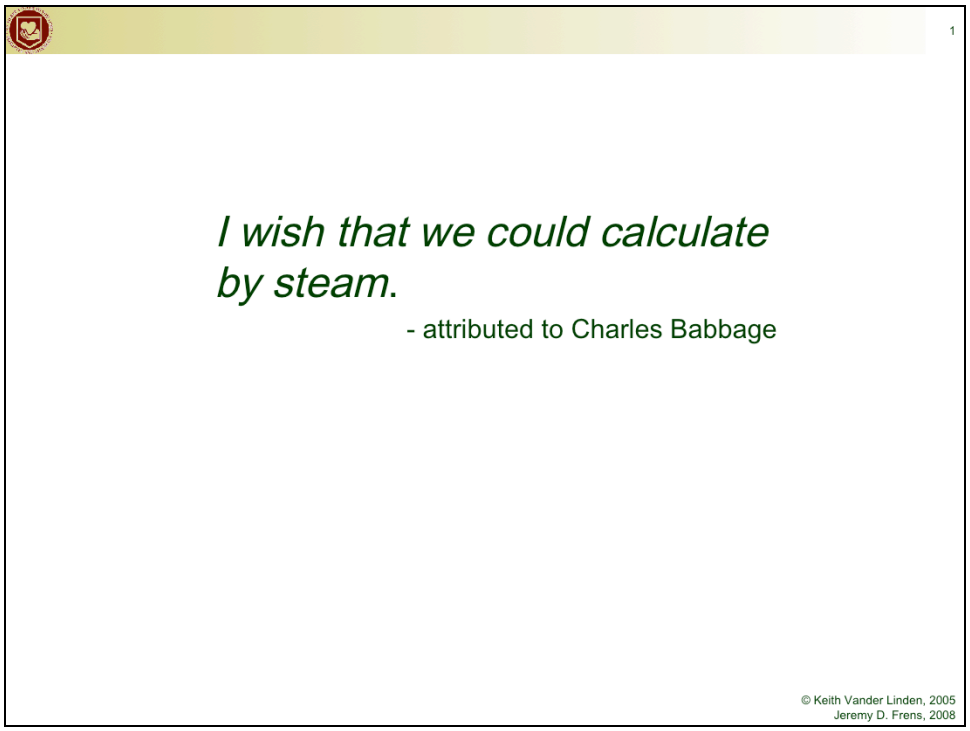
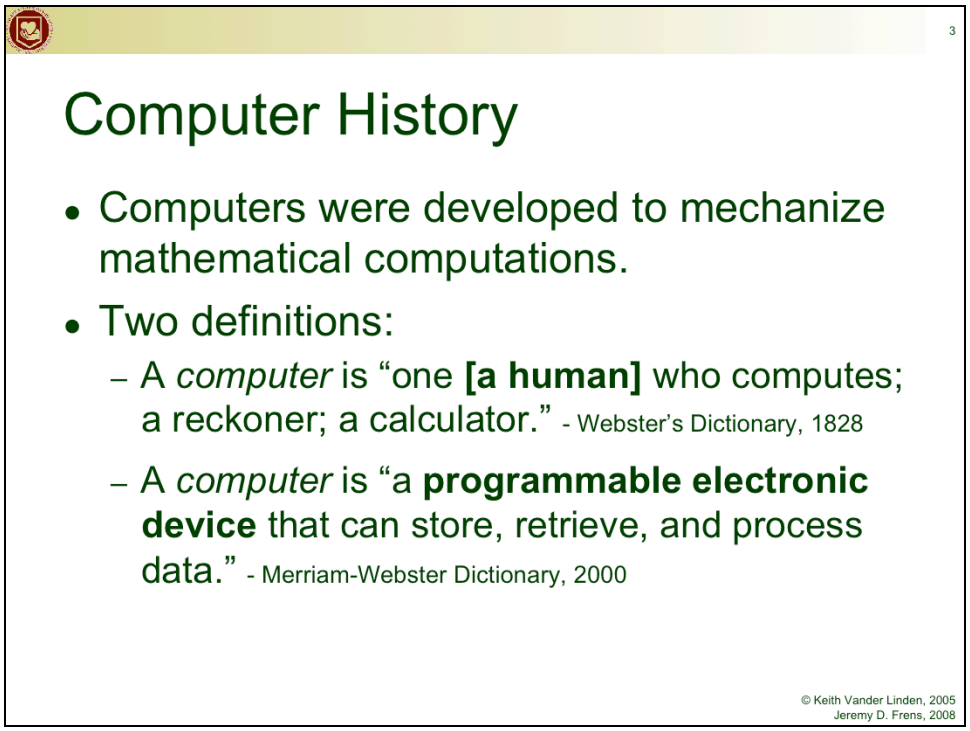


The computer is a universal machine.

It's a mind-set, not a skill-set. Brilliance helps, but is not required.

