The A+ Cram Sheet

CORE HARDWARE EXAM

1. The power supply brings in 110 volts (AC) and typically puts out 12, 5, and 3.x volts (DC). Sometimes jumpers can set a voltage regulator module (VRM) on the system board to provide other voltages. Many processors use 3.3 volts or less. Mobile technology CPUs use just above 1 volt. Intel "Centrino" is a branded name for mobile technology.
2. **ESD** is **electro*static*** discharge. **EMI** is **electro*magnetic*** interference.
3. A good circuit (for example, working fuse) shows close to 0 Ohms on a **multimeter**. Capacitors store an electrical charge and are used in power supplies.
4. BIOS chips come in PROM (programmable ROM), EPROM (erasable programmable ROM), and EEPROM (electrically erasable PROM). Flash memory is used on things like Compact Flash and SmartMedia cards. Flash memory is built like an EEPROM chip, but uses different write/erase.
5. CMOS is a battery-backed chip that contains system settings, configured from a hot-key combination at bootup. CMOS stores passwords. The best way to recover from a forgotten CMOS password is to disconnect the chip's power supply and clear all settings. A badly configured CMOS (where the hardware attached is set with the wrong name) usually generates a "device mismatch" error.
6. Slot 1, Slot 2, Socket 7, Socket 8, and Socket 370 are Intel processor mountings. **Slot A** and **Socket A** are **AMD** processor mounts.
7. Pentium chips have a 32-bit address bus, and a 64-bit processor bus, for the most part. Hyper Threading technology is an Intel-specific technology. Net Burst is also Intel's name for new Pentium 4 features.
8. **IDE** is a **type of hard drive** with integrated electronics. EIDE is the extended IDE. **ATA** is a **specification** for how data transfers from a disk to the motherboard. ATA comes in Fast-ATA and Ultra-ATA. UDMA is just another name for the ATA specification. So is ATA/ATAPI. ATA is like SCSI, and both are specifications. SCSI is also a bus architecture like PCI.
9. If a keyed connector doesn't have a physical notch, the red stripe refers to Pin 1.
10. **Sectors** are **512 bytes**. Clusters change sizes and must completely fill a logical drive (volume).
11. The **Master Boot Record** (**MBR**) is in Sector 0, Track 0, Head 0, Cylinder 0 of the Active, Primary partition. FAT32 uses smaller clusters and can address more than the FAT16 2GB drive limit. NTFS is the Windows NT File System.
12. SIMM stands for Single Inline Memory Module. DIMM stands for Dual Inline Memory Module. Parity tests RAM chips for structural integrity. Thermal changes can affect the RAM chips and cause parity errors. Parity comes in Odd or Even parity.
13. DRAM is Dynamic RAM and isn't timed. SDRAM is Synchronous DRAM and is timed. SRAM is Static RAM and is very fast. RDRAM is Rambus RAM, licensed by Intel. DDR SDRAM is Double-Data Rate SDRAM and uses half-ticks.
14. **Parallel** cables usually have a **DB25** 25-pin male connector on one end and a **Centronics 36-pin** male connector at the other end. The Parallel port on the back panel of the PC is usually a 25-pin female socket.
15. **Serial** cables usually have a **DB9** 9-pin connector. **Video** cables use a **15-pin** connector.
16. PS/2 connectors are 6-pin circular connectors. DIN connectors (or AT connectors) use a 5-pin connector larger than PS/2 connectors. USB and FireWire connectors look like rectangles.
17. RJ-45 is a network connector. RJ-11 is usually a telephone connector.
18. **SCSI** uses **50-pin** ribbon cables. SCSI chains have 1 Host Adapter, and up to 7 additional devices (8 total devices). SCSI cables must be **terminated** at both ends, and are used for devices outside the box. Host adapters are usually inside the box (expansion cards).
