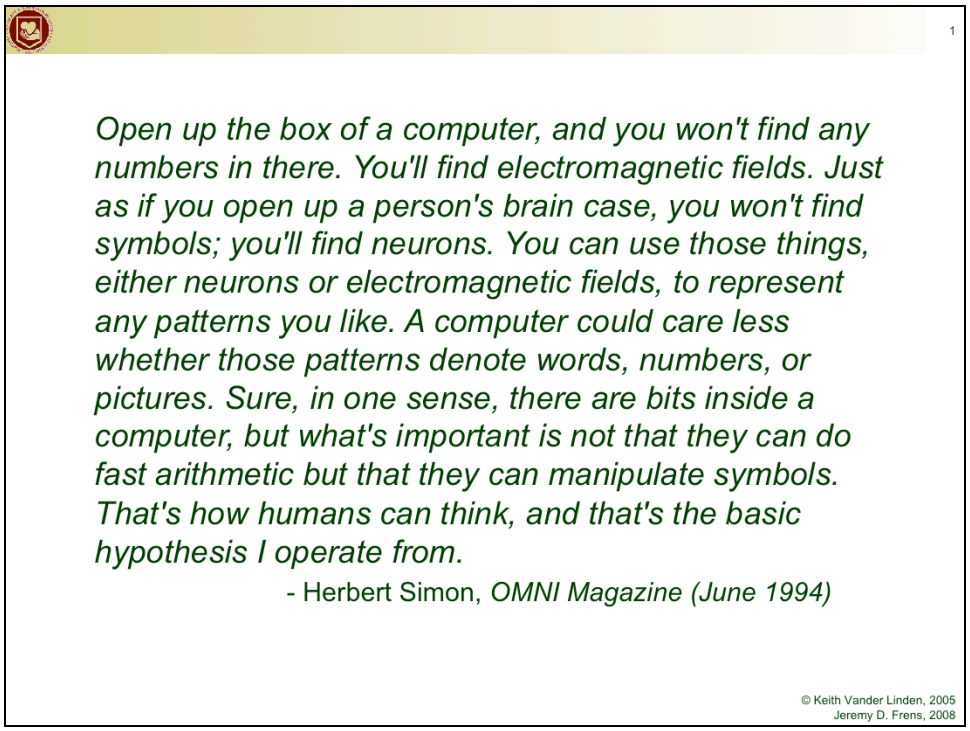
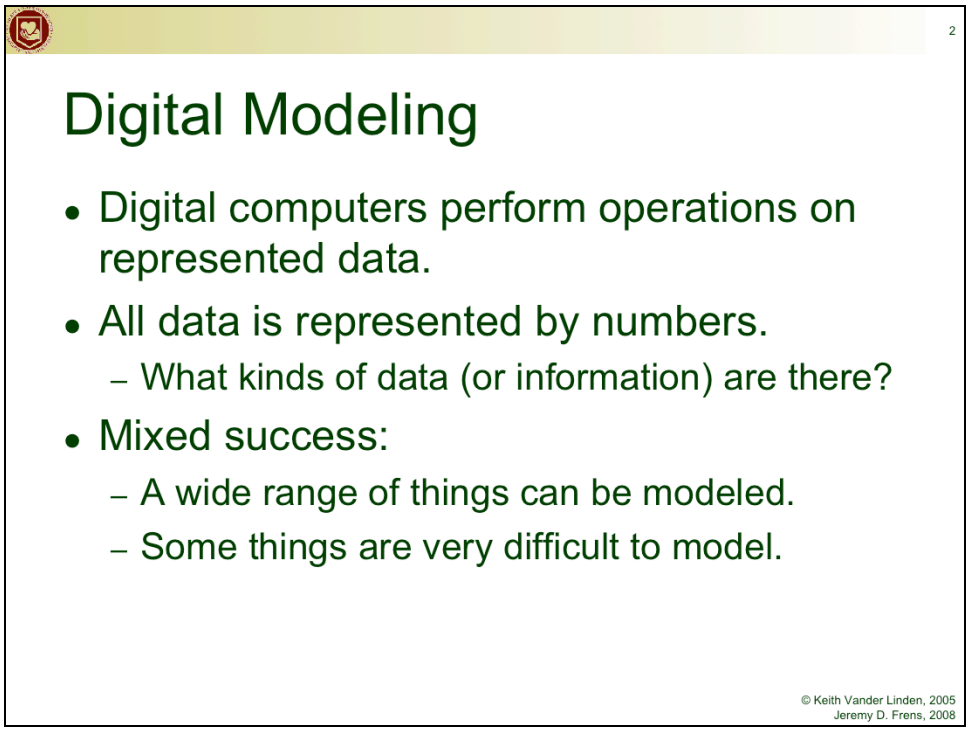


