Intellectual Property

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What is Intellectual Property?

- *Intellectual property* is a complex notion that is neither easily defined nor clearly understood.
- It is any unique product of the human intellect that has commercial value. e.g. books, songs, movies, prgorams,….etc.

Intellectual Property (continued)

- When discussing *property*, we tend to think of tangible items.
- Originally, "property" referred to land.
- Current conceptions of property also include objects that an individual can own – e.g., a car, a mobile phone…etc.

Property (continued)

- Property should not be viewed in terms of items or things, but rather as a certain kind of *relationship between individuals in reference to things*.
- Three elements need to be considered:

  (i) an individual, *X* ;

  (ii) an object, *Y*;

  (iii) *X's* relation to other individuals (*A*, *B*, *C*, etc.) in reference to *Y*.

Property (continued)

- *X* (as the owner of property *Y*) can control *Y* relative to persons *A*, *B*, *C*, and so forth.
- If Harry owns a certain object (e.g. a Toshiba laptop computer), then Harry can control who has access to that object and how it is used.
  - e.g., Harry has the right to exclude Sally from using his laptop computer; or he could grant her unlimited access to that computer.
- Ownership claims involving "intellectual objects" are both similar to and different from ownership of tangible objects.

Intellectual Objects

- The expression *intellectual objects* refers to various forms of intellectual property.
- Intellectual property consists of “objects” that are not tangible.
- Non-tangible or "intellectual" objects represent creative works and inventions, which are the manifestations or expressions of ideas.

Intellectual vs. Tangible Objects

- Tangible objects are exclusionary in nature, intellectual objects (e.g., such as software programs) are *non-exclusionary*.
  - If Harry owns a laptop computer (a physical object), then Sally cannot, and *vice versa*.
  - If Sally makes a copy of a word-processing program (that resides in Harry's computer), then both Sally and Harry can possess copies of the same word-processing program.

Intellectual vs. Tangible Objects (continued)

- The sense of *scarcity* that applies to physical objects, which often causes competition and rivalry, need not exist for intellectual objects.
- Intellectual objects can be easily reproduced.
- There are practical limitations to the number of physical objects one can own.
  - e.g., there are natural (and political limitations) to the amount of land that can be owned.
- Countless copies of a software program can be produced – each at a relatively low cost.

Intellectual vs. Tangible Objects (continued)

- Another distinguishing feature has to do with what exactly one can legally claim to have ownership over.
- Legally, one cannot own an idea in the same sense that one can own a physical object.
- Legal protection is given only to the *tangible expression* of an idea that is creative or original.

Ideas vs. Expressions of Ideas

- If an idea is literary or artistic in nature, it must be expressed (or "fixed") in some tangible medium in order to be protected.
  - A “tangible medium” could be a physical book or a sheet of paper containing a musical score.
- If the idea is functional in nature, such as an invention, it must be expressed in terms of a machine or a process.
- Authors are granted copyright protections for expressions of their literary ideas, inventors are given patent protection for inventions.

Why Protect Intellectual Objects?

- One answer to this question is that our current laws say that it should.
- We could then further ask on what philosophical grounds are our laws themselves based?
- In the Anglo-American law, the philosophical justification for property rights is grounded in two different types of views about property: natural rights, and constructed rights.

Protecting Intellectual Objects (continued)

- One theory holds that a property right is a type of "natural right," which should be granted to individuals for the products that result from the labor expended in producing an artistic work or a practical invention.

- Another theory is based on the notion that property rights are social constructs designed to encourage creators and inventors to bring forth their artistic works and inventions into the marketplace.

Software as Intellectual Property (IP)

- Should computer programs be eligible for patent protection?
- Should they be protected by copyright law?
- Do they deserves both, or perhaps neither, kind of protection?
- Computer software consist of lines of programming code (or codified thought).
- It is not exactly expressed or "fixed" in a tangible medium in a way that literary works are.

Software as Intellectual Property (continued)

- So, initially, computer programs were eligible for neither copyright nor patent protection.
- Eventually, however, copyright protection was granted to software programs.
- Some argues that computer programs are more like inventions that could be patented.

