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AICPA

InfoTech

Practical Advice For Implementing Technology

UPDATE

106.1A
CPB

LAN Issues When Using CD-ROMS

By Mark R. Scarborough

Mark R. Scarborough is a systems manager with Johnson & Scarborough, CPAs, in Vienna, Virginia. In this article, he discusses the technical aspects of his firm's installation of their CD-ROM reader on a local area network (LAN).

In the Summer '92 issue of *InfoTech Update*, we examined the practitioner's perspective on using CD-ROM databases for tax research applications. Wil Robinson, a partner in the firm of Cherry, Bakaert & Holland in St. Petersburg, Florida, stated that the next step from a stand-alone CD-ROM reader was to bring the tax database to the tax professional's desktop by sharing the CD-ROM reader on a local area network. There are a few issues which need to be addressed in order to facilitate CD-ROM sharing.

Many manufacturers of CD-ROM drives claim their products to be "network compatible" or "network aware." In fact, many CD-ROM readers include only the device drivers which need to be loaded on the machine to which the CD-ROM is physically attached. Each CD-ROM controller (and drive) has a corresponding device driver which, like disk drivers, has a .SYS file extension. The drivers allow the PC to access the CD-ROM reader like any other storage or disk drive. However, user stations on the LAN still are unable to access the database since the network operating

system cannot recognize the CD-ROM hardware.

Some hardware manufacturers have developed their own programs which can be loaded into a network file server memory linking their hardware with the network operating system. Novell Netware, for example, calls this type of program an NLM (Netware Loadable Module). Unfortunately, most CD-ROM readers do not include the needed NLM. If you are a programmer, or strong technically, you can use Novell's API (Application Programming Interface) to develop your own NLM, just as you would for other SCSI (Small Computer Systems Interface) devices. For most users, this is too advanced and not very practicable. These users may be better off purchasing third-party software.

There are several programs available which allow users to share CD-ROM databases over a network. Most of these programs work on any network which fully supports NetBIOS (an IBM interface between network hardware and networking software). The programs usually allow user access through Microsoft MS-DOS/CD-ROM Extensions. Microsoft Extensions allows a standard CD-ROM disk to be accessed like a hard drive using network logical drives.

With a program using Microsoft Extensions, multiple CD-ROM servers can be accessed on the same network. (You can attach up to seven SCSI devices onto a single SCSI controller.) Memory

ACCOUNTANTS

AMERICAS *In This Issue*

6-8775

2

So Your Client is Going To Computers

5

Pen Technology Update

8

Do You Need Multiple CONFIG.SYS Files?

caching may be supported to provide greater functionality and speed. Also, the installation utilities included make CD-ROM server and user setup easier.

For the best possible performance on a network, you should run the CD-ROM server as a dedicated server rather than as a non-dedicated server TSR (terminate-and-stay-resident). The optical server should have at least an 80286-based processor. (Many companies are using an old IBM AT or compatible as their dedicated server.)

In addition, the issue of licensing must be addressed. Even though you can hook up a CD-ROM to a LAN, the software license for the CD-ROM may not allow more than one user. Before installing the CD-ROM on your LAN, check the software license for the agreed-upon number of authorized users.

Once the CD-ROM reader has been networked, and the professional staff trained, you will find less demand for the paper service tax, accounting, and auditing library.

IT

Computer Auditing — So Your Client Is Going To Computers

By J. Christopher Reimel, Jr.

J. Christopher Reimel, Jr., is chief of Information Systems Audit with the New Jersey Department of Labor. In this article, Reimel discusses how to audit clients that have become computerized.

Over the past year, one of your major clients has completed the process of installing a new computer system that DOES EVERYTHING. The client raves about the increase in efficiency that the system has brought for all aspects of the business. Sales are up and expenses are down. The client then states that the audit should be a lot more efficient, thus generating savings in time and in money (that is, the audit fee should be lower this year.) You were planning on auditing this client the same way as last year. The only way to lower the fee is to take an even bigger discount than last year, and the fee is already at the low end of your fee schedule! There must be a better way of handling this situation.

