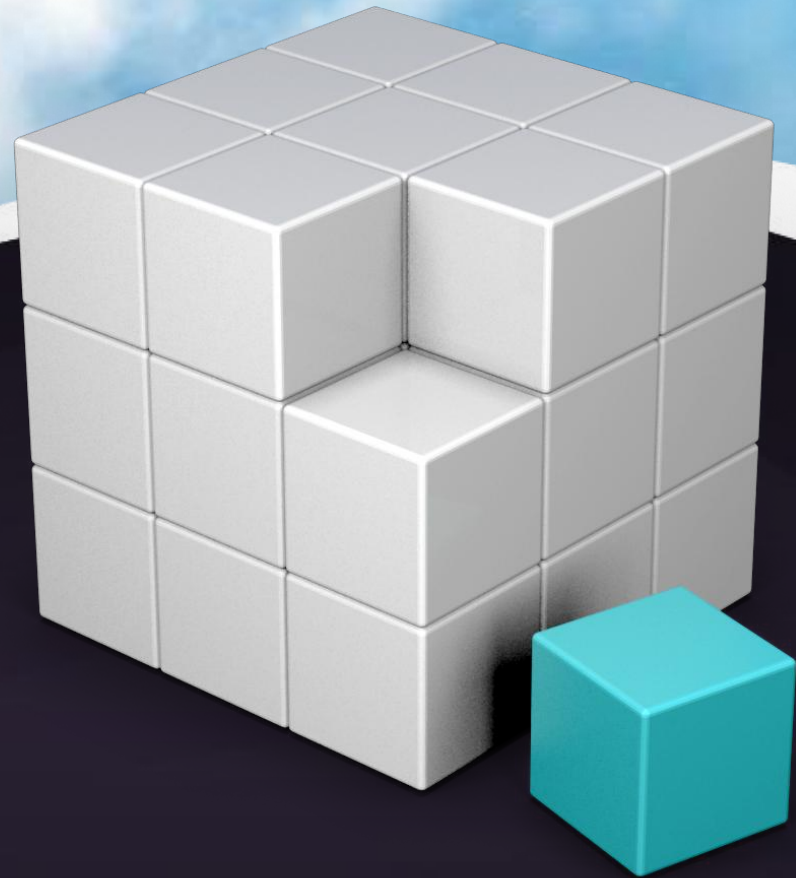
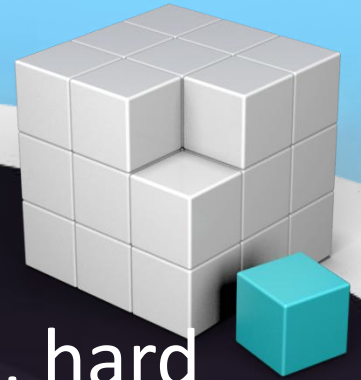


BIOS

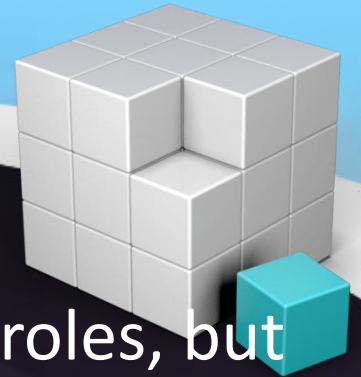


Basic Input / Output System (BIOS)



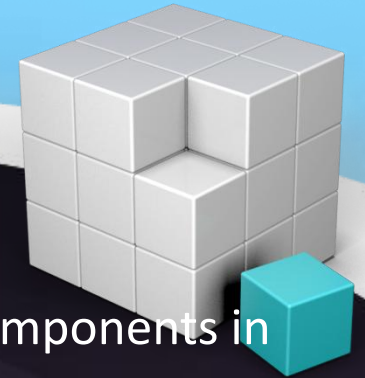
- The BIOS makes sure all the other chips, hard drives, ports and CPU function together.