Arguments for and against IP

- Arguments for:
  - New ideas in the form of inventions improves quality of life
  - Ownership promotes useful habits and accomplishments (David Hume)
  - It is a necessary motivation to work
  - Ownership is the least possible reward for the inventor
- Arguments against:
  - Some philosophers believe that most conflicts are rooted in the possession of private property and it should be abolished(Karl Marx)

ICT and Intellectual Property Rights

- IT development worsen IPR violations:
  - Enhancements of storage media
  - Regularity of storage standards e.g. compressing
  - Speed of digital transmission
  - Interoperability of media (easy editing, sharing and conversion)
- Violation can take place in the following ways where data could be:
  - Modified and corrupted without permission
  - Distributed in illegal copies.
  - Digitized and placed on internet without permission
  - Plagiarized (downloaded, copied and pasted)

Protecting Intellectual Property

- WIPO an international Org. dedicated to promoting the use and protection of human works

- According to WIPO, Intellectual Property is divided into two categories:
  - Industrial property (inventions, trademarks, designs..)
  - Copyright (literary and artistic works)

- Copyright law distinguish between ideas that cannot be owned and the expression of the ideas

Four factors for ineffectiveness of traditional protection

- Software have several distinct and complex qualities (compactness, ease of transmission, ease of replication) making current legislation inapplicable to digital products:
  1. The development of new ICT blurred boundaries between media
  2. Intellectual Property has become increasingly abstract & intangible
  3. Globalization increased both incentives for violation and economic harm
  4. Privatization & using market mechanism to gather and disseminate info

Software (SW) Piracy

- SW piracy include the unauthorized copying of SW in large quantities for resale, reproduction or illegal use
- Not all software are copyrighted with regard to redistribution and use.
- Four categories of SW products are:
  - Freeware: Copyrighted SW that produced free but with restriction regarding sale or modification
  - Shareware: free distribution with voluntary payment
  - Public Domain: Free SW without restriction on sale modification
  - Proprietary SW: Commercial copyrighted produced for sale with license and no modification allowed

Categories of Software Piracy

- SW piracy involve proprietary SW and are mainly of four categories:
  - Internet piracy (SW downloaded or exchanged illegally)
  - Dis-reputable sellers (illegal SW purchased by dishonest manufacturers)
  - End-user copying software
  - Counterfeiting (SW copied, distributed or sold on large scale)
- Pirated software is risky because:
  - It lacks documentation, warranty, or update
  - Counterfeit discs my be infected with viruses
  - Users put themselves and employers at risk

Copyright Protection Schemes

- Four schemes:
  - *Copyright law*;
  - *Patents*;
  - *Trademarks*;
  - *Trade secrets*.

1. Copyright Protection

- Copyright law in the Anglo-American world was in response to concerns resulting from certain uses of printing-press technology.

- It was also in response to concerns about the widespread publishing of pamphlets made possible by the printing press.
  - Authors wanted to protect their creative works from being reproduced without their permission.

What Exactly Does Copyright Law Protect?

- A copyright is a legal form of protection given to a "person" or author.
- The author can be an entity such as organization or a corporation, such as Microsoft, as well as an individual.
- A copyright protection is given for the expression of an idea such as a book, poem, musical composition, photograph, dance movement, motion pictures, audiovisual works, or computer software.

Copyright Protection (continued)

- For a work to be protected under copyright law, it must satisfy three conditions. It must be:
  - original;
  - non-functional;
  - fixed in a tangible medium.

Copyright Protection (continued)

- Copyright holders have the exclusive right to:
  - make copies of the work;
  - produce derivative works, translations into other languages, movies based on the book, and so forth;
  - distribute copies;
  - perform works in public (musicals, plays. etc.);
  - display works in public (e.g., art works).

The Fair Use Principle

- To balance the exclusive controls given to copyright holders against the broader interests of society, we have the principle of *fair use*.
- Fair use means that every author or publisher may make limited use of another person's copyrighted work for purposes such as criticism, comment, news, reporting, teaching, scholarship, and research.

Fair Use (Continued)

- Fair use restricts the (total) control that the copyright holder would otherwise enjoy.
- The fair-use principle has supported the practice of "reverse engineering."
- Reverse engineering is very important in the computer industry in particular, and in engineering in general.
- It allows someone to buy a product for the purpose of taking it apart to see how it works.

Fair Use (Continued)

- Fair use of Intellectual property underlined by four essential factors:
  - Purpose of use (commercial or non profit)
  - The nature of the copyrighted work
  - The amount and substantiality of the portion used
  - The effect the use on the market value of the copyrighted work
- However, to prevent plagiarism:
  - Place electronic watermarks of authentication
  - Inform IP protecting orgs like WIPO
  - Upload data in read only forms e.g. PDF files

The First-Sale Doctrine

- The first-sale doctrine is another balancing scheme in copyright law.
- It applies once the original work has been sold for the first time, when the original owner loses rights over the work of art.
  - e.g., once you purchase a copy of a book, audio tape, painting, etc., you are free to give away, resell, or even destroy the copy of that work.
- It is not clear that one can even give away licensed software.

