DATA PROCESSING

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X COMPUTER USE

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New Monthly Features Starting in This Issue:

Legal Protection for ©omputer Programs

By John F. Banzhaf III

JUST A MONTH AGO the Copyright Office reversed a long standing policy and announced that it would register copyrights on computer programs. Pressure on the Patent Office to issue patents on programs is increasing and some programs already may have been patented under the guise of being either machines or processes. This article will acquaint the computer programmer and user with the advantages of legal protection for programs and the problems associated with obtaining such protection. In nonlegal language, it will indicate the requirements for and the scope of the protection available under the copyright and patent laws and the effect program protection may have on the data processing industry.

Programming, already a billion dollar business in this country, is growing even faster than the computer manufacturing industry and is expected to equal it in dollar volume by 1972. However, in the absence of legal protection, most programs have either been donated for general use through sharing organizations or have been kept secret. While this situation has resulted in a free interchange of information and a vast library of available programs, it has also caused many companies to hoard important programs. Moreover, many programs which cannot profitably be developed by one company remain unwritten because the company cannot be assured that other users can be made to pay a proportionate share of the development expense.

Copyrights

A copyright is a legal monopoly, created under an act of Congress, which grants to the author of an original writing the right to prohibit others from copying his work. To secure this right, the author need only publish an original work with the required notice and, prior to initiating court action, register his copyright with the Copyright Office. A computer program may be copyrighted only if it is an original "writing" of an "author" within the meaning of the statute. The scope of the protection will depend upon the legal meaning of "copying".

A portion or all of a computer program clearly may be a "writing" and therefore copyrightable. If so, a program composed of a deck of punched cards would probably be considered a "writing," particularly if it could be read by someone familiar with the symbols. Since courts have held that code books and mathematical tables may be copyrighted, it is no bar to copyrightability that the program is composed of numbers or non-English words. The requirement of original authorship is a modest one and would seem to be satisfied if the program is not simply an encoding of known mathematical formulas into computer language. In other words, if two programmers, working on the same problem, would arrive at substantially different programs, each of the two programs would have sufficient original authorship to be copyrightable. Finally, to be original, the program cannot be well known or have previously been made public.

A program on magnetic tape can hardly be considered a "writing" within the ordinary meaning of the word, particularly because it cannot be directly perceived and understood by human beings. On the other hand, the meaning of "writing" in the copyright law has been extended so far beyond its original sense that it contains a debatable question whether programs can be copyrighted in magnetic tape form. A negative answer to this question, however, would not foreclose the issue of protection from an infringement by a magnetic tape since such a tape might still be considered by the court to be a "copy" of a copyrighted program.

The Copyright Office, in accordance with its policy of resolving doubtful issues in favor of registration whenever possible, has agreed to accept programs for copyright registration under three conditions: 1) the creation of the program involved sufficient assembling, selecting, arranging, and editing to constitute original authorship; 2) the program has been published with a notice as required by the copyright law; 3) the copies of the program required to be deposited for registration, or some accompanying material, be directly perceivable and indicate the content of the program. Under this new policy, the author recently received the first two registrations of copyrights issued specifically on computer programs, one for a printed program and the other for a program on magnetic tape.[1] Programs which previously had been published as part of other copyrighted works presumably fall within the scope of this decision.

This decision by the Copyright Office is not the last word on the matter since it is subject to review and possible reversal in the courts. On the other hand, because of the Copyright Office's expertise, courts are likely to follow its lead and uphold the copyrightability of computer programs, particularly if the protection proves to be of value to the computer industry. Finally, while their decision stands, program copyrights can be registered and the computer industry can experiment with this new means of protection.

Scope of protection under copyrights

The most serious limitation on the scope of copyright protection is that it protects only the writing and not the ideas contained therein. For example, a copyrighted book describing a mathematical system for solving a problem is protected only against an unauthorized use of the author's language and not against an unauthorized use of the mathematical system. While the law will protect the copyright owner against a plagiarist who makes only colorable alterations in the language of the copyrighted work, it will not prevent another author from writing and selling a book describing the same mathematical system in his own language.

