




Computers and Society

Intellectual Property

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Intellectual Property

- Refers to the rights you possess regarding your ideas or creative work.
- Can subdivide into three areas:
 - Creative works (copyright)
 - Inventions (patent)
 - Identity (trademark)

Copyright

- Meant to protect individual works from being copied
- Applies to:
 - Written works (Books, articles, web pages ,etc)
 - Visual works (Movies, television, art, photographs, etc)
 - Audio works (music, performances, etc)
 - Software
- Copyright is intended to allow a creator to profit from his/her creative works.

Copyright

- Underlying ideas are not protected; only their specific manifestation.
- For example, if someone reverse-engineered your encryption tool and released their own, which functioned equivalently, this is not a copyright violation. (might be a patent violation.)
- A Copyright gives an author exclusive rights to their works for a “limited time.” (U.S. Constitution, Article 1, Sec 8)
- Protects original work, but not derived ideas or facts, or pre-existing incorporated material.

Copyright

- What “limited time” means has been a legal debate
 - Originally 28 years, then 56, then life plus 50 years.
 - Currently life + 70, or 95 years for corporate authorship
- Standard for originality is very low.
 - Must embody “a minimum level of creativity”
 - Must owe its origin to the author claiming copyright.

Copyright

- In the U.S., a work is copyrighted as soon as it is created.
- No special application needed.
- Applications can be obtained from U.S. Copyright office
- Registering your copyright may help you get damages

Copyright and Software

- Reverse Engineering
 - Not always clear-cut
 - Some courts have ruled that decompilation to an intermediate form, which is then copied, is a copyright infringement.
 - Reverse engineering to a wholly different form is usually considered fair use.
 - Often, software licenses will expressly forbid reverse engineering.
 - DMCA forbids circumventing copy-protection measures

Copyright and Software

- “Look and Feel”
- Some manufacturers have tried to sue competitors for copying the “expression of their ideas.”
- 1988: Apple sues Microsoft and HP for copyright infringement
 - Courts found that if there’s only one way to express an idea, that expression cannot be copyrighted.
 - Apple lost the suit, not because of the validity of copyrighting look and feel, but because it was ruled that there was no other way to implement overlapping windows.

Copyright and Software

- 1995: Lotus sued Borland
- Lotus had already sued two small companies for producing Lotus 1-2-3 clones.
 - claim: Borland Quattro had a “Lotus 1-2-3 emulation mode”
- Lotus won at the trial court level, but lost in appeals.
- Issue is still unsettled.

Public Domain

- Non-copyrighted works are said to be in the “public domain”
- A work in the public domain can be freely used by anyone.
 - Grimm’s Fairy Tales
 - The Bible
 - The U.S. Constitution
 - Bach, Beethoven, etc.

Public Domain

- Once copyright expires, works enter the public domain
- U.S. Government works cannot be copyrighted.
- Forfeiture
 - Previously, if authors did not defend their works against infringement, copyright was considered forfeited.
 - Since 1988, this is no longer the case.

Patent

- Patents are designed to protect the ideas behind an invention.
- Owner has an exclusive monopoly for 20 years.
- A patent protects the *idea itself*, rather than the expression of an idea.
- Owner must specifically file for a patent.

Patent

- Four types of inventions can be patented
 - Machines, man-made products, compositions of matter, processing methods.
- Cannot be patented:
 - Laws of nature, natural phenomena, abstract ideas.
- Gray area: algorithms can be patented if instantiated in a machine or process with a “useful” result.

Patent

- To be patented, an invention must be new, original, novel, and nonobvious.
- Extended to manufactured goods, plants, medical procedures, and software.
- Goals: Reward innovation, encourage competitors to reproduce functionality in a new form.
- Dangers: Stifle competition by presenting a barrier to entry.

E-commerce Patents

- Most early CS and networking innovations were not patented by their inventors.
 - e.g. TCP/IP, Ethernet, mouse
- 1998: Federal Appeals court rules that “business methods” can be patented.
 - Signature Financial patented a ‘hub and spoke’ system for consolidating portfolios.
 - Court ruled that a “business process” was no different from a manufacturing process.
 - Led to a huge spike in the number of patent applications in e-commerce.

