3.3 The "Abstraction, Filtration, Comparison" Test

This approach was developed more fully by the Second Circuit Court of Appeals in the case of **Computer Associates International Inc. v. Altai Inc**. [29] The court started its analysis by pointing out that since the statute provided that computer programs are to be protected as literary works then, non-literal structures of computer programs must be covered analogously with the position in other literary works. After noting with approval Judge Learned Hand's decision in the Nichols case mentioned above, and pointing out that "nobody has ever been able to fix that boundary [between an idea and a expression] and nobody ever can" the court went on to propose a three step analysis which has become to be known as the abstraction-filtration-comparison test. In doing this, the court should first try to determine the level of generality at which it can be said that expression of an idea differs from the idea itself. The court noted that this was a standard technique in dealing with plays and other literary works and suggested that in dealing with computer software it would be useful to follow the designer's steps to try to establish the appropriate level. The court noted that:

> At the lowest level of abstraction, a computer program may be thought of in its entirety as a set of individual instructions organized into a hierarchy of modules. As a higher level of abstraction, the instructions in the lowest-level modules may be replaced conceptually by the functions of those modules. At progressively higher levels of abstraction, the functions of higher level modules conceptually replace the implantation of those modules … until finally one is left with nothing but the ultimate function of the program.

The court did not indicate at which of these levels it felt the idea-expression boundary was being crossed. However, from the general tenor of the decision as a whole there is an implication that the highest level at which expression might be found is in the organization and structure of hierarchy of modules.

The second step in the test is the filtration step; the object of which is to separate out protectable elements of the expression from unprotectable material. Such unprotectable materials include elements dictated by efficiency, elements dictated by external factors, and elements taken from the public domain.

Finally the court noted that "the primary object of copyright is not to reward the labor of authors but rather their original contribution. [30]

The final test is to compare what remains with the alleged infringement.

The abstraction-filtration-comparison test for determining whether there has been infringement in cases other than where there has been direct actual copying [31] has now been endorsed by several appeal courts including: the Fourth [32], Fifth [33], Tenth [34], Eleventh [35] and Federal [36] Circuit Courts of Appeals. [37] In **Lotus Development v. Borland**,[38] however, the First Circuit doubted its usefulness in cases where the issue was one of literal copying of a literal element of a program. As noted by the Eleventh Circuit, this is not surprising since the test was developed to deal with the problem of non-literal copying of non-literal elements (the court defining literal elements as source code and object code only). [39]

In **Computermax Inc. v. UCR Inc**.,[40] a district court, in Georgia (which is in the Eleventh Circuit), adopted the abstraction-filtration-comparison test to find that there was copyright infringement in copying the plaintiff's file structures, since these structures were not dictated by outside factors, such as market forces, and were not merely analogous to blank forms, since they collect and organize information entered by the user.

The Fifth Circuit first held that only literal copying of elements of a computer program could be considered an infringement, [41] then it simply recognized that non-literal elements of computer programs "such as structure sequence and organization" may be copyrightable, [42] and then applied the abstraction-filtration-comparison test to conclude that copyright protection could in principle exist in input and output formats and used interfaces as long as these formats were not dictated by external requirements. [43] The court found that the expressive nature of such interfaces outweighed their utilitarian function.

3.3.1. "Abstraction"

In **Harbor Software Inc. v. Applied Systems Inc**.,[44] the court in its abstract analysis noted the possible applicability of the case law relating to protection of compilations to the selection and arrangement of modules in a program and that such protection was likely to be "thin".

3.3.2 "Filtration"

In **O.P. Solutions Inc. v. Intellectual Property Network Ltd.**,[45] the court listed the filters that must be passed through before reaching the point at which a comparison is made as including: 1) a test for originality, 2) whether there has been a merger of the idea and the expression or the related scenes a faire doctrine applies and 3) whether a public domain exception applies.

