16 A Study of Patentability of Computer Software -Related Inventions
－ Practice in U.S., Europe and Japan and Outlook for China －

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Software is a global business. Computer software has the dual nature: the Copyrightability and the Patentability. The features of the computer program away from the traditional opinion that software is just the implementation of mathematics logical algorithm. With the development of software industry, software has become an indispensable tool for human to solve problems or realize some functions, with some essential elements required by the patent law, such as "technology" and "non-obviousness".

The proposed paper will review the exploring and practice of software-related inventions patent case law in USA. It will compare the legislation and the examination guiderlines about the patentability of software-related inventions between USA, JP and EU and, study substantive requirements for software-related invention patent, specially the requirement of "non-obviousness" of software-related inventions in USA, JP and EU. Finally, it will give the status and the future about the protection of software-related inventions in China, including the prospect and suggestion about software under protection of patent system in China. At end of the paper, it will bring forward some conclusions and questions of the author.

Among the brilliant achievements in the development of human civilization are the inventions of the number system, the computing method and computing tools, the significance of which lies in the fact that the inventions have served as a foundation more important than the three most significant inventions by mankind (fire, the wheel and the bank).[(*1)] The computer, as a machine capable of controlling other machines, is playing a special role in our production and life nowadays. Software, as the brain of the computer and the soul of the Internet, is playing an even more critical role. However, arguments about the legal protection model for software have never ceased. Although there has started to be a tendency worldwide toward patent protection nowadays, this is still far from becoming a consensus in developed countries like the U.S. and Japan. Consequently, it is extremely necessary to conduct a study of this issue from both the theoretical and practical points of view.

Ⅰ Concept of computer software and the protection model

1 Concept of computer software relative to hardware

Until now there has been no unified definition regarding the concept of computer software.[(*2)] According to engineers who are actually engaged in the design of the computer

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(*1)   Guangdong New Oasis Life Science & Technology Co., Ltd: All competitions of modern science and technology boil down to the competition of algorithm. http://www.bioisland.com/

(*2)   According to the online dictionary of Office 2000, Microsoft defines software as "programs and applications that can be run on a specific computer system, e.g. word processing or database packages." This definition seems to focus the intrinsic nature of software on databases or products. Cambridge University holds that there are at least two definitions regarding computer software, one in British English and the other in American English. The definition in British English is "the instructions which control what a computer does; computer programs, e.g. we write a piece of software to analyze text," and the one in American English is "the instructions which control what a computer can do; computer programs, e.g., education software." The fourth edition of the American Traditional English Dictionary defines software from the viewpoint of science and technology as "software, computer programs: programs, routine instruction series and encoded languages to control the computer hardware functions and operations." Random House Webster's Collegiate Dictionary gives a relatively eased definition as "software: 1.a. the programs used to direct the operation of a computer or process data, as contrasted in whole to hardware; b. documentation; 2. any materials use with mechanical or electronic equipment, especially audio-video materials, as films, tapes, records, etc." Merriam Webster Collegiate Dictionary defines software as "something used or associated with and usually contrasted with hardware: as **a**: the entire set of programs, procedures, and related documentation associated with a system and especially a computer system; specifically : computer programs **b**: materials for use with audiovisual equipment."

system, software and hardware are designed as an integral part in a unified way.[*3]

In view of the relativity between "soft" and "hard," software may also mean different things even in the field of computer science if judged from intellectual property protection; normally, "software" viewed from the aspect of copyright extends further than "software" viewed from the aspect of patent. As the object of copyright protection, normally "computer software" includes not only the "computer program" but also its related files; but when computer software is treated as the object of patent protection, only computer software is included while its related files are not included.

From a historical point of view, the development of the computer underwent four stages in general. In the first three stages, software and hardware were indivisible as an integral part. That is, each particular computer system was one in which the particular hardware system and the particular software system were combined with each other, with the particular hardware system matching only the particular software system, and vice versa. It was not until the fourth stage that IBM started trying to sell software and hardware separately and major companies injected more and more funds for software development, which also made people attach more attention to computer software.