E-commerce Patents

- Some e-commerce patents
 - Amazon: One-click purchasing
 - CyberGold: Attention brokerage (paying people to view ads)
 - Open Market: Electronic Shopping Carts
 - Priceline: “name your own price” sales
 - Akamai: Internet Content Delivery via Global Hoting System
 - NetZero: Display of third-party ads in floating windows
 - British Telecom: Hyperlinks
 - DoubleClick: Dynamic display of ads

Patent Criticisms

- Some observers worry that the Patent Office is not discerning enough.
- May be unable to adequately take into account technological issues.
- May make patent claims in the hope of collecting (or suing for) licensing fees.
- Many patent claims are very broad. (hyperlinks)
- Many ideas are either 'obvious' or an extension of a historical practice. (shopping carts)
- In Europe, business methods are not patentable unless implemented through a particular technology.

Trademark

- A Trademark is a mark used to identify goods and their source.
- Brand name, mascot, slogan, etc.
- Cannot be trademarked: Flags of nations, common descriptive words ('green'), deceptive marks, previous trademarks.
- Last for 10 years, and can be renewed indefinitely.

Trademark and the Internet

- Trademark-related lawsuits typically claim that a mark is being *diluted* (the association between mark and seller is being weakened) or that *market confusion* (Consumers are being misled).
- Example: Registering a domain name corresponding to a trademark for your own business.
 - www.fordrecalls.com used to point to an “adult” website
 - Court ruled that this diluted Ford’s trademark.

Trademark Infringement

- Like copyright, trademark rights do not extend to:
 - Parody
 - Non-commercial use
 - Product evaluation/new reporting
 - Fair Use (either the term is in common use, or the user must be using it to refer to his/her own product in an unambiguous way)
 - Geographic limitations

Trademark and the Internet

- Cybersquatting
 - Buying a domain name to sell it to the trademark holder.
- Metatagging
 - Including trademarked terms in META tags to improve search engine ranking.

Methods for Protecting and Distributing

- Once you've made an intellectual property, such as a program, you need to decide what to do with it.
- You need to decide the *terms* under which people can use your software.

Licensing

- A license specifies the terms under which a piece of software can be used. It can grant all of the terms that copyright does, or just a subset.
It may specify:
 - rules about copying
 - use for profit
 - number of installations
 - ownership (do you own the software, or just use it?)
 - Responsibility for usage
 - technical support

Commercial Licenses

- These are the traditional licenses that come with most shrink-wrapped software.
- Legal contract: as copyright holder, the authors can choose whatever usage terms they like.
- They typically prohibit users from tampering with, modifying or redistributing the software.
- Often, ownership remains with the vendor; users are technically leasing the code.
- Typically limits liability; vendor is not responsible for damage.
- May also restrict usage, duration, number of machines, reverse engineering.

Public Domain

- The simplest way to freely distribute your program is to put it into the public domain.
- No copyright is retained; users can do whatever they want with your program.
- This includes selling it or converting it into a proprietary product and copyrighting the derivative work.

Copyleft

- Copyleft is more restrictive than putting something in the public domain.
- Copyleft is an idea promoted by the GNU foundation
- Copyleft requires that anyone who redistributes software, either original or changed, must release this software under copyleft.
- Note that you *can* charge for this new software, but you can't change the licensing terms.
- This provides developers with an incentive to develop free software

Copyleft

- Stallman: “If you will make your software free, you can use this code.”
- Example: The C++ front-end to gcc was developed in industry. GNU’s copyleft required it to be copylefted, since it used copylefted code.

Examples of Copylefted Software

- Emacs
- gcc
- Many unix tools
- Anything released under the GNU Public license

GNU Public License

- The GNU Public license is the most well-known implementation of the “Free Software” principles.
- Distribution terms: everyone has the right to use, modify and redistribute copylefted code as long as the rights to this code or any derived code are not changed.
- In other words, you can’t weaken the use conditions (or strengthen restrictions) on copylefted code.

Free Software

- It's useful to think a bit about what “free software” really means.
- “Free as in speech, not as in beer.”
- In other words, you have the right to do what you want with it, not that you're obligated to get it without paying.

