Copyright Issues for Computer Software Program in the United States after *Oracle. v. Google*: Are the Laws Making the Intellectual Property Protections Easier or Harder?

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ABSTRACT

In light of the decisions made by both the District Court of Northern District of California and U.S. Court of Appeals for Federal Circuit on *Oracle v. Google* case, the intellectual property protections for software program and its eligibility were again brought to the attention not only to software developers but also to law professions and general publics. Despite Oracle's intention in bringing patent and trade secret issues into the present case, it turned out focusing on copyright issue. This paper intends to make a thorough review on the present case and discuss the legal development of the copyright law including copyright subject matter, copyrightability and its legality in software program in the United States. In addition, through the dispute of the case, it will discuss the remain issues of copyright protection for software program; as well as, whether copyright, among the intellectual property protection rights, is an eligible aspect in protecting software programs. Finally, it will try to provide a suggestion of a comparatively appropriate method of intellectual property protection for computer programs to the software developers and legal professions.

Keywords: computer software program, intellectual property, copyright, copyrightability, fair use

I. Introduction

Oracle v. Google[1] is a dispute between Oracle America, Inc. and Google, Inc. on Oracle's patent and copyright claims to Google's Android operating system. This case has viewed on the trend of the law for software programs in the intellectual

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[1] *See* Oracle America, Inc. v. Google, Inc., 872 F.Supp.2d 974 (N.D. Cal. 2012).

property regime; in May 2012 the jury in this case found that Google did not infringe on Oracle's patents,[2] and the trial judge ruled that the structure of the Java Application Programming Interfaces (APIs) used by Google was not copyrightable.[3] Further in May 2014, the Federal Circuit partially reversed the district court's ruling, and ruled in Oracle's favor on the copyrightability issue, and remanded the issue of fair use to the district court.[4] In May 2016, the jury of District Court of Northern District of California ruled Google's action to be fair use.[5]

Our modern world is dominated by digital information systems, and these digital systems in turn owe their capability to the strength and operation of software programs (software). The practice of law in the software intellectual property law field often require the integrative thinking; as well, to understand the adequacy of existing laws to the challenges posed by computer software may encourage the development of technologies and achieve the best solution in helping the industry grow. Though the laws to protect computer software nowadays among the international communities are covered by copyright, patent, semiconductor chip protection, trade secret, contract, trademark, unfair competition, international trade, criminal law, design and consumer protection;[6] the present case discussed merely only about copyright law.

Patent law is an almost complete form of intellectual property protections; it is the main protection for computer hardware systems and become more important as an option for protection for software programs in USA. Copyright law was not in the main focus of software prior to 1980's before the software programs protection amendment to the copyright law has been passed in the United States.[7] Copyright law protects the expression of the software programs. Ideas, processes, and functions are not protected under copyright law, but may be protected under trade secret or patent law. The main protection of software programs historically was trade secret law in the United States and similar protections elsewhere.[8]

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[2] The U.S. Patent No. 6,910,205 ("the '205 patent") is specifically mentioned in this paper for the replication of the SSO of the APIs by Google; Oracle's complaint claimed on seven patent infringements by Google, including U.S. Patent No.: 6,125,447 ("the '447 patent"), 6,192, 476 ("the '476 patent", 5,996,702 ("the '702 patent"), 7,426,720 ("the '720 patent"), RE38, 104 ("the '104 patent"), 6,910, 205 ("the '205 patent"), and 6,061, 520 ("the '520 patent").

[3] *See Oracle America, Inc. v. Google, Inc.*, *supra* note 1 at 988.

[4] *See* Oracle America, Inc. v. Google Inc., 750 F. 3d 1339 (Fed. Cir. 2014).

[5] *See* Oracle Am., Inc. v. Google Inc., 2016 U.S. Dist. LEXIS 74931, 2016 Copy. L. Rep. (CCH) P30,939 (N.D. Cal. June 8, 2016).

[6] *See* ROBERT P. MERGES, PETER S. MENELL & MARK A. LEMLEY, INTELLECTUAL PROPERTY IN THE NEW TECHNOLOGICAL AGE, 12 (2nd ed., Aspen Publishers 2000).

