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IP Basics for Software Innovations

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IP Basics Agenda

- Background on the basics of computing
- Brief History of intellectual property (IP)
- Explanation as to why IP is important in technology transfer
- Four types of IP for Software Innovations
- Goal – To establish the IP foundation needed for those who plan to attend the 2018 AUTM Software Course

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AUTM Software Course

Pittsburgh, PA

May 10th and 11th, 2018 (Thursday-Friday)

- Designed for those who work with software and other information assets.
- Covering basic principles, best practices, emerging models and actual cases.

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Schedule at a Glance

Thursday, May 10th, 2018

- Anatomy of a Software License
- Software Patent Perspectives
- Artificial Intelligence (AI) Terminology review
- Small Group Discussions & Ask the Experts
- Faculty Experiences Q & A

Friday, May 11th, 2018

- The Pittsburgh Health Data Alliance – Putting Healthcare Information to Work
- Evolving Issues in Open Source
- Faculty Experiences Q & A
- Nontraditional Licenses
- Small Group Discussions & Ask the Experts

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Computing Basics

- Computers are executing bodies
- Software breathes life into those bodies
  - Machine Language (aka executable code) – 1s, 0s,
  - Higher Language (Fortran, Basic, C++, Java) – object code/source code
- Compilation – programs that take object files and transform them in machine readable forms
  - Libraries can be linked

Computing Basics (cont'd)

- Algorithm:
  - A step-by-step problem-solving procedure, especially an established, recursive computational procedure for solving a problem in a finite number of steps.*

*The American Heritage® Dictionary of the English Language

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Executable Code

Source Code

functions.php

```
$howmanykilled = 1;
$count = 1;
$match_String = "killed";
$ti = 0; //the temp index
$title_ar = explode(" ",$string);
foreach ($title_ar as $i => $item) {
        $ti = $i;
        if ($title_ar[$i] == $match_String) { //once we find $match_string, work backward through the array
        while ($ti > 0) {
                $ti=$ti-1;

                //this checks to see if there is a number right after $match_string.
                //if there is, then we will use that one.
                if (is_numeric($title_ar[$i+1])) {
                        $howmanykilled = $title_ar[$i+1];
                        break;
                }
                if (is_numeric($title_ar[$ti])) {

                        if (($i-$ti) <= $index_offset){
                                //echo "<br>good to go!<br>";
                                $howmanykilled=$title_ar[$ti];
                        } else {
                                //echo "<br> to far away<br>";
                                $howmanykilled = 1;
                        } //end if...else
                break;
                }

         }//end while
          }//end if
}//end foreach
if ($howmanykilled > $limit) {
        $howmanykilled = 0;
}
return $howmanykilled;
}// end FUNCTION: getkilled

//FUNCTION: countKilled()
function countKilled($database_mysqidb, $mysqidb, $write = TRUE) {
//This will add up the total number of people reported killed that this program finds.
//and write it to the "total" table of the database if $write is TRUE, if $write is FLASE it won't
        $totalKilled = 0;
        mysql_select_db($database_mysqidb, $mysqidb);
        $query_EBK_DB = "SELECT `killed` FROM news";
        $EBK_DB = mysql_query($query_EBK_DB, $mysqidb) or die(mysql_error());
        $killed_ar = mysql_fetch_assoc($EBK_DB);
        $totalRows_EBK_DB = mysql_num_rows($EBK_DB);
        do {
                $totalKilled +=$killed_ar['killed'];
        } while ($killed_ar = mysql_fetch_assoc($EBK_DB));
```

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IP Has Deep Roots

United States Constitution: Article I Section 8 Clause 8

"To promote the progress of Science and the Useful Arts by securing for limited times to authors and inventors the exclusive rights to their respective writings and discoveries"

- Birthed federal patent and copyright laws in the U.S.