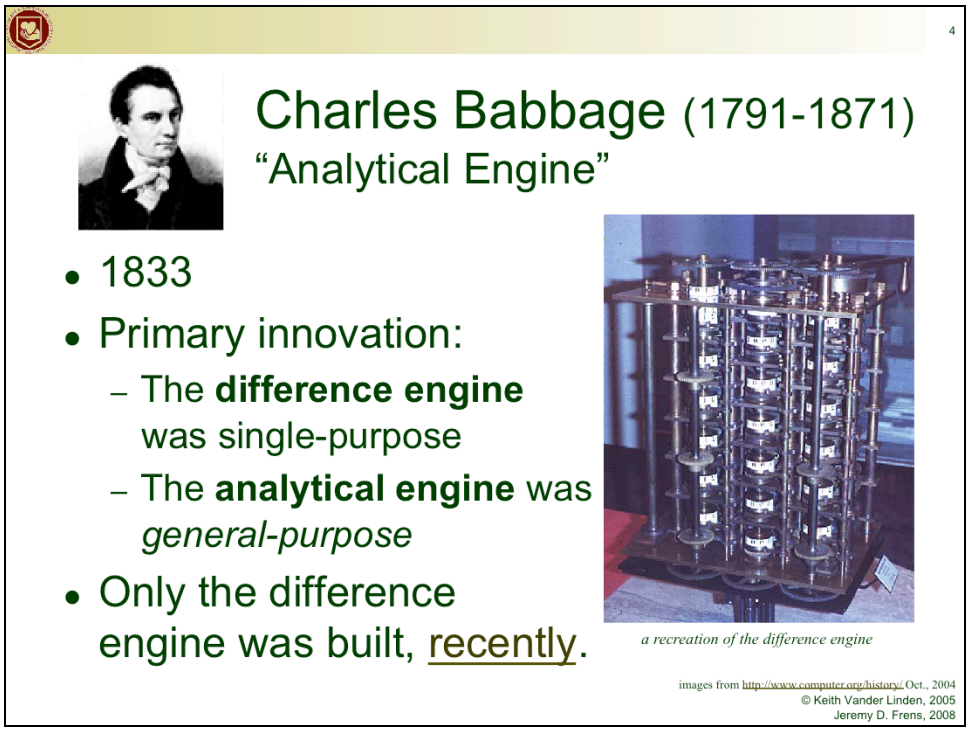
Instead, adopt these mantras: be stubborn, **bossy**, lazy, obsessive, cynical, plodding, and importunate. Why? So you can use IT as a tool to do cool stuff…



Manual computing was very important in the 1800's (industrial revolution) and into the 1900's (the world wars) because of the use of mathematical tables in navigation, engineering, etc. The tables were also very hard to produce and filled with errors.

A British mathematician named William Shanks spent 28 years of his life calculating Pi to 707 places, finishing in 1873. Soon after his calculations, another mathematician called De Morgan found that Shanks had made an error in the 528th place, after which all his digits were wrong!

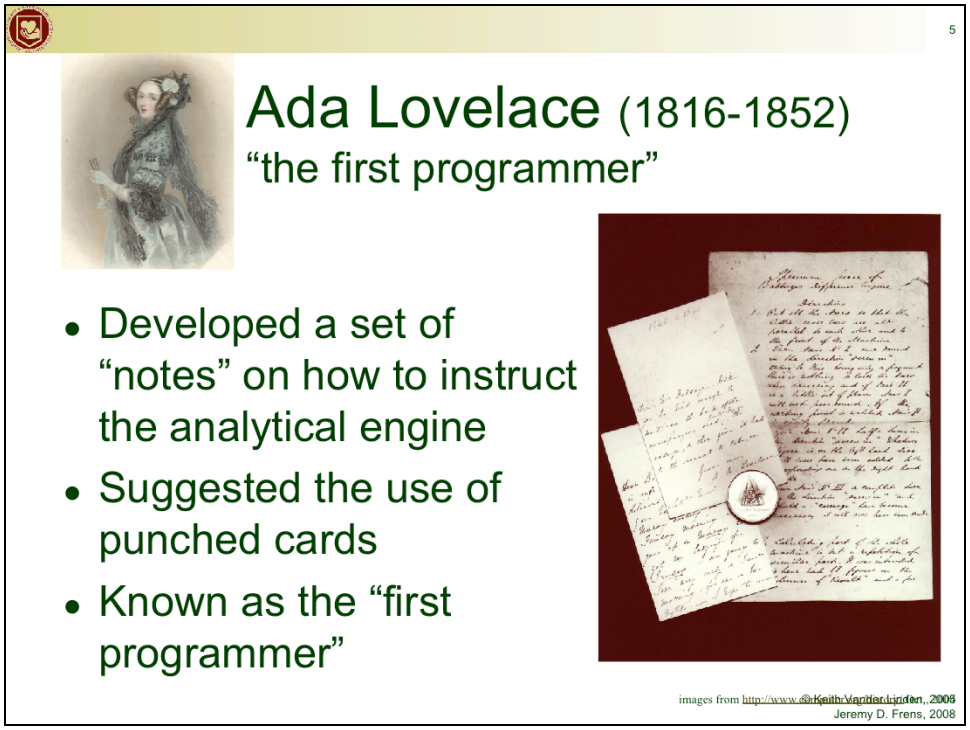
The 2 definitions show how the view of computing changed around 1940.