Recently at a continuing professional education seminar, you learned that automating certain audit procedures and auditing through the computer are ways of saving time. However, you do not yet feel that you have the knowledge or resources to attempt either or both of these. You are also concerned that the audit fee is not large enough to devote the time to attempt something new. Doing things differently takes time and money. However, if you do not

adopt new technology, your client may lose confidence in your professional ability and may think that your skills are not current. What should you do?

The decision is a difficult one, but as a professional, you know that you must constantly upgrade your skills. You have used a personal computer to prepare tax returns for the last few years. It took some time to become comfortable with it, but you now know that it was an investment worth making. Mathematical calculations are performed correctly, numbers are carried correctly from one form to another, and last minute changes are performed quickly. Likewise, you now realize that using a computer during an audit is one of those new skills that you should acquire. The good news is that computer auditing has changed over the last several years and has become more user friendly to the auditor. Computer auditing still requires an understanding of computer systems and technology, but the advent of the personal computer has made using a computer easier than using a centralized mainframe computer. Thus, using a computer in an audit can be more efficient and effective than using manual audit methods, and can save an auditor time and money. Of course, there is still the upfront investment of time that is necessary for performing any new task. However, after a short time, you will become as comfortable with computer auditing as you are

with computer tax preparation.

Many clients now have their entire operations on inexpensive personal computers and minicomputers. They are using inexpensive general ledger software to obtain the financial information that they need. The auditor now has personal computer audit software packages such as IDEA and ACL. These packages perform many of the audit functions that were previously only available in large mainframe audit software packages, but are easier and less costly to use.

Computer Auditing Demystified

There are many aspects to computer auditing, but it is best understood when thought of as "auditing through the computer" or "auditing with the computer." Auditing through the computer means that the auditor is performing audit tests using the client data in an automated fashion. The auditor is writing computer programs and running these programs through the client's computer using the client's data. If the results of the computer programs written by the auditor equal the results of the computer programs written by the client, then the auditor has verified the accuracy of the client's data processing reports for this particular segment of the audit.

The auditor may be sending test data through the client's computer or may be re-performing calculations that the client system has performed. Auditing with the computer means automating audit procedures that were previously performed manually. This includes tasks such as footing a file, making a confirmation selection, recomputing interest earned, or recomputing an inventory valuation.

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Basic Audit Tasks

Using a computer during an audit does not change the basic tasks that are performed by the auditor. The auditor obtains sufficient competent evidential matter regarding the following five assertions:

- existence or occurrence
- completeness
- rights and obligations
- valuation or allocation
- presentation and disclosure

The fact that the client is now processing transactions in a computer does not alter the auditor's responsibility to collect the appropriate evidence. It may change the *method* of obtaining the evidence. It may also alter the *format* of the evidence. But the basic responsibility remains the same.

What are some of the concerns that the auditor will encounter in auditing a computerized accounting system as well as a manual accounting system? Some of the major concerns are:

- understanding the computerized internal control structure
- performance of substantive audit tests
- management letter recommendations.

Understanding The Internal Control Structure

Statement on Auditing Standards 55 requires the auditor to understand the internal control structure of the audit client. He or she must do this in order to properly plan the audit, regardless of whether the client is using a computer or not. The auditor must understand the flow of the transactions. In an automated system, a computer program processes the transactions that would normally be processed by hand in a manual system. The difference is that in the automated system, each transaction is processed exactly the same as any other similar transaction. No human intervention for decision making is required at the time of the transaction. The decision making was performed earlier by management. These decisions were then communicated by management to the computer programmer. The data in each trans-

action flows through the computer program and the result is a transaction that is stored on a magnetic disk, tape, or cartridge and is printed on reports.

In a manual system, different people may process similar transactions differently. Also, the same person may process similar transactions differently from one day to another. Therefore, internal controls have the potential to be stronger in an automated system than in a manual system. While there is little difference in understanding and documenting the controls in an automated or manual system, the reliability and consistency of the controls may differ. Automated systems with strong controls should be more reliable than manual systems. However, automated systems' strong controls may be less obvious than controls in a manual system. Therefore, an auditor may have a different audit plan for an automated system than for a manual system.