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The Challenge

IP constantly strives to strike the right balance for:

- Protections for individual inventors/authors
- Induce and incentivize works
- Progress the Common Good of a society

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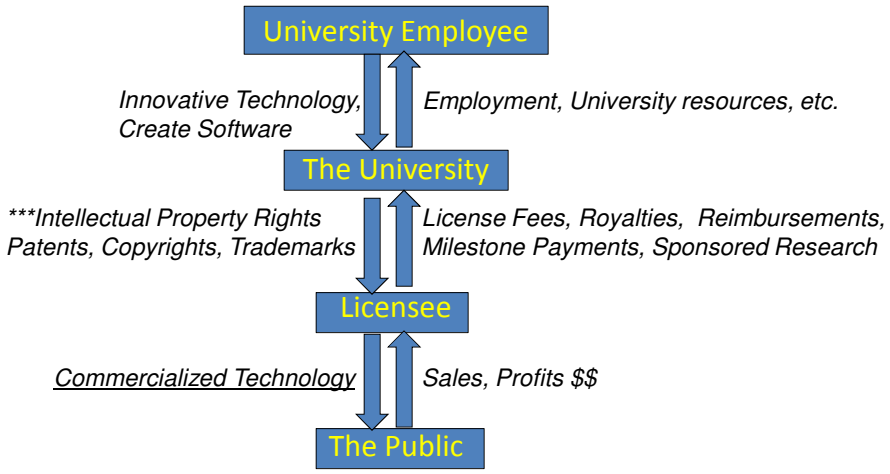
The University Technology Transfer Model



Credit: Dillon I. Beardsley

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IP Types for Software

- **Patents** – New, Useful, and Non-obvious ideas
- **Copyrights** – "Copyright subsists for any **original work of authorship** fixed in a **tangible medium** of expression."
- **Trademarks** – Words, symbols or sounds that identify source
- **Trade Secret** – any information not generally known or available (i.e. a secret) that conveys a particular advantage or economic value

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Patents

Section 101 of Title 35 U.S.C. sets out the subject matter that can be patented:

> *Whoever invents or discovers any new and useful* ***process, machine, manufacture, or composition of matter, or any new and useful improvement thereof****, may obtain a patent therefor, subject to the conditions and requirements of this title.*

Patents (cont'd)

- Provisional Patents – (1 year) – Holds your priority filing date
  - Non-examined placeholder application
- Utility Patents – (20 years) – "patents for invention"
  - Relates to structural or functional features
- Design Patents – (15 years if filed on or after May 13, 2015, 14 years if filed prior to that date)
  - Relates to ornamental features or appearance
  - Design cannot have any utility

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Patents (cont'd)

- Utility Patents
  - Patentability Requirements:
    - Patentable Subject Matter/Usefulness § 101
    - Novelty § 102
    - Non-obviousness § 103
    - Enablement/Written Description/Best Mode § 112

Patents (cont'd)

- 35 U.S.C. § 101 "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof."
- Patentable Subject Matter
  - For an invention to be patentable, it has to consist of statutory subject matter.
    - Process, Machine, Composition of Matter, Article of Manufacture.
  - U.S. Supreme Court: "Anything under the sun that is made by man" (*Diamond v. Chakrabarty*).

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Patents (cont'd)

- Non Patentable Subject Matter:
  - Discoveries
  - Natural Laws
  - Abstract Ideas or Ideas in general
  - Scientific Principles
  - Natural Phenomena
  - Mathematics
  - Atomic Weapons
  - Anything encompassing a human being
  - Naturally occurring things (except plants)

Patents (cont'd)

- The issue with software, algorithms, and methods of doing business centers around what constitutes an unpatentable idea.
- Computer Related Inventions – The Supreme Court
  - *Gottschalk v. Benson* (1972)
    - Patent on method for converting binary-coded-decimal numerals into pure binary numerals for use with general purpose digital computer of any type was denied because computerization of mathematical equations could not shift them from the realm of ideas to that of industry.
  - *Diamond v. Diehr* (1981)
    - Patent on a process for curing synthetic rubber which included in several of its steps the use of a mathematical formula and a programmed digital computer was granted because it involved a number of **discrete steps.**

