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Legal Protection of Programming Languages

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Advanced Topics in Programming
Languages and Compilers

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Presentation Overview

1. Introduction
2. Copyright Protection
3. Patent Protection
4. Free Speech Limitation
5. Summary

1. Introduction

- Justification for Intellectual Property Protection
  - Natural Rights (John Locke)
  - Personhood
  - Utilitarianism
- Practical Implications
  - Duration of Protection
  - Open Source & Free Software

1. Introduction

4 Different Types of Intellectual Property

- Copyrights – Works of Authorship
- Patents – Inventions
- Trademarks – Brands
- Trade Secrets – Information

1. Introduction
2. Copyright Protection
3. Patent Protection
4. Free Speech Limitation
5. Summary

2. Copyright Protection

"[T]he owner of copyright […] has the exclusive rights to do and to authorize any of the following:

(1) to reproduce the copyrighted work in copies […];

(2) to prepare derivative works based upon the copyrighted work;

(3) to distribute copies […] of the copyrighted work to the public by sale or other transfer of ownership, or by rental, lease, or lending […]."

(17 U.S.C. 106)

2. Copyright Protection

"Copyright protection subsists […] in original works of authorship fixed in any tangible medium of expression, now known or later developed, from which they can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device. […]." (17 U.S.C. 102 (a))

2. Copyright Protection

"In no case does copyright protection for an original work of authorship extend to any idea, procedure, process, system, method of operation, concept, principle, or discovery, […]."
(17 U.S.C. 102 (b))

2. Copyright Protection

Copyright Protection for Software

- Program Code
- Program Output
- Graphical User Interface
- ...

2. Copyright Protection

Digital Millennium Copyright Act (DMCA)

- "No person shall circumvent a technological measure that effectively controls access to a work protected under this title. […]" (17 U.S.C. 1201 (a) (1) (A))
- "No person shall manufacture, import, offer to the public, provide, or otherwise traffic in any technology, product, service, device, component, or part thereof, that is primarily designed or produced for the purpose of circumventing a technological measure that effectively controls access to a work protected under this title […]." (17 U.S.C. 1201 (a) (2) (A))
- Exemptions for
  - Reverse Engineering (17 U.S.C. 1201 (f))
  - Encryption Research (17 U.S.C. 1201 (g))
  - Security Testing (17 U.S.C. 1201 (j))
- Civil Remedies and Criminal Offenses

2. Copyright Protection

Free & Open Source Software

- Berkeley Software Distribution
  Licensed under Berkeley Software Distribution License
- GNU / Linux
  Licensed under GNU General Public License (Richard Stallman)

2. Copyright Protection

- Can Programming Language be Original Work of Authorship?
- Programming Language is Formal Language
- “[N]o precedent that supports the contention that a ‘language’ [...] is not copyrightable.“ (Lotus Dev. Corp. v. Paperback Software Int'l, 740 F. Supp. 37, 72 (D. Mass. 1990) (in dictum))

2. Copyright Protection

- Programming Language Excluded from Copyright Eligibility as Idea, Procedure, Process, System, Method of Operation, Concept, Principle, Discovery?
- Programming Languages both expressive and Functional
- Programming languages are copyright eligible to the extent "design elements can be identified as reflecting […] artistic judgment exercised independently of functional influences."
  (*See* Brandir Int'l, Inc. v. Cascade Pac. Lumber Co., 834 F.2d 1142 (2nd Cir. 1987))

2. Copyright Protection

Programming Languages are Copyright Eligible

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3. Patent Protection

"[W]hoever without authority makes, uses, offers to sell, or sells any patented invention, within the United States, or imports into the United States any patented invention […] infringes the patent."
(35 U.S.C. 271)

3. Patent Protection

"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, […]."
(35 U.S.C. 101)

