

5.1: Identify basic concepts, printer operations and printer components.

- Laser printers: (first 5 steps happen in the toner cartridge)
 - Print process
 - Cleaning EP drum is cleaned with a rubber blade before it can take on a new image
 - Conditioning: Erase lamps shine on the photosensitive *drum* to remove any residual *toner* particles. Then the *primary corona wire* uses a highly charged negative (-600V) field to apply a uniform negative charge on the drum. The EP drum is given a negative charge of approximately -600 Volts by the primary corona wire
 - Writing: A laser draws out the image on the drum. Anywhere the laser strikes, the drum gains a positive charge. A laser beam is used to write to the EP drum, causing the dots on the drum to lose some of the negative charge and become relatively positively charged.
 - Developing: The drum turns through the toner powder. The toner particles are attracted to stick to the positive areas of the drum, and repelled by the negative areas. A toner is transferred from the toner cylinder to the EP drum by attracting to the area of the drum that has relative positive charge.
 - Transferring: The *transfer corona (moves the ink from the drum to the paper)* wire imparts a highly positive charge +600V on the sheet of paper. When moved past the drum, the positively charged paper attracts the toner particles from the drum to the paper. The transfer corona wire charges the paper with a high positive charge. The EP drum turns as the paper passes under it, pulling the toner into the paper. A static charge eliminator prevents the paper from wrapping around the drum.
 - Fusing: The *compression rollers* and the quartz-lamp heated *fusing roller* press and melt the toner into the paper. The paper passes between the heated fuser roller and the rubber roller, the toner is melted and pressed into the paper. The heated roller reaches the temperature of about 180 degrees Celsius. The temperature sensor on the fuser roller will shut down the printer if the temperature gets dangerously high. Finally the excess toner is scrubbed off the paper by the cleaning pad.
 - End of cycle The paper with the final image is rolled out of printer. The eraser lamp is turned on near the surface of the EP drum, causing the drum to lose its charge.

The toner is a combination of plastic, metal and organic compounds. In most laser printers the toner and EP drum are contained in one "toner cartridge". Do not recycle the toner cartridge, it needs to be replaced.

- A paper jam can occur when the wrong type of paper is used. It can cause more than one page to enter the registration rollers. A jam can also be caused by the bad separator pad.
- Laser printers use a *platen* to feed the paper through.

Types of Laser Printers

- EP (Electrophotographic)- Uses static charges, laser light, and toner. Process: Charging, Exposing, Developing, Transferring, Fusing, and Cleaning.
- HP (Hewlett Packard)- Very similar to EP Process. Process: Conditioning, Writing, Developing, Transferring, Fusing, and Cleaning.
- LED (Light Emitting Diode)- Uses LEDs held very close to the drum in place of the laser.
- Parallel interface- Transfers 8bits at a time over 8 wires.
- Standard; non bi-directional. 150KB/sec. Limited to 10 Feet.
- Bi-directional; bi-directional parallel interface.
- Enhanced; greater Transfer speeds and can send memory addresses.
- ECP; designed to transfer Data at high speed to printers.
- EPP; supports bi-directional throughput from 150KB/sec to 1.5MB/sec.

Inkjet printers:

- Inkjet printers produce images by squirting a precisely controlled stream of ink drops onto the paper.
- Ink drops are sprayed by using *thermal shock* or *mechanical vibration*.
- Inkjet printers use a platen to feed the paper through.
- Maintenance station: cleans the printhead nozzles and seals the printhead; keeps ink from drying

Dot matrix printers:

- A grid of pins on the printhead impact with the ink ribbon and push the ink into the paper.
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5.2: Identify care and service techniques and common problems with primary printer types

- General:
 - If a printer doesn't respond, make sure it is on-line.
- Laser printers:
 - The ozone filter needs to be replaced when performing preventative maintenance.
 - To clear up dark spots on the page, run several blank sheets through the printer.
 - Protect the drum from light, since excessive exposure to light can damage it.
 - Dark paper: problem with primary corona
- Dot-matrix printers:
 - A tight ribbon can cause flecks and smudges on the paper.
 - Missing or broken printhead pins cause incomplete characters.
 - Erratic print density is caused by a problem with the ribbon advance.
 - The printhead should only be cleaned with denatured alcohol, since it leaves no residue.
 - Never touch a dot-matrix printhead after use, it becomes extremely hot.
 - Never lubricate a dot-matrix printhead

5.3: Identify the types of printer connections and configurations

- Printers can be attached to serial ports, parallel ports, or used through a network.
- The printer itself usually has a 36-pin D-shell Centronics port.