It's a mind-set, not a skill-set. Brilliance helps, but is not required. Instead, adopt these mantras: be stubborn, bossy, lazy, retentive, **cynical**, plodding, and importunate. Why? So you can use IT as a tool to do cool stuff…

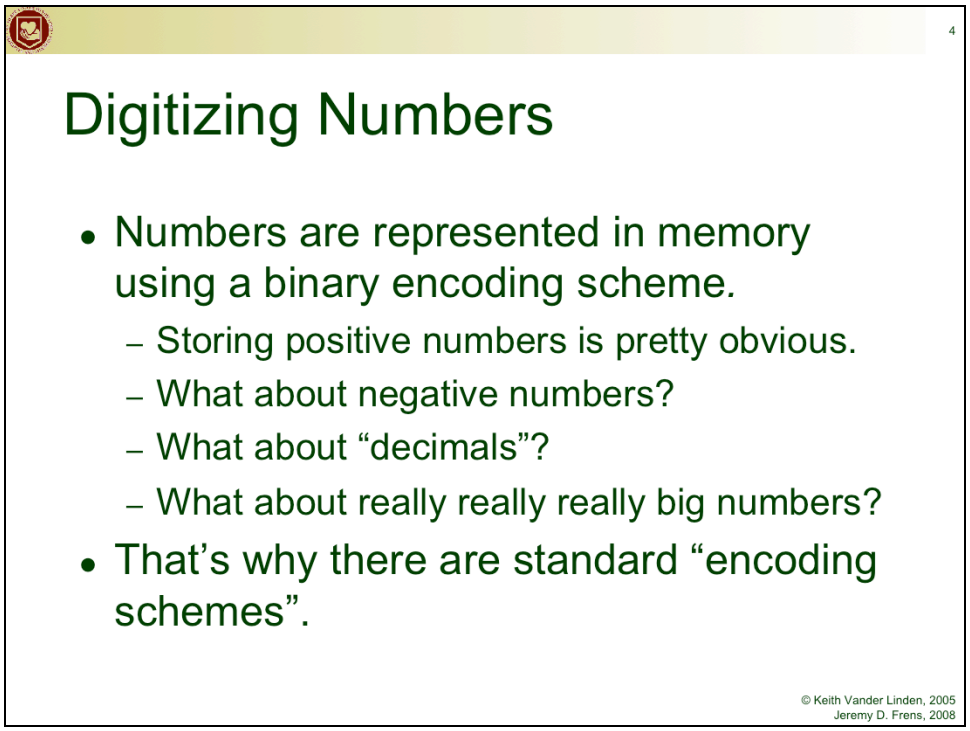


It's surprising (sometimes) what can and can't be modeled.

Binary

- Binary is a *base-2* numbering system.
- A *bit* is a "*b*inary dig*it*":
  - 0 (or "off")
  - 1 (or "on")
- Binary is just as powerful as decimal -- no more or less.

Decimal	Binary
0	0
1	1
2	10
3	11
4	100
5	101
6	110
7	111
8	1000
9	1001
10	1010
11	1011
12	1100
13	1101
14	1110
15	1111



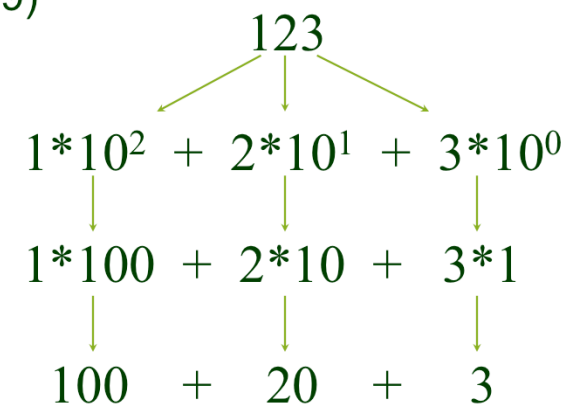
It’s all binary underneath!

