Lecture 4-3
Intellectual Property

Participation Quiz

Which is a better love story than *Twilight*?
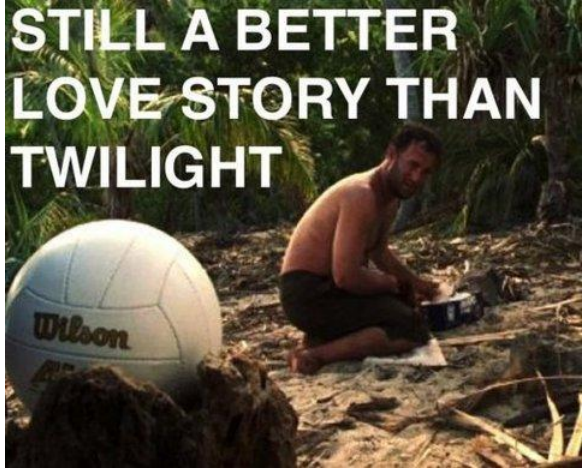
A:

B:

C:

D:

E: nothing could be better

4. Copyright

- Provides owner of an original work five rights
  - Reproduction
  - Distribution
  - Public display
  - Public performance
  - Production of derivative works
- Copyright-related industries represent 5% of U.S. gross domestic product (> $500 billion/yr)
- Copyright protection has expanded greatly since 1790

Software Copyrights

- Copyright protection began 1964

- What gets copyrighted?
  - Expression of idea, not idea itself
  - Object program, not source program

- Companies treat source code as a trade secret

- Violations of copyright
  - Copying a program to give or sell to someone else
  - Preloading a program onto a computer being sold
  - Distributing a program over the Internet

- Important court cases
  - Apple Computer v. Franklin Computer
    - Established that object programs are copyrightable
  - Sega v. Accolade
    - Established that disassembling object code to determine technical specifications is fair use

Copyright Creep

- Since 1790, protection for books extended from 28 years to 95 years or more
  - latest extension done to prevent Disney characters from becoming public domain?
- Copyright Term Extension Act of 1998 challenged as unconstitutional
- U.S. Supreme Court disagreed: CTEA does not create perpetual copyrights

Copyright creep
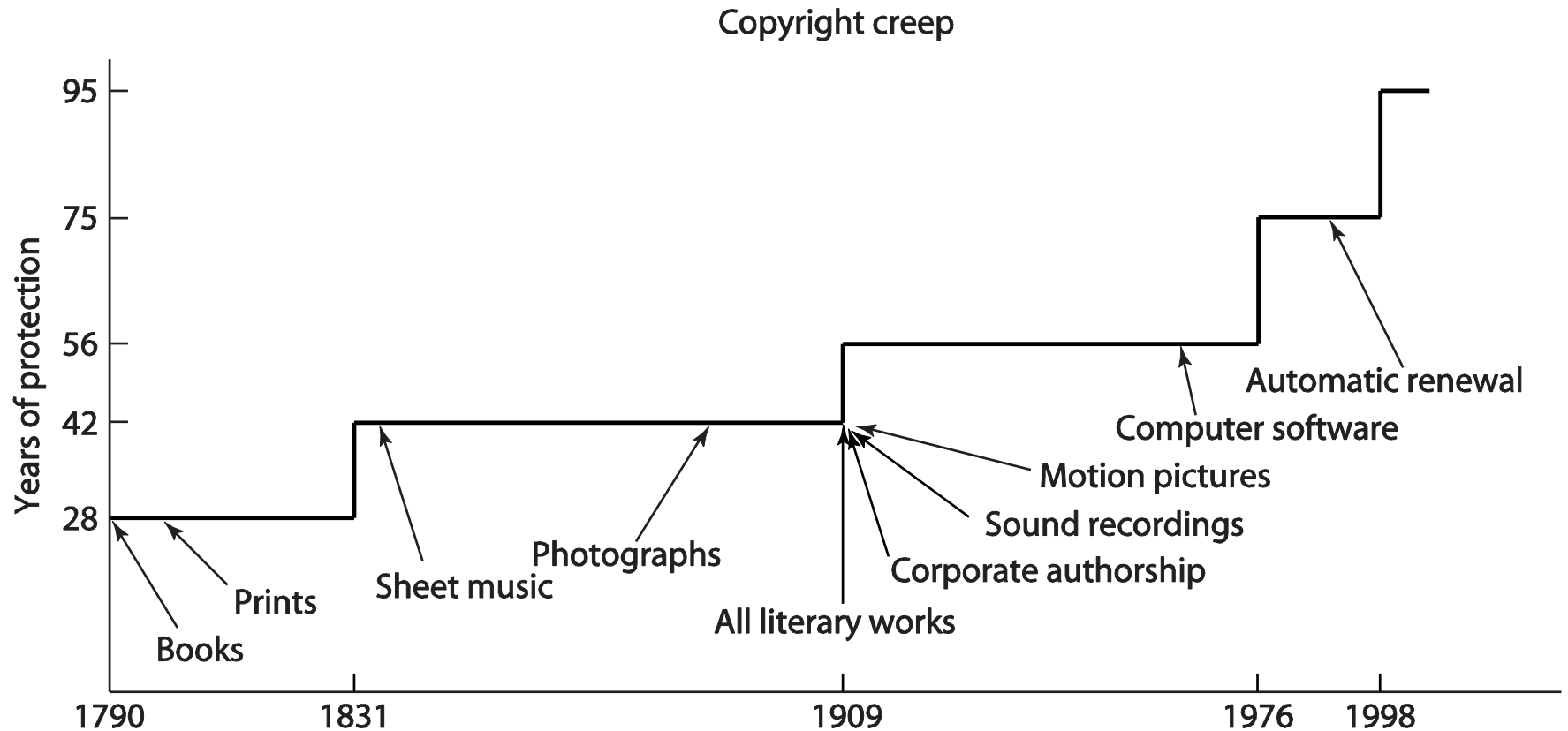
Digital Rights Management

