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Software choices for in-house databases

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Many software packages are now available to help you create an in-house database on your microcomputer. The capabilities, costs, and complexities of these packages vary greatly. Because they vary so widely and because different packages are better suited for different things, it is useful to categorize the packages by general characteristics. These categories describe typical features and general strengths of the software, but sometimes a package does not neatly fit every characteristic of a category. The categories should therefore be considered indicative, not exact.

Software for in-house databases can be divided first into two broad types: 1) general purpose database software, and 2) special purpose database software. These two categories can be subdivided further. Under general purpose software we include text retrieval packages, file managers, and database management systems (DBMS). Under special purpose are information storage and retrieval packages, integrated bibliographic systems, and library applications. Each type of software is particularly appropriate in different situations.

GENERAL PURPOSE DATABASE SOFTWARE

General purpose packages were not designed explicitly for the textual types of databases we as information professionals usually think of when we think of databases or files. They instead were designed for a wide market from business to home use to libraries. Packages of this type have been used for a variety of applications such as inventory files, personnel files, recipe files, name/address files, and bibliographic files.

General purpose packages are usually sold through microcomputer stores or mail order software distributors at discounted prices. They are frequently less expensive than the special purpose packages because they have such a wide market. Because of this marketing and distribution arrangement, producers of general purpose packages typically do not offer installation or support services. On the other hand, national and local user groups exist for many of the widely used general purpose database packages. Finding knowledgeable lay people who are using a package can often be of more help than telephone support services from the producer. Also, for the widely used packages, there may be books that describe how to design and build databases using the package.

Text Retrieval Packages

All of the software discussed in this article stores and retrieves textual information. What we categorize as "text retrieval" are packages that are designed to deal with unstructured text instead of (or in addition to) information that is structured into fields. A common use of text retrieval packages is for control of word processing files. Word processing files may include many different types of records such as letters, memos, reports, or technical papers. Each document type has very different characteristics and structure. It would be difficult and time-consuming to impose some sort of consistent field structure on such documents in order to search and retrieve information from them.

Another possible use of text retrieval packages is to provide retrieval from files that were created by downloading records from several different databases and different online services. These files would typically contain several different structures, different field tags, and different field contents. If you do not want to take the time to edit downloaded records for consistency and compatibility, a text retrieval package will allow you to search and retrieve entire records.

Text retrieval packages allow varying information types to be stored and retrieved without imposing structure or adding subject index terms or abstracts. Each document is treated as a single piece of text and searched based on word occurrence. Powerful search capabilities are usually supported, but lack of structure means you cannot customize output. Unless there is a "cut and paste" capability, each entire retrieved document must be output just as it is input.

ZyINDEX, TEXTBANK, and SearchExpress are typical text retrieval packages that have been used successfully for a variety of applications. All deal with any ASCII text; ZyINDEX can also handle the non-ASCII formats created by several popular word processing programs. All offer powerful search features such as nested Boolean operations, word proximity, truncation, and set building. In addition to these standard search capabilities, each package has some unique features.

ZyINDEX treats each document as a file, meaning that you do not need to recopy word processing documents into a single file to be able to search them with ZyINDEX. This gives you search capabilities with a minimum of preprocessing. ZyINDEX also allows portions of the text to be marked and saved in a separate file, making it a good choice if you are planning to create new documents with selected parts of old.

TEXTBANK uses "zones" to impose some of the advantages of structure on unstructured text. Zones are defined by the user and may be any logical portion of a document (tables, lines, sentences, paragraphs, sections, chapters, etc.). Sub-zones within larger zones may be defined (such as a paragraph within a section). Retrieved documents are displayed by the zone specified. (Some special character or sequence of characters must be input to define a zone, requiring a certain amount of preprocessing when you set up the TEXTBANK database.) In addition to standard search features, TEXTBANK offers zone proximity or word proximity and "Macro term" definition which allows you to search for all words defined as synonymous (e.g., water -river or stream or lake or canal or water).

SearchExpress offers searching for similar documents (displayed in order by degree of similarity), searching for associated documents using user-created links, and user-assigned weights to terms. SearchExpress reduces overhead, but increases the likelihood of false drops because the program automatically strips suffixes from words when they are machine indexed. (Thus compute, computer, computers, and computing are all considered equivalent in SearchExpress.)