2’s compliment for integers

Floating point for real numbers

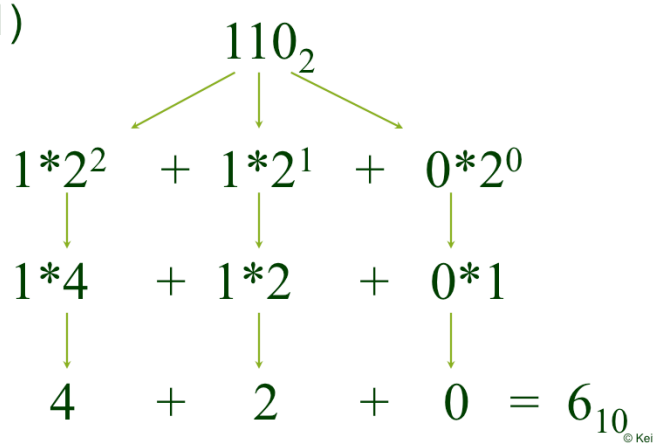
Decimal Numbers

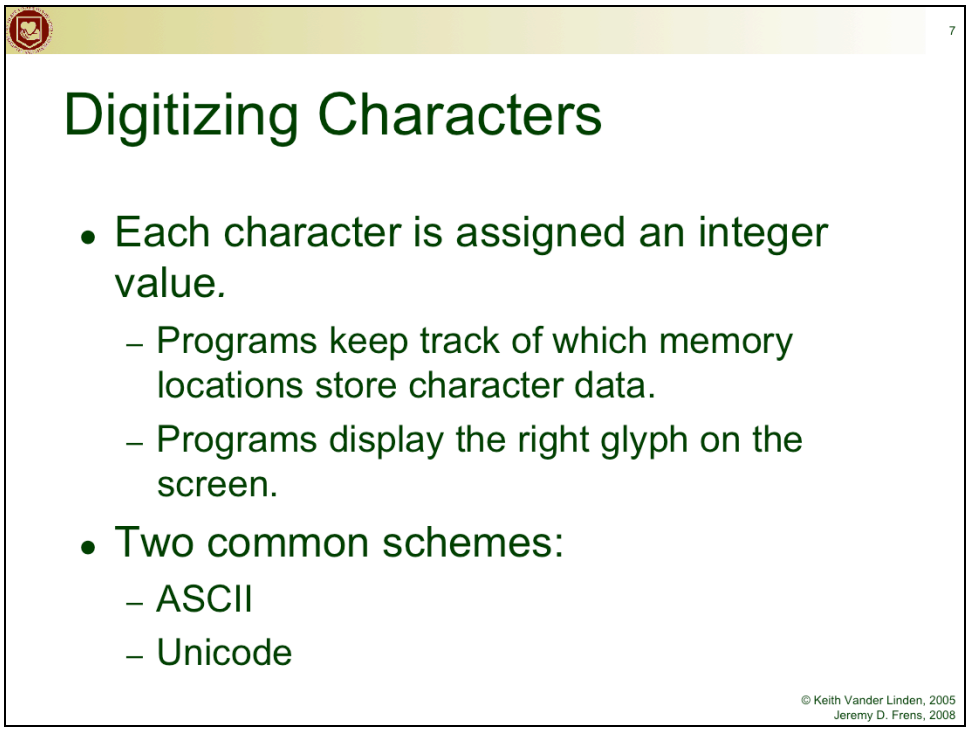
Decimal numbers are base-10 (using digits 0-9)



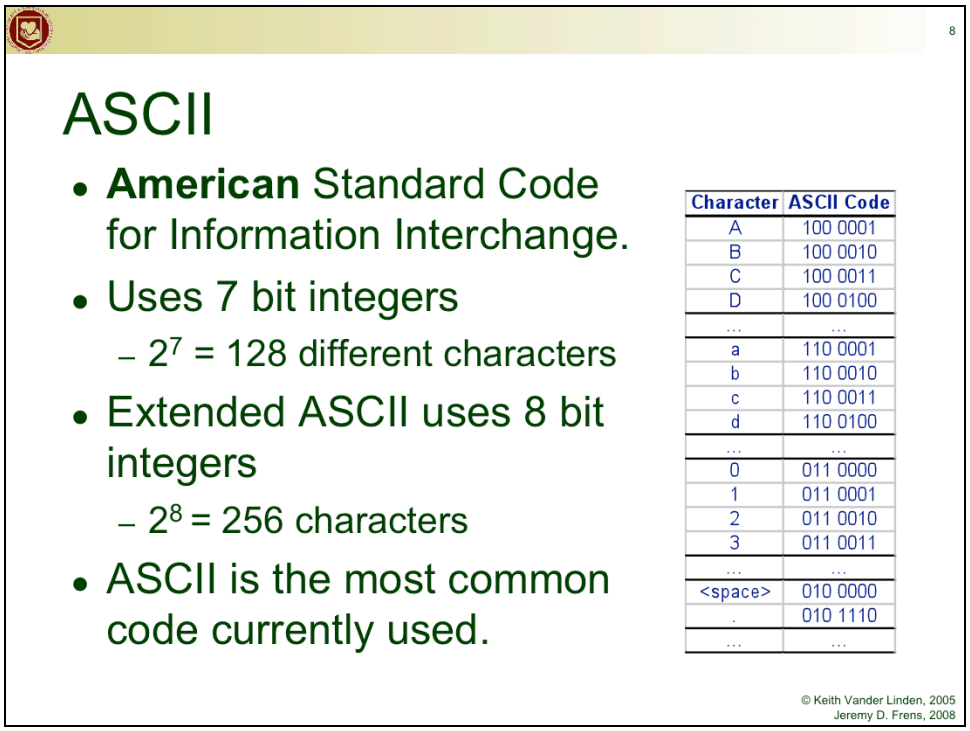
Binary Numbers

Binary numbers are base-2 (using digits 0 & 1)

