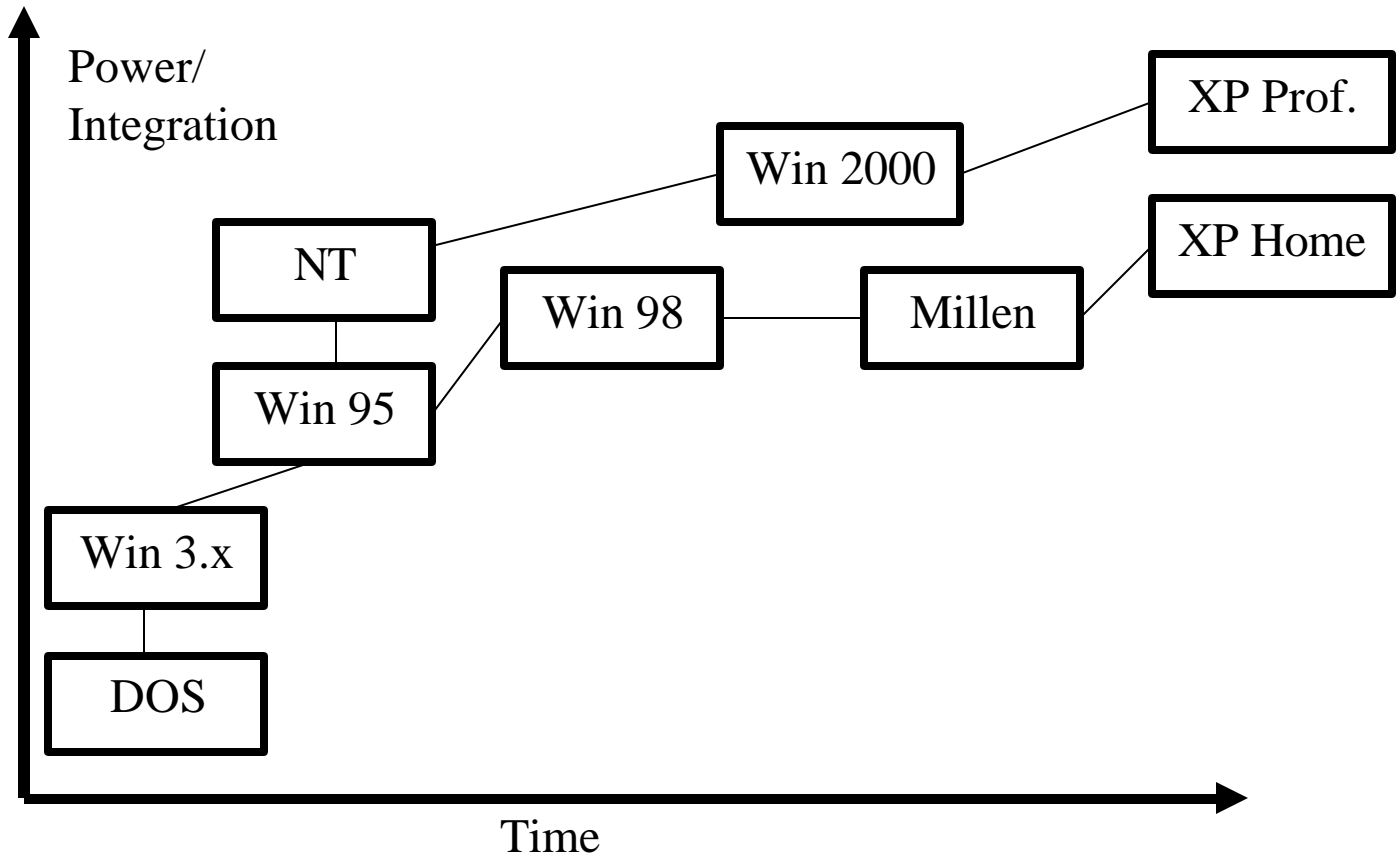
File management services

- Include storage and file management functions
- Includes:
 - o Formatting and disk copying
 - ✍ Formatting: Preparing a disk for reading and writing
 - ✍ When a disk is formatted it loses all its information
 - o Checking the available storage
 - o Copy, renaming, deleting, moving, creating short cuts