7 See Raymond T. Nimmer, The Law of Computer Technology I-2 (4th ed., West Publishing 2009).

8 Id. at I-4~5.

The case *Oracle v. Google* creates another trend for the court when evaluating intellectual property protections for open source software;[9] however, for the limitation of time and space, this paper may not discuss the complexity of open source software. The following sections of this paper will provide firstly the copyright discussion for software programs in the United States, then the *Oracle v. Google* case and its copyright issues. Finally, in the conclusion, this paper will provide a view on whether copyright protection is a proper way protecting software, how developers do or shall do under current trends of intellectual property laws and an industry-wide suggestion.

II. Copyright Protection for Computer Software

Copyright law in the United States is part of federal law, and is authorized by the U.S. Constitution, pursuant to the constitutional clause, Congress adopted a copyright statute in 1790 and since that time, the law has substantially revised or rewritten four times in 1831, 1870, 1909 and 1976.[10] Besides the patent protection, copyright is also considered as important aspects when software programs seek for intellectual property protections.[11] The copyright law of the United States governs the legally enforceable rights of creative and artistic works under the laws of the United States.[12] Until recently, copyright was not regarded as being of much relevance to the sale of products other than traditionally "artistic" products[13] such as books and gramophone records.[14] Today, copyright laws in the United States protects virtually all "original works of authorship,"[15] all of the Acts have required deposit or registration of the protected work to varying degrees either with a United States District Court, the Secretary of State or, as is presently the case, the Register of Copyrights.[16] However, in addition to these traditional areas, copyright has

9 See Maxim V. Tsotsorin, Open Source Software Compliance: The Devil Is Not So Black as He Is Painted, 29 Santa Clara Computer & High Tech. L.J. 559, 577 (2013).

10 Bob Zeidman, The Software IP Detective's Handbook 63 (Prentice Hall 2011), ("Two short software programs were submitted on April 20, 1964 by John Francis Banzhaf III, a Columbia University Law School student assigned to research and draft a note for the Columbia L. Rev. on whether software programs and other software could be protected under U.S. copyright law; One software programs were submitted as a printout published in the Columbia Law School News on April 20, 1964, while the other was on magnetic tape. The copyrights for both student software programs were registered in May 1964, and North American Aviation's software programs was registered in June 1964.")

11 See Thorne D. Harris III, the Legal Guide to Computer Software Protection: A Practical Handbook on Copyrights, Trademarks, Publishing and Trade Secrets 43 (Prentice-Hall, Inc.1985).

12 See Roger D. Blair and Thomas F. Cotter, Intellectual Property – Economic and Legal Dimensions of Rights and Remedies 26 (Cambridge University Press 2005).

13 *See* OBERT P. MERGES, PETER S. MENELL & MARK A. LEMLEY, INTELLECTUAL PROPERTY IN THE NEW TECHNOLOGICAL AGE 349 (2nd ed., Aspen Law & Business 2000).

14 *See* LEE GURGUNDER, LEGAL ASPECTS OF MANAGING TECHNOLOGY 7 (4th ed., Thomson West 2007).

15 17 U.S.C. §101 (1976).

16 *See* ARTHUR R. MILLER AND MICHAEL H. DAVIS, INTELLECTUAL PROPERTY IN A NUTSHELL –

become an extremely important weapon in preventing piracy of computer software[17] and preventing copying of various useful items to which "art" has been applied.[18] While many of the legal principles and policy debates concerning software copyright have close parallels in other domains of copyright law, there are a number of distinctive issues that arise with software. Not every software developer has either the time or the funds to register every software product they develop with the Copyright office of the Library of Congress.[19] Besides, during the development state, the software product matures and changes so rapidly that copyright protection at this stage simply is not the best means of protecting a developer's intellectual property. In this scenario, some may think it is best for the software developer to rely upon trade secret protection for software.[20]

PATENTS, TRADEMARKS AND COPYRIGHT 284 (West Publishing 1990).