DOMAIN6 Portable Systems Weight: 5%

6.1: Identify the unique components of portable systems and their unique problems.

- PCMCIA:
 - PCMCIA cards can be removed and inserted while the system is powered on. This is called *hot-swapping*.
 - Type I: The thinnest type of PCMCIA card, measuring 3.3mm thick, usually used for memory.
 - Type II: These cards are 5mm thick, and used for most PCMCIA peripheral cards, such as modems and network cards.

- Type III: 10mm thick, these are usually hard drives.
- LCD display: This display is a grid of set pixels, so the resolution must be set to the correct setting, or pixelization or incorrect sizing may appear.

DOMAIN7

Basic Networking

7.1: Identify basic networking concepts, including how a network works.

- A full-duplex device can send and receive data simultaneously
- To connect to a network: UTP; serial, parallel (not SCSI)
- Types of networks:
 - LAN (Local Area Network)
 - WAN (Wide Area Network)
 - MAN (Metropolitan Area Network)
- Types of cabling:
 - 10Base5 (Thicknet): Coaxial cabling with 10Mbps transfer rate. Max length: 500 meters Uses AUI. 10Base2 (Thinnet) is a specification for 10Base5, its maximum length is 185 meters. Uses BNC. Coaxial cables need outside terminators (looks like TV cable connection)
 - 10BaseT: Twisted pair cable with 10 Mbps transfer rate. Twisted pair cables use RJ-45 end connectors. Maximum: 100 meters (328 feet). Other name: STP (shielded twisted pair)
 - 100BaseT: Twisted pair cable with 100 Mbps transfer rate
 - Fiber optic: Glass core cable with 100 - 1000 Mbps transfer rate (10 BaseF)

7.3: Identify the ramifications of repairs on the network.

- An improperly configured network card can prohibit network access, and can even bring down the network in a token ring network.
 - Topologies
 - Bus; cheap and easy to install; Difficult to reconfigure and a break in the bus disables entire network.
 - Star; cheap and easy to install, reconfigure, and fault tolerant; more expensive than bus. Has hub. Easiest to modify.
 - Ring; efficient and easy to install; Reconfiguration is difficult and expensive. Only goes in 1 direction.
 - Mesh; simplest and most fault tolerant; Reconfiguration extremely difficult, expensive and complex.
- Hybrid; gives combination of best features of each topology; Complex
- Four major PC categories: hardware; software protocols; sharing resources; accessing shared resources
- When sharing resources, the rules are known as naming convention
- HARDWARE: cables, hubs, etc.
- packets-frames: data is moved into chunks; every network card has a built in identifier (MAC à media access control)

TOPOLOGY: laying out of the cables

1. bus topology: single cables through all the PCs; all devices must first listen to see if anyone is sending a packet before they can send a packet. This is called CSMA/CD (carrier sense multiple access/collision detection). When 2 cards talk at the same time à collision. To alleviate reflection (when reaches end of a cable) need a termination, a resistor to avoid bad signals.

2. ring topology: connects all pcs on one cable, but the bus is shaped like a ring. Use a transmission method called "token passing" in which a miniature packet called token is constantly being passed from one card to the next in one direction. If ones pc, wants to talk to another, must wait for the token. Often referred to as token-ring. 9 pin female DB. Only goes in one direction.
3. star-ring: the ring is stored inside a special box called MSAU or MAU (multi-station access unit), or like a hub
4. star-bus: single most popular, cheap and centralized, if cable breaks, system still ok_

HARDWARE PROTOCOLS:

1. ethernet : based on CSMA/CD bus topology; coaxial cables; speed 10Mbps and 100 Mbps; oversized phone cable; 15 pin female DB
2. thick ethernet: uses bus topology, thicker coaxial cables
3. thin ethernet : coax cable (RG-58), 10Mbps per second, can only have 30 devices per segment
4. 10baseT: most popular, use unshielded twisted pair (UTP), 10Mbs in a star bus topology; come in categories that define the speed : cat1,2,3,4,5 (faster), standard for UTP cabling is RJ-45
5. Arcnet: uses star topology; slowest type of LAN
6. Token ring