File Managers

File managers, or "flat file managers" support a single file at a time, usually with a single type of record structure. As a group, file manager packages can be characterized as easy to use, but with fairly limited search capabilities. They may not offer powerful search features such as proximity searching, nested Boolean logic, set building, etc. They may have computational capabilities. File managers often have restrictions on field length, number of fields per record, number of values per field, and number of records per file. They work well with simple applications such as name and address files or inventory files.

The cost and capabilities of file manager programs vary greatly, and there are hundreds on the market varying in price from free to many hundreds of dollars. On the average, the prices of file managers tend to be less than other types of software used for in-house databases. Because they are in such widespread use in offices, are simple to use, and are frequently inexpensive, it makes sense to look at some file manager programs if your database is relatively small and your needs are simple and straightforward. Some file managers are better suited than others for textual databases. Some of these are briefly summarized below.

Simple File Managers

Q & A and PFS Professional File both support large databases with generous field lengths. Standard mathematical calculations can be done within or across fields and new fields can be derived from the results.

An especially interesting feature of Q & A is its Intelligent Assistant, an artificial intelligence-like search interface. Using the Intelligent Assistant, the database designer can specify synonymous words to designate the file (e.g., database, Books Databank, etc.), the search process (e.g., retrieve, search, find, locate, etc.), the records (e.g., documents, articles, information), the fields in each record (e.g., author, writers, creators), and for data elements (e.g., OSHA, Occupational Safety and Health Administration). The users can then use any of the words in a query, entering such things as find me all documents in the Books Databank that were created by OSHA. Alternatively, retrieve records with the author of Occupational Safety and Health Administration will work as well. This allows for users with different levels of experience, giving them the power of natural language interaction.

PFS Professional File is a widely used program that combines the earlier programs of PFS: File and PFS: Report. PFS First Choice is an even simpler version of the integrated package. All of the PFS programs are easy to use, and even an inexperienced user can set up and create a simple database in a few hours. A limiting factor of PFS is that only the first field in each record is indexed and the others are searched sequentially. This feature saves indexing overhead, but will slow down search and retrieval time for all but very small databases.

Hybrid File Managers

As mentioned earlier, it is not always easy to place a package exactly into a single category. DayFlo TRACKER and Ask Sam contain many of the characteristics of text retrieval packages as well as file manager packages. DayFlo TRACKER stores and retrieves a mixture of structured and unstructured text within a single file. Records with varying structures such as bibliographic citations, memos, letters are all stored in the same file with variable length fields up to 32,000 characters. A basic word processor and a report generator are included.

AskSam is a powerful package with many interesting features. It is becoming popular for a variety of applications, because it has many capabilities beyond the easy-to-learn basic functions. AskSam deals with unstructured or structured text. Up to ten templates to define fields may be created for each file, but additional fields can be added to any record during data entry. Fields may repeat and their order may vary from record to record. Records can be any size.

AskSam recognizes numbers, dates, and telephone numbers and can use these to do calculations, calendar functions, and automatic phone dialing. Other search features include: Boolean logic (without nesting parentheses), comparison operations, truncation, and proximity searching. A programming language allows queries and commands to be saved for later execution. A new hypertext capability in Version 4.0 of askSam promises capabilities of linking records.

Database Management Systems (DBMS)

Database Management Systems are defined as software packages that allow multiple files to be used simultaneously. This offers advantages when the same data is needed for more than one application, but when the applications are different enough to warrant keeping some information separately. DBMS also typically include computational capabilities. A good application for a DBMS package might be in an organization that keeps related but independent files such as a teacher file and a student file. These two files might both be used in a class scheduling file. Each application may need certain information in common but will use the information for different purposes. The information in common needs to be kept only once with links in the applications files that allow the data to be retrieved when it is needed.

Most DBMS packages include a programming language that allows custom design of applications. Frequently, programming is required to make even a simple application work, and time to learn the language and develop the programs is a must. Once mastered, the flexibility and capabilities offered by programming is a big advantage of the DBMS packages. Another advantage of the most popular programs such as dBASE III PLUS is that there are user groups, knowledgeable users, practical textbooks, and dBASE programs available to help you. Programs for applications similar to yours may already exist and you may be able to merely copy and use them.

