Lab #1 (SU4)

"The PC Mechanic"

1. Introduction:

We covered a number of topics in our last lecture.

1.1. A+ Certification

A+ certification is a vendor-neutral certification that indicates an individual is a competent computer technician; able to build or configure new hardware, install and update software packages, and create and maintain computer networks.

An individual who is "A+ certified" is like a mechanic for computers; able to troubleshoot and repair many common problems that affect computers.

1.2. FRU (Field Replaceable Unit)

The parts of a computer that can be replaced without the need for special tools or equipment (other than a screwdriver and/or ESD strap) are called FRUs. Most FRUs are hardware components that "plug-in" to the motherboard and include, but are not limited to:

- CPU's
- Memory modules (RAM)
- Hard drives
- CD/DVD drives
- Video cards, network cards (expansion cards)

1.3. To upgrade or not to upgrade... that is the question.

An average hard-drive can be expected to last about 3 years before it fails (so backup your data). New programs and operating systems come out every other year and they almost always require more RAM and improved graphics capabilities.

Upgrading a machine IS NOT HARD. But you should be honest in your expectations and realistic about what you want to use an upgraded machine to do. As an example, a machine that is less than 4 years old that will be used primarily for surfing the web and writing papers is probably a good candidate for an upgrade.

Example Upgrade Cost Sheet:
1. New hard-drive (1TB Seagate Barracuda 7200.12) for $80
2. New RAM (2GB of brand-name DDR2) for $100
3. New Video Card (Radeon HD4650 512MB AGP) for $80
4. New Operating System (Ubuntu 10.04 LTS, with Open Office) - FREE
Total Cost: $260

The parts listed above won't work with every motherboard! And each upgrade or replacement FRU will need to be checked to make sure it will work with a PC's motherboard.

2. Upgrading a PC - common tasks.

2.1. Gathering Information

Before you can upgrade a machine or replace a machine component you will need to find out what components will work in your machine; there are different kinds of RAM; there are different kinds of hard-drives; there are different kinds of expansion cards. You will want to make sure that anything you want to add to your machine will fit and is compatible.

1. ***Documentation***: Hopefully you kept the original paperwork that came with your computer. It will be a good starting place for the information that you require. If your machine is from a major manufacturer (Dell, Gateway) you may have a special tag on the machine with a number you can use at the company's website to find more information.
2. ***Special programs***: A variety of free programs are available to help you find out the configuration details of a machine and if you are running windows you can get information by right-clicking on the "computer" icon and choosing "properties".
3. ***BIOS* (Basic Input Output System):** The BIOS software program is in charge of configuring system hardware (among other tasks). You can access the BIOS interface by pressing certain key(s) when the PC starts. Look for instructions ("to access BIOS, System Setup, etc.") when the machine boots.
4. Using a machine available to you, try and find out the following information:

- Processor Model (brand and type):

  _____

- Processor Speed (Mhz or Ghz):

  _____

- Motherboard model:

  _____

- Chipset:

  _____

- Front side bus speed / type of RAM (memory) needed:

  _____

- Total memory (installed):

  _____

- The type and brand of your video card:

  _____

- Physical storage devices (note down all devices):

  _____

- Physical/BIOS memory banks Dimm1/2/3 etc.
  (Physical spaces for memory chips on your main board.)

  _____

- Expansion Slots Supported:

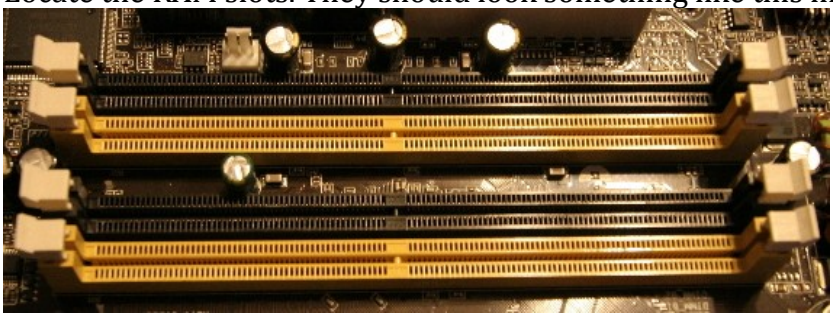
  _____

2.2. Opening the machine

1. Turn off (but do not unplug) the machine.
2. Remove/unplug all peripheral devices (Keyboard, Mouse, Monitor, Speakers, Microphones, USB devices).
3. Make sure that you and the machine are properly grounded so that you do not pose an ESD risk to the PC components.
4. Carefully remove the PC case outer panel(s).
   NOTE: Many modern machines don't require any special tools to open. Look for buttons, levers and handles that need to be pushed in order to remove sections of the case.
5. Locate the Motherboard, Power Supply and CPU.

2.3. RAM

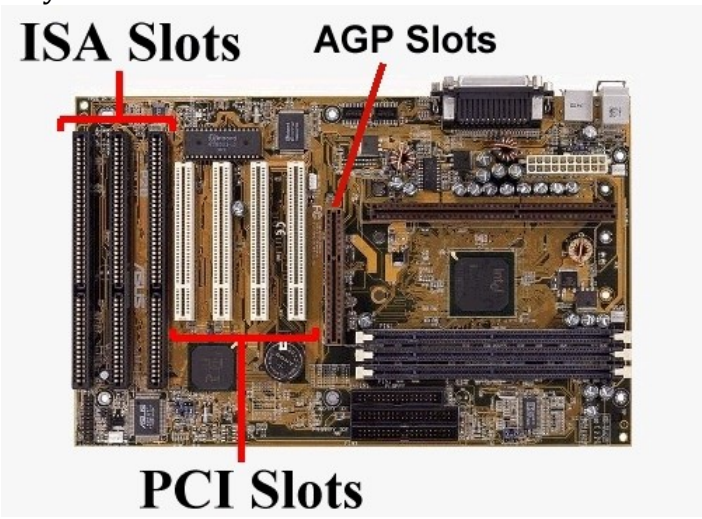
1. Locate the RAM slots. They should look something like this image:



2. Remove and reinsert any RAM modules you find. Note that the RAM slots are numbered, and make sure you put them back in their original slots (or in the lower 1, 2 slots).

2.4. Expansion (Graphics) cards

1. Locate the expansion slots on the motherboard. What kind of expansion slots do you have?



2. What kinds of cards are present? How can you tell?
3. Remove and reinsert at least one of the cards.
   NOTE: You may need a screwdriver for this part of the lab.

2.5. Hard-drives

1. Locate your hard-drive and your CD/DVD player.
2. What type of devices are they? IDE or SATA?

3. Your hard-drive and CD/DVD drive should have two cables connected to them. Which cable carries data and which cable carries power? How can you tell?
4. Remove and then reinstall the hard-drive or DVD for your machine. MAKE SURE that you connect it exactly as it was connected before. Older IDE hard-drives may not work properly if attached to the wrong IDE port.

2.6. Put everything back, the way it was.

1. Close the case.
2. Reattach all peripherals (Keyboard, Mouse, Monitor, Speakers, Microphones, USB devices).
3. Restart the machine, and go to the BIOS Screen.
   NOTE: If when you reboot your machine and you get an error, make sure that all of the items you removed and reinstalled are properly seated in the machine. Possible errors include:
   - machine won't start
   - machine makes beeps (post codes)
   - machine gives warning message at boot