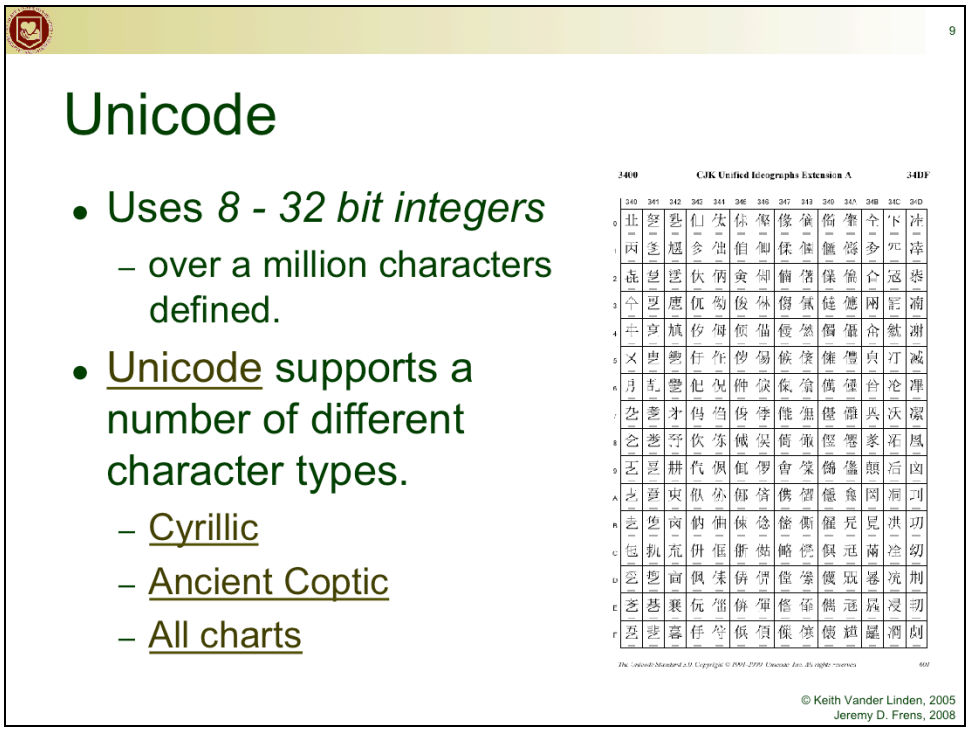




It's all binary underneath!



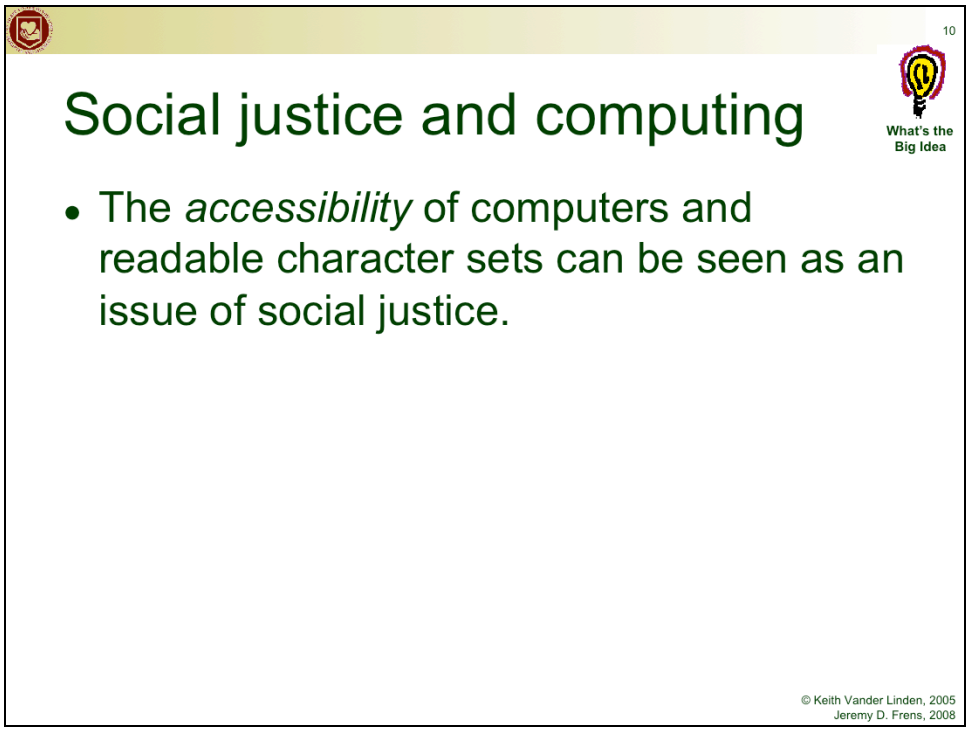
Note the “numerals” have their own ASCII code which means that “1” is different from 1. Confusing!