[17] *See* Irah Donner, *The Copyright Clause of the U. S. Constitution: Why Did the Framers Include It with Unanimous Approval?* 36 AM. J. L. HIS. 361,363 (1992).

[18] *See* PETER B. MAGGS, JOHN T. SOMA, & JAMES A. SPROWL, COMPUTER LAW 3 (West Publishing 1992).

[19] *See* SHELDON W. HALPERN, CRAIG ALLEN NARD, KENNETH L. PORT, FUNDAMENTALS OF UNITED STATES INTELLECTUAL PROPERTY LAW : COPYRIGHT, PATENT, TRADEMARK 280-1 (2nd ed., Kluwer Law International 2007).

[20] *See* Maayan Perel, *Reviving the Gatekeeping Function: Optimizing the Exclusion Potential of Subject Matter Eligibility*, 23 ALB. L.J. SCI. & TECH. 237, 241 (2013).

A. The Protection and Scope of Software Copyright

The Copyright Office had prior to the passage of the present copyright statute, accepted certain software programs for registration; [21] moreover, after 1980, Congress erased any doubt that software programs any embody the subject matter of statutory copyright.[22] Software programs have been accepted by the Copyright office for copyright registration for years;[23] mere registration did not make them copyrightable, but did reflect that programs have sufficient originality and authorship to be copyrightable and do not suffer from the fata defects of the utility-nonutility or idea-expression dichotomies.[24] The Copyright Act defines a software programs as "a set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result."[25] With certain highly specific exceptions, software programs are not treated by the Copyright Act as a special category of intellectual property, subject to idiosyncratic rules.

1. Source code and object code

With respect to the literal work constituting the software programs in which the literary work is written, "source code" is written in a programming language while "object code" is understood by the machine from the translation of computers. In computer science, source code is any collection of computer instructions; software programmers write in a programing language and there is no doubt about the availability of copyright protection for source code, [26] though most cases programmers keep the source code as a trade secret and do not distribute it. The source code of a programming language is specially designed to facilitate the work of software programmers, who specify the actions to be performed by a computer mostly by writing source code. Copyright can protect source code for it involves substantial individuality and reflects personal choices in selecting variable names,

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[21] *See* U.S. COPYRIGHT OFFICE, COPYRIGHT REGISTRATION FOR SOFTWARE PROGRAMS 361 (Bull. Copyright Society 1964); *see also* Pamela Samuelson, *Creating A New Kind of Intellectual Property: Applying the Lessons of the Chip Law to Software programs*, 70 MINN. L. REV. 471, 472 (1985).

[22] *See* NATIONAL COMMISSION ON NEW TECHNOLOGICAL USES OF COPYRIGHTED WORKS, FINAL REPORT 12-3 (1979), *see also* Michael S. Keplinger, *Computer Software--Its Nature and Its Protection*, 30 EMORY L. J. 483, 487 (1981).

[23] *See* Tyler T. Ochoa, *Copyright Duration: Theories and Practice*, in PETER K. YU, INTELLECTUAL PROPERTY AND INFORMATION WEALTH, ISSUES AND PRACTICES IN THE DIGITAL AGE VOL. 1 COPYRIGHT 133, 142-4 (Praeger Publishers 2007).

[24] *See* MILLER & DAVIS, *supra* note 16 at 307.

[25] 17 U.S.C. §101(1976).

[26] 17 U.S.C. §117(1976), ("the 1976 Act was amended in 1980 to allow for the copyrightability of software programs; CONTU made three recommendations: (1) that software programs be copyrightable, (2) that the new Act apply to all computer uses of copyrighted programs, and (3) that owners of copyrighted programs be allowed to copy those programs to the extent necessary to use them effectively without incurring liability for infringement.")

organizing how they appear in sequence, developing output, and designing other aspects of the program, and they constitute expression.[27]

Object code, or sometimes object module, is what a computer compiler produces. In a general sense object code is a sequence of statements or instructions in a computer language, usually a machine code language or an intermediate language. The object code may also be copyrightable and classified as a literary work and thus under the protection of copyright[28] and there is no difference for legal purposes between the source code and the object code and emphasized the copyrightability of both source code and object code.[29]