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Patents (cont'd)

- *Bilski v. Kappos* (2010)
  - The patent in dispute concerned a method of hedging risk in the field of commodities trading in the energy market.
  - The Supreme Court found that the patent was not directed to patent-eligible subject matter, and affirmed the use of the "Machine-or-Transformation Test."
- "Machine-or-Transformation Test"
  - A claimed process is patent-eligible under § 101 if:
    - (1) it is tied to a particular machine or apparatus, or
    - (2) it transforms a particular article into a different state or thing.

Patents (cont'd)

- *Alice v. CLS Bank* (2014)
  - *Alice* was the first Supreme Court case on the patent eligibility of software since *Bilski*.
  - The patents in dispute concerned mitigating settlement risk in financial transactions by using a computer system as a third-party intermediary.
  - The Supreme Court found that patents directed to a patent ineligible invention must contain an inventive concept that transforms the patent into an eligible invention.
- Computer Processes
  - Claimed process is patentable if it is tied to a particular machine or apparatus (aka a computer or device), or
  - It is Transformative

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Patents (cont'd)

- Usefulness § 101
  - Utility Requirement.
  - The invention must have *some* application for beneficial use in society.
  - Low threshold: "All that the law requires is, that the invention should not be frivolous or injurious to the well-being, good policy, or sound morals of society." – Justice Story

Patents (cont'd)

- Novelty § 102
  - The invention must be demonstrably different from what is publicly available.
  - Prior Art References.
  - Anticipation: A Patent is denied if the invention claims each and every element of a single prior art reference.

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Patents (cont'd)

- Non-obviousness § 103
  - The invention can not be obvious to a person having ordinary skill in the art.
  - Unlike anticipation under § 102, multiple prior art references may be combined to consider whether the invention is obvious.

Patents (cont'd)

- Enablement/Written Description/Best Mode § 112
  - The Specification:
    - Must "**enable"** a person having ordinary skill in the art to make and use the invention.
    - Must contain a **"written description"** of the invention, sufficient to show that the inventor had accomplished the invention.
    - Must detail the **"best mode"** contemplated by the inventor.

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Recent Decisions - Claim is not directed to an abstract idea

- Core Wireless (GUI for mobile devices that displays commonly accessed data on main menu)
- ***DDR Holdings (matching website "look and feel")***
- ***Enfish (self-referential data table)***
- Finjan v. Blue Coat Sys. (virus scan that generates a security profile identifying both hostile and potentially hostile operations)
- ***McRO (rules for lip sync and facial expression animation)***
- Thales Visionix (using sensors to more efficiently track an object on a moving platform)
- Trading Tech. v. CQG † (GUI that prevents order entry at a changed price)
- Visual Memory (enhanced computer memory system)

Recent Decisions - claim as a whole amounts to significantly more than the recited judicial exception, i.e., the claim recites an inventive concept

- Abele (tomographic scanning)
- Amdocs (field enhancement in distributed network)
- ***BASCOM (filtering Internet content)***
- Classen (processing data about vaccination schedules & then vaccinating)

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Protecting the user experience

THE PARTS OF SOFTWARE THAT CAN BE PROTECTED USING DESIGN PATENTS

Design Patent – brief recap

- Design patent is a granted on the ornamental design of a functional item
  - There must be a unique or distinctive shape or appearance to the article not dictated by the function that it performs
- Design patents are a type of industrial design right
- 15 year* protection period

*Design patents resulting from applications filed on or after May 13, 2015 have a 15 year term from issuance. Previous design patents have a term of 14 years.