This is just a small part of the full unicode support for chinese characters.

Unicode is becoming more and more common.

I may have to explain hexadecimal to explain what the row and column numbers mean.



Related to the digital divide material included in the computer anatomy lectures.

Given the English-centric nature of the web, one might more accurately call it the ***Western*-wide web.**

Digital divide – the WWW is hard to access in:

- the developing world
- the non-western world
- underpriviledged social classes
- the disabled community

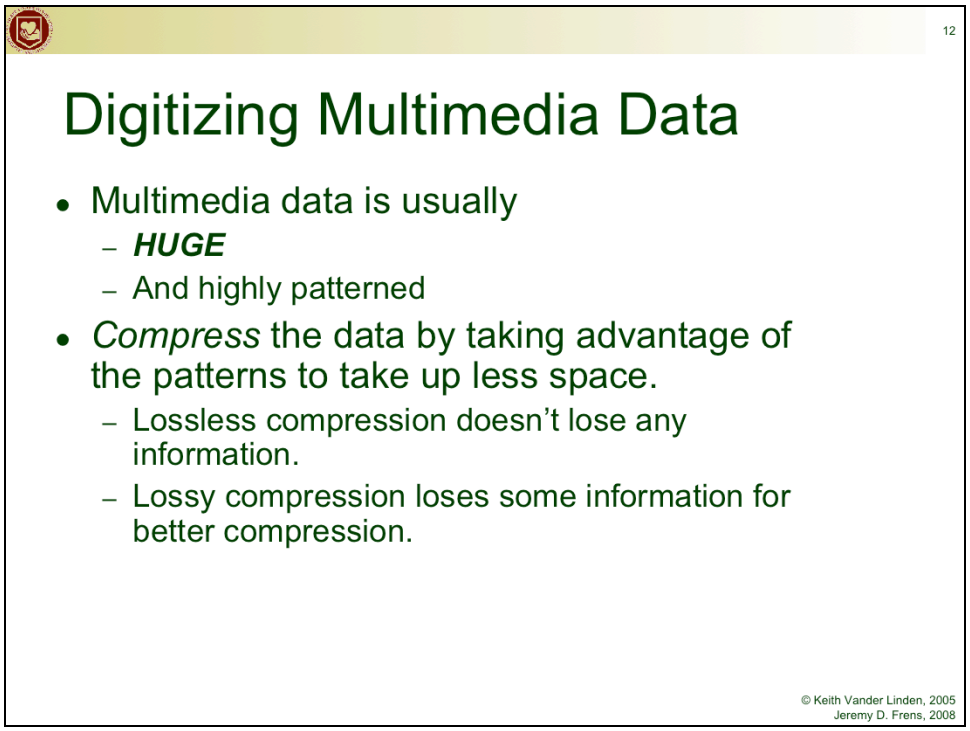
What could we do to help bridge this divide?

- Unicode
- internationalized domain name resolution
- better translation tools
- better international/disabled design and testing

Check out this article on digitally edited photos:

Can Photos Be Trusted? - Popular Science

http://www.popsci.com/popsci/technology/generaltechnology/d6002684e4646010vgnvcm1000004eecbccdrcrd.html