Nevertheless, software must be used with a computer and hardware makes no sense if software is absent. Moreover, along with the development of the SLSI technology and progress in research on the fifth-generation computer, it has become a common phenomenon for software to become part of hardware and vice versa. From the very beginning, hardware and software have been two parts indivisible from each other in the computer system, and on top of that, the two interact with each other and constitute a common system for a common purpose.

2 Duality of software and its protection model

(1) Copyright grantability and patentability

Since the Philippines took the lead in stipulating in its copyright law in 1972 that software can be granted copyright, copyright protection has been the most important means for software in addition to its own encryption technology. The WIPO, too, issued the "Method of Demonstration for Computer Software Protection" and the "Computer Software Protection Treaty" in 1978 and 1983 respectively, recommending computer software protection through the copyright law. Furthermore, in Article 10.1 of the TRIPs agreement, it is directly required that computer software be protected as literary works by the copyright law.[*4]

Software itself has the "characteristics of a work" and it is easy to link it to copyright. Judged from the form of expression, computer software, with no difference from ordinary literary works, can be expressed by various languages (computer programming languages of various kinds, some of which are close to natural languages) and signs, fixed on all the carriers which carry literary works, and easily duplicated like literary works. And as to creativity (also referred to as originality), reproducibility and expressivity, computer software can completely satisfy these three requirements, and therefore it is logical to provide protection for computer software through the copyright law.

However, we cannot tackle the issue only from the viewpoint of the form of computer software. Software also has its "functionality" at the same time and the value of software lies in its inherent technical idea. Among the three major right categories of intellectual property, the patent right has the closest relationship with the development of science and technology. A piece of valuable new software must satisfy novelty, creativity and utility as required by the patent law; otherwise, there is no necessity to provide legal protection for it.

(2) Comparison between the two types of protection models

The two protection models, copyright and patent, are different from each other in the start point, purpose and principle, and the object to be protected, too, is totally different if judged by the fundamental nature.

First, as the object of copyright, a work acts on a person, namely a natural person, whereas what computer software acts on is a product, namely computer hardware.

(*3) GREGORY A. STOBBS: Software patents (Second edition), Aspen Publishers, Inc. A Wolters Kluwer Company 2004,p10.
(*4) Article 10.1 of the TRIPS Agreement reads:"Computer programs, whether in source or object code, shall be protected as literary works under the Berne Convention(1971)."

Second, as the object of copyright, the function of a work is to convey ideas to people, whereas the function of software is to drive hardware so that it can bring about an actual movement, mechanical or electronic.

Third, as the object of copyright, a work has the strong personal characteristics of its author, reflecting its author's recognition and opinion of life and society; it can be profound or superficial, correct or erroneous, or even against natural law; there is no necessity for it to be verified through practice and to bring about actual effects; so long as it is the expression of the author's own thoughts, it satisfies the characteristics of a work and fulfills the function that a work should have. But computer software is different. Judged from its nature, computer software is designed by using natural law and it must conform to and not contradict natural law, and what is more important is that it must be applied to objective practice, be verified through practice and bring about actual effects.

Fourth, people buy a work to read or view for the purpose of understanding its author's thoughts. And it is by disseminating the thoughts to its users (this means readers or audience in the case of a conventional work) that a work realizes its value. However, computer software does not present its programmer's thoughts to people and the program itself, whether the original code or the target code, is even invisible to people.

Comparison of Related Factors under Two Protection Models for Computer Software

	When computer software becomes the target of copyright protection		When computer software becomes the target of patent protection		
Content to be compared \\ Item to be Compared	Conven-tional work	Computer software	Computer software	Conven-tional invention	Item to be Compared \\ Content to be compared
Whether the expression of thought is required	Yes	No	Yes	Yes	Whether it is required to provide expression of thought
Whether the expression of thought is protected	Yes	Yes	No	No	Whether the expression of thought is protected
Whether the dissemination of thought is required	Yes	No	Yes	Yes	Whether the dissemination of thought is required
Whether the expression of thought itself is protected	No	No	Yes	Yes	Whether the expression of thought itself is protected
Whether it is possible to change without permission	No	No	Yes	Yes	Whether it is possible to change without permission
What the target of action is	Person	Product	Product	Product	What the target of action is
Substantial requirement — Creativity (originality)	Yes	Yes	Yes	Yes	Novelty — Substantial requirement
Substantial requirement — Expressivity	Yes	No	Yes	Yes	Creati-vity — Substantial requirement
Substantial requirement — Reprodu-cibility	Yes	Yes	Yes	Yes	Utility — Substantial requirement