As applied to computer programs, this means that if the program is little more than an embodiment of a new idea or principle, the principle itself cannot be protected by copyrighting the program. Examples of this type of program might include: 1) a program to predict the behavior of the stock market, based on the programmer's secret discovery that a few stocks are key indicators; 2) a program to control the inventory of a soft drink

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PROGRAMS ACCEPTED FOR COPYRIGHT REGISTRATION BASED ON THREE CONDITIONS

1. Program involved sufficient assembling, selecting, arranging, and editing to constitute original authorship.

2. Program was published with a notice as required by the copyright law.

3. Copies of the program, or some accompanying material directly perceivable were deposited for registration.

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[1] See NEW YORK TIMES, May 8, 1964, p. 43.

manufacturer, embodying secret information about the ingredients and their proportions in the drink's formula; and 3) a program to decode secret messages. In each case, a skilled programmer could read the copyrighted program, extract the essential idea, and write a new program, with different instructions embodying the same idea, which would not be an infringement of the copyrighted program.

Fortunately, most programs are more than a few secret formulas written in computer language. Many contain a large amount of valuable information arranged in a coded format to be used by a computer in solving a particular problem. Examples of this type of program might include: 1) a language translation program (e.g. Russian-English), embodying word lists and vocabulary rules; 2) a chess playing program, embodying lessons learned from many past games, favorable positions, elaborate weighing systems, or complicated rules of play; or 3) an information retrieval program, containing a glossary of related technical words. In each case, the essential ingredient is the reference information rather than an essential idea or sequence of instructions. Since a programmer could no more steal the essential idea from such a program without infringing than an author could extract the idea behind a copyrighted telephone directory, translation dictionary, or thesaurus, programs of this nature could be completely protected under the copyright law.

Most programs fall somewhere between these two examples; i.e., they include both novel ideas which are not protectable and reference data in a computer format which is completely protectable. However, for most programs the most important and valuable element is the vast amount of programming time and effort which went into the writing, ordering, arranging, and debugging of the instructions. Here, it seems, lies the main development effort and expense. Consider for example a FORTRAN compiler. Everyone familiar with it would agree that it incorporates new and novel ideas. On the other hand, isn't the major value and worth of the program, and the major development effort directed towards incorporating these ideas into a program which is internally consistent and which predictably produces the desired results under all conditions? Put another way, could such a program be easily duplicated by a programmer who had examined it but could not copy from it? To the extent that the second answer is negative, that element of the program would be protected under a copyright.

Additional problems of the scope of protection arise with respect to copies with alterations in the instructions, in other languages, and in other physical forms. It would seem that mere colorable alterations such as renaming variables or relocating instructions would not protect a program

plagiarist against legal action. Furthermore, the program would probably be protected against any unauthorized translation into another computer language. A Supreme Court decision in 1907 held that a perforated paper roll for a player piano was not a "copy" of a copyrighted musical composition because the piano roll was designed to operate and control a machine and was not intelligible to human beings.[2] By analogy, a magnetic tape would seem not to be a "copy" of a copyrighted printed program. However, if the copyrighted program is itself in the form of a magnetic tape rather than a printed paper, it would be hard to see how a second tape would not be a "copy" of the first under any reasonable definition of the word. It is also possible that the holder of a copyright on a printed program would be protected against an unauthorized duplication of his program on a magnetic tape under a post-1907 amendment to the copyright law which prohibits the production of "records" (in addition to "copies") of copyrighted works.

The statutory term of copyright protection is 28 years and it may be renewed for another 28 years upon proper application.

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[2] White-Smith Publishing Co. v. Apollo Co., 209 U.S. 1 (1907).