- Actions owners of IP take to protect their rights

- Approaches
  - Encrypt digital content
  - Digital marking so devices can recognize content as copy-protected

- Example: the (failed) Secure Digital Music Initiative (2000)
  - Consortium didn't stick together
  - Cracked by CS researchers

- Example: Sony BMG Rootkit (2005)
  - Made everyone angry; retracted

- Example: online music stores (2003—2009)
  - Started out with DRM, in part to lock people into platforms
  - Lately, moving away from it

Fair Use/Fair Dealing

USA: Fair Use

- Cases where copyrighted work can be reproduced without permission
- Use can be for any purpose
- Usage must be fair
    1. Purpose, character of use
    2. Nature of work
    3. Amount of work copied
   4. Effect on market for work

Canada: Fair Dealing

- Three protected activities:
    - research or private study
    - criticism or review
    - news reporting
- Usage must be fair
    1. purpose (commercial/private)
    2. character (e.g., # copies made)
    3. amount copied from the original
    4. alternatives (was copying necessary?)
    5. nature (e.g., public availability of the copyrighted work)
    6. effect (does the copy compete with the original?)

Is it ethical to break a digital lock in order to make fair use of a copyrighted work?

Some famous examples of fair use

- "Time shifting" (recording shows on VCR/DVR)
- "Space shifting" (transcoding music onto MP3 player)
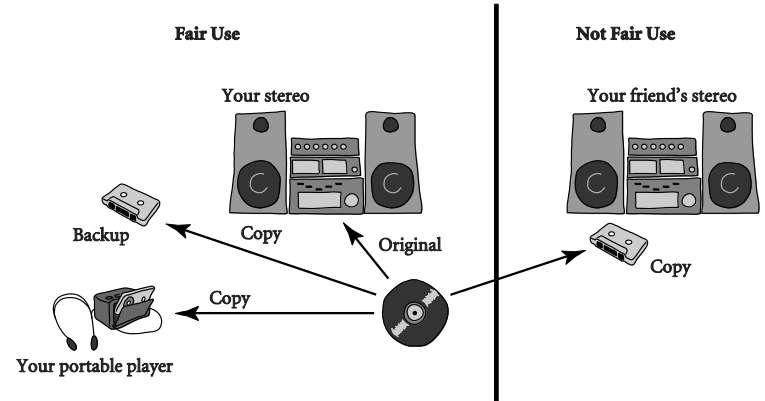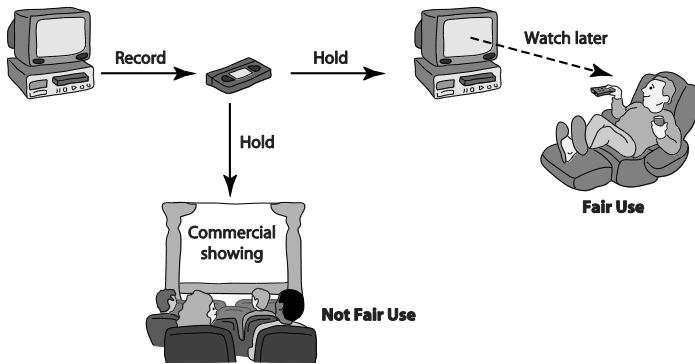
- Use of image thumbnails in search results
- Google books – indexing full texts

Legitimacy of IP Protection for Software

- Software licenses typically prohibit you from making copies of software to sell or give away
  - Our focus is not on whether it's ethical to violate such a legal agreement after having agreed to it.