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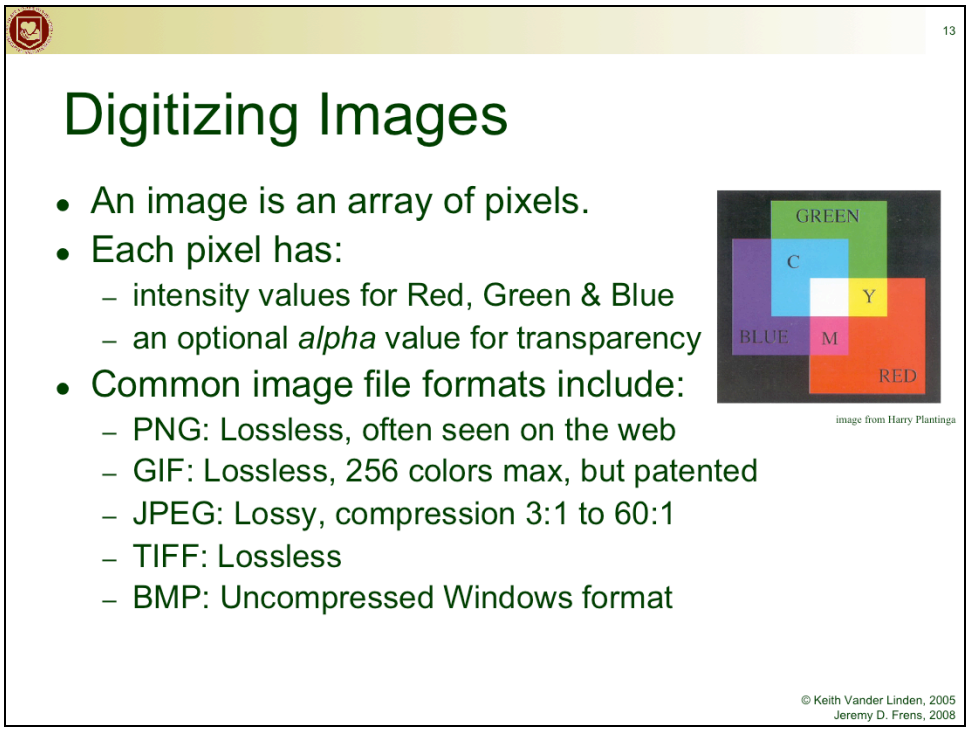

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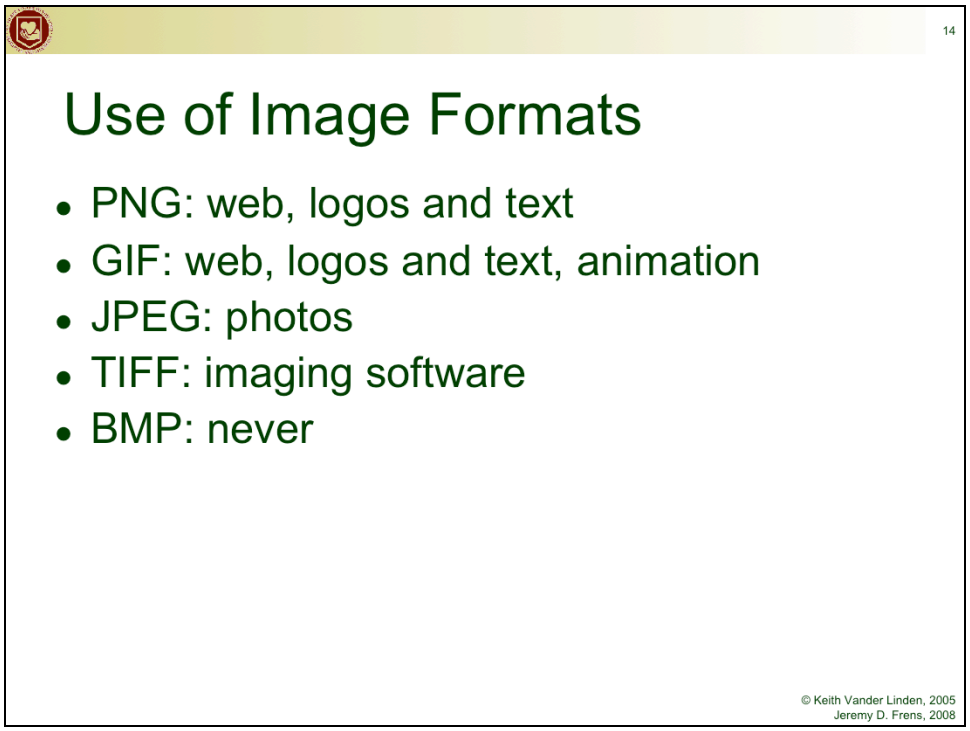