What should an auditor be looking for in an automated system that may not be in a manual system? Since a significant amount of controls that previously resided with the clerical personnel now reside in the computer, the auditor might want to test the following:

- controls over access to the computer and to the data
- controls over the development of new programs
- controls over changes to existing programs
- controls over the retention of data.

Performance of Substantive Audit Tests

The auditor must perform substantive tests to determine that the financial statements are presented fairly. Accounts are analyzed, tested, and confirmed. The method of testing can differ when auditing a manual system as opposed to an automated system. An auditor can use a computer audit software package to perform many of the time-consuming audit tasks such as footing, crossfooting, analyzing, and aging. Some of the software packages

Steps In Performing A Computer Audit

- 1 Flow chart the various systems to document the internal control structure. Inexpensive software flowcharting packages are available.
- 2 Obtain the record definitions and database structures for all files and databases.
- 3 Write programs or use a database-query language to obtain the information needed for the audit.
- 4 Re-perform calculations that were performed by the client's software, for example, overtime paid, sales discounts given, interest earned, etc.
- 5 Perform substantive tests using the information obtained directly from the computer.
- 6 Enter adjusting entries and produce the audited financial statements.
- 7 Prepare management-letter recommendations. Change the order to place the most important recommendations first. Do not overlook the opportunity to demonstrate to the client your knowledge of the system.

that clients are using have their own report generators that the client can use to obtain critical management information. The auditor may wish to test these report generators to determine the accuracy of the management reports. The auditor can use any computer audit software packages like the ones mentioned above to perform this test. The client may be making important management decisions based on inaccurate reports. This permits the auditor to demonstrate to management that the auditor is thoroughly reviewing the new computer system and to bring added value to the client by discussing this review with management. The client will then realize that this thor-

continued on page 4

Audit Software Packages

<u>Package</u>	<u>Vendor</u>
ACL	ACL Services Limited 200-575 Richards Street Vancouver BC V6B2Z5 Canada Phone: 604-669-4225 Fax: 604-669-3562
Expert Auditor	Boden Associates 11 Meadow Lane East Williston, NY 11596 Phone: 516-294-2648
IDEA	American Institute of Certified Public Accountants Order Department P.O. Box 1003 New York, NY 10108-1003 Phone: 1-800-TO-AICPA

Flowcharting Software Packages

<u>Package</u>	<u>Vendor</u>
EASYFLOW	HavenTree Software Limited PO Box 1093 E Thousand Island Park, NY 13692 Phone: 1-800-267-0668 613-544-6035 Ext. # 83 Fax: 613-544-9632
FLOW CHARTING 3	Patton & Patton Software Corporation 485 Cochrane Circle Morgan Hills, CA 95037 Phone: 1-800-525-0082 408-778-6557

continued from page 3

ough review and test of the new computer system is more than worth the audit fee. Management wants to know what is functioning correctly as well as what is functioning incorrectly.

Some audit tests require the auditor to transcribe information from a series of computer generated reports and then

to foot this information to obtain the correct account balance. This is time-consuming and inefficient. For example, payables may consist of salaries, raw materials, office supplies, and miscellaneous. In an automated system, the auditor could use an audit software package to quickly and efficiently collect this information in one report.

An audit software package can also be used to select and print a stratified sample or a random sample. Examples would be receivables or payables to be sampled and confirmed. The audit software package could also be used to print the confirmation letter and could even be used to sort the confirmations by zip code in order to receive the lower postal rate for presorted mail.

A program can be written to produce an aging of the accounts receivable. The auditor's aging can then be compared to the client's aging. Also, programs can be written to perform the calculation of interest earned or overtime paid. The auditor's calculations can then be compared to the client's calculations. Differences can be analyzed quickly and discussed with the client. Selecting and sorting information are two of the most powerful tools that an audit software package can provide. These functions permit the auditor to accumulate only the information that is needed for an account balance analysis. The information can then be sorted in ways that enable the auditor to perform analysis efficiently and effectively.