THE BOSS
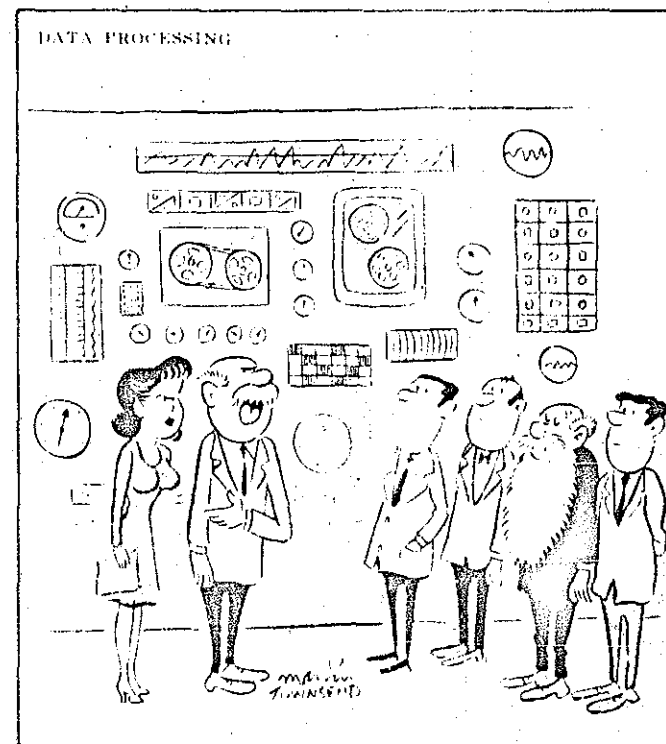
"ALL RIGHT, GENTLEMEN! WHICH ONE OF YOU PROGRAMMED THE COMPUTER TO SAY '23 SKIDOO' EVERY TIME MISS JOHNSON WALKS BY?"

A patent is a legal monopoly granted to an inventor in return for a full public disclosure of his invention. Patents afford a greater scope of protection and are more difficult to obtain than copyrights. They are granted by the Patent Office only after a thorough examination to insure that the creation meets the high standards of invention set by law. Patents may be obtained for "any new and useful art, machine, manufacture, or composition of matter."

The Patent Office has taken the firm position that computer programs cannot be patented and has denied many such applications. The basis for their decision is the well established principle that a mere thought embodied in a machine, article of manufacture, chemical composition, or physical design cannot be patented because it is not within the statutory categories of patentable inventions. The Office analogizes programs to detailed sets of instructions for solving problems and thus finds them to be no more patentable than a new mathematical formula. While admitting that the legal precedents on either side of the argument are sketchy, the Patent Office relies principally on a case which held that a plan for traffic control could not be patented unless embodied in a physical system.[2]

There are two other strong arguments for refusing to grant program patents. One is the fear that a scientific law, ordinarily not patentable, could in effect be patented through the use of a computer program. Suppose someone discovers that telltale factors in the soil can be used to predict the existence of oil deposits below. Suppose further that he writes a program which will cause a computer to predict the presence of oil based upon input information about the presence or absence of the factors. If such a program were patentable, the inventor might claim that because of the patent no one else could make use of the law of nature he discovered, particularly if a computer were required to make the detailed calculations. Secondly, a computer is a machine which performs certain operations in response to external controls. If these operations are new and novel it could be argued that the manufacturer, rather than anyone else, should receive the patent. A patent on a program might prevent him from using his machine as he wishes and it is unfair to expect the manufacturer to foresee all the uses to which the computer could be put and to patent them initially.

Counterarguments take several forms. It has been suggested that a computer program in the form of a magnetic tape recording is a physical device capable of being patented. Alternately,

others insist that because a novel program causes a computer to function in new ways, it is an improvement on a machine and thus patentable. Finally, some arguments simply say that a creative programmer is as much an inventor as the man who creates a new eggbeater and that the patent law should be interpreted more broadly to include new forms of inventions. At this writing, the Patent Office remains unpersuaded.

It has been suggested that the Patent Office may already have issued patents which cover computer programs. This is possible because a new invention can be described in many ways, some of which may obscure its basic form. A general purpose computer operating under the control of a program behaves like a special purpose machine. There is reason to believe that some inventors may have secured program patents by describing their programs so that the invention appears to be a special purpose computer. However, it is possible that the courts will invalidate patents obtained in this manner because of a fraud on the Patent Office or because of a failure to fully disclose the invention.

Even if programs were held patentable in principle, many would still be unpatentable because of a lack of "invention". Every new device and process is not patentable; only those which attain a rather high standard of novelty and utility are entitled to be called "invention" in the patent law sense. For example, an "invention" must be more than that which would normally occur to a person skilled in a particular technical field; if it combines known elements in a novel combination, it must produce a result which is both new and surprising. Under these restrictions, and particularly as they are now being applied by the courts, many if not most programs would not rise to the level of an "invention". As a simple test, if a programmer can be told to write a certain program with reasonable certainty that he will be able to do it, the resulting program is probably not an invention in the patent sense.