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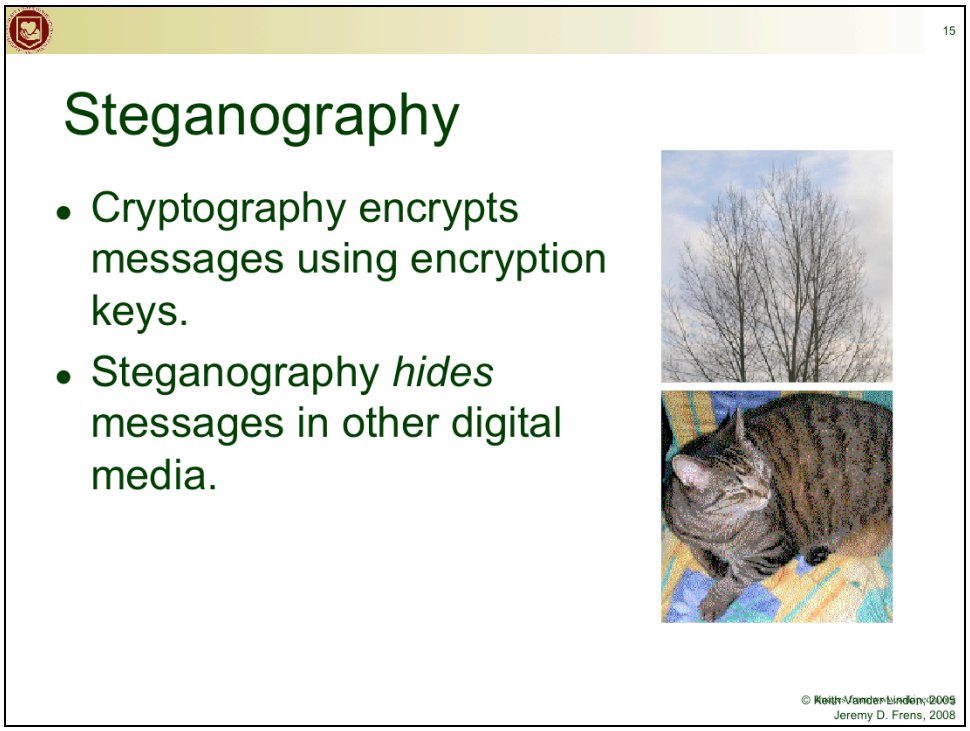


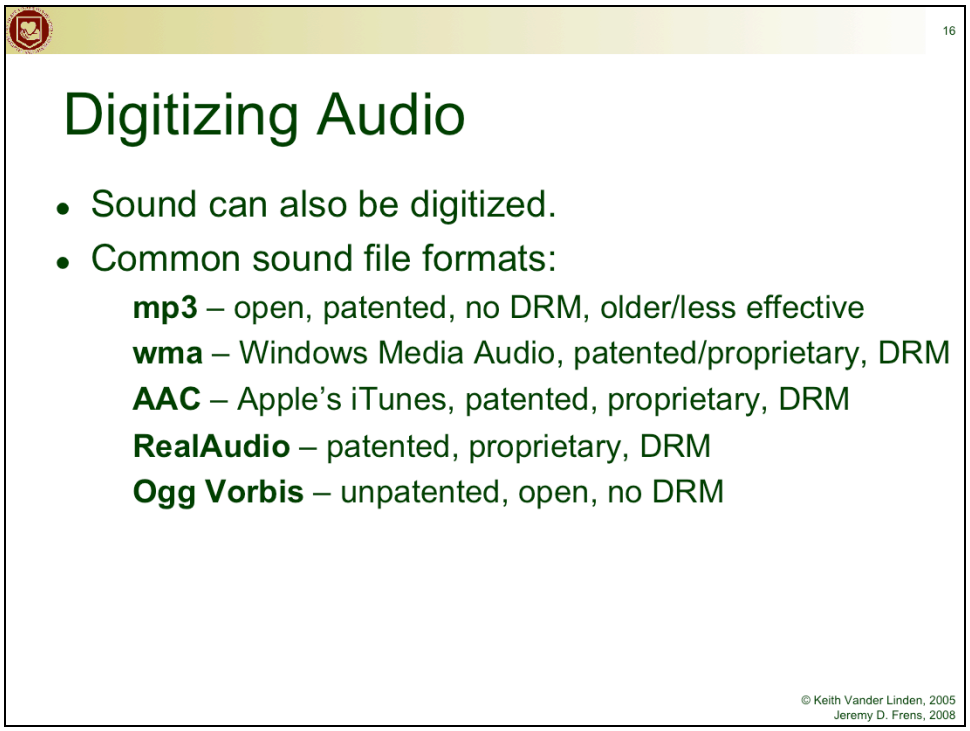
The bottom picture was hidden in the last 2 bits of the pixel codes of the top picture and recovered. People looking at the original would never have known that the cat was there, except, perhaps, by noticing that the relatively large size of the image file is not congruent with the relatively poor resolution of image.

http://en.wikipedia.org/wiki/Steganography

http://www.calvin.edu/~lave/s-tools/

This works for GIF but not for JPG (because of the way JPG codes the colors for compression).

http://www.stegoarchive.com/



DRM – digital rights management (see wikipedia)