Management Letter Recommendations

Management letter recommendations can be geared toward items that strengthen the internal control structure and increase efficiency. For example, when you recalculated the interest charged to the client's customers, you determined that the client's program was incorrect and that customers were being undercharged. It is this type of recommendation that gets the immediate attention of top management and brings added value to the audit in the client's mind. Recommendations that are implemented will increase client efficiency because once a change is implemented in an automated system, its effects are immediate, pervasive, and consistent. Management letter recommendations will become more of a management consultant's report rather than a list of

minor errors discovered during the audit.

Conclusion

Automated systems are becoming more far-reaching, sophisticated, and easier to use. As clients become more knowledgeable and comfortable with these systems, they will expect the same from their auditors. Auditors who do not use computer audit software with these clients will find themselves at a competitive disadvantage. Clients who believe that their auditors are not technically proficient in understanding and using their system will change auditors.

The client's expectation is that the auditor knows more about automated accounting systems than the client. To remain technically proficient, auditors must obtain the necessary knowledge through continuing professional education courses and hands-on experience. **IT**

Looking Ahead—1993 Annual Microcomputer Conference

In the upcoming weeks, you will be receiving information about the AICPA's Annual Microcomputer Conference & Exhibition—June 13–16, 1993. There will be free passes to the exhibition for IT members and coupons entitling members to \$50 off the \$575 conference fee. There also will be a special reception and demonstration for IT members. This year the conference will take place at the Sheraton Boston Hotel & Towers, Boston, MA. Topics include:

- What's Hot: Software & Hardware;
- Basic LAN Installations;
- Client Server Introduction;
- EIS Case Study;
- Spreadsheet Design; and
- Maximizing Windows.

So check your calendar and be prepared to be there!

Pen Technology Update

By Tom Dagenais

Tom Dagenais is managing partner of Dagenais Gareri in Woodbridge, Toronto. He is also a member of the Canadian Institute of Chartered Accountants (CICA) Information Technology Committee. This article, in its entirety, appeared in the September 1992 *Microview* (Vol. 6, Issue 2). Dagenais discusses the Pen market — the issues and the impact that it will have on businesses in the next 12 to 24 months. Pen computing, which is characterized by its reliance on a stylus to enter handprinting and marks into a computer, is slowly maturing and becoming an active tool of the trade.

Where Do We Stand?

In late spring 1992, the pen computing market became a reality with the shipping of the required hardware, operating systems, and application software.

Several major research organizations, including Evans Research of Toronto, predict that overall, the pen industry will generate \$40 million in sales in 1992 and that this figure will rise to over \$450 million by 1995. While these estimates may be somewhat aggressive, most industry pundits are taking pen computing and its potential for growth very seriously. An independent observer of this newly forming industry might liken it to the PC industry of 1982 — full of new players in the hardware and software markets, with a large number of startups attempting to be the next Lotus or Microsoft.

This industry could see its shakeout come well before it gets off the ground. We are already seeing possible victims in its first 12 months with Momenta, a producer of pen hardware in finan-

cial difficulty in less than 8 months of operation.

In addition, the pen operating system market has 2 major players, Microsoft and Go Corporation. Microsoft has entered the market with its Windows for Pen operating system. It is competing with Go, a brand-new startup headed by Mitch Kapor, founder of Lotus, with somewhere between \$20 million and \$50 million in capital. This pits the market behemoth against the tiny, but talented, industry creator.

The Market — Why Pen Computers

The interest of the hardware and software developers in pen computing has been driven by 3 major influences in the computer industry:

1 A large portion of the work force is not automated. The PC's penetration in the business workplace has been primarily limited to the desktop. Not until recently have PCs become small enough for people to carry around and use in their day-to-day business dealings, if those dealings mean leaving their desks.

2 The largest drawback of existing PC operating system technology is that it relies upon data to be entered via a keyboard. That requirement generally restricts the effective use of the technology to clerical staff with developed typing skills and to situations where both hands are free to type the required information.