PROTOCOLS:

1. ipx/spx : invented by Novell, internetwork packet exchange/sequenced packet exchange protocol and built versions of Netware around it; works well with routers, offers speed, takes little RAM. Routable.
2. NETBEUI :by IBM; Netbios extended user interface; small size, high speed, cannot be used for routing, so used by networks < 200 nodes; default protocol for windows for Workgroups; LANtastic and windows 95, W3.X
3. TCP/IP : terminal control protocol/internet protocol, designed by ARPANET. Windows NT uses it as default protocol. Lacks speed and takes lots of memory, but it is robust and universally supported. TCP/IP. Routable. Used by UNIX.
4. Appletalk:
5. DLC : routable
6. Decnet: routable
 - IEEE specification: Ethernet : 802.3
Token ring: 802.5
 - Characteristics FDDI: dual ring, token ring; beaconing; 100Mbps/second data transfer; uses fiber optic cable
 - Ethernet to token ring: router
 - NT based LAN to AS400: gateway

Share option in W95: full access; read only; depends on password
W95, 2 places to access TCP/IP:

1. select dial-up networking under my computer, right click on existing setup and select properties...server type..tcp/ip settings
2. open control panel, double click the networks icon and select tcp/ip...properties
 - BNC push and turn connector can be used to connect to network
 - 10baseT: base à baseband
 - only necessary element to be on network: protocol

- to boost a digital signal → booster
- to boost an analog signal → amplifier
- to configure network protocol in W3.1 or W95: no diff, except W95 is P&P
- to map a drive on host computer to client computer in W95: either right click Network Neighborhood OR choose tools in Windows Explorer
- OSI : open systems interconnect. Here are the following layers:

1. Physical (repeaters; most network problems, puts network data on wire)
2. Data link (bridges)
3. Network (routers)
4. Transport
5. Session
6. Presentation
7. Application (gateway)

- Most used protocol should be installed first
- DHCP server: IP address configured automatically
- Troubleshooting tool to test cables for breaks, crimps, shorts : TDR
- 3 things needed for networking - client, adapter, & protocol
- WINS server: resolves NETBIOS names to IP addresses
- Repeater: regenerates network signal so they can travel farther; primarily used in linear cable systems. All segments must have same access address (NOT true: every node on network must have same address)
- Gateway: can be a computer
- Bridges: can translate protocols; be used to split a network in 2 segments; can be used in Arcnet
- Router: is more versatile than a bridge; separates computer network segments by their logical network addresses

CLIENT-SERVER VERSUS PEER-TO-PEER

- CLIENT-SERVER: dedicates one machine as a resource to be shared over the network, with a dedicated NOS optimized for sharing files.
 - powerful caching software
 - high speed file access
 - high levels of protection

This machine is a dedicated server; machines that use the data → clients, workstations

- do not run DOS or W95; use NOSs - Novell Netware and Microsoft NT server
- require more hardware; need power
- security: write; read; modify; file scan; access rights; create; erase; supervisory
- need 3 computers

PEER-TO-PEER every computer acts as both as server and a client cheaper than client server most popular : W95/98 allows any or all machines on the network to act as a server over 20-30 machines: slows down security is not the best

security : full access; read-only; depends on password; computers cannot access every file on the other computers, but only files in the shared directory.

INSTALLING PROTOCOLS w95 automatically installs IPX/SPX and NetBEUI If PC needs to communicate with other W95 machines: keep NetBEUI If PC going to link into Novell Netware, keep IPX/SPX

- To install : network window, in control panel, select add/protocol, and choose

TCP/IP and the INTERNET -primary protocol of the internet -days of w3.x, tcp/ip software had to be loaded via a special program : socket -systems do not have names but use 4 sets of 8 binary numbers so instead of SERVER1 we would have 202.34.16.11 so for real the numbers would look like 11110010.00000101.00000000.00001010, too long so decided to write 00000000=1, 00000001=1, 00000010=2 (so IP addresses range from 0.0.0.0 to 255.255.255.255)

Adding an IP address to DNS server search order: tells the local system where the DNS server is located

Rule: cannot have 0 or 1 (so 255 is 11111111)

- DNS is used to resolve domain names to IP addresses that the puter can understand
- W3.1 and W3.11 need TCP/IP32 installed to have TCP/IP networking. W95 has it included

5.1: Identify the networking capabilities of DOS and Windows including procedures for connecting to the network.