BIOS



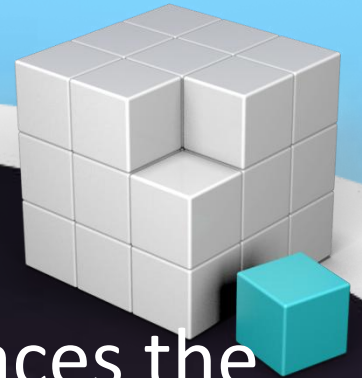
- The BIOS software has a number of different roles, but its most important role is to load the operating system.
- When you turn on your computer and the microprocessor tries to execute its first instruction, it has to get that instruction from somewhere.
- It cannot get it from the operating system because the operating system is located on a hard disk, and the microprocessor cannot get to it without some instructions that tell it how. The BIOS provides those instructions.

Task the BIOS Performs



- A power-on self-test (POST) for all of the different hardware components in the system to make sure everything is working properly
- Activating other BIOS chips on different cards installed in the computer - For example, SCSI and graphics cards often have their own BIOS chips.
- Providing a set of low-level routines that the operating system uses to interface to different hardware devices - It is these routines that give the BIOS its name. They manage things like the keyboard, the screen, and the serial and parallel ports, especially when the computer is booting.
- Managing a collection of settings for the hard disks, clock, etc

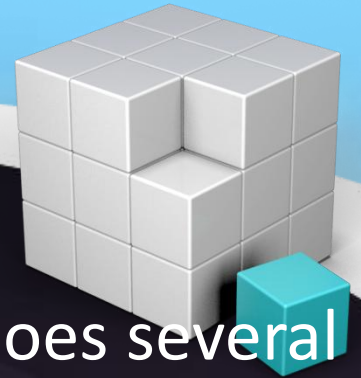
BIOS



- The BIOS is special software that interfaces the major hardware components of your computer with the **operating system**. It is usually stored on a Flash memory chip on the **motherboard**, but sometimes the chip is another type of **ROM**.

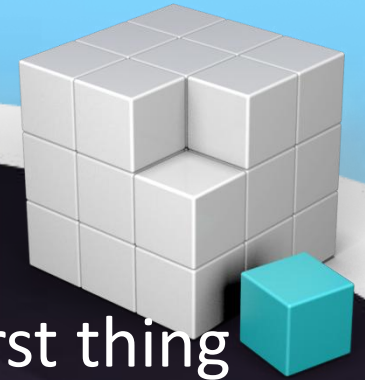


BIOS



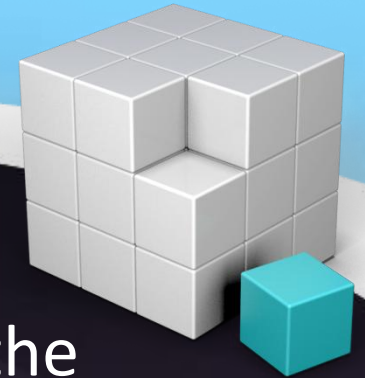
- When you turn on your computer, the BIOS does several things. This is its usual sequence:
 - Check the CMOS Setup for custom settings
 - Load the interrupt handlers and device drivers
 - Initialize registers and power management
 - Perform the power-on self-test (POST)
 - Display system settings
 - Determine which devices are bootable
 - Initiate the bootstrap sequence

Booting the Computer



- Whenever you turn on your computer, the first thing you see is the BIOS software doing its thing.
- On many machines, the BIOS displays text describing things like the amount of memory installed in your computer, the type of hard disk and so on.
- It turns out that, during this boot sequence, the BIOS is doing a remarkable amount of work to get your computer ready to run. This section briefly describes some of those activities for a typical PC.