3 Industry in general has not yet found an automation solution for the vast majority of blue-collar workers who work in the field collecting the required corporate data. In some cases, this group of individuals can be more than 50% of the company's workforce, providing the primary data from orders,

continued on page 6

continued from page 5

invoices, and other key items which drive the sales cycle. Blue-collar workers are often not computer literate and their work environment may not be well-suited to the fragile PC.

Pen computing appears to be the most practical address to all of the above issues. Its reliance on the pen and paper paradigm is something that makes it accessible to all company employees in all tasks. Of the input devices now available on the market, it is the closest thing to comfortable and familiar that exists.

Hardware manufacturers have also been able to reduce the weight of these pen-based machines to under 4 pounds and provide for sufficient memory and data storage to make their performance and weight acceptable to the field worker. It is predicted that with the advances in battery, hard-drive, and screen display technologies in the next two years, these machines could weigh in at less than 2 pounds.

Operating Systems — Microsoft Windows For Pen Computing

Microsoft has taken Windows and added the ability to accept input from a pen device instead of a keyboard or mouse. Other than that change, the operating system is identical to Windows and uses the standard desktop paradigm and icon/graphical user interface.

The problem, of course, is that the Windows desktop paradigm is not especially easy for the average non-computer user to understand. We must not forget that many pen users will have no prior experience with DOS or any other program.

Operating Systems — PenPoint from Go Corporation

PenPoint is a completely new operating system designed without reference to any previous operating system design or paradigm. The company's founders set out to design an operating system that allowed the user to process data

in a manner similar to recording information with pen and paper. The system makes no reference to spreadsheets, word-processing, or graphics. In short, it is designed to allow the user to quickly use the system in a manner that is already familiar.

The Issues

Since this new industry is in its infancy, the major questions are:

- Which operating system, or systems will dominate?
- Which hardware suppliers will survive?
- Which applications will succeed?
- What kind of evidence would represent widespread acceptance of the technology?

While we can only hypothesize on the answers to these questions, it is quite clear that a general consensus should emerge in a much shorter time-frame than for the PC in 1982. Due to the speed of technological advancements, some hardware manufacturers have announced upgrades to existing pen machines at the same time they have announced shipment of their first machines. This shakedown should take no more than 18 months.

The solution to the operating system question is not simple. If all things were equal, PenPoint from Go Corporation would be the clear winner. But things are not equal, and the size and marketing strength of Microsoft will not allow the battle to be won solely on the merits of the quality of the product.

It is likely that the hardware battle may be won by several companies, likely with two in each of the hardware categories. Grid has significant experience and expertise in the pen arena. IBM and Samsung have solid technology and marketing skills behind them, while IBM boasts the corporate faithful. But there is potential for some of the start-ups to capture a portion of the market if they concentrate on specific vertical applications and ensure that they run both operating systems, Windows for Pen and PenPoint, to guard against failure.

The problems which will impede this technology's rapid acceptance into the marketplace are:

1 The hardware is expensive. At an average of \$4,000 to \$6,000 for a basic machine, it will be difficult to cost justify the purchase of 500 machines to automate a sales force. It is expected that the urgency of this issue will fade as the installed base increases, production costs decrease, and larger market demand and competition force prices down. There is already talk of machines for under \$2,000.

2 Handwriting recognition does not exist yet. Only handprinting is decipherable and then generally only at a 90% accuracy rate. Those within this margin of error must train the system to recognize their individual printing styles.

3 The confusion in the choice of operating systems and hardware will need to be dissipated and some proven track record established by the major players before mass market acceptance is possible. As with any new technology, the bleeders will be the first to analyze the product, and once they work the bugs out, the general market will be more willing to accept the technology without the associated pain of testing and experimentation.

The Impact On Accountants

The impact on the accounting profession can be clearly divided into the internal firm-use impact and the external consulting opportunity.

Internally, pen computing may be the first true technology to offer auditors what they have craved since the PC was invented: a way to automate, as closely as possible, the existing work papers, memos, reports, and analyses that they perform daily. With pen computing, the entire audit staff from the bookkeeper to the partner can use the tools of technology to make the task less boring and more accurate.