Scope of protection under patents

The scope of protection under a patent is generally greater than that of a copyright. A copyright protects only the writing itself; in this case the computer program. The extent of the patent's protection is determined not by the written description of the program but by a separate set of claims, based on the disclosed invention, which delineate and determine the protected area. An inventor will generally seek to draft claims as broad as the Patent Office will permit in order to secure the widest measure of protection.

Unlike a copyright, a patent offers protection against any subsequent use of the same device, whether or not the infringer copied the original invention. It is no defense that the infringer de-

[2] E. Post, Hitchins, 99 U.S.P.Q. 288 (Pat. Off. Bd. of Appeals 1953).

veloped the device without knowledge of the original invention.

The statutory term of patent protection is 17 years. A more complete discussion of patent protection for programs is beyond the scope of this article.[4]

The best method for protecting programs

There is no single best method for protecting programs and the method selected should be tailored to the particular program and the needs of the company. If the essence of the program is a secret idea or formula which could be recognized by a skilled programmer and embodied in an entirely new program, patent and copyright protection are impractical because they require a public disclosure. The only recourse then is to rely on the laws of trade secrets under which all users of the program are bound by contract to secrecy. This arrangement will create legal rights under the contract against the other parties but none against third persons who may learn of the program.

At present, there is no recognized right to program protection under patent law and legal efforts to secure it will probably be long and costly. If it were available, it would be most useful for programs which meet the high standards of invention and which are valuable primarily because of their principles of operation rather than for the reference information which they contain. Patents are costly and generally require several years to obtain but provide a wider scope of protection than copyrights.

For programs containing large amounts of reference data, copyright protection is ideal because it affords full protection against copying and is available at very little cost with little or no waiting time required. For most programs, it affords an adequate scope of protection with the same advantages. If a program is to be made public, there is no reason for not copyrighting it since it may still be dedicated to the public at any time or offered free to any class of users if the author desires. Programs may be copyrighted if only to prevent others from palming them off as their own.

Additional considerations

Another copyright problem arises from the use of copyrighted material in computers, particularly in connection with information retrieval. It may be an infringement of an author's copyright to record his work on tape or punched cards, to store it in memory, to make a shortened version of it, or to print it out in whole or in part. Regretably, these legal problems are still unresolved and further discussion is beyond the scope of this article.

The Copyright Office, at the request of Congress is now preparing a new copyright law to be presented to that body in the near future. A tentative draft has been published and comments from interested groups have been solicited. However, data processors have done little to indicate their needs and their feelings on this bill to the Copyright Office. Specifically, the tentative draft provides that computer programs will be protected under copyright [Sec. 1(a)(1) and 5(a)] and that holders of copyrights on other works will have the right to prevent their use in information storage and retrieval systems [Sec. 5(a)]. If these provisions are not in accord with the needs of the data processing industry, now is the time for it to indicate its feelings to Congress and the Copyright Office.

Effect of program protection

Legal protection for computer programs probably will have a mixed effect on the computer industry. It would seem that the availability of protection and the hope of pecuniary reward through program leasing will discourage the voluntary contribution of programs to sharing organizations. Likewise, it may hinder the free flow of programs from user to user because copyright holders will require leasing agreements to be made before releasing programs. On the other hand patent and copyright protection were created "promote the Progress of Science and the Useful Arts", according to the Constitution. Protection for programs may do this in several ways. First, it could encourage programmers, particularly computer service bureaus, to release programs which heretofore have not been shared by offering the incentive of leasing fees. Second, it may encourage companies to write programs which they ordinarily would not undertake because the development cost would not be justified by the limited usefulness within the company. Protection will probably encourage programming the same way that patents have always encouraged inventors and copyrights have always encouraged literary authors: by providing a guarantee that the results of their labor and creativity can be traded in the market place like any other valuable commodity in a free enterprise system.

The author believes that copyright protection for computer programs will be an advantage to the data processing industry because the difficulty of detecting infringements plus the limited scope of protection would be balanced by the stature and reputation of the licensees which would preclude deliberate cheating and the result would be a system of program licensing at reasonable fees which would stimulate far more programs than it deters. In any case, legal protection is a challenge for the computer industry which should actively be faced by people who fully comprehend its potential and its importance. ∎

[4] For a more complete treatment, see *The Patentability of Computer Programs*, N.Y.U. LAW REVIEW, Vol. 38, pp. 891-917 (Nov. 196_).