Booting the Computer



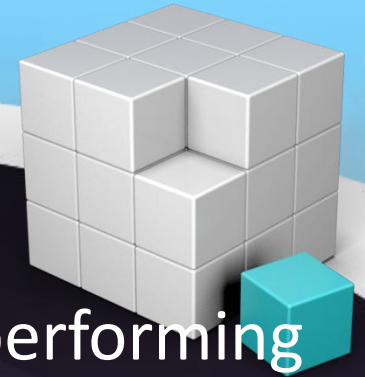
- After checking the CMOS Setup and loading the interrupt handlers, the BIOS determines whether the video card is operational.
- Most video cards have a miniature BIOS of their own that initializes the memory and graphics processor on the card. If they do not, there is usually video driver information on another ROM on the motherboard that the BIOS can load.

Booting the Computer



- Next, the BIOS checks to see if this is a cold boot or a reboot. It does this by checking the value at memory address 0000:0472. A value of 1234h indicates a reboot, and the BIOS skips the rest of POST. Anything else is considered a cold boot.

Booting the Computer



- If it is a cold boot, the BIOS verifies RAM by performing a read/write test of each memory address.
- It checks the PS/2 ports or **USB** ports for a keyboard and a mouse. It looks for a peripheral component interconnect (PCI) bus and, if it finds one, checks all the PCI cards.
- If the BIOS finds any errors during the POST, it will notify you by a series of beeps or a text message displayed on the screen. An error at this point is almost always a hardware problem.

Booting the Computer



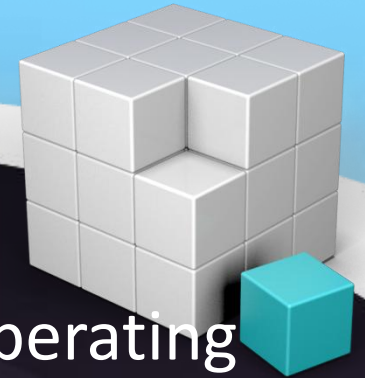
- The BIOS then displays some details about your system. This typically includes information about:
 - The processor
 - The floppy drive and hard drive
 - Memory
 - BIOS revision and date
 - Display

Booting the Computer



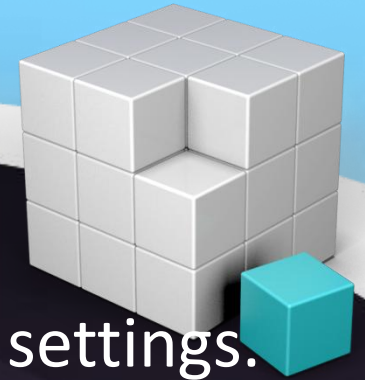
- Any special drivers, such as the ones for small computer system interface (SCSI) adapters, are loaded from the adapter, and the BIOS displays the information.
- The BIOS then looks at the sequence of storage devices identified as boot devices in the CMOS Setup. "Boot" is short for "bootstrap," as in the old phrase,

Booting the Computer



- Boot refers to the process of launching the operating system. The BIOS will try to initiate the boot sequence from the first device.
- If the BIOS does not find a device, it will try the next device in the list.
- If it does not find the proper files on a device, the startup process will halt.
- If you have ever left a floppy disk in the drive when you restarted your computer, you have probably seen this message.

Configuring BIOS



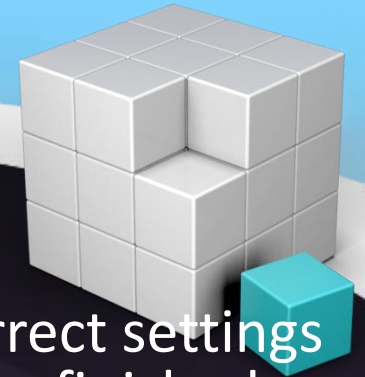
- The BIOS checks the CMOS Setup for custom settings. Here's what you do to change those settings.
- To enter the CMOS Setup, you must press a certain key or combination of keys during the initial startup sequence. Most systems use "Esc," "Del," "F1," "F2," "Ctrl-Esc" or "Ctrl-Alt-Esc" to enter setup. There is usually a line of text at the bottom of the display that tells you "Press ___ to Enter Setup."