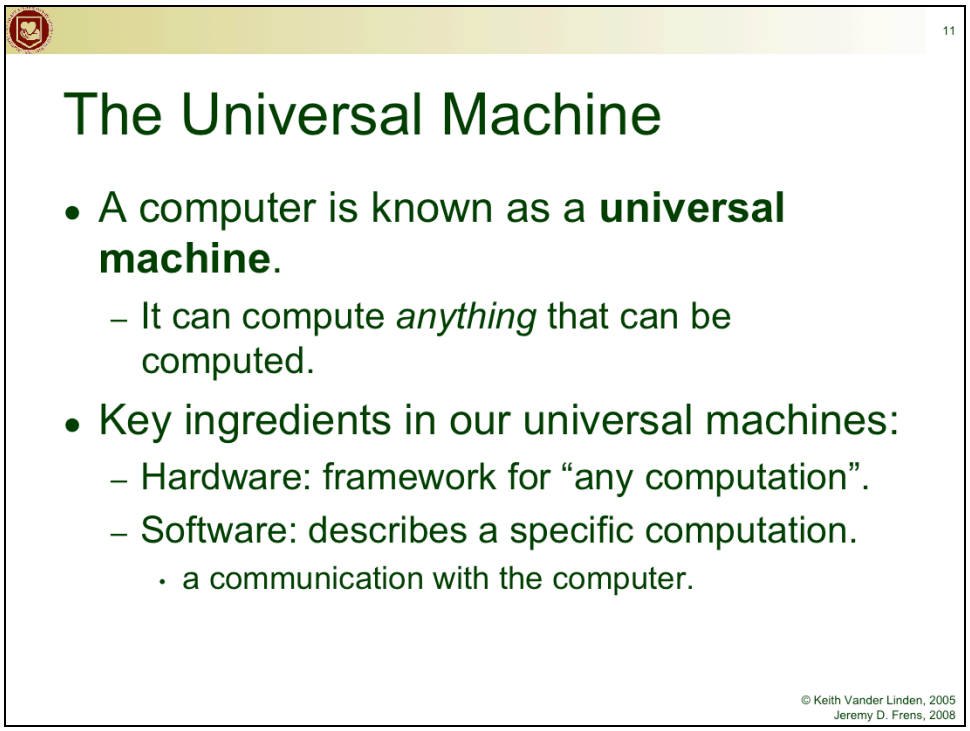
Babbage died an embittered man, having never convinced anyone of the value of his ideas (apart from Ada and a few others - see the next slide)

"recently" links to excellent 4 minute video of Difference Engine No. 2 built after 2000

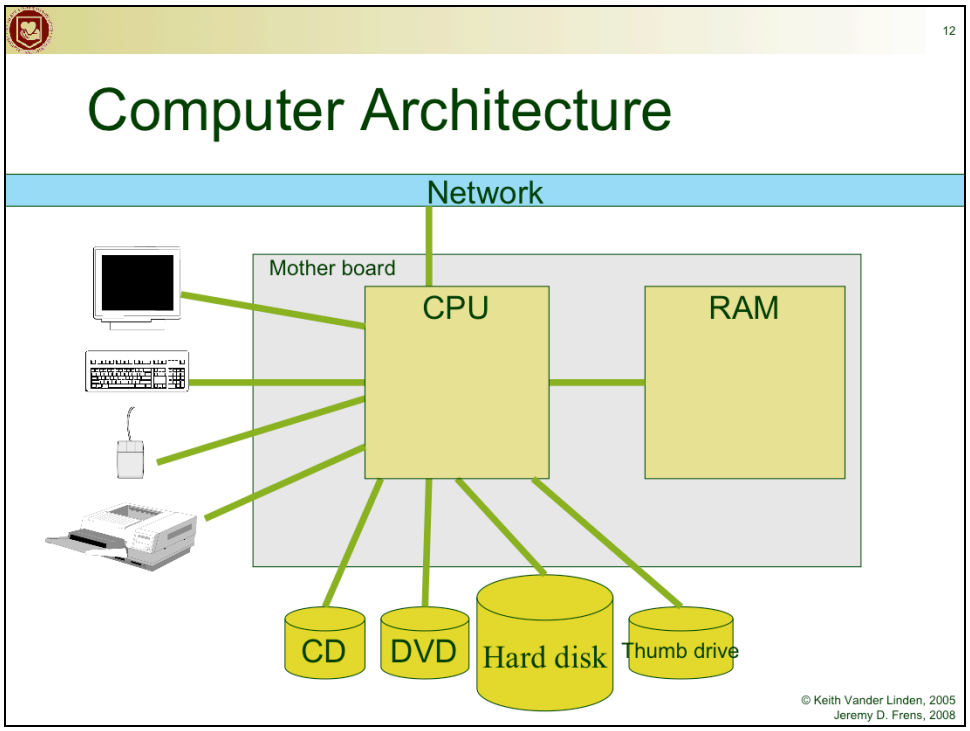
XXX *In the video the machine is much bigger. And the picture is from the British museum? I think I saw it there.*



She was Countess of Lovelace and Lord Byron's daughter. She was a supporter and mentor of Babbage.



Computers are universal devices, unlike hammers and other artifacts that are designed to do one thing.



•**CPU/Main Memory** - Find info on your machine's CPU (mouse-right on "My Computer" and choose "Properties"). You should be able to find all the info on your main memory and processor, but our lab may restrict part of that information.