- Instead, we will think about:
  - whether society *should* give IP protection to software
  - if so, how this protection ought to be limited
  - what ethical argument can be used to justify this protection.

Break into groups; discuss and debate:

"The producers of software should have the right to prevent others from copying the software they produce."

Intellectual Property

"The government should aggressively prosecute intellectual property infringement, particularly including peer-to-peer file sharing."

Rights-based Analysis

- "Just deserts" argument
  - Programming is hard work that only a few can do
  - Programmers should be rewarded for their labor
    - Mixing my labor with something implies ownership
- Criticism of "just deserts" argument
  - Why does labor imply ownership?
    - Maybe mixing my labor with something means I lose my labor
    - Pour a can of tomato juice into the ocean: I don't own the ocean.
  - A society in which all labor went to common good could be just
  - Intellectual property not like physical property
    - I cut logs: I own the logs
    - I write a book: I get to restrict other people from copying the book
- *What do you think about this argument?*

Utilitarian Analysis

- Argument against copying
  - Copying software reduces software purchases…
  - Leading to fewer software producers…
  - Leading to lower production of new software…
  - Leading to fewer benefits to society

Reduced software sales result in a decline in the software industry.

Fewer software products means fewer benefits for society.

Copying software results in reduced software sales.

A decline in the software industry will result in fewer products.

Software copying is wrong.
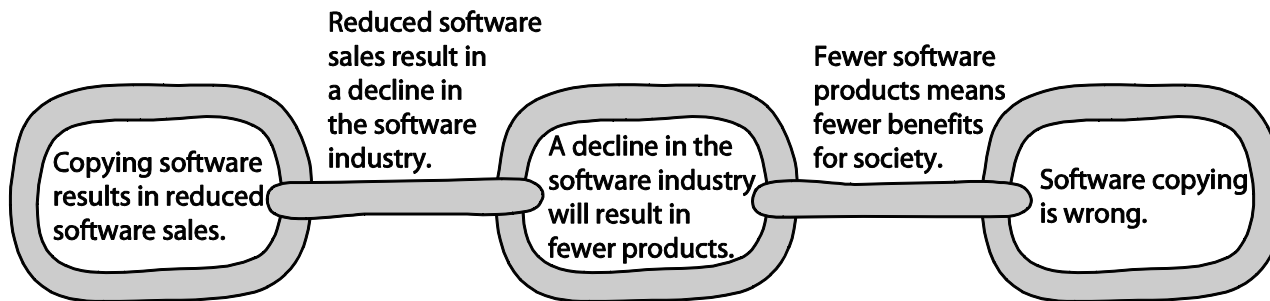
- Each of these claims can be debated
  - Not all who get free copies can afford to buy software
  - Open-source movement demonstrates many people are willing to donate their software-writing skills
  - Hardware industry wants to stimulate software industry; many apps are supported via ads
  - Difficult to quantify how much society would be harmed if certain software packages weren't released

What do you think about this argument?

Napster

- Peer-to-peer music exchange network
- Began operation in 1999
- Sued by RIAA for copyright violations
- Courts ruled in favor of RIAA
- Went off-line in July 2001
- Re-emerged in 2003 as a subscription music service

