CS 4001: Computing, Society & Professionalism

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Week 10: Software as IP
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Recap: Fair Use

Fair Use Concept

- Sometimes legal to reproduce a copyrighted work without permission
- Courts consider four factors
  - Purpose and character of use
  - Nature of work
  - Amount of work being copied
  - Affect on market for work

Fair Use Quiz

Peer to Peer Networks

Peer to Peer Networks

- Peer-to-peer network
  - Transient network
  - Connects computers running same networking program
  - Computers can access files stored on each other's hard drives
- How P2P networks facilitate data exchange
  - Give each user access to data stored in many other computers
  - Support simultaneous file transfers among arbitrary pairs of computers
  - Allow users to identify systems with faster file exchange speeds

Cyberlockers

- Also called file-hosting services or cloud storage services
- Internet-based file-sharing services
- Allow users to upload and download password-protected files
- Support workgroup collaboration
- Make sharing of copyrighted material easy

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

Recording Industry Association of America (RIAA) Lawsuits

- April 2003: RIAA warned file swappers they could face legal penalties
- RIAA subpoenaed Verizon for identities of people suspected of running supernodes
- Judge ruled in favor of Verizon
- September 2003: RIAA sued 261 individuals
- December 2003: U.S. Court of Appeals ruled Verizon did not have to give customer names to RIAA

- 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

Concept Behind BitTorrent
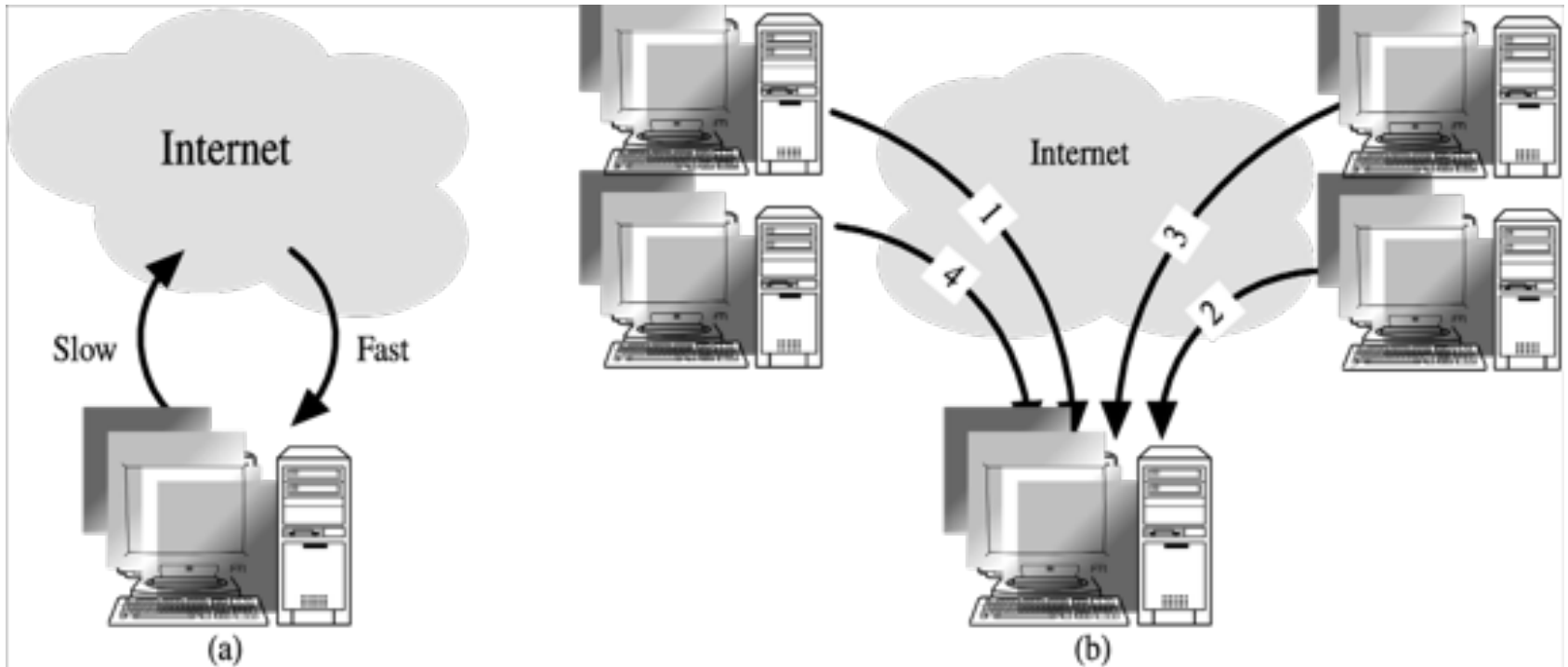
Legal Action Against Pirate Bay