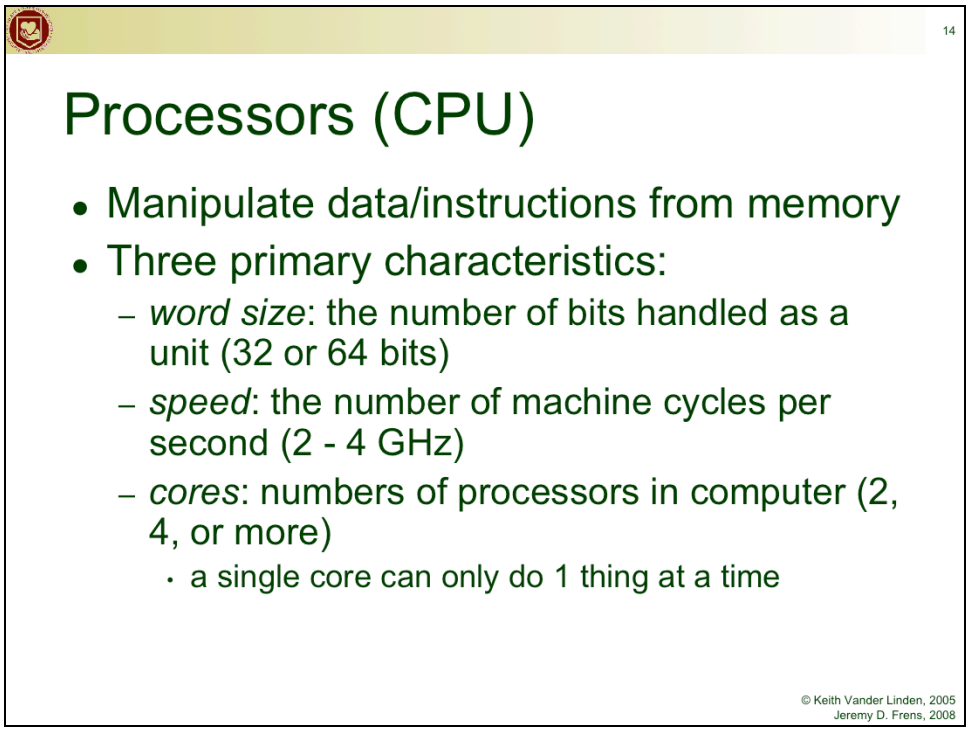
•**System State** - Show the current system use (ctrl-alt-del and choose "Task List"). See what you can find about the current machine state here.

•**Secondary Storage** – Find the size of your hard drive an your other mounted drives. Double-click on "My Computer". Make particular note of the H: drive.

•**Peripheral devices** – Note the peripheral devices the system has. Note that the printer is mounted remotely and that you now have a print quota at Calvin.

•**Network** – Check the network connection speed (using the task manager opened above).

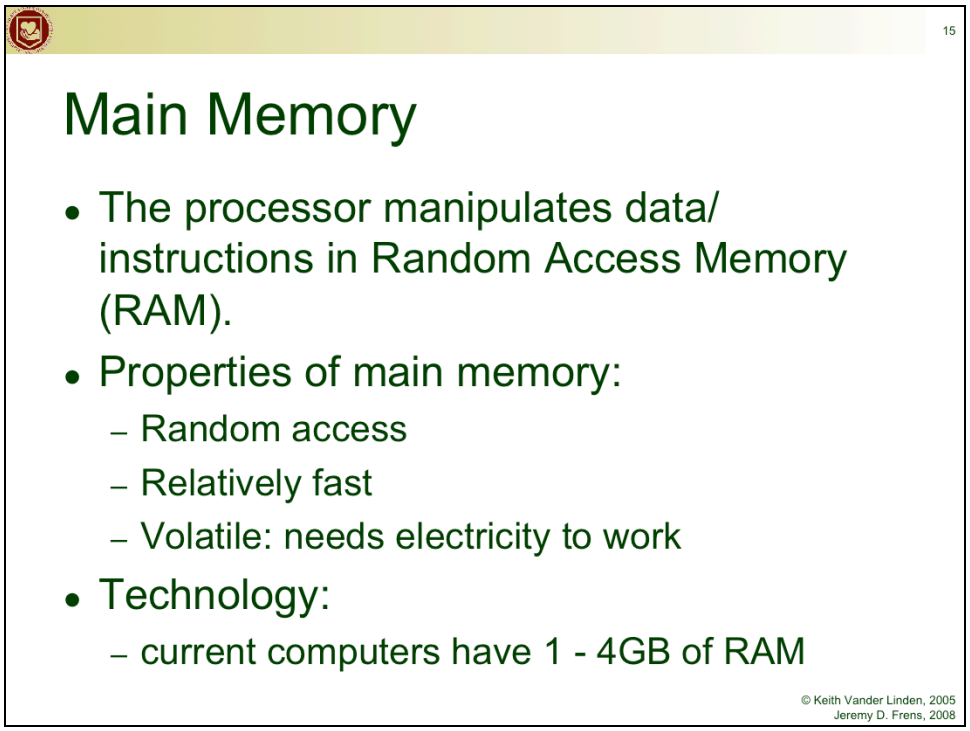
•**Software** – Check out the OS (using "My Computer" – "Properties") and the application programs as time allows.



The computer's speed/efficiency is based on these characteristics. To speed things up, increase the number of cores or the clock speed.

Least control over word size.

The Central Processing Unit (CPU) - You can find information on your MS Windows system processor in the system properties browser (start this tool by either clicking mouse-right on the "My Computer" icon on the desktop and choosing "Properties", or by choosing "Start"-"Settings"-"Control Panel"-"System").