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Design Patent – for protecting software

- Examples: Graphical User Interfaces:
  - Icons
  - Screen layout
  - Visual cues
  - color
  - Animation (e.g., “Cover Flow” that protects flipping through albums)
- Devices that house the software:
  - Buttons
  - Shape
  - Industrial Design
  - colors

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Design Patents

- Unlike utility patents, design patent subject matter may relate to surface, ornamentation, and/or configuration.
- The purpose of protecting a design is because it has a distinctive feel.
- Design patents are closer to trademarks and copyrights.
- Design Patent Litigation – Apple, Inc. v. Samsung Electronics Co. Ltd.

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Copyrights

- A copyright is an original work of authorship fixed in a tangible medium.
- Example: Books, Letters, Films, Paintings, Source Code, Technical Specifications
- Rights for a term ending 70 years after the death of the author. If the work was a work for hire (e.g., those created by a corporation) then copyright persists for 120 years after creation or 95 years after publication, whichever is shorter.

Copyrights (cont'd)

- Protects: Works of Authorship
  - (1) literary works;
  - (2) musical works, including any accompanying words;
  - (3) dramatic works, including any accompanying music;
  - (4) pantomimes and choreographic works;
  - (5) pictorial, graphic, and sculptural works;
  - (6) motion pictures and other audiovisual works;
  - (7) sound recordings; and
  - (8) architectural works.
- Not protected:
  - **facts,** ideas, titles, procedures, processes, methods of operation, concepts, principles, or discoveries.
  - any work of the United States Government

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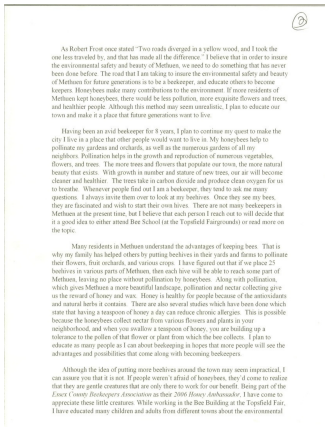
The Same?

Literature



As Robert Frost once stated "Two roads diverged in a yellow wood, and I took the one less traveled by; and that has made all the difference." I believe that in order to insure the environmental safety and beauty of Methuen, we need to do something that has never been done before. The road that I am taking to insure the environmental safety and beauty of Methuen for future generations is to be a beekeeper, and educate others to become keepers. Honeybees make many contributions to the environment. If more residents of Methuen kept honeybees, there would be less pollution, more exquisite flowers and trees, and healthier people. Although this method may seem unrealistic, I plan to educate our town and make it a place that future generations want to live.

Having been an avid beekeeper for 8 years, I plan to continue my quest to make the city I live in a place that other people would want to live in. My honeybees help to pollinate my gardens and orchards, as well as the numerous gardens of all my neighbors. Pollination helps in the growth and reproduction of numerous vegetables, flowers, and trees. The more trees and flowers that populate our town, the more natural beauty that exists. With growth in number and stature of new trees, our air will become cleaner and healthier. The trees take in carbon dioxide and produce clean oxygen for us to breathe. Whenever people find out I am a beekeeper, they tend to ask me many questions. I always invite them over to look at my beehives. Once they see my bees, they are fascinated and wish to start their own hives. There are not many beekeepers in Methuen at the present time, but I believe that each person I reach out to will decide that it a good idea to either attend Bee School (at the Topsfield Fairgrounds) or read more on the topic.

Many residents in Methuen understand the advantages of keeping bees. That is why my family has helped others by putting beehives in their yards and farms to pollinate their flowers, fruit orchards, and various crops. I have figured out that if we place 25 beehives in various parts of Methuen, then each hive will be able to reach some part of Methuen, leaving no place without pollination by honeybees. Along with pollination, which gives Methuen a more beautiful landscape, pollination and nectar collecting give us the reward of honey and wax. Honey is healthy for people because of the antioxidants and natural herbs it contains. There are also several studies which have been done which state that having a teaspoon of honey a day can reduce chronic allergies. This is possible because the honeybees collect nectar from various flowers and plants in your neighborhood, and when you swallow a teaspoon of honey, you are building up a tolerance to the pollen of that flower or plant from which the bee collects. I plan to educate as many people as I can about beekeeping in hopes that more people will see the advantages and possibilities that come along with becoming beekeepers.