- The Pirate Bay started in Stockholm, Sweden
- One of world's biggest BitTorrent file-sharing sites
- People download songs, movies, TV shows, etc.
- After 2006 raid by police, popularity increased
- In 2008 the International Federation of the Phonographic Industry sued four individuals connected with site
- Defendants said The Pirate Bay just a search engine
- Found guilty; sentence to prison and fined $6.5 million
- Meanwhile, The Pirate Bay still operational
- More than 150 proxy servers all over the world

Megaupload Shutdown

- Megaupload a prominent cyberlocker
  - More than 180 million registered users
  - Once world's 13th most popular Web site
  - Source of movies, TV shows, songs, games
- FBI used PRO-IP Act to shut down Megaupload (January 2012)
- FileSonic and FileServe responded by disabling sharing functionality

Legal Music Services on the Internet

- Subscription services for legal downloading
- Some based on monthly fee; some free
- Consumers pay for each download
- Apple's iTunes Music Store leading service, surpassing WalMart as top music retailer in United States
- Still, illegal downloading far more popular than legal music services

Protections for Software

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

Class Discussion: Identify Copyright Violations

- Transferring the copy of a program you bought from the CD to a hard disk

- Copying a program you bought onto a CD or DVD to give or sell to someone else

- Executing a program that you bought from your computer's hard drive

- Preloading a program onto the hard disk of a computer being sold

- Distributing a program over the Internet

Quiz on Software Copyright Violations

Class Activity 1a

Copyright violation may occur when a company attempting to create a software that competes with another existing product

Class Activity 1b, 1c

Safe Software Development

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

Software Patents

- Until 1981, Patent Office refused to grant software patents
  - Saw programs as mathematical algorithms, not processes or machines
- U.S. Supreme Court decision led to first software patent in 1981
- Further court rulings led to patents being granted for wider range of software

Software Patents

- Thousands of software patents now exist
  - Microsoft files ~3,000 applications annually
  - Licensing patents a source of revenue
- Secondary market for software patents
  - Patent trolls: Companies that specialize in buying patents and enforcing patent rights
  - Companies would rather settle out of court than spend time and money going to trial
  - RIM didn't settle quickly; ended up paying $612 million

Software Patents

- Critics say too many patents have been issued
  - Patent Office doesn't know about prior art, so it issues bad software patents
  - Obvious inventions get patents
- Companies with new products fear getting sued for patent infringement
  - Build stockpiles of patents as defense mechanism
  - Software patents used as legal weapons
- Bezos: software patents should expire in 3-5 years

Software Copyrights vs. Patents

	Software Copyright	Software Patent
What is protected?	Object Program, screen displays	Software process with practical utility
Is getting protection expensive?	No	Yes
Is getting protection time consuming?	No	Yes
Is reverse engineering allowed?	Yes	No

Open Source Software

Criticisms of Proprietary Software

- Increasingly harsh measures being taken to enforce copyrights

- Copyrights are not serving their purpose of promoting progress

- It is wrong to allow someone to "own" a piece of intellectual property

Open Source Definition

- 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)

Beneficial Consequences of Open Source Software

- 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

Screenshot from OpenOffice.org, a registered trademark of Apache Software Foundation.
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GNU Project and Linux

- GNU Project
  - Begun by Richard Stallman in 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 O.S.
  - Commonly called Linux

Impact of Open Source Software

- Linux an alternative to proprietary versions of Unix

- Linux operating system on 95% of the world's 500 fastest supercomputers

Critique of the Open Source Movement

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

Legitimacy of IP Protection for Software

Do We Have the Right System in Place?