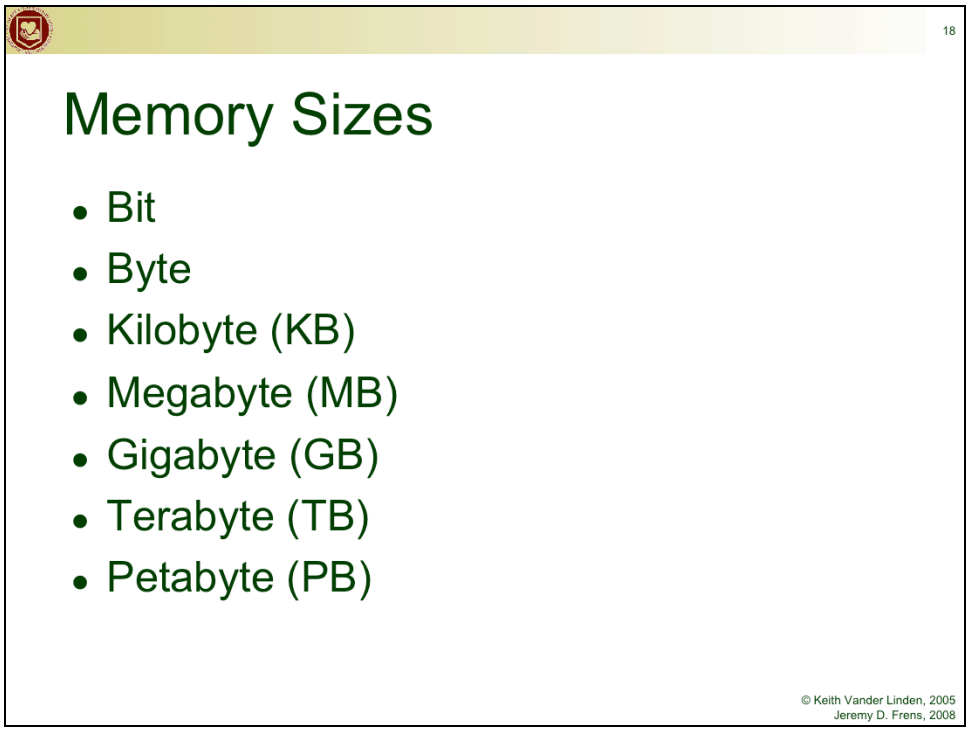

15
Main Memory
• The processor manipulates data/ instructions in Random Access Memory (RAM).
• Properties of main memory:
– Random access
– Relatively fast
– Volatile: needs electricity to work
• Technology:
– current computers have 1 - 4GB of RAM
© Keith Vander Linden, 2005
Jeremy D. Frens, 2008

Usually RAM

Secondary Storage

- Mass, long-term storage
- Properties of secondary storage:
  - Slow
  - Non-volatile: no power required
  - Less expensive
- Technologies:
  - *Magnetic*: hard disk, tape
  - *Optical*: CD, DVD
  - *Solid state*: USB stick

Save early, save often!



Bit - A single 0 or 1

Byte - 8 bits: enough to store one character

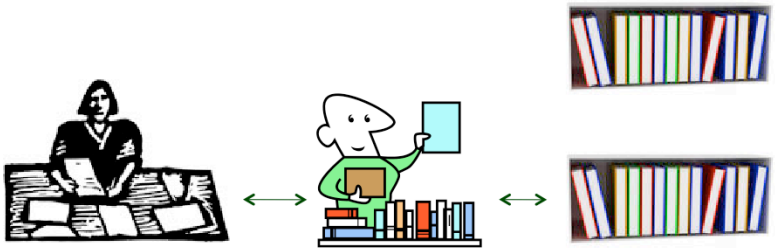
Kilobyte (KB) – 1024 (2^10) characters: a paragraph of text

Megabyte (MB) - ~1 million (2^20) bytes: a book or a minute of mp3 audio

Gigabyte (GB) - ~1 billion (2^30) bytes: 16 hours mp3 audio, 20 minutes of DVD video

Terabyte (TB) - ~1 trillion (2^40) bytes: all the text in Calvin's library, or 150 DVD movies

Memory Sizes, CPU Speeds



RAM: You can use information quickly on books open on your table.

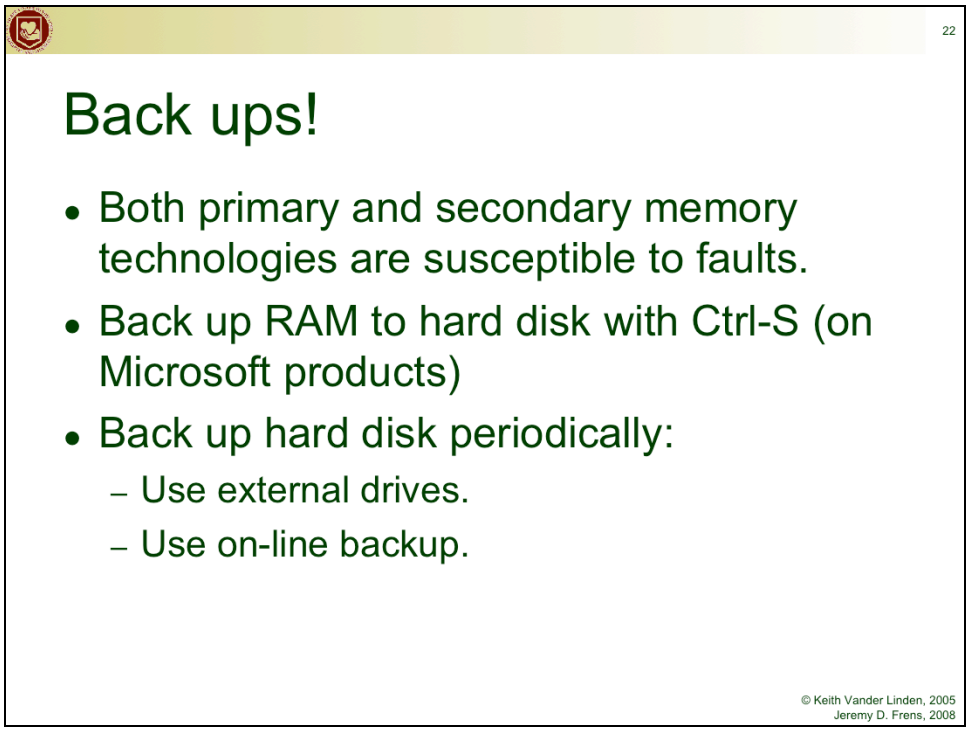
Bigger table = more RAM = more apps/files open at once

CPU: gets books (applications) and files from the bookshelves

Faster CPU = getting apps/files is faster

Hard disk: holds files and applications.