Configuring BIOS



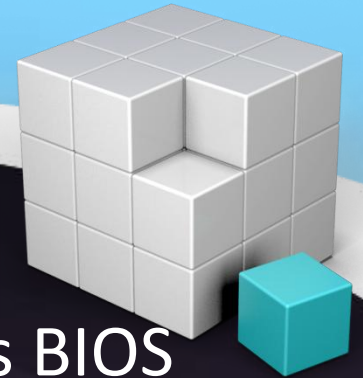
- Once you have entered setup, you will see a set of text screens with a number of options. Some of these are standard, while others vary according to the BIOS manufacturer. Common options include:
 - System Time/Date - Set the system time and date
 - Boot Sequence - The order that BIOS will try to load the operating system
 - Plug and Play - A standard for auto-detecting connected devices; should be set to "Yes" if your computer and operating system both support it
 - Mouse/Keyboard - "Enable Num Lock," "Enable the Keyboard," "Auto-Detect Mouse"...
 - Drive Configuration - Configure hard drives, CD-ROM and floppy drives
 - Memory - Direct the BIOS to shadow to a specific memory address
 - Security - Set a password for accessing the computer
 - Power Management - Select whether to use power management, as well as set the amount of time for standby and suspend
 - Exit - Save your changes, discard your changes or restore default settings

Configuring BIOS



- Be very careful when making changes to setup. Incorrect settings may keep your computer from booting. When you are finished with your changes, you should choose "Save Changes" and exit. The BIOS will then restart your computer so that the new settings take effect.
- The BIOS uses CMOS technology to save any changes made to the computer's settings. With this technology, a small lithium or Ni-Cad battery can supply enough power to keep the data for years. In fact, some of the newer chips have a 10-year, tiny lithium battery built right into the CMOS chip!

Updating BIOS



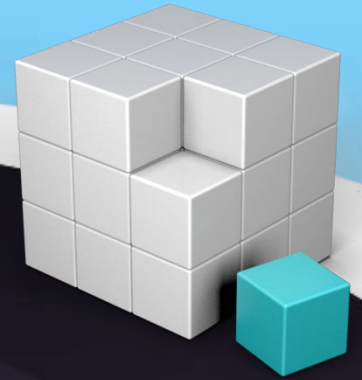
- Occasionally, a computer will need to have its BIOS updated. This is especially true of older machines.
- As new devices and standards arise, the BIOS needs to change in order to understand the new hardware.
- Since the BIOS is stored in some form of ROM, changing it is a bit harder than upgrading most other types of software.

Updating BIOS



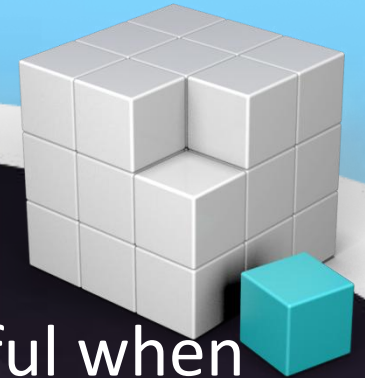
- To change the BIOS itself, you'll probably need a special program from the computer or BIOS manufacturer.
- Look at the BIOS revision and date information displayed on system startup or check with your computer manufacturer to find out what type of BIOS you have. Then go to the BIOS manufacturer's Web site to see if an upgrade is available.
- Download the upgrade and the utility program needed to install it. Sometimes the utility and update are combined in a single file to download. Copy the program, along with the BIOS update, onto a disk. Restart your computer with the disk in the drive, and the program erases the old BIOS and writes the new one.

Updating BIOS



- Major BIOS manufacturers include:
 - American Megatrends Inc. (AMI)
 - Phoenix Technologies
 - ALi
 - Winbond

Updating BIOS



- As with changes to the CMOS Setup, be careful when upgrading your BIOS. Make sure you are upgrading to a version that is compatible with your computer system.
- Otherwise, you could corrupt the BIOS, which means you won't be able to boot your computer.
- If in doubt, check with your computer manufacturer to be sure you need to upgrade.