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SETTING UP THE LNS LIBRARY MANAGEMENT SYSTEM

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Abstract

An information library system designed to operate in the physics research environment is described. It is a computer based bibliographic management program with a variety of library functions. It allows to easily create and maintain a database containing tens of thousands of entries, retrieve reference and prepare bibliographies. Financial benefits are finally discussed.

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Preface

Through the application of computer and communication technology libraries have developed new services and reduced barriers to access and use. Remote access to on-line catalogs allow researchers to consult the record of the library's holdings without coming to the library. The automation of library operations, electronic information sources, the need for information management and service resources are a few examples of the range of developments in information and library work.

The availability of local databases means the researchers can more easily learn of research results as they are reported in the journal literature. While these developments represent important improvements, new approaches are needed to allow researchers to make more efficient use of the published records and to support channels of information.

The LNS library automation project was initiated during 1994 with the overall goal to design and implement a document catalog that serves the information needs of the research community better than the traditional catalogs we know. The goals for the automating project are:

- run the library more efficiently and provide better control over library holdings
- increase the use of library resource and services
- provide more complete and timely information for the researchers.

The primary task of the library is to support the scientific research community activities of LNS, by helping to deliver information more quickly and efficiently for a rapid dissemination of the research done worldwide. The LNS library serves the researchers working at the Laboratories and scientists from foreign research institutes.

As the researcher and information professional often encounter difficulties in using retrieval systems, I tried to avoid the need to memorize command syntax and to type commands. to in order to easily perform retrieval operation.

Compared to traditional databases LNS library system contains more and different information. Bibliographic descriptions can be extended and information like, contents, abstracts, keywords, promoter are also part of the database.

The possibility for the user to navigate in the database is very important in order to identify and recognize what is essential instead of having to describe it explicitly. To do this the user is offered paths and ordered set of links and other graphic illustration tools to locate references soon.

It is extremely easy to use and the intuitive nature of the program along with the help facilities make it possible for new users to begin working in a few minutes. The system design should result user friendly, flexible, easy to modify and capable of connecting to others network.

At the end of an analysis of automation system for library available on the market, I realized that the better and cheaper solution along with the relative merits of maintaining databases in house, was to develop an home made system with the enormous possibility to solve out our specific needs allowing enormous financial savings.

1 Automating Information Center

1.1 The new role of the electronic library

For some twenty years now the world of information communications and publishing has been preparing itself for a new era of technological advances, so that all the traditional information world have to adapt to new techniques.
With the advent of the information age, libraries and information centers were introduced to technologies which had already affected other social activities. The electronic revolution of the last decades has provided the indispensable tools for effective manipulation and dissemination of information and knowledge. It has also created a range of new electronic products. Microcomputers, gateways, CD-ROM, electronic mail, electronic journals, ISDN, artificial intelligence, hypertext, Internet, WWW all are now part of current vocabulary.
Gateways provide a way to access the world of digital information by removing barriers to compute telecommunications moving the library beyond its institutional walls. These links to remote holdings offer many benefits. An end user connected to such a system can initiate a link command that supports connectivity to a remote computing system over the Internet.
Information today permeates all levels and spheres of activities. The value of information is directly correlated to the ease with which it can be made available.
Libraries are institutions whose primary purpose is to collect and make available to users all kinds of information and documents since they are one the major intermediaries for science, technology and education.
As the rapid progress in research has shortened the life cycle of the information, libraries have to confront the problem of a growing variety of publications and make it immediately available to the scientific community, coping with an exponential growth in the number of items and a shrinking life of information spread.
Current users may judge us on the ability to delivery information promptly. To achieve this we must invest in the library's cataloguing process by automating the library system.
Recently libraries are becoming a place to accommodate dynamic multimedia information and providing living information. Making electronic multimedia information will mean that many types of publication can be easily and instantaneously accessible. Living information means the provision of facilities to support the creation of virtual libraries, for instance the ability to

browse around a library system without having to go to it physically. Computer systems give not only administrative resource but represent a tool for accessing a wide range of electronic publications. "Virtual library" will be the next step in which all the information that it contains will be only in a digital forms.

1.2 Planning for information technology

Throughout the history libraries, regarded as depositories of information resource, have played many important roles within the knowledge archival, information retrieval. The process initiated by the information revolution during the last decades is accelerating so that the modernization and improved performance has to be achieved through a more efficient use and control of resources. If libraries can no longer provide efficiently the services and play a major role in the information society, in the end they are condemned to work only as depository room

Of course there are many reasons for wanting to introduce and use new technology in libraries, for example to improve the quality of the services and drastically reduce the need of repetitive actions. Basically the motivation for wanting to apply new technologies to library system comes from the need to easily spread the knowledge, use resources more friendly and alleviate the library job.

For libraries, information technology is a crucial consideration. It changes the nature of staff activity and has important implications for operational and management processes as acquisition, processing, storage and dissemination of information.