The power offered by DBMS packages varies. Like file managers, not all DBMS are suitable for textual database applications. Some of the most popular packages that work well for in-house databases are listed in Table I and summarized below.

Fixed Length DBMS

Paradox, dBASE III PLUS, and R:BASE System V all use fixed length fields and are similar in their basic capabilities and limitations. They are all relational database management systems that support linking of multiple files. Fixed length fields mean wasted storage space and limitations on records and field size; response time with very large databases may be slow. It takes time to learn all of the features and functions for these three packages, but once learned their programming languages offer much power for customizing applications.

All of these packages have a menu interface that allows simple databases to be designed with little effort. Paradox and R:BASE offer natural language interfaces that are easy to use.

Variable Length DBMS

Variable length DBMS overcome the wasted storage space and field length limitations of the three packages above. Revelation is one such package that looks promising for textual database applications.

Revelation can deal with variable length fields and records, has no limit on file size, and allows up to 6000 simultaneous files. It includes extremely powerful retrieval capabilities and a programming language for customized applications. Revelation is a complex program, however, with few supporting materials. It will not be easy to get an application up and functioning on Revelation. Probably because of its complexity, Revelation has yet to live up to its promise of widespread use for textual databases.

(Advanced Revelation is just out (see Software Pick of the Month in May 1988 ONLINE, and is a totally redesigned product, not simply an upgrade. It is supposed to be more user-friendly, as well as more powerful. -Nancy Garman)

SPECIAL PURPOSE SOFTWARE

Special purpose packages generally have a smaller target audience than general purpose packages and frequently are more expensive. They are typically purchased directly from their producer or an authorized distributor, and more hand-holding at the implementation stage can be expected. Because the market for these packages is limited you will not find books about them at your local computer store, but the database and library literature frequently feature articles about them. Information Storage and Retrieval Programs

Information Storage and Retrieval (IS&R) packages were designed to emulate the powerful search capabilities of the major online systems such as DIALOG, LEXIS/NEXIS, or BRS. They are often the best choice for large structured textual databases (such as typical bibliographic databases) that need sophisticated search and retrieval features but do not need computational capabilities or linking of files. They are usually of the flat file manager type.

Most IS&R packages create inverted indexes to allow searching of large databases with reasonable response times. They typically allow all fields or a selection of fields to be indexed. The database creator specifies each field, its characteristics, and whether or not it should be indexed. The overhead required for the indexes varies, but is often over 100%.

IS&R packages offer a variety of search features, typically including: Boolean logic with nesting, truncation, proximity searching, set building, range searching. They frequently offer a choice of output formats, but report writing capabilities vary. Because these packages were designed specifically for textual databases, they usually have variable length fields, few restrictions on field or record

length, and accommodate repeating values in a field.

Packages under \$1000

INMAGIC and Personal Librarian, both IS&R packages priced under \$1000, are quite different in their strengths and weaknesses. INMAGIC offers power and flexibility in the database design process and in report generation. Fields may be designated as word indexed, phrase indexed, or both. This adds power to controlled vocabulary fields by allowing subject headings to be searched as complete bound phrases or as individual words within the subject headings. Field and file size are unlimited, and fields may be repeated any number of times in a file.

INMAGIC allows nested Boolean operations, truncation, and set building, plus it can calculate numerical fields in formatted reports. Records in INMAGIC files may be output in any specified bibliographic style, in card catalog format, or in a format for input into another database or online catalog. The system is menu or command-driven, and pre-defined database models or report designs are available in a companion package called 'BiblioGuide: Using

INMAGIC in Libraries.

Personal Librarian (formerly called SIRE) offers unique and powerful search capabilities, but limited editing and printing features. A new version should be available by mid-1988. Personal Librarian is ideally suited to situations where ease in searching is required, and search results are needed on the screen but long bibliographies will not be printed. A good setting for a Personal Librarian database might be a school library or for personal file management.