Although the idea of putting more beehives around the town may seem impractical, I can assure you that it is not. If people weren't afraid of honeybees, they'd come to realize that they are gentle creatures that are only there to work for our benefit. Being part of the *Essex County Beekeepers Association* as their *2006 Honey Ambassador*, I have come to appreciate these little creatures. While working in the Bee Building at the Topsfield Fair, I have educated many children and adults from different towns about the environmental

Source Code

```
functions.php
    $howmanykilled = 1;
    $count = 1;
    $match_string = "killed";
    $i = 0; //the temp index
    $title_ar = explode(" ",$string);
    foreach ($title_ar as $i => $item) {
        $ti = $i;
        if ($title_ar[$i] ==  $match_string) { //once we find $match_string, work backward through the array
        while ($ti > 0) {
            $ti=$ti-1;

            //this checks to see if there is a number right after $match_string.
            //If there is, then we will use that one.
            if (is_numeric($title_ar[$ti+1])) {
                $howmanykilled = $title_ar[$ti+1];
                break;
            }
            if (is_numeric($title_ar[$ti])) {

                if (($ti-$ti) == $index_offset){
                    //echo "<br>good to go!<br>";
                    $howmanykilled=$title_ar[$ti];
                } else {
                    //echo "<br> to far away<br>";
                    $howmanykilled = 1;
                } //end if...else
            break;
            }

        }//end while
        }//end if
    }//end foreach
    if ($howmanykilled > $limit) {
        $howmanykilled = 0;
    }
    return $howmanykilled;
}// end FUNCTION: getkilled

//FUNCTION: countkilled()
function countkilled($database_mysqldb, $mysqldb, $write = TRUE) {
//This will add up the total number of people reported killed that this program finds.
//and write it to the "total" table of the database if $write is TRUE, if $write is FLASE it won't
    $totalkilled = 0;
    mysql_select_db($database_mysqldb, $mysqldb);
    $query_ERR_DB = "SELECT `killed` FROM news";
    $ERR_DB = mysql_query($query_ERR_DB, $mysqldb) or die(mysql_error());
    $killed_ar = mysql_fetch_assoc($ERR_DB);
    $totalRows_ERR_DB = mysql_num_rows($ERR_DB);
    do {
        $totalkilled +=$killed_ar['killed'];
    } while ($killed_ar = mysql_fetch_assoc($ERR_DB));
```

Copyrights (cont'd)

- Only a "modicum of originality" required
- Tangible Medium
  - Defined as a copy or phonorecord (CDs, audiotapes, vinyl, and digital recordings)
  - Digital storage of a work is considered a "copy".
- Exclusive Rights of copyright holders:
  - to reproduce (aka "to copy"); to prepare derivative works; to distribute by sale, transfer of ownership, or by rental, lease, or lending; to perform and/or display publicly;

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Copyrights (cont'd)

- Copyright and Computer Software
  - Copyright law aims to protect expression over functionality, but computer software is unique in that it is a creation that incorporates both functionality and expression.
  - The National Commission on New Technological Uses of Copyrighted Works (CONTU) recommended to Congress that copyright laws offered the best protection to computer software.
  - In 1980, Congress amended the 1976 Copyright Act to include a definition of "computer program." According to Section 101 of the Copyright Act, "a 'computer program' is a set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result."

Copyrights (cont'd)

- Copyright and Computer Software
  - In a Third Circuit Court of Appeals case, the court in *Apple Computer, Inc v. Franklin Computer Corp.* (1983), confirmed that computer programs are in fact literary works protected under the Copyright Act.
  - The court explained that "the definition of 'literary works' in section 101 include[s] expression not only in words but also 'numbers, or other . . . numerical symbols or indicia', thereby expanding the common usage of 'literary works.'"
  - Therefore, the court held that a computer program, "whether in object code or source code, is a 'literary work' and is protected from unauthorized copying, whether from its object or source code version."