Controlling a network

- Operating systems can be Network OS (NOS)
- Connecting a server and several clients
- Sharing resources / resource allocation

Types of operating systems



DOS:

- MS-DOS (Disk Operating System) 1980
- Used for personal computers
- IBM Compatibles
- Uses Command lines

Windows 3.x:

- DOS driven program with GUI interface (3.1, 3.11, etc.)
- DOS-based OS with GUI operating environment
- Not multitasking
- Based on 16-bit processors

Windows 95

- Multi tasking OS (not based on DOS)
- Uses 32-bit processors
- Used for Windows NT

Windows Me

- Upgrade to 98
- For home users
- Optimized for digital photography and movies, audio, web design, home networking

Windows XP

- Home and professional editions
- Movie Maker
- Better file sharing
- Fast startup
- Better security

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Stand-alone	<ul style="list-style-type: none"> • DOS • Windows 3.x • Windows 95 • Windows NT Workstation • Windows 98 • Windows 2000 Professional • Windows Millennium Edition • Windows XP Home Edition • Windows XP Professional Edition • Mac OS X • OS/2 Warp Client • UNIX • Linux
Network	<ul style="list-style-type: none"> • NetWare • Windows NT Server • Windows 2000 Server • Windows .NET Server • OS/2 Warp Server for E-business • UNIX • Linux • Solaris
Embedded	<ul style="list-style-type: none"> • Windows CE • Pocket PC 2002 • Palm OS

Types of operating systems:

- **Stand- alone: Complete OS working on a desktop, notebook, etc. Examples: Window XP, Mac, Linux, UNIX**
- **Network: Designed to support networks, typically reside on the server,**
- **Embedded: Reside on a ROM chip – used for PDAs mobile devices, Examples: Windows CE, .NET, Windows Mobile**

Type of software

- Application (perform a specific task)
 - Graphics, Multimedia, Web page designer, Communication software
- System Software
 - programs controlling the operation of the computer and devices
 - ✍ Operating system programs
 - ✍ Utility programs

Utility Programs

- A system software that typically manages a computer, its devices or its programs
- Utility suites: collection of several utility programs
- Examples of utility programs: Norton Utilities, McAfee
- Basic utility files:
 - File viewer: View or copy files
 - File compression: Shrinks (Zips) the size of a file – PKZIP, PKUNZIP
 - Diagnostic utility: Compile information about the computer performance and devices - memory usage, processor utilization, etc.
 - Uninstaller: Utility that removes all the related files, typically embedded in the OS
 - Scanning files: Moves all unnecessary files, finds some physical and logical problems
 - ✍ Physical problem: bad disk, scratched CD
 - ✍ Logical problem: corrupted files

- Defragmenting: Organizing the files on the hard drive
 - ✍ Fragmented file: a files scattered on different sectors on the HD
 - ✍ Defragmenting: place files on continuous sectors
 - Backup utility: copy and backup your files
 - ✍ Program restoration: accessing the backup files
 - ✍ Using an Internet hard drive
 - Screen savers:
 - ✍ Used to be critical to avoid permanent image “etching” on monitor’s screen
 - ✍ Today mostly used for screen blocking
 - ✍ Want some cool screen savers? **<http://www.free-search.com/>**
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Who are computer hackers?

- A person who enjoys exploring the details of programmable systems and how to stretch their capabilities, as opposed to most users, who prefer to learn only the minimum necessary.
- One who programs enthusiastically (even obsessively)
- A person capable of appreciating hack value.
- A person who is good at programming quickly.
- An expert at a particular program, or one who frequently does work using it or on it.

Basic hacking operations

- Piracy (copying and using commercial software purchased by someone else)
- Sniffing gather information regarding the status of components of a network system
- Attackers (forcing to teardown the system)
- And more...

Cute hacking

- Play with the hidden files
- Change system files (boot-up logos)

Hacking software

- Password stealer (AOL password, windows, etc.)
- Sniffers
- Cracking tools
- Spy tools (monitor all key strokes, and other computer activities)

Why do we need computer security?