Bigger hard disk = more apps/files can be stored

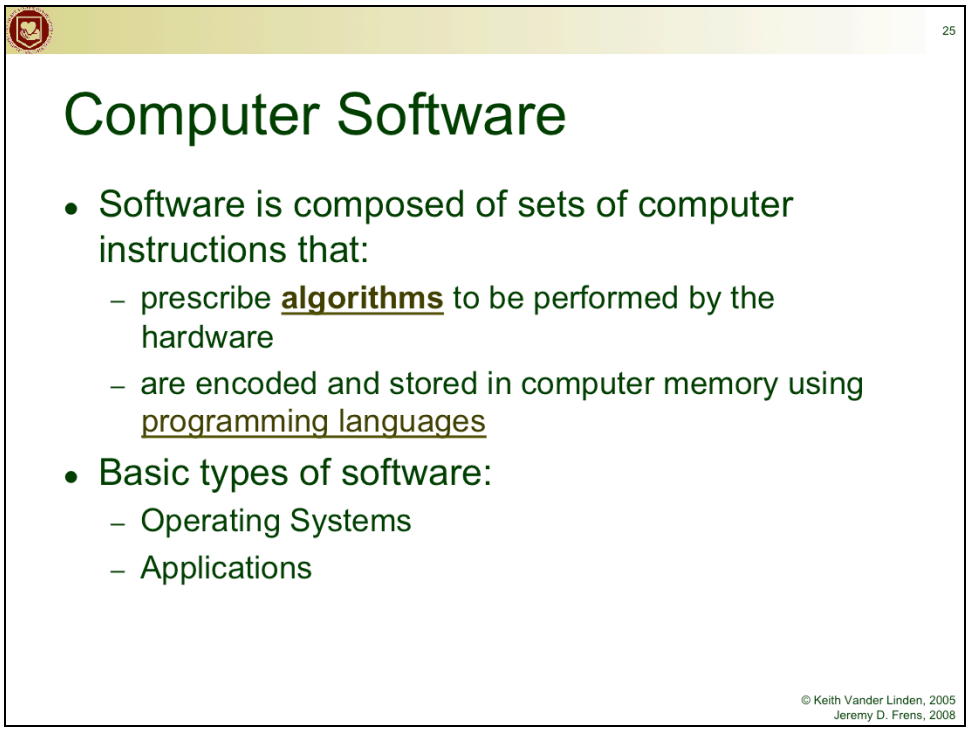


Impress upon them the importance of (psychotically) backing things up.

Your H: drive in the windows lab is a network drive that is backed up by CIT. So is the Knightvision server.

Input/Output Devices

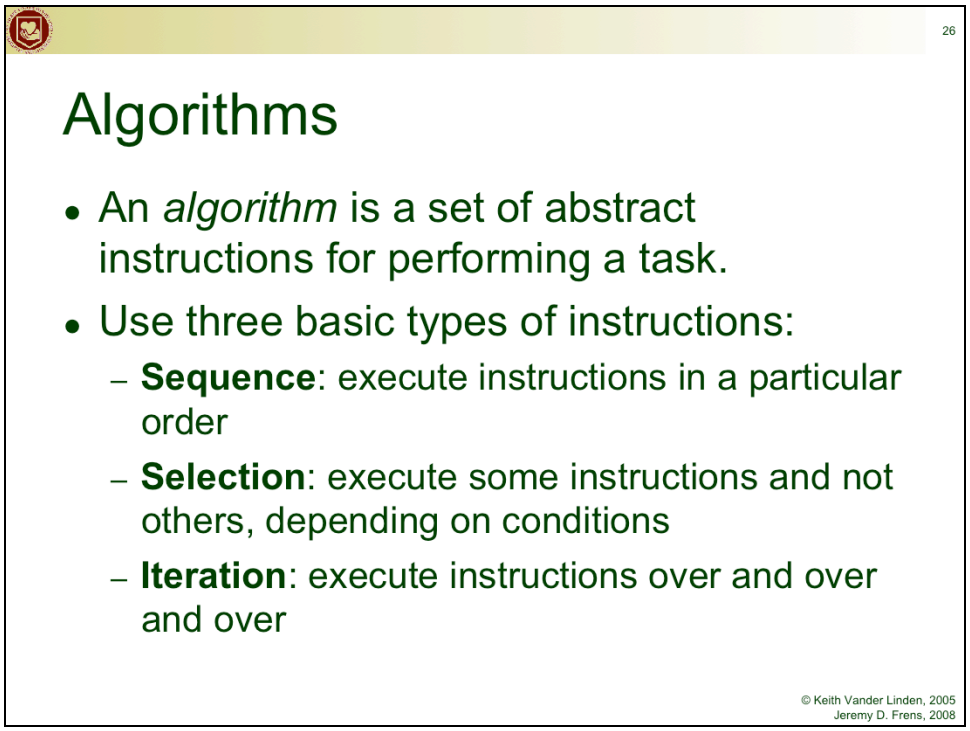
- To be useful, the computer must usually be expanded by additional devices:
  - e.g., monitor, keyboard, mouse, camera, printer, scanner, microphone, touchpad, etc., etc., etc.