19. IDE controllers can have up to 2 devices on each controller. Motherboards usually have 2 IDE connectors (also known as controllers). SCSI and USB are used for external devices such as CDROMs, DVD drives, and scanners. IDE doesn't connect to devices outside the box.
20. COM1 and COM3 are logically joined, whereas COM2 and COM4 are logically joined. **COM1 and 3** use **IRQ 4**, whereas **COM2 and 4** use **IRQ 3**.
21. COM port addresses: com1=03F8; com3=03E8; com2=02F8; com4=02E8
22. **LPT1** uses **IRQ 7**, and LPT2 uses IRQ 5.
23. **IRQ 14** is the **primary** (first) drive controller. **IRQ 15** is the **secondary** drive controller. Floppy controllers use IRQ 6. **IRQ 9** cannot be used when it **cascades** to **IRQ 2**. The PCI bus provides IRQ sharing, and several PCI devices can use an available IRQ.
24. There are **8 DMA** channels and **16 IRQ** lines (2 four-channel DMA controllers, 2 eight-channel IRQ controllers).
25. **Interlaced** monitors scan odd lines, then even lines, in a **two-step** process. **Non-interlaced** monitors scan every line in one pass.
26. Dots per inch is written as **dpi** (printers and scanners). Pixels measure graphics resolutions.
27. Standard **VGA** (**Safe Mode**) is 640x480x16 colors. SVGA is *super* VGA and provides resolutions up to 1,600x1,200x16-million colors.
28. The **Primary corona** wire charges the EP drum. The drum is cleaned, charged, and written to. The image develops (by the charge) and pulls toner to the drum. Charged paper pulls toner from the drum. The **fuser rollers** fuse toner. If the heat sensor on the fuser rollers shuts down, the toner will fail to stick to the paper. A bad **separator pad** usually causes paper jams.
29. **FAT16** uses 16-bit addressing, in 16KB, and limits at 2GB. FAT32 uses adjustable cluster sizes and limits at 8GB. NTFS uses a relational database type of file system for better security.
30. USB supports hot-swapping. Devices can be changed without the power being turned off. USB 1.1 supports speeds up to 12Mbps. USB 2.0 provides 480Mbps throughput. 1 USB controller can support 127 devices, using hubs.
31. Plug and Play requires three things: a PnP operating system, PnP BIOS, and PnP devices. Windows can use a non-PnP device, but it won't allocate dynamic resources to them.
32. The **IEEE-1394** (Sony i.Link or **FireWire**) controller can support speeds up to 400Mbps (now 800Mbps) and 63 daisy-chained devices. Sony uses 4 wires; FireWire uses 6 (two for power).
33. IEEE **802.11b** is **wireless** networking and uses Frequency Hopping Spread Spectrum broadcasting (FHSS). The **SSID** is the **Service Set ID** number used for security. **WEP** is **Wireless Equivalency Privacy**, and is used for wireless data encryption.
34. **Ethernet** is a **bus** (wire) network. It can be wired in a *star* or *bus* topology. Token ring networks can be wired in a *star* or *ring* topology. Star topology uses hubs. USB uses hubs in a tiered-star topology. USB is not a networking protocol.
35. **Bridges segment** a congested network into parts. **Routers connect** and direct traffic between networks. **PING** tests a connection. **TRACEROUTE** reports segment hops.
36. Ethernet cables are 10Base5, 10Base2, and **10Base-T**. The "2" and 5" are 200 and 500 **meter limits**. The "T" stands for twisted-pair wire and comes in **Cat-5** (category 5) and other categories. Twisted pair comes in Shielded twisted pair (STP) and Unshielded twisted pair (UTP).
37. **OSI** Layers: *#7*—Application. *#6*—Presentation. *#5*—Session. *#4*—Transport. *#3*—Network. *#2*—Data Link. *#1*—Physical. (Physical layer is wire. Network layer connects to networks. Application layer is for programs.)