In **Bateman v. Mnemonics**,[46] the Eleventh Circuit Court of Appeals held that the district court erred in instructing a jury to filter out only nonliteral similarities in carrying out the filtration stage of the abstraction-filtration-comparison test since the purpose of this stage was to eliminate from consideration all unprotectable elements such as ideas, facts, public domain information, merger material, *scenes a faire* material and other unprotectable elements of the … program under consideration.

As noted above, in addition to the "abstraction" concept that is derived from traditional copyright law, two other traditional doctrines are now often referred to in computer cases at the "filtration" stage. These are the "merger" doctrine and the "*scenes a faire* " doctrine. Both of these may have the effect of limiting copyright protection in the software area. An example of the application of the former is found in the recent case of **Interactive Network Inc. v. NTN Communications Inc**.[47] In this case it was held that the idea behind a prediction scheme for an interactive video game played with televised football games merged with its expression and so there was no infringement in copying the elements of the game in which such merger had occurred. The copied elements were stated to be "inherent in, inseparable from, or constrained by" the idea of an interactive football game. The *scenes a faire* doctrine excludes from copyright protection those elements that follow naturally from a works theme rather from the author's creativity. [48] The doctrine was applied, for example in **Computer Associates v. Altai** discussed above as part of the filtration stage to eliminate from consideration any features that were themselves incapable of protection. In **Computer Management Assistance Co. v. Robert F. DeCastro Inc.** [49] It was pointed out that the doctrine could be used to filter out hardware standards and mechanical specifications, software standards and compatibility requirements, computer manufacturer design standards, target industry practices and demands and computer industry programming practices.

In the case of **Feist Publications Inc. v. Rural Telephone Service Co. Inc**.[50], the United States Supreme Court considered the question whether copyright protection can exist in compilations of data. A key question was what was required to satisfy the "originality" requirement of the Copyright Act. In her opinion, Justice O'Connor noted that this required not only that the author not copy the work from another, but also the work involved "at least some minimal degree of creativity." Although she noted the requisite level of creativity is extremely low, she went on to note with approval that Supreme Court decisions in the late 19th century had referred to the originality requirement that what should be protected by copyright were the "fruits of intellectual labor." Thus, in order for protection to arise something more than the "sweat of the brow" was required.

Even though in principle there may be a broad interpretation of what may be protected as a literary work, it must be recognized that in some circumstances the degree of protection given even to a literary work may be rather narrow. Two such situations have been seen which either are directly related to the computer industry or are clearly relevant to it. The first is where the plaintiff's own acts have the effect of narrowing its protection. A case in point is **Apple Computer Inc. v. Microsoft Corp**.[51]. In the early days, Apple had licensed Microsoft to use certain visual displays produced by graphical user interface (GUI) programs. Subsequently it sued Microsoft for infringement on the basis of certain displays that were present in late generation Windows programs. The Court found that most of the acts complained of were in fact covered by the license and concluded that so far as unlicenced material was concerned, Apple's copyrights should be construed narrowly because of the external limitations imposed upon Microsoft in view of the limited number of ways in which a GUI could be expressed. In **Adobe Systems Inc. v. Southern Software Inc**.[52] It was held that a program for creating type fonts could have the minimum degree of creativity required since in this area two independently working programmers using the same data and the same tools can produce an indistinguishable output that will have few points in common.

A second area in which narrow protection is traditional is in respect of compilations [53]. Thus, copyright in a compilation extends only to what was created by the person making the compilation and does not give any new right in pre-existing material that has been compiled. [54] Similarly, the protection given to standard forms and similar documents has been held to be very narrow. [55]

In the Feist case noted above the data constituted a list of names and telephone numbers taken from a small rural telephone directory. The U.S. Copyright Statute specifically refers to compilations being protectable by copyright only if the facts included in the compilation have been "selected, coordinated or arranged in such a way that the resulting work as a whole constitutes an original work of authorship". Twentieth century cases in which compilations of data had been held to constitute copyrightable subject matter had been those wherein the person making the compilation had contributed original elements of selection and arrangement. In the case of a telephone directory, the compiler had no choice in the selection of entries and the arrangement of them in alphabetical order was, she believed, so commonplace as to preclude the necessary element of originality.