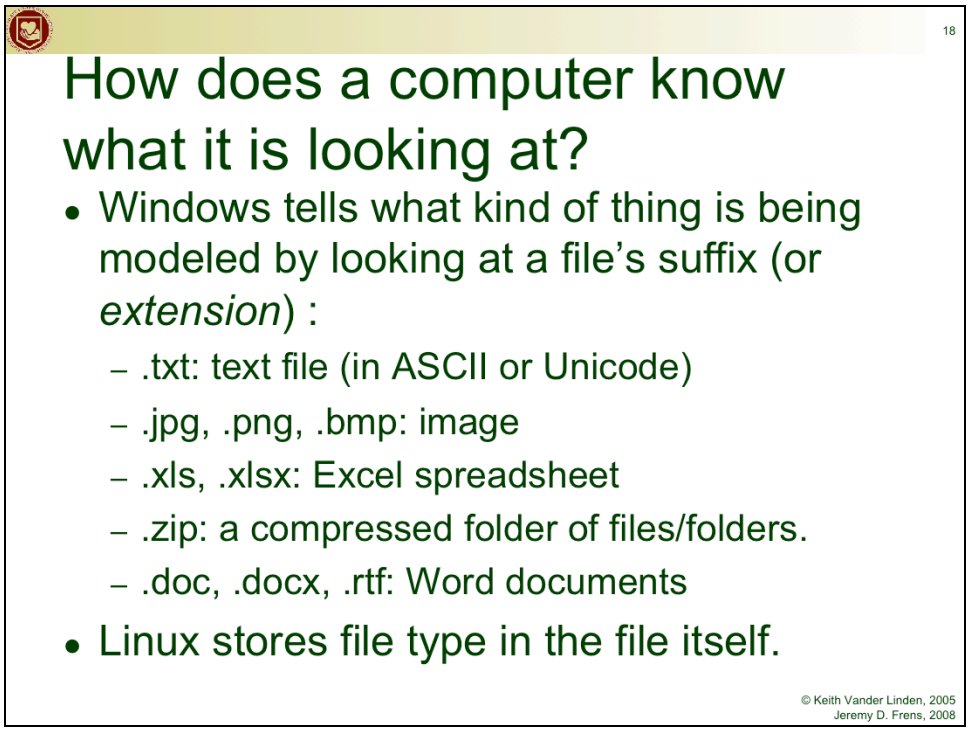
Lossy vs. lossless

Fights over "standards"

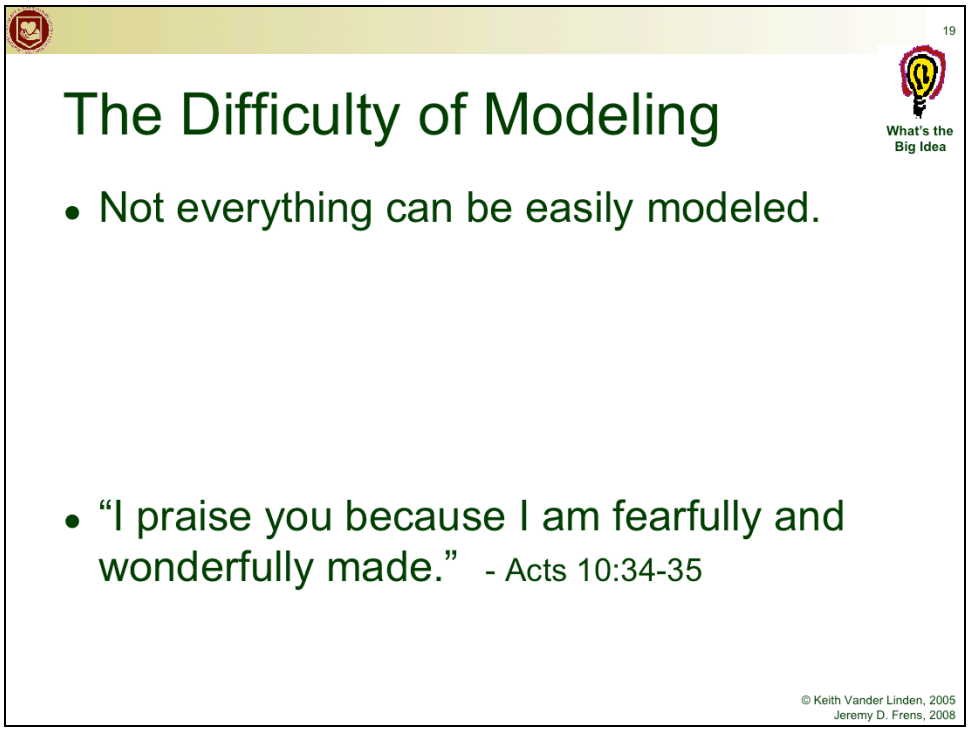
DRM is an ever-more-important issue

Digitizing Video

- Common movie file formats:
  - **mpeg** – Open (but patented) standard
  - **avi** – Windows Media Player
  - **DV** – As used in digital camcorders
  - **divx** – very high compression ratios



If you change the suffix of a file name, Windows thinks it is a different kind of file and will try to open it with a different program.



The weather (just too much stuff) (although this is getting much better every year)

The human genome (just too much stuff we don't understand)

Human intelligence (AI – to the sussman anomaly example here) - Easy things are hard, hard things are easy. E.g., Being human is harder than it looks. "One year in AI is enough to make one believe in God" – Alan Perlis.