Ⅱ Research on and practice of computer software patentability

In the field of computer science, the U.S. has unrivaled power in both hardware and software. The U.S. has always played the role of "method explorer" and "principle formulator" regarding intellectual property protection, including patent protection, of computer software.

In 1966, in its report submitted after one year's investigation and research, a special commission appointed by the U.S. president held that computer software should not become the target of patent protection.

The report pointed out the following four reasons therefor. First, computer software does not fall under patent protection, as it is not a method in the sense of the patent law; second, there is no necessity to provide patent protection, as the advent of computer softwaretechnology did not depend on patent protection at all at the very beginning; third, computer software has already been protected by other laws, as copyright and trade secrets have already provided protection for it; fourth, there exist no examination conditions for computer software, as there are no conditions for the patent office to examine computer software patentability.[*5] Consequently, the USPTO used a unified response to process patent applications of computer software, i.e., no software should be a patentable subject matter.[*6]

In the appeal of the Diehr case,[*7] the court held that patentability should not be excluded simply because computer software is involved, noting that in an invention which uses a mathematical formula or an algorithm, the software invention is patentable as a whole if it is integrated with other devices or processes. This was the first case in which the Federal Supreme Court confirmed for the first time patentability of a computer software-related invention, thereby leading to the change from "whether or not to grant a patent" to "how to grant a patent" regarding computer software-related inventions in the U.S. and paving the way for patentability of computer software-related inventions.

Under these circumstances, the USPTO officially issued the "Examination Guidelines for Patent Applications of Computer Software" in 1981, which treated computer software patentability itself in a different way from patentability of computer software-implemented technology and shifted the examination priority from computer software itself to "computer software-related inventions," thereby laying the foundation for patent protection of computer software.

In the Alappat[*8] and the Lowry[*9] cases, the Federal circuit gave up the "two-step test process" regarding the computer algorithm, holding that a software invention as a whole is patentable if a mathematical algorithm can generate any "practical, concrete and tangible result" or a memory storing a special data structure.

Therefore, the USPTO issued "Examination Guidelines for Computer-Related Inventions" in February 1996. The new "Guidelines" clearly stated in its foreword: Computer-related inventions include computer-implemented inventions and inventions using computer-read media, and computer-read media are categorized as products and fall under patent law protection; the "two-step test process" is no longer required to be used in a compulsory manner; processes used in business activities may be treated in the same way as in the case of other process-related claims, and this led to the approval of some patent applications of computer software related to business activities.

In the State Street Bank& Trust Co. case[*10] in 1998 and the AT&T case in 1999,[*11] the CAFC held that a software invention related to a business process, whether it is a machine or a process, is patentable so long as it can generate any "practical, concrete and tangible result" as a whole.

It may be said that judicial precedents in the U.S. have already confirmed that "business process" software is a target of patent protection and is patentable; and in the course of examining novelty, non-obviousness and utility of a patent application, "useful art," one of the legal requirements for patent protection, has been changed to "practical utility." That is, the examination standard for software inventions has been considerably relaxed in the U.S.