Just summarize the basic types of software, without visiting the slides:

OS - manages the hardware/software of the computer, e.g., MacOS, Windows, Linux

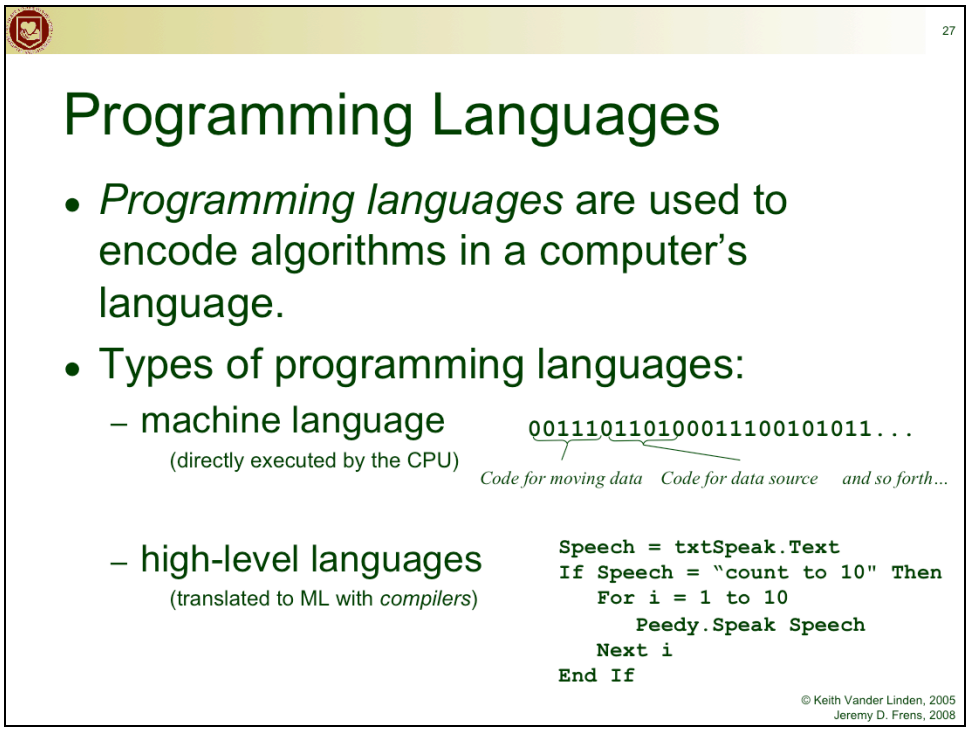
Applications - support basic user tasks, e.g., Word, Excel, Dreamweaver, Powerpoint



Algorithms are like recipes.

We'll see them used in a programming language in this week's lab.

```
print "Enter your name"
name = get_input()
while name == "":
    print "I mean it!"
    name = get_input()
if name == "Vic":
    print "Hey, Vic!  Hi!"
```



e.g., C++, Java, VB.net

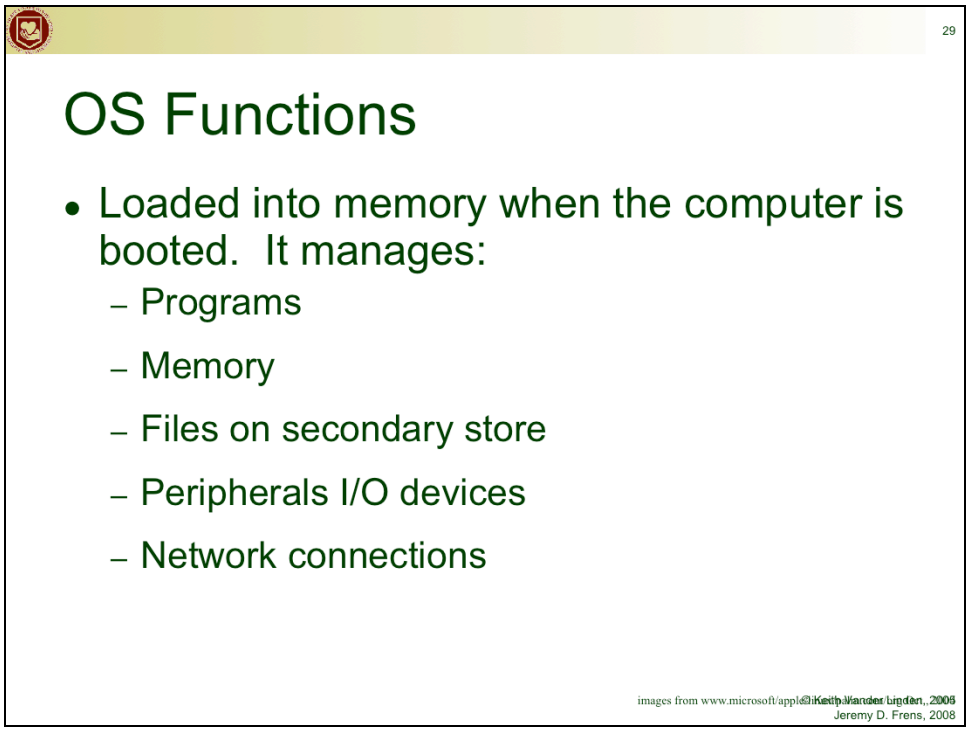
Most of these students won't do much programming, so they probably won't need PL support on their machines.