Some concern has been expressed by those involved in other types of database compilation that this decision may affect copyrightability of such databases, It should, however, be noted that the court focused heavily on the question of the way in which data was selected and arranged and indicated that copyright protection clearly could exist in such selections and arrangements as long as at least a minimum degree of creativity was involved. It remains to be seen how courts will view this requirement when confronted with databases organized in accordance with, for example, commercial computer programs. In **O.P. Solutions Inc. v. Intellectual Property Network Ltd**. noted above it was held that it might be possible to show that the screen lay-out of a trademark docket management system was "sufficiently original and creative to deserve copyright protection as a compilation of facts". However, protection would be narrow and infringement found only if the defendant's program "differs by no more than a trivial degree".

In EPM Communications Inc. v. Notara Inc. [56] it was held when considering the possibility of granting a preliminary injunction that where the facts contained in a data base were in the public domain, it was unlikely that there was infringement of copyright in a printed compilation by an online database directory containing information copied from the plaintiffs printed compilation. The court reasoned that the organization of the material was different in the on line database, where information was stored at random and retrieved using a search engine, from the structured organization of the printed compilation.

Another traditional doctrine that has required review and application to the computer age is the "blank forms" doctrine. Based on the Supreme Court's decision in **Baker v. Sedden** noted above, it had long been the practice of the Copyright Office to refuse to register blank forms for recording information unless the form itself conveyed information. [57] This practice has implications in the computer field in connection with the design of screens and computer interfaces. In a non-computer case, **Kregos v. Associated Press**,[58] the Second Circuit pointed out that "if [a blank form] contained a group of headings whose selection (or possible arrangement) displayed cognizable creativity, the author's choice of those headings would convey to users the information that this group of categories was something out of the ordinary."

An attack on the protectability of a database on the ground that it was a "utilitarian object" failed in **General Precision Tool Co. v. Pharma Tool Corp**.[59] However, the effect of the Feist decision and its requirement that for protection there must be some minimal degree of originality has been felt in the software area as is shown by **Mitel Inc. v. Iqtel Inc**.[60] where it was held that short arbitrary sequences of numbers, forming part of what were known as "command codes" lacked sufficient originality to be the subject of copyright protection. Other aspects of the command codes did require intellectual effort for their creation, but even here the court found that "much of the expression in [the] command codes was dictated by the proclivities of technicians and limited by significant hardware, compatibility and industry requirements and application of the *scenes a faire* doctrine meant that there was nothing left that could be protected by copyright.

On the other hand, Feist's recognition that compilations of elements that are themselves not protectable can be the subject of copyright protection when the necessary selection, coordination and arrangement was combined with the abstraction-filtration-comparison test. In **Sofitel Inc. v. Dragon Medical and Scientific Communications**, [61] copyright protection could exist in the "architecture" of a computer program even if this was made up of unprotectable elements where it was possible to conclude that there was a degree of expression in establishing interrelationships between the various elements involved.

3.3.3 Comparison

Once filtration is complete the court moves on to comparing that which has been found to be susceptible of protection with the alleged infringement. Although traditionally it has been said that for there to be infringement a "substantial" part of the work must be taken, the word "substantial" has often been construed in a qualitative rather than a quantitative sense. [62] The Second Circuit has expressed the requirement as follows:

> It is only when the similarities between the protected elements of the plaintiff's work and the allegedly infringing work are of "small import quantitatively or qualitatively" that the defendant will be found innocent of infringement. [63]