(*5) Reporter of the president's commission on the patent system (1966)
(*6) Robert Patrick Merges, John Fitzgerald Duffy: Patent Law and Policy Cases and Materials, LexisNexis,2002,P132.
(*7) Diamond v. Diehr, 450U.S.175(1981)
(*8) In re Alappat, 33F.3d 1526, 31USPQ2d 1545 (Fed.Cir.1994)(in banc)
(*9) In re Alappat, 33F.3d 1526, 31USPQ2d 1545 (Fed.Cir.1994)(in banc)
(*10) State Street Bank & Trust Co.
(*11) AT&T Corp. v. Excel Communication Inc.50 USPQ2d 144, Fed.Cir.1999

Ⅲ Comparisons of legislation on patentability of software-related invention and examination standards

Currently, patent legislation varies in the U.S., Japan and Europe. Article 101 of the U.S. Patent Law classifies only the patentable subject matter and does not clearly refuse to provide patent protection for computer software-related inventions; Japan's Patent Law, which was amended in 2002, clearly stipulates that computer software can be granted a patent as a product; but the European Patent Convention can be considered to have explicitly refused to provide patent protection for computer software itself. The European Commission's effort to unify patent protection of computer software within its member countries proved to be a failure as a result of the vote by the European Union Parliament in July 2005.

In the current stage, software inventions which the trilateral patent offices deem eligible for patent protection are as follows: In the U.S. and Japan, new computers consisting of program plus working process, of program plus device or of program plus a publicly known computer, software products, and business process inventions; in Europe, new computers consisting of program plus working process, of program plus device or of program plus a publicly known computer, software products, and device inventions which contain business processes.

Software inventions which the trilateral patent offices deem not to be protected by the patent law are as follows: In the U.S., mathematical formulae, mathematical algorithms and computer software which represents only abstract ideas without any utility; in Japan, solutions using the natural law which are merely a program enabling the computer to process data or a program storing data on the computer-read storage media; in Europe, computer software itself which can not generate any "further technical effect."

To summarize the three examination standards, one could say as follows: The U.S. adopts the standard of "practical, concrete and useful result," Japan adopts the standard of "application of natural law" and Europe adheres to the standard of "technical effect."

In general, Japan can be said to have adopted a stance which closely follows the U.S. as far as patent protection of software is concerned, while Europe is more cautious and it was not until 1999 that the examination standard was opened and software products were allowed to be protected by patent; compared to the U.S. and Japan, an additional step is required for the examination of software patent, that is, the software patent application in Europe should have a technical effect. Moreover, regarding patent protection of business process software, Europe still has certain reservations and approves patent protection only for devices which contain a business process.

Ⅳ Substantial requirement for patent of software-related invention: Ultimate goalkeeper of the patent system

1 Creativity: Ultimate goalkeeper of the software patent system

The purpose of the patent system is to encourage technology innovation, and the examination standard of creativity directly assesses the degree of innovativeness; the basic aim is to distinguish between inventions so as to provide patent protection for those which have made actual important progress, prevent ordinary technologies from being patented and prevent abuse of patent. How high the standard of creativity is has a direct impact on the role played by the patent system in social progress.

One of the important reasons why many people oppose software patent nowadays is that, in their opinion, those patented software inventions have been granted a patent merely for luck: They are either so obvious or so simple that the possibility of profitability arising from the patent is totally disproportional to the investment made for the generation of the invention.

The substantial requirement for patent means the degree of sophistication and functions which an invention has and it covers the technical nature of the invention. The internationally accepted substantial requirement for patent includes novelty, creativity and utility.

The first element, the standard of novelty, is relatively objective, and the key to the issue lies in the retrieval of software information and the building of a related database. And regarding the standard of utility, the last element, we should say that for a software invention patent, this has already been solved at the stage of the patentable subject matter; in other words, a software-related invention already satisfies the requirement of utility if it passes the examination of patentable subject matter.

Consequently, the key to the substantial requirement for the patent of a software invention lies only in the requirement of creativity and this is just the most difficult threshold that an invention must surmount in order to be patented, a standard for which it is the most difficult to make an absolutely objective assessment. Because of this, some scholars refer to it as "ultimate goalkeeper of the patent system."[*12] It is in the field of computer software inventions (including business processes) that this "ultimate goalkeeper" plays an even more important role.