The final result can look just like a workpaper file and be printed in the

same format. All products will operate identically and integrate seamlessly, thereby eliminating the need for work-paper packages, spreadsheets, word processors, and graphics programs. The light weight of the hardware will also allow all users to carry the systems wherever they need to go to get the audit evidence they require — including inventory counts and other client on-site work requirements.

To enhance the mobile nature of the technology, a series of radio-based communications hardware components have been developed. These include built-in faxes, cellular phones, and radio frequency modems which will allow communication in a variety of forms with the office, clients, or other professionals on a more efficient basis than has been seen in the past.

Consulting in the pen arena will be something that only some firms will consider. In its early stages, pen technology will not be widely accepted, and the market for consulting services will be small. A fairly large investment in the technology and its applicability will also be required. For consultants, it will be important to assess whether consulting services can be offered profitably, something that might be decided after a consideration of the following points:

1 Determine whether the new technology has the potential to become part of the mainstream of micro-technology.

2 Determine whether the developers/vendors are capable of financially supporting the development, marketing, sales, and support aspects of the product.

3 Determine how the technology will affect the business cycle and the process that will be required to implement the technology. This generally requires that the consultant purchase and research the new technology in order to make a valid determination.

4 Determine what goods and services the consultant can offer the marketplace in the delivery, imple-

mentation, or support of the new technology.

5 Determine whether the consultant can make a profit on providing the service. This would require pricing the services at a rate acceptable to the market and which allows for the recouping of the investment in the technology as well as the investment in learning the "losing technology."

Whatever the outcome, it is clear that pen computing is here to stay. What directions it takes and the number of bumps it will experience along the way will all emerge in due course.

IT

Winter Discount Offerings

This quarter's Discount Offerings, which were mailed earlier this month, included the following:

- Discount offering on Software Directions PrintQ software.
- Discount offering on IHS Regulatory Products The Banking Library CD-ROM product.
- Discount offering on CTS Guide to Accounting Software for Microcomputer and Requirements Analyst™ Lotus 1-2-3 template.

Publications

The Information Technology Division has published two technology alerts — *Avoiding Telephone Fraud* and *Virus Update*. Technology alerts are one page releases on up-to-the-minute topics. Have you received your copy? Or do you need additional copies? Call the Information Technology Membership Section at (212) 596-6010.

INFOTECH Qs & As

DOS

Q – Occasionally, I get a DOS error message "Error Reading Drive A:" when trying to retrieve information on a diskette. Why does this happen?

A – This error message generally means that some or all of the data on the diskette has been damaged or corrupted. This could have been caused by improper formatting of the diskette; exposure to a magnetic field such as a phone receiver; physical damage to the diskette such as bending, exposure to extremely hot or cold temperatures, or cigarette smoke; or removing the diskette from the drive while the drive is active. Practicing good diskette backup procedures will help reduce the disruption this situation may cause. Also, periodically reformatting your diskettes is a good cautionary step which helps eliminate fragmented files and corruption of the root directory. The error message also will appear if a diskette has not been inserted into the drive.

Contributed by Kenneth D. Askelson, CFP, CIA, CPA, J.C. Penney

Q – What is a disk defragmenter, and what can it do for me?

A – DOS normally puts files wherever there is room on the disk. Portions of a given file may be in different places on the disk. This is known as fragmentation. Defragmenters, for example, Norton Utilities, PC-Tools, and ORG, take these spread-out fragments of a file and put them back together physically

continued on back page

Do You Need Multiple CONFIG.SYS Files?

By Larry J. Wolfe

Larry J. Wolfe is a vice-president of Direct Link Software, Inc., and a member of the AICPA's Information Technology Executive Committee. In this article, Wolfe discusses the use of multiple CONFIG.SYS and AUTOEXEC.BAT files.

Today's software products are much more complex than they were just a few years ago. To make them run most efficiently, many of them require specific lines in either your CONFIG.SYS or AUTOEXEC.BAT file. If you were only using one program, this would not present a problem. However, during the course of a day, we often use many different programs.