Finally, in this section we should note certain acts that have been considered by the courts to constitute an impermissible use of copyrighted software. Thus, in **MAI Systems Corp. v. Peak Computer Inc**.,[64] the Ninth Circuit Court of Appeals found that the simple unauthorized act of loading a program into the random access memory of a computer constituted infringement since it created a copy that can be "perceived, reproduced or otherwise communicated". [65] In **Sega Enterprises Inc. v. Maphia** [66] it was found that not only was uploading a computer game on to a computer bulletin board a direct copyright infringement but that the person who did this was also liable as a contributory infringer whenever someone accessed the bulletin board to download the program. On the other hand, it has been found that unauthorized creation of a hypertext link to pages within someone else's website was not of itself a copyright infringement since a user of the link was being transferred to a genuine page that had been made available by the copyright owner. [67]

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[29] 23 USPQ2d 1241 (1992).
[30] In this context, the court referred to the Supreme Court decision in **Feist Publications Inc. v. Rural Telephone Service**, 18 USPQ2d 1275 (1991), which held there was no copyright protection for a telephone directory on the grounds that there was insufficient originality in merely arranging a series of names in alphabetical order. In reaching its decision the Court disapproved of earlier cases that had indicated that one might be entitled to copyright protection simply by virtue of the labor that had been expended in creating the work, the "sweat of the brow" test. The degree of originality need not be all that high, however. For example in **CDN Inc. v. Kapes**, 53 USPQ2d 1032, it was found that a compilation of wholesale prices for collectible coins met the standard since in order to come to the stated valuations, the compilers carried out a number of different steps and then extrapolated their stated values from the results of their analysis and calculations.
[31] The analysis need not be carried out where direct actual copying is clear. **Mitel Inc. v. Iqtel Inc**., 44 USPQ2d 1172 (10th Cir), **MAI Systems Corp. v. Peak Computer Inc**., 26 USPQ2d 1458 (9th Cir.).
[32] **Autoskill Inc. v. National Education Support System**, 26 USPQ2d 1828 (1993).
[33] **Computer Management Assistance Co. v. Robert F. DeCastro Inc**., 2000, endorsing particularly the form of the test set out in the Tenth Circuit's decision in **Gates Rubber Co. v. Bando Chemical Industries Ltd**., 9 F.3d 823, 28 USPQ2d 1503 (10th Cir. 1993).
[34] The **Gates Rubber Company v. Bando Chemical industries Ltd**., 28 USPQ2d 1503 (1993). The court's summary of the test has been approved in other circuits and is as follows:
> First, in order to provide a framework for analysis, we conclude that the court should dissect the program according to its varying levels of generality as provided in the abstractions test. Second, poised with this framework, the court should examine each level of abstraction in order to filter out those elements of the program which are unprotectable. Filtration should eliminate from comparison the unprotectable elements of ideas, processes, facts, public domain information, merger material, *scenes a faire material* and other unprotectable elements suggested by the particular facts of the

program under examination. Third, the court should compare the remaining protectable elements with the allegedly infringing program to determine whether the defendants have misappropriated substantial elements of the plaintiff's program.

The court identified six levels of abstraction: (i) main purpose,(ii) program structure or architecture, (iii) modules, (iv) algorithms and data structures, (v) source code and (vi) object code.

[35] **Mitek Holdings Inc. v. Arce Engineering Inc**., 39 USPQ2d 1609 (1996).

[36] **Atari Games Corp. v. Nintendo of America**, 24 USPQ2d 1015 (1992).

[37] **In Apple Computer Inc. v. Microsoft Corp**., 32 USPQ2d 1086 (1994) the Ninth Circuit Court of Appeals continued to follow its Brown Bag approach but regarded the dissection of the issues involved carried out under that test as being essentially the same analysis as required under "abstraction – filtration - comparison test "although articulated differently."

[38] 34 USPQ2d 1014

[39] **MiTek Holdings v. Arce Engineering**, 39 USPQ2d 1609.

[40] 26 USPQ2d 1001(M.D. Geo. 1992).

[41] **Plains Cotton Co-Op v. Goodpasture Computer Service**, 1 USPQ2d 1635 (1987). In fact, the case can also be looked at as a case where the Court simply refused to give protection to features that it regarded as having been dictated by externalities of the situation.