2. Processes

While source code and object code is copyrightable, processes are unprotected.[30] The essentially utilitarian nature of a software programs further complicates the task of distilling its idea from its expression; in order to describe both computational processes and abstract ideas, its content "combines creative and technical expression."[31] The legislative history indicates that section 102(b) was intended to make clear that the expression adopted by the programmer is the copyrightable element in a software programs. It is a method of operating and a choice to create a particular command system and specific words are essential to operating something, which is unprotectable.[32] However, there is a critical consideration whether more than a limited number of ways exist to process or express the idea of the operating system and whether operating system programs are not per se excluded from copyright.[33]

3. Subject Matter and Its Copyrightability

These categories are not meant to be exclusive, rather they function as administrative categories employed in registering copyrighted works. The fundamental concept is that, except as specifically excluded, all original creative expression fixed in a tangible medium of expression is eligible for copyright protection.[34] Purely utilitarian objects are not subject to copyright protection;

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[27] *See* NIMMER, *supra* note 7 at I-43.

[28] *See* Apple Computer, Inc. v. Franklin Computer Corp., 714 F.2d 1240,1243 (3d Cir. 1983), ("the definition of "literary works" in Section 101 includes expression not only in words but also "numbers, or other…numerical symbols or indicia", thereby expanding the common usage of "literary works" thus a software programs, 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.")

[29] *See GCA Corporation v. Chance* et al., 217 U.S.P.Q. 718,719 (N.D.Cal.1982).

[30] 17 U.S.C. §102(b)(1976).

[31] *See* SAS Inst., Inc. v. S&H Computer Sys., Inc., 568 F. Supp. 416,422-3 (M.D. Tenn. 1983).

[32] *See* Lotus Development Corporation v. Borland International, Inc., 516 U.S. 233, 245 (1996).

[33] *See Apple Computer, Inc. v. Franklin Computer Corp., supra* note 28 at 1243-5.

[34] *See* SHELDON W. HALPERN, CRAIG ALLEN NARD, KENNETH L. PORT, FUNDAMENTALS OF UNITED

however, to the extent a work is non-utilitarian or with respect to those separable portions of a work that are non-utilitarian, there is no reason to deny copyright protection assuming it is statutorily authorized.[35]

B. Issues in Copyright Protection for Software programs

As described set forth in the previous section, software programs, to the extent that they embody an author's original creation, are proper subject matter of copyright; in 1980, the United States Congress added the definition of "software programs" to Copyright Act[36] and amended to allow the owner of the program to make another copy or adaptation for use on a computer[37] and plus court decisions such as *Apple v. Franklin* clarified that the Copyright Act gave software programs the copyright status of literary works.

In software design, look and feel is a term used in respect of a graphical user interface (GUI) and comprises aspects of its design, including elements such as colors, shapes, layout, and typefaces (the "look"), as well as the behavior of dynamic elements such as buttons, boxes, and menus (the "feel"). The term can also refer to aspects of an API, mostly to parts of an API which are not related to its functional properties; it is used in reference to both software and websites. However, user interfaces are governed by market standards and functional considerations; therefore, the significant problems and controversial issues relating to software programs is to determine when and how to protect the detailed structural elements of a program. The designation of the first of the so-called "look-and-feel" computer cases *Whelan v. Jaslow*[38] was derived from the court's willingness to have copyright protect the structure, sequence and organization of a program. It is frequently difficult to distinguish the idea from the expression since the decision is inevitably ad hoc.[39] Most of the object codes is compiled by computer, when the courts use the view of the works of authorship standard, issues may occurred, if a copyright is claimed in a work written in machine-readable codes and the copying is of the literal aspect of a software programs, the results favor the claimant.[40]

STATES INTELLECTUAL PROPERTY LAW: COPYRIGHT, PATENT, TRADEMARK 5 (2nd ed., Alphen an den Rijn, The Netherlands : Kluwer Law International 2007).