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Copyrights (cont'd)

- Common Law Copyright
  - Rights present upon fixation
  - No printed "©" necessary
    - Formal registration unnecessary (unless bringing suit)
- Copyright Registration with the Library of Congress
  - Necessary to bring suit for infringement
  - Statutory Damages: No need to prove actual losses via evidence
    - Must be registered within 3 months of publication or 1 month of known infringement, whichever date is earlier.
    - Up to $150,000 for willful infringement – per infraction

Copyrights (cont'd)

- Copyright infringement requires:
  - (1) Access; and
  - (2) Substantive Similarity
- Fair Use Exception:
  - Criticism, comment, news reporting, teaching, scholarship, or research, are potentially not an infringement of copyright.
  - Determining Factors:
    - (1) the purpose and character of the use - commercial v. non commercial purposes
    - (2) the nature of the copyrighted work - fiction v. non fiction
    - (3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and
    - (4) the effect of the use upon the potential market for or value of the copyrighted work

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Copyrights (cont'd)

- Fair Use and Computer Software
  - The *Sega Enters. Ltd. v. Accolade, Inc.* (1992) case tested the application of fair use to computer software.
  - Instead of becoming a licensee of Sega to develop and sell games compatible with the Sega Genesis video game console, Accolade reverse engineered Sega's video game programs and created its own games for the Genesis console without copying any of Sega's programs.
  - The court applied the four factor fair use test, and found "that where disassembly is the only way to gain access to the ideas and functional elements embodied in a copyrighted computer program and where there is a legitimate reason for seeking such access, disassembly is a fair use of the copyrighted work, as a matter of law."

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Trademarks

A trademark is **a distinctive sign or indicator** used by an individual, business organization, or other legal entity to identify for consumers that the products or services on or with which the trademark appears originate from a unique source, designated for a specific market, and to distinguish its products or services from those of other entities.

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Trademarks (cont'd)

- Software Names "Outlook", Brand "Apple", Sound "Intel"
- Unlimited Duration – Renewable every 10 years
- Must use the mark in commerce before registering the trademark or file an "intent to use"
- Examples of famous marks: McDonalds, Apple, Disney

Trademarks (cont'd)

- Subject Matter:
  - Words, names, symbols, devices, slogans, logos, sounds, or a combination of any of these
- Common Law Rights ("TM"):
  - May arise from use of the mark in commerce
  - May only be enforceable in geographic regions where the mark has been used and areas where use of the mark is likely to expand
- Federal Registration ("®"):
  - Must register at USPTO
  - Provides a number of advantages, including constructive notice of ownership, nationwide rights, certain statutory remedies, and priority rights under certain international conventions

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Trademarks (cont'd)

- Marks likely to get rejected:
  - Immoral, Deceptive, Scandalous, Disparaging marks
  - No flags of US, or other countries
  - No names, portraits or signatures of the Living without consent
  - No names, portraits or signatures of deceased US Presidents
  - Surnames, Descriptive marks, Geographic marks, Generic marks that have not acquired secondary meaning
  - Confusing Marks

Trademarks (cont'd)

- Types of Marks:
  - *Generic*
    - Refers to the basic nature of the goods or services provided rather than to the specific characteristics of a particular good or service.
    - Generic marks are not entitled to protection.
  - *Descriptive*
    - Portrays the characteristics of the article or service to which they refer.
    - Need "secondary meaning" that suggests the public has come to associate the mark with the source of the good or service.
  - *Suggestive*
    - Connotes rather than describes some particular product or service.
  - *Arbitrary or Fanciful*
    - Do not suggest, connote, or describe the good or service provided.
    - These are the strongest marks and entitled to the greatest protection.