- The NET command allows a user to connect to a network from DOS.
- Use the Network applet in Control Panel to configure network settings on a Win95 PC.
- Windows 95 Universal Naming Convention (UNC) follows the format \\COMPUTERNAME\SHARENAME. (15 characters max)
- Shared folder: [\\server_name\shared_folder](#)

5.2: Identify concepts and capabilities relating to the Internet and basic procedures for setting up a system for Internet access.

- The Internet uses the TCP/IP protocol.
- HTTP: Hypertext Transfer Protocol.
- FTP: File Transfer Protocol (FTP commands: MGET; APPEND; LCL; MKDIR).
- Domain Name: Website naming method, such as [www.utah-inter.net](#).

Windows dials the Internet using the Dial-up Adapter through the modem. It uses a PPP (Point-to-Point) protocol for web access, and SMTP or POP3 for E-mail.

DOMAIN8
Customer Satisfaction
Weight: 10%

8.1: Differentiate effective from ineffective behaviors as these contribute to the maintenance or achievement of customer satisfaction.

- The customer is always right!
- Be punctual
- Take responsibility for your actions

- Face-to-face meetings are the best when possible
- Try to establish a good rapport
- Share the customer's sense of urgency
- Adjust to the customer's technical level

DOMAIN1

Function, Structure Operation and File Management

Weight: 30%

1.1: Identify the operating system's functions, structure, and major system files.

- MS-DOS:
 - Filenames must have 1 to 8 characters, and up to 3 characters in the extension. Filenames cannot contain special characters such as spaces, asterisks, questions marks, or most other punctuation (/ [< + = ; , * ? “ (Valid: ! \$ % & ' () * + , - . / : ; < = > ? [\] ^ _ ` { | } ~)
 - 3 main files: IO.SYS (hidden) MSDOS.SYS (hidden) COMMAND.COM
 - DOS: largest partition is 2.1GB

Operating system: method for other programs to communicate; creates user interface; enables users to add/move and delete installed programs and data

In order to manipulate and organize data and programs, the OS: provides a method to identify data as to what type of program uses that particular data AND provides a naming system for each drive.

- located in root directory: io.sys; msdos.sys; config.sys
- k-board driver is keyboard.drv is located in system.ini
- internal (resident) command: command.com
- external (transient) command: exe and com in DOS directory
- FDISK: /MBR restores master boot record from FAT table
- DOS (FAT16) supports up to 2gig partitions.
- DOS 6.0 and higher can load port system code above 1024KB area
- Sets DOS to current drive: \$P
- Himem.sys not needed to boot DOS
- Rename a file: REN, COPY, MOVE
- Safe mode: only VGA and mouse driver are loaded
- Check partitions for errors : /c
- Sysedit: protocol.ini-win.ini-autoexec.bat-config.sys-system.ini
- Edit text base config files: sysedit
- If get incorrect DOS version: use SETVER to trick DOS
- Configure DOS applications to use higher memory: adjust shortcut of application
- Cannot have 2 DOS sessions in W
- DOS filters: SORT, FIND, MORE (not ver)
- DOS 5.0 is a 16 bit operating system