35 17 U.S.C. §102(a) (1976); see also MILLER & DAVIS, *supra* note 16 at 296-297.

36 17 U.S.C. §101 (1976).

37 17 U.S.C. §117 (1976).

38 *See* Source Material. Whelan Association v. Jaslow Dental Lab, Inc., 797 F.2d 1222, 1230 (3d Cir. 1986).

39 *Id.* at 1230.

40 *See* Atari Games Corp. v. Oman, 693 F. Su 1204,1205 (D.D.C. 1988), ("the Copyright clause of the Constitution has been interpreted by the United States Supreme Court to limit the term authors and also to limit Congress' authority to determine what subject matter may be covered by copyright legislations.")

Originality is another doctrine which limits the scope of protection. The concept of "authorship" has been reproduced and transformed in U.S. copyright law regarding computer software; the notion of authorship is arguably the most central concept of the copyright doctrine. Most of software are programmed in certain 'language', such as Java in the present case, developers or programmers usually use common libraries or codes to write the applications. What makes them different is when different combinations are used by programmers and compiled into new applications; therefore, it is difficult to identify which part can be considered as original. There also exists in any claim of statutory copyright, including one relating to a software programs, an issue of originality; it is the work of authorship issue that has proven most controversial in the area of software programs. As to the originality issue, any claim to statutory copyright requires at a minimum the act of independent intellectual creations.[41]

III. Oracle v. Google, the Copyright Case and the Legal Issues

Although the case between Oracle and Google involves not only about copyright, but also patent infringement and issues regarding trade secret;[42] as to this day on October 26th, 2016 when Oracle officially filed an appeal to its loss in "fair use" on the ground to Federal Circuit, this case has turned into copyright infringement dispute only.[43] In this session, the paper will briefly introduce the facts presenting from the very beginning and why it has turned to solely copyright dispute and the issue remained and discuss how the findings impact both to copyright law and software developers**.**

A. Factual Background

Oracle accuses Google of infringing some of Oracle's Java-related copyrights in portions of Google's Android software program. These specific accusations are regarding 12 code files and 37 specifications for APIs[44] packages. The Java technology and the basics of object-oriented programming were explained in the

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[41] *Id.at* 1207.

[42] *See Oracle America, Inc. v. Google, Inc., supra* note 1 at 976-8.

[43] *See Oracle America, Inc. v. Google, Inc., supra* note 4 at 1347.

[44] Java™ Platform Standard Edition 7 API Specification, *available at* https://docs.oracle.com/javase/7/docs/API/ ("An API allows software programs to communicate with each other. It is a set of definitions controlling how the services of a particular program can be summoned, including what types of input the program must be given and what kind of output will be returned; APISs are usually made of "methods" or "functions," which are software programs that perform particular services. Methods must be defined before usage, by stating its name and describing its argument(s) and return(s) according to syntax conventions. Once a method has been declared, it can be documented and implemented. Documentation is not a code; it is a reference item providing programmers with information about the method, its requirements, and its use. Implementation is a code that actually tells the computer how to carry out the method. Multiple implementations are likely for a given method." last visited Feb. 5, 2017).

claim construction order. An overview of APIs and their role in Java and Android are as follows. Java was originally developed by Sun Microsystems starting in 1991. It comprised a new programming language, a virtual machine, and a set of libraries for use with the language.[45] Java and Android are both complex software platforms with several components. Java programming has been made freely available for use by anyone without charge; both sides agree on this. Oracle alleges that other aspects of the Java platform, such as the virtual machine and class libraries, however, are protected by patents and copyrights. The Android platform uses the Java programming language, thereby allowing software developers who already use the Java language to continue using the same language to write programs for Android. Google released a beta of the Android platform on November 5, 2007, noting that it would use some Java technologies including some of the APIs from Java SE; Google negotiated with Sun about possible partnership and licensing deals for Java, but no agreement was reached. In 2010, Oracle became the owner of Java when it acquired Sun Microsystems and subsequently sued Google over allegations that the Android mobile operating system violated copyrights and patents on Java and Oracle sued Google for copyright and patent infringement in August 2010.