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Trademarks (cont'd)

Type	Strength	Example
Fanciful	Most Strong	Exxon, Kodak, Xerox
Arbitrary	Strong	Apple (computers)
Suggestive	Medium Strength	Netscape, Microsoft
Descriptive	Some Strength	Sunglass Hut, Sharp (TVs)
Generic	No Strength	Apple (fruits)

- Names (Ernest and Julio Gallo, McDonald's) are Descriptive
- Geographical marks (Nantucket Nectars) are Descriptive

Trade Secret

A trade secret is a formula, practice, process, design, instrument, pattern, or compilation of information which is not generally known or reasonably ascertainable, by which a business can obtain an economic advantage over a competitor's customers.

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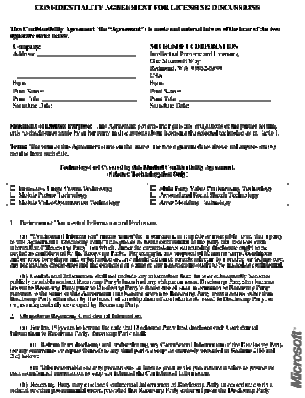
Trade Secret (cont'd)

- Trade secret rights:
  - To use and derive benefit and to safeguard against misappropriation – acquisition by improper means or unauthorized disclosure.
- Requirements:
  - Formula, practice, process, design, instrument, pattern, or compilation of information must be treated as a secret
  - Must take reasonable efforts to maintain its secrecy under the circumstances
- Duration is indefinite:
  - Trade secret rights will last as long as the trade secret is a value to the company and it is kept secret
  - Public disclosure negates trade secret protection
  - Confidential disclosure is permitted
  - Independent discovery and reverse engineering is permitted

Trade Secret (cont'd)

- Non-disclosure Agreement
  - A non-disclosure agreement (NDA) is a tool that many software companies use to protect their computer software as a trade secret.



CONFIDENTIALITY AGREEMENT FOR LICENSING DISCUSSIONS

Microsoft

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What is Open-Source Software (OSS)?

- Computer Software
- Under Copyright
- Source code available with a license, providing the rights to:
  - study,
  - copy,
  - modify,
  - make derivative works, and
  - distribute to anyone and for any purpose
  - (under certain terms and conditions).

Intent of OSS and OSS Licenses

- Collaboration for development
- Spectrum of restriction for use:
  - "open" with much less restrictions known as permissive licenses
  - stricter and limiting on what can be done with the source code and any source code the open source is integrated into known as copyleft licenses

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Common Open Source Licenses

- Apache License 2.0
- BSD 3-Clause "New" or "Revised" license
- BSD 2-Clause "Simplified" or "FreeBSD" license
- GNU General Public License (GPL)
- GNU Library or "Lesser" General Public License (LGPL)
- MIT license
- Mozilla Public License 2.0
- Common Development and Distribution License
- Eclipse Public License

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What the difference means to you

PERMISSIVE V. COPYLEFT LICENSES

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Not all Open-Source is Equal…
Most people think of it as **free** code

Certain open source licenses allow for every open use which are usually called permissive free software licenses, some examples are:

- Apache
- BSD (Berkeley Software Distribution License)
- MIT

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What is a "copyleft" license?

Copyleft is a general method for making a program (or other work) free, and requiring all modified and extended versions of the program to be free as well under the same terms and conditions.

Some examples of popular open source licenses:

- GPL (GNU General Public License)
- AGPL (GNU Affero General Public License)
- LGPL (GNU Lessor General Public License)
- MPL (Mozilla Public License

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Final Thoughts

- Copyrights provide a head start
  - Will not protect against clean room coding
- Patents as a tool – offensive and defensive
  - Is it enforceable?
  - Algorithm or Business Method
- Robust development and TM Branding are equally important
- Do not rule out trade secrets and beware of open source

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Register for the AUTM Software Course

Pittsburgh, PA

May 10th & 11th, 2018 (Thursday-Friday)

Register Online: https://www.autm.net/events-courses/courses/software-course-(1)/

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Questions?

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Thank You! See you in Pittsburgh!