2 Comparison of creativity examinations of software patent

The trilateral patent offices of the U.S., Europe and Japan currently adopt different standards of creativity regarding software patents, and the requirement of creativity can be divided into the following three cases in general:

Regarding computer software for the non-functional descriptive material, the patent offices in the U.S., Japan and Europe do not grant patents to those applications without any creativity, either as a whole physical entity or as the non-functional descriptive material itself.

Regarding applications in which creativity is shown only in the non-functional descriptive material, only the U.S. recognizes that they have non-obviousness required by the patent law.

Regarding patent applications of computer-related inventions whose entire solution has creativity, the patent offices in the U.S., Japan and Europe all hold that they have creativity, regardless of whether or not their non-functional descriptive material itself is non-obvious.

In addition, regarding the examination of creativity, the standpoint differs between Japan and Europe. While Japan pays more attention to how the technical solution contributes to creativity, Europe stresses to what extent the solution generates the technical effect if compared to existing technology.

V Current state and future of protection of computer software-related inventions in China

1 Regulations of the patentable subject matter under China's Patent Law

China's existing Patent Law went into force on April 1, 1985 and was amended in 1992 and 2000. According to Article 2 of the existing Patent Law, the object of a patent should be "invention and creation" which includes inventions, utility models and industrial designs. Rule 2 of the Implementing Regulations of the Patent Law of the People's Republic of China interprets the above three types of inventions in the following way: " 'Invention' in the Patent Law means any new technical solution relating to a product, a process or improvement thereof."

From the viewpoint of technology legislation, China's Patent Law and its Implementing Regulations do not directly define the scope of patentable subject matter but in contrast stipulates in Article 25 of the Patent Law that the scope of subject matter of non-patentability includes the following five cases: scientific discoveries, rules and methods concerning intelligent activities, methods to diagnose and cure diseases, varieties of animals and plants, and substances obtained by using the method of nuclear transformation.

According to the current legal system of computer software protection, obviously copyright treats software as one of the objects of protection, but from a legal viewpoint, China's Patent Law and its Implementing Regulations do not exclude computer program-related inventions from the scope of patentable subject matter.

2 Chinese Patent Office's patentability examination of computer software-related inventions

The Chinese Patent Office considers the patentability of a computer software-related invention, first of all, from the following two judgments:

First, it should be determined whether or not the software invention is a subject matter excluded from the scope of protection under the Patent Law. According to the provisions of the examination guideline, the computer program itself and the computer program itself recorded on the carrier fall under the rules and methods concerning intelligent activities which are not patentable under the Patent Law.

Second, it should be determined whether or not the invention falls under the category of legal invention. Regarding this stipulation, if we input a program into a computer and consider software and hardware as a whole entity, then it should not

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(*12) Adelman, Martin J. et al. Patent Law: Cases and Materials (Minnesota: West Publishing Co., 1998).

be deemed that this invention is not patentable merely because it contains a computer program, provided that the subject matter of the patent application of this invention can generate the technical effect and constitute a complete technical solution.[13]

According to the above requirements, regarding whether an invention containing computer programs is patentable, the examination should be conducted in the following four aspects:

(1) Whether or not integrity was taken into consideration. This means the combination of software and hardware, with the emphasis laid on the input of software to the computer.

(2) Whether the invention can generate the technical effect. Neither the Patent Law nor the examination guideline has clearly defined the connotation of the "technical" effect, but the examination guideline makes explanations by citing examples: The technical effect should be an effect of improvement, a positive and useful effect. This useful effect originates from the technical features that constitute the invention or should be a logical result naturally generated from the said technology.[14]

(3) Whether it is a technical solution. Neither the Patent Law nor its Implementing Regulations have defined the connotation of the technical solution, but from the two expressions concerning the technical solution, we can find two key factors which constitute the technical solution, i.e., it must solve a technical problem and have technical features. If it is not a technical solution, the application should be rejected according to the Implementing Regulations of the Patent Law of the People's Republic of China Rules of Patent Law.