[45] Jon Byous, *Java Technology: The Early Years*, SUN DEVELOPER NETWORK (April 2003), *available at* http://web.archive.org/web/20080530073139/http://java.sun.com/features/1998/05/birthday.html (last visited Feb. 5, 2017).

B. Issues

The central issues of the case involve whether Oracle's Java APIs are subject to copyright protection and if so, whether Google's Android Operating System infringed this protection. The copyrightability was brought out in the lower court regarding the structure, sequence and organization and after the appealed court reversing the decision and return the "fair use" part, it became the major issue in discussion of the present case.

C. Holdings

The case was brought to the United States District Court for the Northern District of California, and was assigned to Judge William Alsup, who split the case into three phases: copyright, patent, and damages. This paper may not introduce or discuss the underlying arguments regarding patent and other issues than copyright.

The copyright phase consisted of several distinct claims of infringement: a nine-line rangeCheck function, several test files, the structure, sequence and organization of the API, and the API documentation as well as 8 decompiled security files. The jury ruled that the API was infringed, but deadlocked on Google's fair use defense for this claim. They also found that rangeCheck was infringed, but that neither the documentation nor the other literal code was.[46] The court upheld the jury verdict on rangeCheck, though it was described as "overblown"; the ruling found that the structure Oracle was claiming was not copyrightable under section 102(b) of the Copyright Act because it was a "system or method of operation.[47] Both Oracle and Google appealed, the Federal Circuit reversed the copyrightability ruled by the district court, remain the ruling of the 8 decompiled security files, but reversed 'fair use' part to the district court. Google then appealed to the Supreme Court, but was certiorari denied.[48] As to the 'fair use' part, the jury has ruled in the favor to Google. Oracle appealed again in its loss on 'fair use' ground to the US Court of Appeal for Federal Circuit.[49]

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[46] *See Oracle America, Inc. v. Google, Inc., supra note* 4.at 1351.

[47] *See* Josh Lowensohn, *Jury clears Google of infringing on Oracle's patents,* BETWEEN THE LINES (May 23, 2012), *available at* http://www.zdnet.com/blog/btl/jury-clears-google-of-infringing-on-oracle-patents/77897, (last visited Feb. 5, 2017); *see also* Joe Mullin, *Google wins crucial API ruling, Oracle's case decimated,* ARS TECHNICA (May 31, 2012), *available at* http://arstechnica.com/tech-policy/2012/05/google-wins-crucial-api-ruling-oracles-case-decimated/ (last visited Feb. 5, 2017).

[48] *See* Google, Inc. v. Oracle Am. (Google II), 750 F.3d 1339 (Fed. Cir. 2014), cert. denied, 135 S.Ct. 2887 (U.S. Jun. 29, 2015) (No. 14-410).

[49] *See* Joe Mullin, *It's Official: Oracle Will Appeal Its 'Fair Use' Loss Against Google*, ARS TECHNICA, Oct. 28, 2016, *available at* https://arstechnica.com/tech-policy/2016/10/its-official-oracle-will-appeal-its-fair-use-loss-against-google/ (last visited Feb. 7, 2017).

D. Discussion

Copyright protection exists in "original works of authorship fixed in any tangible medium of expression."[50] To succeed in a copyright infringement claim, a plaintiff must show that it owns the copyright and that the defendant copied protected elements of the work.[51] Only expressive elements that are "original" are protected. Google advances many arguments as to why Oracle supposedly cannot prove all or part of its copyright infringement claim. The most significant doctrine limiting the copyrightability of works is the "idea-expression" dichotomy, which is codified in section 102(b);[52] furthermore, section 101 of the Copyright Act defines a "useful article" as an "article having an intrinsic utilitarian function that is not merely to portray the appearance of the article or to convey information".[53] Java APIs are commonly used throughout the computer industry to make applications operable across other systems and devices.[54] The decision is crucial because it impacts standard industry practices.[55] Neither courts in present case to this day has directly addressed whether APIs copyrightable.[56] In consideration all relevant cases of computer software, courts shall provide a more comprehensive approach.