Personal Librarian's search features include nested Boolean queries, comparison operations, truncation, inverted index browsing, and set building. In addition, Personal Librarian has several search features that make it a very friendly system for novice users. Personal Librarian allows natural language input by looking for the meaningful words in any input string. (e.g., find me articles about dogs will look for documents that have the word dog or dogs. It will also look for documents with the word article or articles and the words find, me, and about if they are not designated as stopwords.) When a search is completed, the system displays a bar chart that shows the number of documents meeting the search request and their likelihood of relevance based on the number of times the search words occur in the documents. Records are displayed in rank order by word occurrence. When a user retrieves a document he believes is relevant, Personal Librarian can find other documents that have the same word occurrence patterns by using the relevant document as an input query.

Searching is Personal Librarian's strong point; the system has virtually no input or report generating features. Files must be defined and input with a word processing program. Output has one format (full record with field tags), if you want to alter that you must transfer records to a word processing program and edit them there. IS&R Packages Over \$1000

BRS/SEARCH for micros and STAR are two packages that operate on multiple-user highend microcomputers, not on the simple single user personal computer and that most of the packages discussed here do. They might not even be considered in the same class as most of the other packages mentioned in this article because their hardware requirements, complexity, power, and expense make these packages feasible only for fairly large databases with multiple users. Automation of all of a special library's collections or bibliographic files of many thousands of records that will be accessed by many users in an organization are likely applications for either BRS/SEARCH or STAR.

BRS/SEARCH runs under the UNIX operating system and requires a database administrator who is familiar with UNIX. The software is virtually identical to the full BRS online system, so may be a good choice for users who already search BRS. STAR is sold as a turnkey hardware-software system using the Alpha microcomputer with the AMOS operating system. It allows over 1000 files each of which can total over 250 million characters. In addition, it has extremely generous field and record lengths.

Like BRS/SEARCH and STAR, CAIRS is a powerful system with many special features that is suitable for large files. CAIRS operates on single user microcomputers but can be networked and also offers the possibility of upward migration to minicomputers or mainframes. An especially nice feature is the thesaurus module that lets the thesaurus be automatically invoked in searching. CAIRS is not easy to learn and its search interface can be confusing. Although it is not quite as powerful as BRS/SEARCH and STAR, CAIRS is also most appropriate for larger files that require extensive searching power and special features (such as the thesaurus) available only on this scale.

Integrated Bibliographic Packages

Integrated Bibliographic Packages provide several different functions of database creation and management: online searching, file management, and bibliographic formatting. Each function is typically sold as a module that can be used alone or together with the other modules for a complete system.

These packages are marketed primarily to individuals for creation and maintenance of bibliographic files for personal reprint collections. There may be file size restrictions, but these packages generally offer powerful search features. The bibliography report modules will format records according to many standard bibliographic styles such as ANSI, University of Chicago, Modern Language Association, etc. or allow users to create customized bibliographic styles. Each of the packages mentioned here also has an online searching and/or downloading module to allow record transfer from publicly available online databases. Integrated bibliographic systems are ideal candidates for researchers who use online databases to help create personal bibliographic files, and who later want to create printed bibliographies for their own writing.

Sci-Mate and Searcher's Toolkit

The Sci-Mate software system of the Institute for Scientific Information and Personal Bibliographic Software's "Searcher's Toolkit" are the two most complete integrated bibliographic packages. Sci-Mate has three parts: the Searcher, the Manager, and the Editor. The Manager module provides menu-driven access to in-house files with up to 20 fields per record. The Searcher is a front end communications package for searching commercially available database systems (DIALOG, BRS, MEDLARS, Quester). It allows downloading of search results for transfer to an in-house Manager file. The Editor takes records from the Manager and formats them according to several major bibliographic citation style sheets.

Setting up a file, entering records, and searching in a file are all very easy with the SciMate Manager. Searching features include Boolean logic and truncation, but set building, comparison operations, range searching, and other powerful search features are not available. There is no password security and retrieved records may always be edited or deleted, making Sci-Mate inappropriate for many library in-house databases.

Like the Sci-Mate software system, the "Searcher's Toolkit" is a three-part package that offers several types of database access and control. Front end communications to commercial databases is handled by Pro-Search; converting downloaded records into a format for inhouse databases requires one or more of the Biblio-Links packages (BRS, DIALOG, MEDLARS, OCLC, RLIN, or customized); and ProCite handles in-house database management and bibliography generation. The parts can be purchased alone or together.