WordPerfect™ (version 5.1) and Lotus 1-2-3™ (version 3.x.) provide a perfect example of two programs that have conflicting system requirements. If you work with large documents and spreadsheets, you need to have access to memory above 640K. There are two kinds of this higher memory — expanded and extended. While both expanded and extended memory provide additional memory, they go about it in different (and non-compatible) ways. WordPerfect 5.1 can only use *expanded* memory and Lotus 1-2-3 (version 3.x) can only use *extended* memory.

Memory above 640K can be configured (in the CONFIG.SYS file) to be either expanded memory, extended memory, or a combination of both. However, any given section of memory cannot be both at the same time.

How can you make all of your programs run optimally if different CONFIG.SYS and AUTOEXEC.BAT files are required for different programs?

■ **Choose not to fully optimize every**

program. This option may work some of the time, but it is not a good long-term solution. For example, WordPerfect works fine with just 640K. However, if you work with large documents and you don't have expanded memory, WordPerfect "swaps" part of your document to your hard disk when it needs more space. This is much slower than swapping to expanded memory.

- **Buy more hardware.** If you have two programs, and one needs four megabytes of expanded memory and the other four megabytes of extended memory, you could buy eight megabytes of memory and configure one-half each way. This has the obvious downside of requiring you to purchase twice as much memory as you actually need.
- **Create multiple CONFIG.SYS and AUTOEXEC.BAT files.** If you want to optimize your programs and buy the minimum amount of memory, you have the option of creating a special CONFIG.SYS and AUTOEXEC.BAT file for each program. Then, before you run the program, re-boot your computer with the desired CONFIG.SYS and AUTOEXEC.BAT files. This method is difficult to manage because it is hard to remember which files you used. Also, you need to manually (or with a batch file) change the names of the CONFIG.SYS and AUTOEXEC.BAT files. Finally, when you first start your computer, you need to remember the last application you used, so you can determine if the CONFIG.SYS and AUTOEXEC.BAT files are appropriate.

Clearly, the best answer of the three listed above is the last one. However, the renaming of files can be a real

nuisance. There are several commercial software programs (two are listed at the end of this article) that allow you to select your CONFIG.SYS and AUTOEXEC.BAT files at the time you start your computer. These software products keep track of a number of different CONFIG.SYS and AUTOEXEC.BAT files and display your options on the screen. This makes it very easy to select the CONFIG.SYS and AUTOEXEC.BAT files that optimize the application you wish to run.

The only significant limitation to these programs is that to choose a different CONFIG.SYS or AUTOEXEC.BAT file, you have to re-boot your computer. The contents of the CONFIG.SYS and AUTOEXEC.BAT files can be changed from these programs, but the changes only take effect when the computer is re-booted.

While most of this discussion has revolved around the example of WordPerfect and Lotus, there are many other applications and hardware devices that can be optimized with their own CONFIG.SYS and AUTOEXEC.BAT files. If you run both programs from DOS and Windows, you could benefit from these programs. Some other examples of hardware and software that often require different settings are tape backups, CD-ROM drives, FAX boards, LANs, disk caches, RAM disks, TSR programs, and memory management systems.

Two examples of software that allow multiple CONFIG.SYS and AUTOEXEC.BAT files are:

Easy Boot

Clear Software, Inc.
1-800-339-1759

BOOT.SYS

Public Software Library
1-800-242-4775

BOOT.SYS is a shareware product that is available on many bulletin boards. There is no charge to obtain and test the software. However, if you use the software, you must pay the registration fee.

IT

Case-Based Reasoning

By Daniel E. O'Leary

Daniel E. O'Leary is on the faculty of the School of Accounting at the University of Southern California. In this article, he discusses the principles behind case-based reasoning used in expert systems.

Virtually all of the expert systems (also referred to as artificial intelligence systems) developed to date in accounting, auditing, and tax have captured heuristic (rule-of-thumb) reasoning in the form of "if... then..." rules. For example, you are probably all familiar with reasoning which takes the following form: "if poultry is the main course, then order a white wine." These rules are particularly good for those situations where problems can be solved using a sequence or hierarchy of reasoning.