As the case proceeds, the debate will likely to continue and may not be reconciled any sooner. If Oracle had won, it would have been a novel case of a company being able to essentially reverse the open-source process by making any commercial use of Java a pay-to-play endeavor. Some speculated an Oracle win could have scared programmers away from Java, but that kind of ruminating is a moot point now and for the Java programmers of the world, things won't really change much.[57] Nevertheless, to the software industry, the issue did not pop up from nowhere and may remain and revolve as even more complicated. Although the decision for now would ensure that programmers or software developers might not be stopped to create newer and perhaps better software, the loss of Oracle might stop those strong and big developers with great resources to invent revealing their sources and turn into trade secret protection. The intellectual property laws are supposed to protects and improve technology. We enjoy what new technology can bring to the

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[50] *See Oracle America, Inc. v. Google, Inc.*, *supra* note 4 at 1354.
[51] *See* Maayan Perel, *supra* note 20 at 243.
[52] 17 U.S.C. §102(b)(1976); see also *Atari Games Corp. v. Nintendo of Am., Inc.*, 975 F.2d 832, 838 (Fed.Cir.1992).
[53] 17 U.S.C. §101(1976), ("an article that is normally a part of a useful article is considered a 'useful article'.")
[54] *See* Oren J. Warshavsky, et. al, *With High Court Mum on Java Copyright, Is Innovation Safe?* LAW 360, *available at* https://www.law360.com/articles/674082/with-high-court-mum-on-java-copyrights-is-innovation-safe-, (last visited Feb. 7, 2017).
[55] *See* Deba Alam, *Oracle America, Inc. v. Google, Inc.: The Battle Over APIs Continues*, 26 DEPAUL J. ART TECH. & INTELL. PROP. L. 39, 39 (2015).
[56] *Id*. at 39.
[57] *See* Alexander D. Northover, "*Enough and as Good" in the Intellectual Commons: a Lockean Theory of Copyright and the Merger Doctrine*, 65 EMORY L.J. 1363, 1393 (2016).

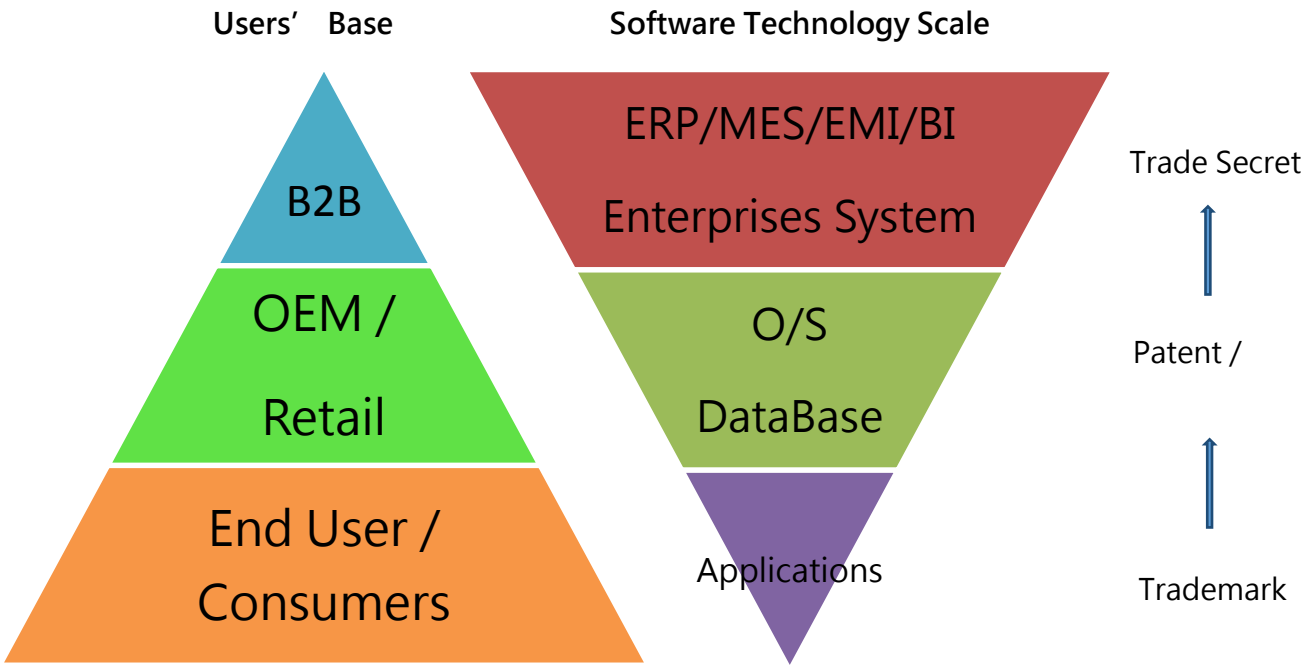
convenience of our lives, and we will enjoy more if the protection from the laws may encourage more inventions. It is hoped that, software industry and the law will mature to the extent that the conflicts and the problems will diminish and all concerned will make benefit only and for the industry to legally protect the works while maximizing the usefulness and ultimately the best law system of all.