(4) Whether the technical solution is complete. In order to determine whether the solution is a complete technical solution, it must be examined whether the necessary technical features described in the independent claim are sufficient.[15] And the necessary technical features mean those that are indispensable for the fulfillment of the aim and effect, with their sum sufficient to constitute the subject matter of the invention and make the solution be different from others.[16] The independent claim should reflect the technical solution of the invention in whole and describe the technical features which are needed to fulfill the aim of the invention.[17] For an invention containing computer programs, the necessary technical features described in the independent claim should include the technical features of both computer software and hardware. Secondly, technical content which is needed to understand and rediscover must not be lacking in the specification. Consequently, a technical solution is a complete one only after it describes all the necessary technical features which an invention has. Applications that fail to satisfy the above requirements normally should be rejected according to the provisions of Paragraphs 3 and 4, Article 26 of the Patent Law.

2   Outlook and suggestions

(1) Outlook

It is an objective requirement of the Chinese economy to actively develop the software industry, and the Chinese government, too, has attached more importance to it. China has already viewed information technology from a high level of national strategy and clearly formulated the policy to "vigorously develop information technologies, spur industrialization through information technologies, so as to realize leap-forward-type development." This is a correct choice for simultaneously pushing forward industrialization and information technology.

Although starting very lately, vigorously supported by the government and firmly underpinned by the rapid economic development, China's information industry, in particular the software industry, has been growing rapidly at an average rate of approximately 25% each year. Nowadays, the number of telecommunication users in China has reached 600 million, the number of Internet users has reached 90 million, and the output value of electronic and information products amounts to 233 billion U.S. dollars, occupying the first, second and third places in the world respectively. Among them, the software industry has become an industry that has an initial scale and is full of vitality, and a number of promising local software companies have emerged. Nowadays, China's software sales

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(*13) Foreword of Chapter 9, Section 2 of Examination Guideline
(*14) Paragraph 2.2.6 of Chapter 8, Section 2 of Examination Guideline
(*15) Paragraph 4.4.1 of Chapter 8, Section 2 of Examination Guideline
(*16) Paragraph 3.1.2 of Chapter 8, Section 2 of Examination Guideline
(*17) Chapter II, Rule 21 of Implementing Regulations of the Patent Law of the People's Republic of China

revenue accounts for approximately 10% of the total revenue of the information industry.[18]

It is undeniable that compared to those economically and technologically advanced countries and regions, China is still lagging considerably behind insofar as computer and its software technologies are concerned, but this does not constitute a reason for us not to pay more attention to the establishment and improvement of the patent protection system. Regarding this issue, Mr. Tian Lipu, current Director of the Chinese Patent Office, pointed out conclusively: "In my opinion, the most fundamental impetus of intellectual property protection, or such demand, arises from the inside of our country."[19]

(2) Suggestions

Firstly, whether in the judicial judgment or in the administrative examination, the intrinsic qualities of an invention should be treated as the core ground and it should be made clear that like other inventions, software inventions, too, fall under the patentable subject matter so long as they satisfy the legal requirements.

No matter how the form of software changes, the core ground for software patentability remains to be the connotation of "invention." The connotation of invention determines the scope of the subject matter of patent protection as stipulated by the patent system. It is very important to make this clear for understanding the intrinsic qualities of an invention.

Secondly, the examination guideline should be revised and the standard regarding patentability of computer software-related inventions should be relaxed.

The part of "Examination of Patent Applications of Inventions Containing Computer Programs" in the patent examination guideline should be revised according to the actual conditions in China. Specifically:
(i) It is necessary to enhance protection of software products and shorten the gap with international trends. From the theoretical and practical developments in the U.S. Europe and Japan it is known that their examination standards have continued to make progress along with the development of times, from "process patent" and

"device patent" to "software patent," and further to current "e-commerce patent," though of course the standards are not completely the same among the trilateral parties. It is known from the conclusion of the above comparisons that currently, at least the trilateral parties have reached a consensus about patentability of computer software products. This is of vital importance in dealing with those patent applications in which software (e.g., computer software plus publicly known computer) alone contributed to the invention.
(ii) It is necessary to define more clearly the connotations of terms like "technical solution" and "technical effect" so that the examination guideline can be further standardized. In the examination guideline, "technical solution" was defined twice: one is for the purpose of preliminary examination of utility models, defined as a set of technical features of employing natural laws which the patent applicant used for the technical problems he/she intended to solve;[20] the other is for the purpose of compiling the specification, defined as the combination of the technical means which the applicant used for technical problems he intended to solve. The technical means are normally expressed through the technical features.[21]