Operating Systems

- Set of programs/utilities/libraries that manages the hardware and basic operations of the computer
- Common operating systems:
  - Microsoft Windows (e.g., XP, pocketPC)
  - Mac OS
  - Unix variants (e.g., Linux, Solaris)
  - PalmOS



images from www.microsoft/apple/linux.com, 2006



Programs

multi-tasking (show the processes and the applications in the task manager)

Memory

Loads files from disk when needed (show memory use in task manager)

Files on secondary store

keeps track of files on disk (discuss the A:, C: and F: drives in windows explorer)

Peripherals I/O devices

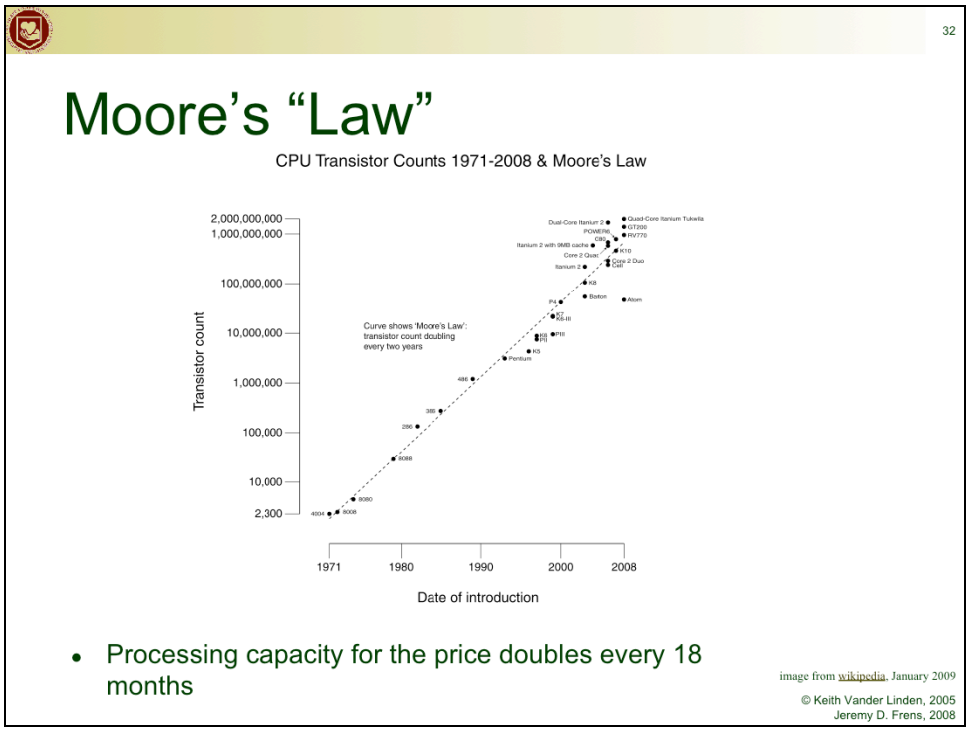
"talks" to all the external devices

Network connections

maintains the network connection (if any) (show network connection in task manager)

Software Applications

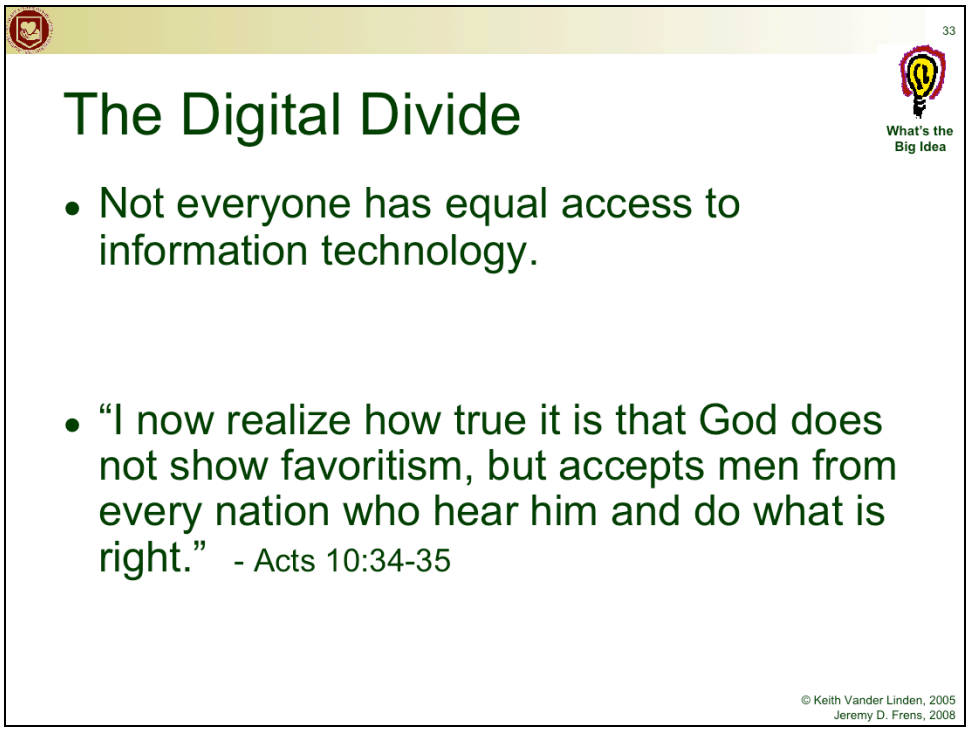
- Programs built on top of the OS that support basic user tasks
- Common Applications:
  - Word Processing
  - Spreadsheets
  - Databases
  - Electronic Mail
  - Presentation Software
  - Web Browsing / Development



There is some question as to whether this trend will continue and if it will ever hit a "wall". See Kurzweil.

Moving to multi-core changes speed-up claim.

Note the log scale on the left!!!!! Exponential growth!!



Key problems:

Computer technology costs money that people don't have.

Computer literacy costs money.

IT is decidedly western in structure and support (e.g., the world-wide-web is not really world-wide).