IV. Conclusion

Copyright protection for software program is not efficient, and is not sufficient. It happens only with the past decades, those major computer-related products providers started an intellectual property war in different courts all over the world.58 Oracle spent many millions or tens of millions on the legal crusade, it somehow came up empty at this time. The issues associated with four elements of a software program: the program function, the external design, the user interface design, and the program code. Copyright covers the later part of the program code only, and that is why I believe when the present case leaves the argument to copyright, Oracle has fewer chance to a material win.

The company may have a sales strategy and a long-range view of know-how, but the legal protection of its intellectual property becomes an after-thought. Before making any suggestion to software developers and/or legal professions in the industry, we have to recognize that the industry is actually no longer a simple and single type of industry. It is not just what makes machines or hardware functioning; software applications grow to used on all kinds of devices, the program to communicate between devices, handshaking between systems, web technology, applications on computers and mobile devices, and cloud services.

[58] *See* Brittany Hort, *Jury Decides Google Did Not Infringe Oracle Patents but Question of Whether APIs Can Be Copyrighted Remains*, 26 HARV. J. L. & TECH 69,133 (May 30, 2012).



Understanding the feature of software industry is very important, and it makes more sense to view on the above graph that how the users' base reacts with software technology scale, hence why and what different IP protection they shall seek for. The largest base of users is those applications on computers and mobile devices, including personal daily use and plant floor instruments (ie. manufacturing equipment, inspection devices, barcode readers, etc.), and the threshold of this kind of software is relatively low. Therefore, those independent developers may not have the intend to care about protecting their intellectual properties of any kind for the rapid change of the development and the functions are common in the most current trend. Trademark may be the only consideration for developers, such as Microsoft, Apple or Google, to seek for IP protection to be recognized by users. In the mid-level software, it is dominant by a few providers, Windows (Microsoft, Inc.), OSx (Apple, Inc.), and Unix (Novell, Inc.) for computers, and iOS (Apple, Inc.), Android (Google, Inc.) and Windows (Microsoft, Inc.) for mobile devices. As their adopters are those OEM vendors or retailers, and the competition among those providers is not diametrically opposed, patent protects the idea while copyright protects the appearance, shall be the most effective portfolio for their IP protections. Finally, the B2B software, ERP (Enterprises Resources Plans), MES (Manufacturing Execution System), EMI (Enterprises Manufacturing Intelligence), and BI (Business Intelligence), these system-wise software requires full-skilled implementations and high-threshold technologies. GE (General Electronics), IBM (International Business Machine), NI (National Instrument), SAP, Oracle, Honeywell, Rockwell, those giant system developers, play the major roles in this part. The complexity of their

technologies contains tons of domain knowledge, trade secret is the only way they use and they shall use for their IP protections. Almost all of them compile program codes before release to their customers. Hence, this article found that although the case draws lots of discussions, specifically on copyright protection, software industry may not be impacted too much for protecting their programs intellectually.

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