38. Network Interface Cards (**NICs**) usually include a link-status light to show whether they're working.
39. Email uses the Internet TCP/IP networking protocol. An email address (`aplus@jamesgjones.com`) requires a *username* (`aplus`) and a *domain name* (`jamesgjones.com`). A Domain Name Systems (DNS) server converts the IP address to a readable name. An IP address consists of many numbers and periods.

OPERATING SYSTEMS TECHNOLOGIES EXAM

40. **FDISK.EXE** is used to create **partitions**. **FORMAT.COM** is used to create **logical drives** (volumes).
41. `FORMAT C: /S` transfers **system files** to Drive C:, making that drive bootable.
42. `SYS C:` (SYS.COM) is used to transfer **system files** to a corrupted Drive C: showing a "Missing or bad system files" error.
43. Physical disks can have a maximum of 24 logical drives (A: and B: are floppies). When a Drive C: has been partitioned, the largest Extended partition can have 23 drive letters. Bootable hard drives must have a Primary, Active partition.
44. `DIR *.*` lists all files with any extension. `DIR *.* /S` lists all files in all subfolders. `DIR *.SYS` lists all files with a .SYS extension. `DIR *.* /A:H` lists all hidden files.
45. **Wildcards** are `*` and `?`. The * finds any number of characters to the right and ? finds only one character per question mark. `DIR *.DLL` will find all .DLL files in a folder. `DIR *.DLL /S` will search all **subfolders**.
46. **ATTRIB.EXE** is used to set file attributes such as Hidden, Read-only, System, Archive. The Hidden or System attribute prevents DOS from showing a file when using the `DIR` command.

47. **DOS** and Windows 9x **bootable floppies** must have **COMMAND.COM**, **IO.SYS**, and **MSDOS.SYS**.
48. **Windows NT/2000/XP** ERD (**Emergency Repair Disk**) must have **NTLDR**, **NTDETECT.COM** (hardware detection), and **BOOT.INI** (NT configuration file). SCSI disks must also have NTBOOTDD.SYS.
49. **Executable** file extensions are mostly .EXE, .COM, .BAT, and .PIF. System initialization (configuration) files are .INI and aren't executable.
50. The **first 1MB** of physical memory is called **conventional memory** (640KB) and can be split into low memory (IRQ tables), application memory (640KB), upper memory blocks, and high memory (together, around 370KB). UMB stands for Upper Memory Blocks, where DOS places certain things such as parts of COMMAND.COM.
51. **Real Mode** originates with the 8086 processor, when the chip could address only 1MB of real memory addresses. Protected Mode allows for virtual memory by swapping memory images to disk. Both are CPU-based events. Windows uses virtual memory.
52. Windows 9x creates a Real Mode virtual machine (VM) to run 16-bit applications and device drivers. Windows NT/2000/XP use the hardware abstraction layer (HAL) to control devices. Windows NT/XP do not support Real Mode.
53. **EMS** is **expanded** memory. **XMS** is **extended** memory ("**X**-10-ded"). EMM386.EXE is never used in Windows 9x, and is commented out if found in a CONFIG.SYS file.
54. **HIMEM.SYS** loads from **MSDOS.SYS** (Windows 9x) and is a **required extended memory manager** in Windows 9x, Windows NT, Windows 2000, and Windows XP.
55. The three critical **DOS system** files are **IO.SYS**, **MSDOS.SYS**, and **COMMAND.COM** (in that order). An operating system is a command line, a command interpreter (COMMAND.COM), and a user interface.
56. The DOS load order is BIOS, POST, IO.SYS, CONFIG.SYS, MSDOS.SYS, COMMAND.COM, and AUTOEXEC.BAT. Beep codes are POST-level error codes, using the internal speaker.
57. **CONFIG.SYS** loads Real Mode device drivers (DEVICE=). **AUTOEXEC.BAT** executes commands at startup. Device drivers usually have a .SYS extension. LASTDRIVE= tells the system how many logical drive letters have been assigned, and is a directive in CONFIG.SYS. The original default was 5 drives. LASTDRIVE=Z is now the default.
