

CS Concepts

- Claude Shannon
- The bit as the fundamental unit of information
- Error detection and correction
- Moore's Law
- Exponential growth
- Voice over IP (internet protocol)

Social Issues

- Technology is not inherently good or evil
- privacy
- safety
- convenience
- social networks
- monitoring
- identify theft

Stories

- Tanya Rider – car accident
- Eliot Spitzer – gov. of NY
- Edward Snowden
- Police videos
- every week another major hacking of personal data

Seven Koans of Bits

- It's all just bits
- Perfection is normal
- There is want in the midst of plenty
- Processing is power
- More of the same can be a whole new thing
- Nothing goes away
- Bits move faster than thought

It's All Just Bits

- text – bits
- pictures – bits
- Voice over IP phone calls – bits
- streaming audio and video – bits
- Computer programs take those bits and render them so we can see/hear/feel/ (smell?) them

Perfection is Normal

- Perfect copies of pictures
- Completely indistinguishable from the original
- If a bit gets corrupted we (generally) know it and can fix it.
- Cheap perfect copies are important in the music and movie industry

Digital technology has now made it possible to create copies of pre-digital artworks that are indistinguishable from the original?

A. True

B. False

There is Want in the Midst of Plenty

- Media changes making old information difficult or impossible to access
- The volume of data can be overwhelming – the needle in a haystack

Processing is Power

- Moore's Law
- Exponential growth (doubling every year and a half to two years)
- Hard to imagine what another 10 years of this growth will make possible...



More of the Same Can Be a Whole New Thing

- Exponential growth (doubling every few years)
- 1,2,4,8,16,32,64,128,256,512,1024,2048, ...
- Cell phones (death of land lines)
- Digital photography (death of film)
 - 1983 (first digital cameras for sale)
 - 1997 Kodak still going strong
 - 2007 Kodak 1/5 its size of the 80s

A particular lake has water lilies growing on it. On the first day, there is one water lily. Each day, the number of water lilies doubles. After 30 days, the water lilies cover half the lake. How long before they also cover the other half of the lake, so the whole lake is full?

A. 1 day

B. 15 days

C. 30 days

Nothing Goes Away

- impact on privacy
- convenience at a price
- mis-information persists
- European “right to be forgotten”

Bits Move Faster Than Thought

- Call centers in India – bits move nearly instantaneously around the world at very low cost
- Impacting the global economy
- Blurring the boundaries of national laws

Technology is Neither Good nor Bad

- Nuclear power
- Cryptography
- Sharing of information on the web
- Monitoring can be invasive (tracking your cell phone) or freeing (Alzheimer patient)
- Snowden, Wikileaks
- New applications bring new opportunities for criminals

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