Pro-Cite is a natural selection for personal file management or creation of files from downloaded citations. Its formatting features allow bibliographic citations to be formatted in several standard styles or in a user defined format. Because different workforms (record structures) can be used in a single file it is a good choice when a file includes different types of documents (such as books, articles, films, etc).

Pro-Cite offers many search features including: nested term Boolean logic, truncation, set building, comparison operations, and index browsing. Other features include eliminating duplicate records, sorting, and merging files. The Pro-Cite menu interface is easy to use.

Other integrated bibliographic packages include Notebook II, Reference Manager, and Finder. Notebook II has three parts: a file manager, a bibliography generator, and Convert for converting records downloaded from BRS, DIALOG, Knowledge Index, or MEDLARS. The search features on the file manager are somewhat limited and, since all searching is done sequentially, response time for larger files maybe slow. Reference Manager was designed for biomedical scientists who will download bibliographic records from the major biomedical databases using a companion program called Capture. For those special applications, Reference Manager works well, but if you download records from other databases or systems not anticipated by the Reference Manager creators you must reformat your downloaded records. Finder, a file manager program, works with FinderLink and PR to edit and transfer downloaded records into Finder format.

Library Automation Packages

Most of the packages that are categorized as library automation packages are less flexible than packages in the other categories because they were designed for specific functions. They may have predefined field labels and lengths, fewer search capabilities, and fewer options for report generation. Some library automation packages offer more flexibility than others. Although these packages are outside the main focus of this article, here are two packages that are representative of the more flexible microcomputer library automation packages.

Mandarin integrates cataloging, online public access catalog(OPAC), and circulation functions. Record definition is flexible with variable length fields. The database designer decides which fields to index and whether they will be word or phrase indexed. Search features on Mandarin include Boolean operations, but without nesting. Set building, truncation, and comparison operations are supported.

TINman could be categorized under DBMS because it is a relational database management system that allows an unlimited number of multiple files to be linked. It is marketed to a more specialized market, however, more typical of the special purpose packages. TINman is especially suited to textual databases because it has variable length fields and no limits on record or field size.

TINman supports many search features including: Boolean operations with nesting, truncation, proximity operations, set building, range searching, and inverted index browsing. A navigation search takes parts of a retrieved relevant document to form another search query. Thesaurus management and report generation are also a part of TINman.

TINlib is a library application package available for TINman. It includes OPAC, circulation, acquisitions, serials control, and management. Together they offer a powerful applications package for all functions in a library.

TABLE I

SELECTED SOFTWARE PACKAGES FOR IN-HOUSE DATABASES

General Purpose Packages

Text Retrieval

SearchExpress Executive Technologies, Inc. 1075 13th Street South Birmingham, AL 35205 205/934-9130

TEXTBANK

Group L Corporal ion 481 Carlisle Drive Herndon, VA 22070 703/47 1 -0030

ZyINDEX Zylab Corporation 233 E. Erie Street Chicago, IL 60611 312/642-2201

DBMS

dBASE III PLUS Ashton-Tate 10150 W. Jefferson Boulevard Culver City, CA 90230 213/204-5570

R:BASE System V MicroRim Inc. 3380 146th Place SE Bellevue, WA 98007 206/641-6619

Paradox Ansa Software 1301 Shoreway Road Belmont, CA 94002 415/595-4469

Revelation Cosmos, Inc. 1346 14th Avenue PO Box 1237 Longview, WA 98632 206/423-0763

File Managers

O&A

Symantec Corporation 10201 Torre Avenue Cupertino, CA 95014 408/253-9600

PFS Professional File Software Publishing Corp. 1901 Landings Drive Mountain View, CA 94043 415/962-8910

askSam

Seaside Software PO Box 31 Perry, FL 32347 800/3-asksam DayFlo TRACKER DayFlo Software 17701 Mitchell Avenue North Irvine, CA 92714 714/474-1364

Special Purpose Packages Information Storage and Retrieval

INMAGIC

InMagic Inc 2067 Massachusetts Ave Cambridge, MA 02140 617/661-8124

Personal Librarian

Cucumber Information Systems 5611 Kraft Drive Rockville, MD 20852 301/984-3539

CAIRS

Information/Documentation, Inc. Box 17109, Dulles International Airport Washington, DC 20041 800/336-0800

STAR

Cuadra Associates, Inc. 2001 Wilshire Boulevard, Suite 305 Santa Monica, CA 90403 213/829-9972

BRS/SEARCH for- Micros

BRS Software Group 1200 Route 7 Latham, NY 12100 800/833-4707

Integrated Bibliographic Systems

Notebook II with Bibliography

Pro/Tem Software, Inc.