BitTorrent

- Broadband connections: download much faster than upload
- BitTorrent speeds downloading
  - Files broken into pieces
  - Different pieces downloaded from different computers
- Used for downloading large files
  - Computer programs
  - Television shows
  - Movies
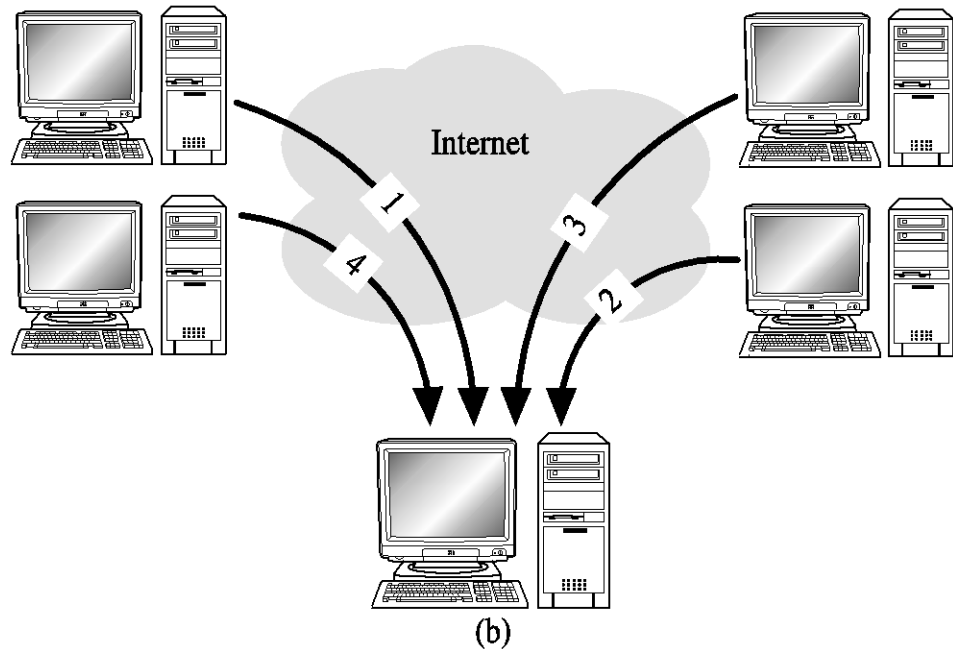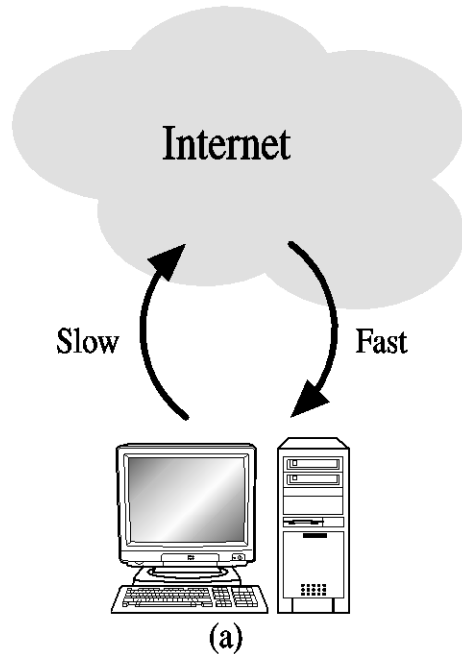
Legal Action Against P2P

- RIAA Lawsuits (2003)
  - Sued 100s of high-volume sharers
- Universities hotbed for sharing
  - Responses: banning, signing site licenses
- MGM vs. Grokster
  - Grokster won at lower levels, eventually lost at Supreme Court
  - Ruling: the technology existed primarily for infringement
- More recently: Pirate Bay:
  - Repeatedly shut down, sued, but keeps on…

Open Source

- A variety of licenses. Some typical ingredients:
  - No restrictions preventing others from selling or giving away software
  - Source code included in distribution
  - No restrictions preventing others from modifying source code
  - No restrictions regarding how people can use software
  - Same rights apply to everyone receiving redistributions of the software (copyleft)
- GNU Project (Richard Stallman, 1984-)
  - Goal: Develop open-source, Unix-like operating system
  - Most components developed in late 1980s
- Linux
  - Linus Torvalds wrote Unix-like kernel in 1991
  - Combined with GNU components to make an OS
  - putting pressure on Microsoft, Apple, and companies selling proprietary versions of Unix

Benefits and Drawbacks of Open Source

- Benefits
  - Gives everyone opportunity to improve program
  - New versions of programs appear more frequently
  - Eliminates tension between obeying law and helping others
  - Programs belong to entire community
  - Shifts focus from manufacturing to service

- Drawbacks
  - Without critical mass of developers, quality can be poor
  - Without an "owner," incompatible versions can arise
  - Relatively weak graphical user interfaces
  - Poor mechanism for stimulating innovation (no companies will spend billions on new programs)

Safe Software Development

- Reverse engineering okay

- Companies must protect against unconscious copying

- Solution: "clean room" software development strategy
  - Team 1 analyzes competitor's program and writes specification
  - Team 2 uses specification to develop software

- Interestingly, same development strategies also used to ensure that open source licenses don't "infect" commercial software

Creative Commons

- Under current copyright law, eligible works are copyrighted the moment they are created

- No copyright notice does not mean it's ok to copy

- Must contact people before using work

- That slows down creative reuse

- Free Creative Commons license indicates
  - Which kinds of copying are ok
  - Which rights are being retained

- Flickr and Magnatune two well-known sites using Creative Commons licenses

cc **creative commons**

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