Unfortunately, rules are limited in their ability to communicate and explain. In human communication, examples provide analogies to aid understanding. Rules do not provide such capability.

Further, rules capture what to do, but not why. Following rules may lead to a good solution, but may not illuminate how the solution was reached.

In many cases, rules arise from the favorable outcome of a number of different occurrences. For example, on average, when one has a main course with poultry, white wine generally best complements the meal. However, in the case of turkey, some red wines go very nicely. Further, in organizational settings, rules constitute negotiated settlements, often with neither of two sides happy with the resultant rules.

As a consequence, there has arisen a desire to explore forms of capturing expertise and intelligence, other than through rules. One such approach is referred to as case-based reasoning.

Case-based reasoning involves the process of making decisions based directly on what has happened in the past, rather than on a generalized set of rules. Previous cases or plans are stored for use in solving further problems. In addition, the approaches used to adapt those plans to work in different decision-making situations also are saved. By making previous solutions available, decision makers can anticipate relevant variables. Past mistakes can be avoided and previous shortcuts can be used. As noted by one developer of case-based planning systems —

The ideas behind case-based planning rise out of the simple principle: If it worked, use it again; and a corollary, If it works, don't worry about it. The refinements come out of a second and equally simple principle: If it didn't work, remember not to do it again; to which is added, If it doesn't work, fix it.

Generally, cases are appropriate for those situations where explanation is achieved through examples or where the domain problem is precedence-based. Cases are useful where there are many exceptions to the rules or where seemingly contradictory rules are present for a given situation. In addition, they are useful in those situations where new solutions can be constructed from altering previous solutions.

At the most basic level, a case-based system must rely on performing the following different actions. First, the cases themselves must be chosen. Typically, this requires a data base of cases — for example, court cases — or an expert to assist in the generation and choice of cases for the system. Second, the case based representation must be chosen. Key elements are

determined so that the data can be organized to meet the demands placed on it. In terms of implementation, this means that the cases are indexed or some other structure is used to organize the cases. Third, there must be an inference decision-making process that allows the system to either suggest modifications in existing cases or combine multiple cases to develop an alternative solution.

Case-based systems have potential applications for a number of areas in accounting, auditing, and tax. The area of accounting regulation is heavily case-based. Typically, previous court cases and other examples of financial reporting guide decisions in the area of accounting regulation. In an application of general ledger validity tests, the cases used as the domain are previous transactions that were examined and determined to be valid. By reviewing past transactions, the validity of the new transactions can be determined. In business, examples of case-based reasoning include Point of Sale (P.O.S.) credit approval and telephone credit card charges. A pattern of phone charges exists for each telephone customer. Drastic changes in the calling pattern (i.e. 20 international calls in a 15 minute span) could be a warning of a stolen card. The same reasoning could be applied to any P.O.S. consumer credit approval. For some further discussion and applications, you may want to consult:

D. O'Leary, "Case-Based Reasoning and Multiple Agent Systems for Accounting Regulation," *International Journal of Intelligent Systems in Accounting, Finance and Management*, Volume 1, No. 1, 1992.

Editor's Note: D. O'Leary is also the author of a research report entitled "Audit and Security Issues with Expert Systems," which is available to Information Technology Section members, free of charge. Please call the IT Section at (212) 596-6010, for a copy.

IT

continued from page 7
on the disk.

This defragmentation process accomplishes a number of things. First, a defragmented file typically loads faster because DOS and the hard drive do not have to search multiple places to find all the fragments. This faster loading is especially true for applications that tend to sequentially load entire files into memory at once, such as spreadsheet and word processing applications.

Second, the defragmenters can optionally move certain types of files such as .COM and .EXE to the front of the file allocation table (FAT) so that they can be found, and therefore loaded, faster.

Finally, the defragmenter typically sorts all directories into the order specified by the user (by file name, creation date, extension, etc.) so that files are easier to find.

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