2363 Boulevard Circle, Suite 8 Walnut Creek, CA 94595 800/826-2222

Reference Manager

Research Information Systems Inc. 1991 Village Park Way, Suite 206 Encinitas, CA 92024 619/753-3914

FINDER and FINDERlink

Finder Information Tools, Inc. 1430 W. Peachtree Street Atlanta, GA 30309 404/872-3488

Pro-Cite, Biblio-Links, and Pro-Search

Personal Bibliographic Software, Inc. 412 Longshore Ann Arbor, MI 48105 313/996-1580

Sci-Mate Software System

Institute for Scientific Information Sci-Mate Customer Services 3501 Market Street Philadelphia, PA 19104 800/523-4092

Library Automation

Mandarin

Media Flex Inc. PO Box 1107 Champlain, NY 12919 518/298-2970

TINman, TINlib

Information Management and

Engineering Ltd. 14-16 Farringdon Lane London EC IR 3AU England +44(0)1 253 1177

DATABASE SOFTWARE: CHOOSE WITH CARE

by Paula J. Hane

Editor, SOFT Online, Inc.

Editor's Note: As part of a major upgrade for Online, Inc's online software database, SOFT on BRS, Paula was responsible for choosing new database management software for the file. Here are some of her tips.

First, re-read Edward Kazlauskas' article in DATABASE, December 1987, and do your planning. Read comparisons of programs to get ideas of packages and possible features. The article on text-oriented database software in the October 27, 1987 issue of PC Magazine is a good example. In fact, read as much as you possibly can about the programs you are considering.

Call the software producers and ask for full product information. Get your hands on a demo disk; some are free, others are very inexpensive. Some demos are full versions of a program with a limitation on the number of records the trial database will hold. Whatever the demo format or cost, it's well worth it. I quickly eliminated several programs after trying the demos, and saved a lot of money and time.

Don't be afraid to call the software producers, especially their technical people and ask very specific questions. I did, and found them very willing to help, and their answers worth the effort.

Here are some questions and problems I encountered:

- * If a program says fields are optional, but you need to be able to search on a field, find out how the fields are defined. One program needed "[" placed at the beginning of each field, and "]" at the end when the field was more than one line long. The program I finally chose didn't require special characters to identify fields.

- * Can text be edited within the program or must it be exported and then edited in a word processor? Is the export/import process smooth enough to be workable for your needs?

- * Will you need to make global changes within a file? One program claimed to have this feature, but wouldn't work when what I wanted to insert was larger than the text it replaced.

- * The size of the file does matter. When asking questions, tell the software people its estimated size. (I had an existing 10MB file.)

- * How long does it take to import an existing file? (10MB would have required six days with one program! The program I used took about 12 hours.)

- * How much overhead space is required for indexes? (One program required 2 1/2 to 4 times the size of the original file.)

- * How fast is the searching speed? Indicate the hardware that will be used. How easy is it to do the type of searches you will want to do?

- * What kind of reporting or output will you need, and how easy is it? Can you get output "on the fly," or does all output require laborious composition? Can you easily page through full records if that is important?

- * Does it use an intuitive natural language or a programming-type language with a syntax of its own? Are you willing to master a complex report capability? For instance, sending the results of a search to the printer differed enormously in packages I considered. One program I eliminated required an insanely long command string with a complex syntax, specifying margins and columns. The program I am now using needs four words to send output to the printer. On the other hand, I gave up a great deal of flexibility in formatting the output.

A big lesson I learned is that there may not be a "perfect program." Study your options enough to be aware of the advantages and the trade-offs before making your final choice.

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