- Last command typed in DOS: F1
- DOS and W: are NOT case sensitive
- Next higher directory: CD..
- Root directory: CD \
- DIR and CHKDSK can give total disk space
- DOS apps giving illegal operations: force app. To run in MS-DOS mode (program panel, advanced buttons)
- Lowest version DOS to run W95: 3.2
- MSDOS.sys: no longer has system code in W95
- Command.com: displays DOS prompt, but statement is put in autoexec.bat
- "sys" files need the extension to be executed
- hierarchy of execution: com, exe, bat (DOS can run files: com, exe, bat (not dat))
- library files: .ovl and .bin (W took it one step further with DLLS)
- defrag not available with DOS 5.0
- in root directory: maximum files: 512 (subdirectory: no max, depends on HD)
- fastest method to do a bootable disk: SYS:A with formatted disk in A:
- Cold boot: reset switch
- hard boot: turning on and off
- krnl286.exe or krnl386.exe : manages memory; schedules tasks and loads applications
- user.exe: controls interaction between user events and their effect on W
- io.sys: basic input/output services to memory
- to detect serial ports, use MSD (microsoft diagnostic)
- smallest unit of storage DOS can work with: cluster
- DOS 6.0 recognizes HD up to 512 Mb in size
- Winoldap: files that provides support to load DOS programs; looks for the PIF for a DOS program
- Cannot print in W: DOS prompt, type: dir>prn
- DOS commands are in: C:\windows\command

WINDOWS 3.X

- W3.X : has cooperative multi tasking
- W3.X will not run if himem.sys not loaded
- If W31 set-up hangs, restart installation, restart system, then RUN SETUP /I (Ignore device errors).
- W3.1 no longer supports real mode of W3.0
- Should not run FDISK from W3.1
- Set up of W3.X : express (cannot choose directory)
- Main user interface: program manager

- Bring up task list of active applications: CTRL+ESC
- Install over a network: setup /a /n run shared copy /I disables hardware detection
- Max partition: 2GB
- Optomize W3.1 with large HD : create permanent swap file
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- Progman.exe : starts W3.X sessions during loading process
- Install program: File, Run, enter name (ex: setup.exe)
- To view HD space: open File manager, click HD, view button screen
- To start W3.1 upon bootup: WIN (last line) of autoexec.bat
- Correct SWAP file in W3.1: control panel à 386 enhanced section à set swap file to none
- If a user forgets their password in WIN31, go to the CONTROL.INI file and delete the [ScreenSaver] section.
- The Scheduling option in Win 3.1 determines how much of the system's resources are dedicated to foreground applications.

WINDOWS 95-98-NT

- boot sequence: W95: io.sys--msdos.sys—congig.sys – command.com – win.com – user.dat – system.dat
- OR boot sequence: io.sys, msdos.sys, config.sys, autoexec.bat, system.ini, win.ini
- filenames: W95 255 characters long (260 with path)
- W primary modes : normal, safe, DOS
- Win 95 SR2 (FAT32) can see up to 2,048GB or 2TB (no max files in root directory) W95 OSR1 is FAT16 has 512 max files in root directory.
- NET USE: drive mappings to create
- To boot to previous operating system: W95 installed in diff directory
- If himem.sys corrupted, W95 will not load, goes to command prompt
- ALT+esc: task bar
- CTRL+ESC: start menu
- ALT+double click on icon: open properties for file
- Install W95: change drive letter
- Install new device on W95: INF file needed to describe device
- W95: dynamic memory allocation à gives enough memory to apps and takes away memory when not needed
- W95 runs only in protected mode
 - Safe and normal mode : in W95 but not in W3.1
 - Bad or missing command.com in W95:
 - path statement in autoexec.bat has been added that does not include C:\windows\command in path

- COMSPEC line in config.sys is incorrect
- The SHELL command in config.sys does not point to correct path for command.com
- WNT4.0 does not support
W95: uses library drivers first, then source disk, then user supplied disk
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W95: uses library drivers first, then source disk, then user supplied disk
- cannot upgrade W95 to NT; can dual boot with NT only if W95 installed first
- W95 uses processor rings : 0 and 3