- Thanks to Internet a huge amount of personal information are being exchanged on the net
- Credit-card information
- Social Security numbers
- Private correspondence
- Personal details
- Sensitive company information
- Bank-account information

Basic security operations

- Encryption
- Authentication

Encryption

- Definition: Encoding the contents of the message in such a way that hides its contents from outsiders
- Goes back to the Roman Empire.
- Without a computer it is easy to break (crack) the code!
- Check the LOCK in your web page!
- Also used in cell phones and cordless phones
- The encrypted message is called the **ciphertext**.
- The process of retrieving the plaintext from the ciphertext is called **decryption**.
- Encryption and decryption usually make use of a **key**
- **Cryptanalysis** is the art of **breaking** ciphers, i.e. retrieving the plaintext without knowing the proper key
- One popular way is to have a Public-key (PGP)
- The key is based on a HASH value

Authentication

- Password
- Password card
- Digital signature
- Biometric
 - o Face scan
 - o Retina check
 - o Finger print
 - o Voice identification

Purchasing a computer

- Computer category
 - Desktop
 - Laptop
 - Supercomputer
 - Internet application
- Basic Component
 - CD/DVD – 24/48 X (150 Kbps) / 650MB & 4.7 GB
 - Modems – 56Kbps
 - Network cards - Supporting DSL
 - Printer – Ink jet; Laser
 - Monitor – LCD, CRT; 17,19,21 inches;
 - Processor – Intel; ADM 2.2 GHz
 - RAM – 256; 516 MB
 - Internet connection – Subscription to ISP, OSP
- Purchasing a laptop
 - Screen size
 - Processor
 - Hard drive size
 - Wireless card
 - Available software
 - Weight
 - Memory – RAM
 - Disk drive / CD-RW
 - Warranty
 - Built-in cam
 - Backup hard drive

– Purchasing online

- <http://www.dell.com>
 - Configure your own PC:
 - ✎ <http://www.mypcgoodies.com>
 - ✎ <http://www.directpc.ca/index.jsp>
 - Search for "**computer auction**"
 - ✎ <http://www.dellauction.com/>
 - search through eBay: www.ebay.com
 - ✎ Search for **computer, laptop**
 - ✎ You can BID on different items!
- Always check the price online!
- Check your computer configuration:
<http://www.pny.com/configurator/config.asp>

Learn more about computers:

PC	MAC	Reviews/Guides
www.shopper.cnet.com	www.store.apple.com	www.shopper.cnet.com
www.hp.com	www.clubmac.com	www.pcworld.com
www.compusa.com	www.macx.com	www.byte.com
www.dartek.com	www.apple.com	www.zdnet.com/review
www.dell.com		www.eshop.msn.com
www.gateway.com		www.macworld.com
www.micron.com		
www.global.acer.com		
www.fujitsu.com		
www.sony.com		

- Warranty?

- How expensive is it?
- How many years?
- One time?
- Covers the screen
- Buy back programs! Nothing short of hoax!

- So what do you use the computer for?
 - o School (work processing and simple projects)
 - ✍ Anything works!
 - o Mostly games
 - ✍ Lots of memory and fast processor
 - ✍ Good monitor
 - ✍ Joysticks, etc.
 - o Internet / browsing / emailing
 - ✍ Good connection
 - o Advance applications (programming)
 - ✍ Lots of memory and fast processor
 - o Multimedia (digital photography)
 - ✍ Lots of memory and fast processor
 - ✍ Good Sound card - Creative Sound Blaster Audigy 2 ZS Good
 - ✍ Video card - Quadro4 3000 FX, 256 MB, AGP 8x
 - ? 3-D display capacity
- Processor types
 - o Pentium
 - o ADM Athlon XP
 - o Celeron
- Operating system
 - o Windows
 - o Mac
 - o Unix
- Capability
 - o RAM size
 - o Processor speed
 - o CD ROM/DVD/ CD Write (CDRW)
 - o Video Card
 - o Cache
 - o Modem / drivers

- Software
 - o Office
 - o Acrobat products
 - o Games
 - o Some are just free!
- Accessories
 - o Printer
 - o Scanner
 - o Digital camera
- Smart shoppers
 - o Return policies
 - o Hidden costs

Check several places and compare prices!

Quiz

Name two types of system software programs.

Name three examples of operating systems.

What is Virtual Memory? – Where is it?

What is booting? How many types of booting we have?

What is Plug and Play?

Quiz

Name two types of system software programs.

What is Encryption?

Why do we COMPRESS files?

Name three examples of operating systems.