58. RAMDRIVE.SYS is a driver that creates a virtual disk in memory (a RAM drive). MSCDEX.EXE is a Microsoft generic CDROM driver.
59. **DEFRAG.EXE** is a way to move parts of files (**clusters**) next to each other and speed up access times on a hard drive. Defrag optimizes disk reads (**performance**). **SCANDISK.EXE** checks and **repairs** a disk with bad **sectors** and file allocation problems.
60. **SMARTDRV.EXE** is a software **cache** for reading hard drives. SmartDrive optimizes performance. Windows 9x removes SMARTDRV from a CONFIG.SYS file. Windows XP installs faster with SmartDrive loaded into memory.
61. REM (remark) goes at the beginning of the line in batch files. The **semi-colon** (;) remarks out lines in an .INI (initialization) file.
62. Windows 9x uses ScanDisk to clean and repair problems on disks. Windows NT/2000/XP use **CHKDSK.EXE** (Check Disk) to do the same thing for a "dirty" disk.
63. **Safe Mode** keys: **F8** for Windows **98**. **NT/2000/XP** also use F8 from the "Which operating system" menu prior to the Welcome screen's appearance. (Windows 95 uses F5.) Windows 98/Me can also use the CTRL key for Safe Mode. Safe Mode loads VGA drivers and keyboard drivers, but no network drivers.
64. WIN.COM starts Windows. **SYSTEM.INI** contains **device drivers** and program configurations. **WIN.INI** holds **user options**, LOAD= and RUN= startup lines, and environment configurations. WIN.INI is not necessary, but it is created if it doesn't exist. (Registry: **System.dat** stores **system settings**, and **User.dat** stores **user settings**.) Windows XP/2000 use "hives" to store settings.
65. All versions of Windows may use an optional CONFIG.SYS and AUTOEXEC.BAT file. Windows 9x loads IO.SYS, CONFIG.SYS, and MSDOS.SYS.
66. SYSTEM.DAT and USER.DAT are the **Registry files**. Windows 9x uses the REGEDIT.EXE editor. Windows NT and Windows 2000 also use the REGEDT32.EXE editor. Windows XP goes back to using REGEDIT.EXE. The Registry Editor gathers together files under **HKeys**.
67. **ERU.EXE** (Emergency Repair Utility) **backs up** the Windows 9x Registry. **SCANREGW.EXE checks** the 9x Registry for structural integrity and makes daily backups, named RB000.cab through RB004.CAB. SCANREG.INI determines how many days Windows will make a new backup before over-writing. Windows XP/2000 uses **System Restore**.
68. LOGVIEW.EXE (Windows 9x) shows startup log files. BOOTLOG.TXT contains startup error conditions. SYSEDIT.EXE opens startup configuration files.
69. **Registry keys**: HKEY_LOCAL_MACHINE, HKEY_CLASSES_ROOT, HKEY_CURRENT_CONFIG, HKEY_CURRENT_USER, and HKEY_USERS.
70. **MSINFO32.EXE** provides hardware and **system information**. **MSCONFIG.EXE** provides **startup** information and system services. TASKMAN.EXE (Task Manager) shows all programs running in memory.
71. **Recovery Console** is in the **\i386** folder. Install to the hard drive with the **winnt.exe /cmdcons** switch. It's a separate, text-based application, not a DOS environment.
72. Event Viewer is part of a Control Panel applet (console) that reports problems with system events, such as loading an application or service, printing, and security. DRWATSON.EXE loads into memory, watches the system, and can run a report of a system snapshot at the time of the error.
73. **XP Startup failures**: "Missing NTLDR" system can't find kernel. "Missing NTDETECT" can't find hardware and devices. "Can't find this or that file." Bad BOOT.INI file, and system can't find system files.