Rings that allow greater access CPU : 0

Most applications use : 3

That use device drivers: 0
- Install W95 over network à netsetup
- To run scandisk, defrag when away: system agent
- Install W95 from DOS : minimum amount of conv. Mem. Needed: 470K (max is 600K)
- W95: pre-emptive multitasking
- Without WIN32.exe addons: 32 bits apps. Cannot be installed and/or ran in W3.X
- Dial up server is NOT a feature built in W95
- WIN/b rewrites bootlog.txt
- Save group settings in W95 and W3.X: back up .grp and .ini files
- Device manager: X : disabled (not loaded or corrupted)
! : problem
- W : do not run CHKDSK, could have problems with long filenames
- In W95, if GPF, try rebooting first
- Install W95: with same settings of W3.1, install it in same directory (to see the program groups of W3.1 in W95 à Start, program)
- To boot to GUI: himem.sys and ifshlp.sys are needed
- Need system.ini to boot W95 (exception file, quirk of W95)
- Can run without emm386.exe, but needs himem.sys
- For W to print, need a TEMP variable to be set
- W uses PIFs to set: start up directory; EMS memory, XMS, run full screen or window; exclusive
- W supports file system : VFAT; FAT; FAT32; CDFS
- W95 creates log file for boot : F8, select bootlog.txt
- W95: does not have bus enumerations à VLB & MCA Has à SCSI, IDE, ISA
- W95 goes to DOS when boots: edit config.sys bootgui=0
- F4 when Starting Windows 95... will load the previous OS.
- W95 uses FAT 16
- W98 uses FAT 32

- WIN 95 compliant programs must have - setup.exe (to install) and uninstall.exe (to uninstall)
- The system administrator uses System Policies to control the W95 environment on a user-by-user or system-by system basis
- W95 incorporates Drag and Print printing
- Is DOS required to run WIN 95/98 – NO
- DRVSPACE is used in DOS-WIN98 for Drive compression.
- W95: view who is accessing shared resources : net watcher
- View system kernel: system monitor

BACKUP(S):

- There are basically two types of virii: Benign and Malicious.
- W95 backup supports very few tape drives- Only QIC 40, 80, & 3010.
- To make a startup disk- start>settings>control panel>add remove programs>Startup and disk tab.
- Full Backup- backs up all files. Gets all files and clears the archive bit.
- Differential- backs up files that have changed from the last full backup (the differential disk gets bigger and bigger each day). Gets all files since last complete back up and does not clear archive bit.
- Incremental- backs up the files each day that have changed since the last backup (Not necessarily the last FULL backup). This requires more disks each day.

FILE TYPES:

- IO.SYS is a W95 environmental file.
- SYSEDIT.EXE loads protocol.ini, system.ini, win.ini, config.sys, autoexec.bat.
- WIN95 does not need MSDOS.SYS. Because some older programs require MSDOS.SYS to exist, a dummy file MSDOS.SYS exists in WIN95. In WIN95 the functions found in IO.SYS, MSDOS.SYS, IFSHELP.SYS, and SETVER.COM are now all in IO.SYS.
- W95 handles caching with VCACHE.
- Windows has a 255 character limit on filenames.
- The exception error codes for memory and video problems in W95 are 0E and 0D.
- The System and GDI heap can fill up and cause memory errors.
- 16bit code is slower than 32bit code because the CPU must run in REAL MODE.
- A memory leak happens when a program does not release all of it's allocations when it ends.
- Printer spooling sends the print job to SPOOL32.EXE and is printed in the background so the program can finish printing sooner. C:\windows\spool\printers

DEVICE DRIVERS:

1. setver.exe à for old software
2. ansi.sys à add color and features to the prompt, remap k-board; if video not looking good (missing in config.sys device=ansi.sys)
 - The COMMAND.COM file interprets DOS commands for the processor. Commands built into the

COMMAND.COM file, such as DIR, are referred to as *internal commands* (CD;COPY;CHDIR;MKDIR; REM ;pressing enter) (not help, scandisk, format)

○ System files (listed in the order they are loaded on bootup):

- IO.SYS (talks to BIOS) (contains DOS kernel)
 - MSDOS.SYS (primary DOS code) (logo, boot menu, boot delay, permits dual boot)
Bootmulti=1 to dual boot
 - CONFIG.SYS
 - COMMAND.COM
 - AUTOEXEC.BAT
- Command.com: if not an internal command, searches current directory, then all directories in PATH= statement

The DOS kernel is composed of two files. IO.SYS and MSDOS.SYS. IO.SYS is a piece of programming code that allows the rest of DOS and programs to interact directly with the system hardware and the system BIOS. It also has built in drivers for such things as printer ports, serial or communication ports, floppy drives, hard drives, console I/O, etc. MSDOS.SYS handles disk I/O. IO.SYS and MSDOS.SYS are loaded into memory at boot-up and stay there at all times.