- Software licenses typically prevent you from making copies of software to sell or give away
- Software licenses are legal agreements
- Not discussing morality of breaking the law
- Discussing whether society *should* give intellectual property protection to software
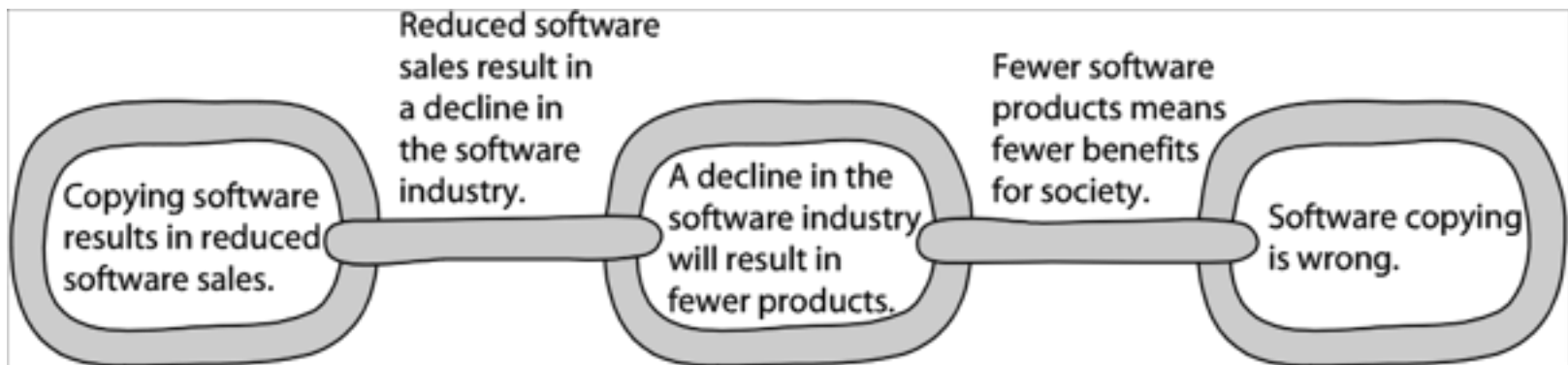
Rights-Based Analysis (Locke)

- "Just deserts" argument
  - Programming is hard work that only a few can do
  - Programmers should be rewarded for their labor
  - They ought to be able to own their programs

Rights-Based Analysis (Locke)

- "Just deserts" argument
  - Programming is hard work that only a few can do
  - Programmers should be rewarded for their labor
  - They ought to be able to own their programs
- Criticism of "just deserts" argument
  - Why does labor imply ownership?
  - Can imagine a just society in which all labor went to common good
  - Intellectual property not like physical property

Utilitarian Analysis

- Argument against copying
  - Copying software reduces software purchases…
  - Leading to less income for software makers…
  - Leading to lower production of new software…
  - Leading to fewer benefits to society

Copying software results in reduced software sales.

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

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

Fewer software products means fewer benefits for society.

Software copying is wrong.

- Argument against copying
  - Copying software reduces software purchases…
  - Leading to less income for software makers…
  - Leading to lower production of new software…
  - Leading to fewer benefits to society
- 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
  - Difficult to quantify how much society would be harmed if certain software packages not released

Creative Commons

Streamlining Creative Re-use

- Under current copyright law, eligible works are copyrighted the moment they are created
- No copyright notice does not mean it's okay to copy
- Must contact people before using work
- That slows down creative re-use
- Free Creative Commons license indicates
  - Which kinds of copying are okay
  - Which rights are being retained
- Flickr and Magnatune two well-known sites using Creative Commons licenses