Introduction of Information Technology into the library brings an increase in the range of skill, activities, products and outputs. Automation is particularly appropriate because, by providing instant feedback, the library becomes a research environment. Contrast the ease and immediacy of automated searches with the slow, painful process of using a manual card catalogue. Using the card catalogue not only means searching for various cards but also searching and waiting for card drawers that are being used by other people.

As every cross reference requires a new search, with manual system, after finding the cards it is necessary to copy the information by hand. In contrast an automated system can immediately print a list of the books, including full bibliographic information. The list can even be saved as a text file and can be used with a word processing program. With a manual system it is necessary to search the shelves to see which titles are currently available.

All the operational processes of libraries involve a vast number of routine transactions for example books are issued, returned, reserved, become overdue are ideally suited to automation Circulation control systems, cataloguing processes, systems for the ordering and acquisitions of stock and for serials control can all be automated in order to improve efficiency and productivity. Records are no longer duplicate and staff are free from manual paper based library

work. The fundamental skills needed to successfully carry out and manage a library automation system in support of library functions are the circulation control, acquisitions, serials control, and loans.

Besides the obvious benefits of increased efficiency and productivity in automating check-in and check-out, the collection becomes more active. The library can easily track circulation activity and collection usage.

In addition basic software packages database, word processing, spreadsheets can be used in the library office. Information technology can speed up routine processes, wide the choice of available information sources and services and make library services more accessible.

Information Technology can also widen the points and methods of access to the library. For disabled people technology gives them the opportunity to use a service. Instead of having to physically visit the room, using electronic networking they can link to the library. Information Technology produces fundamental change on the organizational structure of a library and can place it in a web of electronic connections with other libraries, information sources and services, suppliers and library users.

2. Bibliographic Information Retrieval

2.1 Highlights of cataloguing and classification

The arrangements of materials in libraries is based on subject grouping of books. General libraries that cover all subject field follow the Decimal Classification of Melvil Dewey, the Universal Decimal Classification or the Library of Congress classification. In the specialist library the collection might be arranged by one of the specialist subject classification.

The bibliographic classification scheme designed by Melvil Dewey, in the last century, is one of the great traditional classification schemes used in libraries. It offered for the first time the ability to arrange books in a subject order. Dewey's concept of relative location, assigning a decimal notation to the items themselves and having the catalogue refer to the notation on the book rather than a number on the shelf was revolutionary. The very simplicity of the scheme caused its popularity. Dewey divided the whole knowledge into ten main classes and then divided each of these into ten subdivision into ten section.

The Dewey class are a discipline-oriented scheme where each item is put in the main class to which is related through its parent discipline, it is a general classification scheme designed for libraries with collection that include different fields of the knowledge, non allowing the detail and specificity of a specialist area.

The Universal Decimal Classification was designed by two European documentalist, Paul Otlet and Henry Lafontaine. An early change was the dropping of the Dewey decimal convention that

the main classes start in hundreds with subdivision moving down from that. In the UDC each main class is allocated a single Arabic numeral. The Universal Decimal Classification also contains a wide range of other devices that allow further detail and specification is possible to specify if a work is a periodical publication, a conference document. Classifying using UDC is rather more complex as most information units will have more detailed synthesis.

In the field of specialistic classification the American Institute of Physics has realized the Particle Accelerator Classification Scheme whose primary purpose is to produce uniform subject index to the articles published in physics. facilitating the retrieval of books needed to specific field of research.

Catalogue is a retrieval tool that support the physical arrangement of the information by providing alternative access points, containing information about each item, sufficient to choose and identify. Access is provided through different identifiers such as author, title, type of document etc. Author/title catalogues allows to identify whether an item exists in the system that has been written by a particular person or corporate body or has a particular title. It also locates the item we are looking for by showing the location number to be physically retrieved.

Librarians have traditionally regarded the author as the main entry point for users into catalogue The simple principle of intellectual responsibility must not obscure the fact that decisions are to be made over headings in order to assist in some decisions. There are sets of cataloguing rules that librarians have produced as international standards.

There is a second group problems involved in providing author title catalogues. These are decisions about the forms of name that need to be used in the catalogue for authors, corporate bodies titles. These difficulties over variant forms of name are a jungle of conflicting problems, which can result in a user entering the system with a precise name and being unable to link it with the item in the system.

The main and added entries in catalogues will result in different forms of names, such as personal names; corporate bodies, including governments, institutions and other organizations that are responsible for the content of the work. Titles of reports, monographs, books, series which have be entered in the system either as added entries or main entries.

Most people have a recognizable surname ease to file. However a number of difficulties emerge in this area (compound surnames such as double barreled or hyphenated surnames, prefixes, titles of nobility).