CONFIG.SYS

- to load extra BIOS for hardware that the system BIOS does not support
 - DOS memory manager
 - CDROM drivers are loaded here
 - Contains hardware settings
 - identified by DEVICE= OR DEVICEHIGH= put mouse.sys in config.sys
 - Config.sys : lastdrive="x" if there is anything over "E"
1. BUFFERS à space for incoming and outgoing files = buffer space example: buffer space, look ahead value à
BUFFER=15,3
 - BUFFERS=xx should be reduced if SMARTDRV is loaded.
 - BUFFERS= and SMARTDRV are both used for caching.
 - Normally : 20 in W3.X
 2. STACKS à DOS sets aside memory to temp. store register. This memory area is called stack. Range of stack, size of stack. When a hardware interrupt occurs, try increasing the STACK size in the CONFIG.SYS.
STACKS=32.128
 3. FILES à area of memory to store file info à file handle number of files FILES=15 (maximum amount of application open for DOS) To run W3.X minimum files: 30
 4. FCBS à file handled to control open files à file control blocks maximum # open files, maximum files will never close
 5. SHELL à command interpreter; holder environ variables, front end for OS. SHELL=COMMAND.COM /P /E:2048.
 6. LASTDRIVE
 7. [COMMON] executes regardless of menu options chosen.
 8. DOS=UMB; DOS=HIGH; EMM386.exe
 9. DOS=SINGLE

SYSTEM.INI

TO GO OVER THE LIMIT OF 640k in DOS in config.sys, we use system.ini

AUTOEXEC.BAT AND TSRS

- Autoexec.bat is NOT a form of memory resident program
 - Put mouse.com and mouse.bat in autoexec.bat
 - The second way to add support for devices is through TSR (terminate and stay resident) program. # popular TSRs (& are loaded in autoexec.bat)
 - To show TSRs loaded: MEM/C
 - Autoexec.bat : no shell commands (has exe,set, path)
 - Files COMSPEC is in autoexec.bat
 - Do not want W to boot, put WIN command at last line autoexec.bat
 - To halt autoexec.bat until key is pushed: PAUSE statement
1. DOSKEY : doskey.com, keeps track of commands typed, k-board macros, add extra power to function keys
 2. MODE: mode.com, chge look of monitor, redirect output from ports
 3. SHARE: when one program is using a file, another one cannot
 4. SET : creates environment variables (with sound cards). The SET command will check the DOS environment.
 5. PATH: where to look for programs
 6. PROMPT: defines how the prompt looks
 7. LH or LOADHIGH: loaded in extended memory
 8. PAUSE: to have à press any key to continue
 9. ECHO; SMARTDRV; CLS; WIN
 10. MSCDEX.exe
 11. TEMP

WORKING WITH DRIVES:

1. VOL : every drive letter has a volume label (sign in front of a buiding) create or delete colume label with LABEL, obsolete
2. SYS: copies 3 dos systems files to a partition
3. LASTDRIVE: allocate memory for the drive letters of storage devices other than local HD : cd-rom, zip, network drives

CHECKING DRIVES:

1. CHKDSK : identifies and repairs lost cluster chains, identify cannto fix cross linked files. checks errors in FAT table. Re-install programs + OS, while deleting old files : FDISK C:/S/C; then CHKDSK/F; then install OS + programs
2. SCANDISK: disk repair utility (standard & thorough (checks disk surface))
3. DEFRAG: clearing file fragmentation

- CHKDSK & SCANDISK: lost clusters, unlinked cluster chains, lost chains (if doublespaced volumes à run SCANDISK)
- Difference between Scandisk and DOS scandisk: W fixes automatically errors (DOS needs /FIX)
 - Scandisk : fixes disk errors, repairs FAT, repairs volume label, crossed linked files; recovers lost clusters
 - Defrag : rebuilds FAT; makes files contiguous
 - Memmaker: configures memory
 - Chkdsk : fixes disk errors (older program); fixes lost clusters; identifies cross linked files but cannot fixed them

DBLSPACE:

- DBLSPACE: to compress new drive : /create
To uncompress: /uncompress

DBLSPACE: /create to compress file

- SMARTDRV: software disk cache, can cache HD; CD-ROM, floppy drives
 - SMARTDRV: double buffering needed à smartdrv
Disable write behind caching on drives: /x or in system properties à performance à file system
à troubleshooting
If not loaded à cannot decrease buffers
- VIRUSES:
 1. boot sector: change code in master boot record (MBR) of HD
 2. executable: in executable files
 3. macro: specially written macros
 4. trojan: program that does other than what it says
 5. bimodal/bipartite: boot sector and executable
 6. polymorphic/polymorphs: change its signature
 7. stealth: hides from antivirus, in boot sector
 - least likely to have a virus on BIOS and data files
 - MS-DOS files relating to virus protection: MSAV; VSAFE; MWAV
 - Most difficult to remove: CMOS virus

REGISTRY:

- consolidation of files in config.sys and system.ini

POST (power-on self test)

- program stored on ROM chip
- function: allow the system to be checked out every time the computer is turned on
- the POST sends out a command to devices to check themselves out
- has to notify user: with “beeps”

POST: test the most basic devices (up to and including video with beeps) and then the rest à put message on screen if problem

- POST test no ran when CTRL+ALT+DEL
- POST test can occur during cold boot

- Warm boot: CTRL+ALT+DEL
- Cold boot (clean boot): reset; computer first turned on
- Does not test power supply

If POST indicates failure à configuration problem Errors on screen:

1. numeric error codes: appears in left up corner
2. text errors

POST: done with reset button; counts system board RAM first, then what is stored in ROM BIOS

1XX errors : system board

2XX errors: RAM or ROM

3XX errors : k-board

4XX,5XX,24XX: video adapter

6XX: floppy

17XX: HD controller

- POST cards: if no beeps & display errors è need POST card
- No beep nothing: power supply bad or not plugged in (or speaker no plugged in)
 - 1 long 1 short: system board problem
 - continuous beep: power supply or keyboard problem
 - POST is done : when reset or when computer 1st turned on
 - What is first step in POST - program counter in CPU reset to F0000 and ROM BIOS checked

THE BOOT PROCESS

- still follow original boot process IBM 286 AT
- system counts memory from system board first
 1. electrical current
 2. power supply provides voltage to wire “voltage good”, CPU
 3. POST then runs check operating system in A:, then HD
- Windows 3.x:
 - Windows 3.x is not a true operating system, just a graphical interface for MS-DOS.
 - To run in 386 Enhanced mode, the PC must have an 80386 processor or greater, and 2 MB of RAM.
 - Windows 3.x can only run 16-bit and DOS applications.
 - Windows 3.x uses cooperative multitasking.
- System files:
 - 386SPART.PAR: Permanent swap file
 - PROGMAN.EXE: Windows program manager.
 - CONTROL.INI: Contains desktop settings.
- Windows 95:
 - Windows 95 is a true operating system.
 - Most Win 95 settings are stored in the Registry.
 - Win 95 allows filenames with up to 255 characters. An 8.3 filename is also used for backwards compatibility.
 - Win 95 runs DOS, 16-bit, and 32-bit applications.
 - The Control Panel is the first best way to edit the Registry in Win 95.

- Win95 uses preemptive multitasking.
- Win95 runs all 16- and 32-bit apps in one *virtual machine*, and DOS applications each use their own.
- System files:
 - EXPLORER.EXE: Windows Explorer, which is the main Graphical User Interface (GUI) for Windows 95.
 - SYSTEM.DAT and USER.DAT: Windows Registry files.
 - SYSTEM.DA0 and USER.DA0: Automatically created backup of the Windows Registry.
- Both Windows 3.x and 95:
 - Windows uses PIF files to run DOS applications.
- System files:
 - WIN386.SWP: Temporary swap file in Win 3.x and 95.
 - WIN.COM: Starts Windows 3.x and Windows 95. (determines if W starts in standard or enhanced mode)
 - SYSTEM.INI: Contains drivers and VXD's for Win 3.x and 95. Configures specific hardware devices and settings.
 - VMM32.VXD : is created by W95 setup
 - KERNEL.DLL and KERNEL32.DLL: Responsible for basic OS functions, virtual memory, task scheduling, and file I/O.
 - USER.DLL and USER32.DLL: Manages user interface, including interaction with drivers.
 - GDI.DLL and GDI32.DLL: Responsible for graphics manipulation.
The "32" versions of these files are included in Windows 95 only, for use with 32-bit apps.