Table 8-1: Abbreviations and Acronyms Pertaining to Copyright

CSS	Content Scrambling System
DeCSS	De-Content Scrambling System
DMCA	Digital Millennium Copyright Act (Public Law 304, 1998)
DVD	Digital Versatile Disc
MP3	Standard file digital format (developed in 1987 by the **M**oving **P**icture Exports Group)
NET Act	No Electronic Theft Act
SBCTEA	Sonny Bono Copyright Tem Extension Act
TRIPS	Trade Relationship Aspects of Intellectual Property Standards
UCC	Uniform Commerce Code (for electronic contracts)
UCITA	Uniform Computer and Information Transactions Act
UETA	Uniform Electronic Transactions Act
WIPO	World Intellectual Property Organization

2. Patent Protections

- A patent is a form of legal protection given to individuals who create an invention or process.
- Unlike copyrights, patents offer a 20-year exclusive monopoly over an expression or implementation of a protected work.
- Computer hardware inventions clearly satisfied the requirements of patent law.
- Computer software did not (initially).

Patents (Continued)

- Patent protection can be applied to inventions and discoveries that include functional devices such as machines.

- The Patent Act requires that three conditions must be satisfied:
  - *Usefulness*;
  - *Novelty*;
  - *non-obviousness*.

3. Trademarks

- A trademark is a word, name phrase, or symbol that identifies a product or service.

- The Act intends to ensure that the quality associated with a certain logo or symbol used by a business actually represents the quality that consumers expect (e.g., BMW label).

Trademarks (Continued)

- Consider three common trademarks:
  - the red apple that symbolizes Apple and Macintosh computers;
  - the golden arch-like "M" that has come to symbolize McDonald's restaurants;
  - the expression "coke," which symbolizes Coca-Cola.
- To qualify for a trademark, the "mark" or name is supposed to be distinctive.

4. Trade Secrets

- A trade secret is information used in the operation of a business or other enterprise that is sufficiently valuable and secret to afford an actual or potential economic advantage over others.
- Trade secrets can be used to protect:
  - formulas (such as the one used by Coca-Cola);
  - blueprints for future projects;
  - chemical compounds;
  - process of manufacturing.

Three Philosophical Theories of Property

Labor Theory (John Locke)	Argues that a property right is a "natural right" and that property rights can be justified by the labor or "toil" that one invests in cultivating land or in creating a work of art.
Utilitarian Theory	Argues that property rights are not natural rights but rather artificial rights created by the state. Property rights are granted to individuals and to corporations because they result in greater social utility overall.
Personality Theory (Hegel)	Argues that a property right is a "moral right" and that property rights are justified not because of labor or social utility but because creative works express the personalities of the authors that create them.

Free Software: an Alternative Framework

- Stallman argues information should be totally free. He is the founder of FSF.
- He introduced GNU project & copyleft concept
- He advocates free software in four freedoms:
  1. To run programs for any purpose
  2. To study how program works and adapt it to your needs (source code access).
  3. To redistribute copies to help neighbors.
  4. To improve the program and release improvements to public (source code access).

Alternative Framework (continued)

- His view is often seen as ideal and impractical solution.
- Would we want all information (including our personal information) to be completely free?
- We would have no privacy, if all information were free.

Alternative Framework (continued)

- Stallman's insight is that intellectual property in the form of *information* is something that humans desire to share with one another.
- In order to be shared, information must be communicated.
- So complicated intellectual-property structures that prohibit or even discourage the communication of information would undermine the very purpose of information as "something to be shared."

Arguments for and against free SW

- The arguments supporting free software could be summarized as follows:
  - No software piracy
  - Equality of access
  - Software development
  - Software quality (bugs and security holes immediately fixed)
  - Independency (no software monopolies)
- Arguments against free software are:
  - No software documentation
  - No technical support
  - No standards (different versions available)
  - No funding for programmers
  - No Scientific progress (because of the above)

Towards a "Fair" Intellectual Property System of Laws

- We should presume in favor of the principle that information wants to be shared (but not necessarily free). (Tavani, 2002)
- If we do this, we have a starting point for framing a reasonable policy for the information age that will both:

  (a) allow the flow of information;

  (b) reward fairly the creators of intellectual objects, including software manufacturers, in the cyber-age.