Free Software

- GNU software freedoms:
 - The freedom to run the program for any purpose
 - The freedom to study the program and how it works (i.e. source code access)
 - The freedom to redistribute copies
 - The freedom to modify the program and redistribute the modified version

The Free Software Foundation

- Started by Richard Stallman in 1985 as a response to the overwhelmingly proprietary nature of software at the time.
 - No free OSes (Unix was very expensive), few free tools.
- Goal: develop a free OS, along with a set of tools for that OS (editor, compiler, mail reader, etc)
- This system was referred to as GNU (Gnu's not Unix)
- When the linux kernel was developed in the early 1990s, GNU finally had a free OS to run on.

Lesser GPL

- GNU/FSF also offers something called the “Lesser GPL”
- Allows GPL’ed libraries to be linked into non-free code, which can then be proprietary.
- Goal: encourage adoption of a particular standard
- Or, the free library may do the same job as a widely-existing non-free library.
 - For example, the GNU C library.

Open Source

- *Open Source* is a broader term that covers a number of different possible licensing agreements.
- Basic criteria:
 - License must not prevent redistribution, and must allow free distribution.
 - Source code for the program must be publically available.
 - Derived works must be covered under the original license.
 - License may require modifications to be distributed as separate patches, or be clearly named or identified.

Open Source

- License may not discriminate against groups of users.
 - For example, countries may have export restrictions. An open source license may remind users to obey the law, but cannot explicitly incorporate these restrictions.
 - Also cannot restrict use to, for example, only non-commercial entities
- Cannot require that it be distributed only with other open-source works.

Examples of Open Source software

- Mozilla
- Apache
- Perl, Python, all GNU tools
- PHP
- openSSH
- Much more ...

Economics of Open Source

- A common objection to open source is: “But I need to eat!”
- If your program is freely available, how can you make money from it?
- Maintenance/development: Most programmers spend a large fraction of their time maintaining tools or modifying them for a particular business. this won't change if the underlying codebase is open source.

Economics of Open Source

- Support/consultation. Just because something is free doesn't mean there's no value for people who are experts at using it.
- Paid development. If a tool is widely accepted or deemed valuable, industry will subsidize its development, even if the end product is open source, because it's valuable to them.
 - e.g. Apache, g++, perl, ANTLR

Open Source as a Business Model

- Some managers may also be reluctant to adopt an open-source model.
 - “Why should we give away something that cost us lots of money to develop?”
 - Reliability: open source is arguably more reliable, as more people are using and testing the code.
 - Technical superiority: this is an open argument, but OS proponents argue that having more developers leads to a better product.
 - Rapid response. Faster turnaround times allow businesses to respond to customer needs more easily.

Open Source as a Business Model

- Market penetration. OS may allow a firm to add developments that would not be feasible otherwise. For example, ports to less popular operating systems.
- Remember, software has a “network effect” - getting a large user base makes it more valuable.

Open Source as a Business Model

- Potential Open-source business models:
- Support sellers (RedHat): Give away the product, sell support, after-sale service.
- Multiple levels: (MySQL) - Open-source community version, and a 'for-pay' enterprise version.
- Loss-leader. (Netscape, Java): You give away your software to help sales of related, closed software.

Open Source as a Business Model

- Product improvement. (SGI) A hardware company supports and ships open-source software (such as Samba) that improves their other products.
- Accessorizing. (O'Reilly, VA research) Selling systems or manuals that use or describe open-source systems.

Creative Commons

- These are just a few of the potential ways in which you may want to control the use of your IP.
- Creative Commons is an organization started by IP and CS experts devoted to increasing people's ability to control access to their work.
- Provides a broad set of potential licenses for creators of IP.
- Goals: Increase amount and accessibility of online source material.
- Also provides a standard metadata encoding for these licenses using HTML and RDF.
 - This makes the licenses standardized and machine-readable.

Creative Commons

- Some CC licenses:
- Attribution: Anyone can use your work, but they must give you credit.
- Noncommercial. People can use and display your work for noncommercial purposes.
- No derivative works. People can use or copy your work, but not modify it.
- Share alike. People can distribute derivative works as long as original licensing terms remain.
- Full copyright. You retain all rights to how your work is used.