3. Patent Protection

Computer Programs are Patent Eligible if they are

- Machines or Processes
- New and Useful

3. Patent Protection

Machine

- "We should consider algorithms, like computer hardware, as a technology.“
(Thomas H. Cormen et al., Introduction to Algorithms 13 (3d ed. 2009))

- "Patent law should view a program or data structure as an independent machine just as it does with mechanical inventions.“
(John A. Gibby, Software Patent Developments: A Programmer's Perspective, 23 Rutgers Computer & Tech. L.J. 293, 345 (1997))

- “Where physical machines are built from physical structures like gears, wires, and screws, programs are built from information structures, such as algorithms and data structures.”
(Pamela Samuelson et al., A Manifesto Concerning the Legal Protection of Computer Programs, 94 Colum. L. Rev. 2308, 2321 (1994))

3. Patent Protection

Process

1. Act or Series of Acts
   (*See*, *e.g.*, Gottschalk v. Benson, 409 U.S. 63, 70 (1972))
   Computer Programs Consist of Algorithms

2. Machine-or-Transformation Test
   Subject Matter is Patent Eligible as Process if
   (1) Tied to Particular Machine or Apparatus; or
   (2) Transforms Particular Article into Different State or Thing
   (*See, e.g.,* Bilski v. Kappos, 130 S. Ct. 3218, 3227 (2010))
   (1) Programs are Tied to Computer and other Programs
   (2) Transform General Purpose Computer into Special Purpose Computer

3. Patent Protection

New and Useful

- Laws of Nature, Natural Phenomena, and Abstract Ideas Excluded from Patent Eligibility
  (*See, e.g.,* Diamond v. Diehr, 450 U.S. 175, 185 (1981); Diamond v. Chakrabarty, 447 U.S. 303, 309 (1980))

- Laws of Nature not “New”

- Abstract Ideas (e.g., Pure Mathematics) not “Useful“

- But "mathematical algorithm is unpatentable *only to the extent that it represents an abstract idea* [...] .“
  (State Street Bank & Trust Co. v. Signature Fin. Group, Inc., 149 F.3d 1368, 1373 n.4 (Fed. Cir. 1998) (emphasis added))

3. Patent Protection

Computer Programs are Patent Eligible

What does that mean for Patent Eligibility of Programming Languages?

3. Patent Protection

E.g., Compiler can be Patent Eligible

- Compiler is Machine for Converting Source Code into Target Machine Code
- Compiler is Process
  1. Act or Series of Acts: Compiler Consists of Algorithms
  2. Machine Part of Machine-or-Transformation Test: Compiler is Tied to Computer and other Programs
  3. Transformation Part of Machine-or-Transformation Test: Compiler converts General Purpose Computer into Special Purpose Computer for transforming Source Code into Target Machine Code
- New and Useful because not an Abstract Idea

3. Patent Protection

Could a grammar be Patent Eligible as well?

- Grammar (as such or Written in Programming Language Specification) not a Machine
- Grammar not a Process

1. Rather Set of Rules than Series of Acts
2. Machine Part of Machine-or-Transformation Test: not a Machine
3. Transformation Part of Machine-or-Transformation Test: not a Process Because Grammar itself does not Transform Anything, but Rather its Application

3. Patent Protection

Grammars are not Patent Eligible

But Practical Relevance Low

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4. Free Speech Limitation

"Congress shall make no law [...] abridging the freedom of speech.“
(U.S. Const. amend. I.)

4. Free Speech Limitation

- Is Source Code Speech?
- Source Code is Both Expressive and Functional
- Can be Speech in some Circumstances, thus, Cannot be Categorically Excluded from Being Speech
- Everybody can use Protected Programming Language for Communication, but not Necessarily its Functionality

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5. Summary

- Programming Languages are protected by both Copyright and Patent Law
  - Copyright Protection is Limited to Expressive Form of Language
  - Patent Protection Refers to Language's Underlying Functionality and Software Implementation (not to Grammar)
- Extent of Protection is Reconcilable with Freedom of Speech

Thank You Very Much!