The two definitions differ from each other in the expression and should be unified at the time of revision. In this author's opinion, according to the experiences of the U.S. and Europe and based on the relevant provisions in the TRIPs agreement, it would be better to define the technical solution as practical application in the technical field. A computer program by means of certain carriers should be patentable if its intrinsic qualities cover no more than business processes that can enhance managerial and economic efficiency. As a result of the above comparisons and analysis, this author holds that the answer should be negative.
(iii) It is necessary to draw on the relevant provisions in the USPTO's examination guidelines and make it clear that the standard used to determine patentability of inventions which do not fall under the subject matter of legal protection should be included.

Thirdly, in the judicial judgment it is

(*18) Zhou Kouren: *Development of Software Industry Should Aim at Initiative and Innovation* and Pay More Attention to Services, 2005-12-1 22:28:15, Xinhua Website/ KMCenter
(*19) Tian Liu: *Autonomy and Innovation, and Intellectual Property*, http://www.kmcenter.org/ArticleShow.asp?ArticleID=2624
(*20) Paragraph 5.1.4 of Chapter 2, Section 1 of Examination Guideline
(*21) Paragraph 2.2.5 of Chapter 2, Section 2 of Examination Guideline

necessary to distinguish between patentability and the requirements for granting patents regarding computer program-related inventions.

Fourthly, in view of the characteristics of computer software under the environment of the Internet, it is necessary to ascertain the act of working of a patent of the computer program invention.

Japan's Patent Law revised in 2002 clearly defines the act of providing computer software programs as an act of working of a patent. This is a provision with great significance in response to the feature of transmitting and using computer programs in the era of networks and for timely and effective protection of computer programs from patent infringement.

VI Current recognition and issues to be tackled in the future

1 Current recognition

(1) Software falls under intangible assets and patentability of software invention is not different from that of other inventions.
(2) There should be no difference in patentability between a software product and other products.
(3) The technical nature is a principle to which any invention patent should firmly conform, and the difference in the target of action is the intrinsic difference between an invention and a work (and trademark).[*22]
(4) Business process software which satisfies the definition of invention and the substantial requirements is not different from other software inventions from the viewpoint of patentability; hence there is no necessity to treat it differently as far as patent applications and examinations are concerned. There is no necessity to purposely set conditions like "mathematical algorithms are excluded" or "business processes are excluded."
(5) The key to the examination of substantial requirements regarding software inventions lies in its creativity, i.e., whether it has made creative contributions to existing technologies.

2 Issues to be tackled in the future

(1) Is there any difference in the sense of a patented invention between a mathematical algorithm and a computer program algorithm?
(2) Regarding business processes which fail to satisfy the conventional requirements for inventions, is it possible to establish a protection system similar to the case of industrial designs?
(3) In view of the feature of patentability of computer software, is it possible to combine patentability of computer software and utility referred to in its substantial requirements into one subject matter? Or in other words, is it no longer necessary to examine utility regarding computer software with patentability?
(4) Novelty is the precondition of creativity, but is it possible for creativity to cover novelty?
(5) Further to Questions 3 and 4 above, regarding the examination of patent applications of computer software, is it possible to establish a new system of "two-step examination," i.e., the first step is to examine the patentable subject matter, including utility, and the second to examine creativity, including novelty?
(6) What is the impact of the phenomenon of open-source codes on the software patent system?
(7) In view of the feature of computer program reproducibility, is it possible to further determine the reproduction of a computer program as an act of working of a patent?

(*22) The target of action of intellectual property means the carrier of the utility value of the object of intellectual property. For instance, the object of copyright is a work (referred to as copyrighted work in Japan) and the target of its action is a person who reads and appreciates the work, namely, the carrier of the utility value of the work is a person.