[42] **Kepner-Tregoe Inc. v. Leadership Software Inc**., 29 USPQ2d 1747 (1994).

[43] **Engineering Dynamics Inc. v. Structural Software Inc**., 31 USPQ2d 1641 (1994). Input formats were also found to be protectable in **Lotus Dev Co. v. Paperback Software Int'l**., 15 USPQ2d 1577 (D. Mass. 1990).

[44] 39 USPQ2d 1651 (S.D.N.Y. 1996).

[45] 50 USPQ2d (S.D.N.Y. 1999).

[46] 38 USPQ2d 1225 (11th Cir.) 1996).

[47] 49 PTCJ 496 (N.D. Cal. 1995).

[48] *See*, for example, **Landsberg v. Scabble Crossword Game Players Inc.**, 221 USPQ 1140 (9th Cir. 1984).

[49] 55 USPQ2d 1643 (5th Cir. 2000).

[50] 18 USPQ2d 1275 (1991); *see* fn 45 above.

[51] 32 USPQ2d 1086 (9th Cir. 1994).

[52] 45 USPQ2d 1827 (N.D. Cal. 1998).

[53] The Copyright Act, 17 USC § 101 defines a compilation as "a work formed by the collection and assembling of preexisting materials or of data that are selected, coordinated, or arranged in such a way that the resulting work as a whole constitutes an original work of authorship."

[54] **Triangle Publications, Inc. v. New England Newspaper Publishing Co.**,. 46 F.Supp 198, 54 USPQ 171 (D. Mass. 1942).

[55] **Continental Casualty Co. v. Beardsley**, 253 F2d 702, 107 USPQ 1 (2d Cir. 1957) cert den'd 358 U.S. 816 (1958).

[56] 56 USPQ2d 1145 (S.D.N.Y. 2000).

[57] 37 CFR 202.1(c).

[58] 937 F.2d 700 19 USPQ2d 1161 (2d Cir. 1991).

[59] 35 USPQ2d 1019 (E.D. Pa. 1995).

[60] 44 USPQ2d 1173 (10th Cir. 1997).

[61] 43 USPQ2d 1385 (2nd Cir. 1997).

[62] *See*, for example, **Harper & Row Publishers v. Nation Enterprises**, 105 S.Ct 2218, 225 USPQ 1073 (1985) where the infringement was a matter of about three hundred words taken from President Ford's memoirs.

[63] **Williams v. Crichton**, 84 F.3d 581, 38 USPQ2d 1810 (2nd Cir. 1996).

[64] 26 USPQ2d 1458 (1993).

[65] A similar result was reached in **Stenograph L.L.C. v. Bossard Associates Inc**., 46 USPQ2d 1936 (D.C. Cir.), where it was held that loading software into a computer infringed the copyright in it where the software had been licensed for use only on a single computer in situations in which a "key" supplied by the owner of the copyright was plugged into one of the ports of a computer. Use of the key was subject to a license also. The licenses provided that the keys should not be supplied to third parties without permission. The defendants had obtained the software and keys by an illicit purchase from one of the copyright owners sales representatives. The court had no difficulty in finding that the unlicensed use of the genuine products of the copyright owner constituted copyright infringement as a result of the loading of that software on to a computer's RAM since this involved an act of copying. Another example of use of software outside the scope of a license that had been granted for its use being found to be an infringement is **Sun Microsystems Inc. v. Microsoft Corp**., 49 USPQ2d 1245, (N.D. Cal. 1998) where Sun had licensed its Java software to Microsoft for the purpose of creating an interface and Microsoft had allegedly used the software beyond the terms of that license.

[66] 30 USPQ2d 1921 (N.D. Cal. 1994).

[67] **Ticketmaster Corp. v. Tickets.Com Inc**., 54 USPQ2d 1344 (C.D. Cal. 2000). A claim of trespass tp chattels, which has been pleaded in other cases where electronic intrusion into someone else's computer has caused harm, does not seem to have been pleaded in this case.

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