The basic rules and principles for producing headings and physical descriptions of an item have been evolved by librarians through the world. This process was speed up by the introduction of computers databases as information about books and documents could be disseminated around the world. The result of this process is an International Standard Bibliographic Description (ISBD) for allowing libraries to have the fullest amount of information. This reduces confusion and allow users to move towards a uniform structure of the information.

Most corporate names and institutions, as with personal names, represent a range of difficulties. The solution to most of these problems will be pragmatic response which will match the particular requirements of the users.

However problems arise since a body can have a number of different names due to different languages or names changing over times. The pragmatic solution to this difficulty will be to use the form of name adopted by the body itself in their publications. Many corporate bodies are subordinate to some larger parent organization. This causes some conflict in deciding whether an item is to be entered under the name of subordinate body or the name of parent body.

Problems of uniqueness are fairly simple, with a solution which allows the cataloguer to enter a work under the name or the corporate body that appears on the title page of the document unless the heading that results is not sufficiently unique.

Titles will exist as main entries in the system for items that have no person or corporate responsible for their intellectual content. Alternatively titles will be used as main entries for those works which have several people responsible for their intellectual content. Therefore from the very beginning a catalogue must build in a reference structure to allow users to be led from the name they have looked up to the name that has been chosen by the cataloguer.

Having identified the role of a catalogue as a tool that allows users to choose particular items, it is important to underline that there are certain key elements about the physical production of a document that are relevant to a search.

These elements are the edition, the name of the editor, the place of publication, the publisher, the date of publication, a brief statement on length and format, and any special notes that need to be added. Obviously not all of these elements will be essential for every item in the system but all of them add something to the searcher's ability to choose an item from the retrieval system.

The place of publication is often the only indication of the possible geographical bias of a document. The name of the publisher is included because it gives valuable information about the quality and standing of the item and will also tell searchers where to get hold of replacement or duplicate copies. The date of publication is an absolutely fundamental piece of information which ought never to be omitted, along with an overseas place of publications it gives evidence about the value of the item.

For many information retrieval systems the information given about each item after the heading is the basic description that allow the item to be located within the information unit or acquired elsewhere. Sometimes the bibliographic description is insufficient to decide the relevance of the searching process.

In this contest the role of an abstract is essential in order to know more about the document. Abstracting can be done for particular user groups or subject areas. The task of abstracting is expensive and require a fair degree of skill to summarize or recognize the relative section. The

growth in on-line bibliographic databases has meant that the abstract has become a very essential part of information retrieval systems.

2.2 Finding and sorting information

The primary mission of the library is to support the research by helping to deliver information quickly and efficiently. The library system is a source of information about the work done and the available resource. Library materials must be accessible and controllable.
Researcher today are using a variety of method to access information. Once the correct sources has been identified the search process begins. Some researchers do parts of their research by electronically accessing automated library catalogs on the Internet, a network that connects academic computers. It is here that the researcher saves considerable time. In fact it is possible to navigate through the Internet going from library catalog to citation databases.
The test of any automated library system is the easy to use retrieval tools. Users need powerful search capabilities, but they do not want to spend time learning the system so the menus must be clear.
I developed this module with these clear guidelines in mind: can the user browse without using difficult commands and intuitively? Can the user browse a virtual shell, looking at titles in the same order as they appear on the library shelves? Does the system allow searching on combination of fields for instance title, authors, date? The program allows to find all words, date and numbers contained in text field, date field and number field. Searchable fields include author, title, subject, publisher, classification number, publication date and place etc.
If you want to find all the books, available in the library, written by a certain author, you have to set up a *find* command. The find mode is by selecting *find* from the *Select menu,* or by using the keyboard shortcut of *Command-F*. In the find mode all the field are blank ready to enter your request into the wanted field in order to enter any criteria. The results of the search process are shown in the book icon.
In the find status mode there are a number of symbols that can effect the retrieval process in terms of convenience and efficiency.
< (less than) this symbol is used to find records containing a range that is less than the criteria used.
> (greater than) the opposite of the above mentioned command
≤ or ≥ (less than or equal to; greater than or equal to) to include the specified criteria as well as the values that are less or greater than the criteria.
= (exact match) in order to exactly match the criteria in your request with the found records an equal sign has to be used.
... (range) to indicate a range of criteria. It can be also used to find a range of date.

! to find duplicate value within a given field. Useful when weeding out duplicates in a database which should contain only unique value.

" " quotation marks for exact match searching. In the related field an exact match entry limits the result to just the word or phrase specified and exclude entries with additional words in the field. If you omit the quotation marks, the search would also find other titles including the terms entered.

If any records matches the entered criteria a prompt signal is displayed "No records match this request". Before leaving the find mode check you have spelled the request correctly or short the spelling of the word. If you are looking for a date the system will suggest the correct form.

If a new find command is executed or simply a different search criteria is wanted, we can use a *refind* command, located in the *Select* menu with the corresponding keyboard shortcut of *Command-R*. If a request is successfully performed you are automatically returned to the browse mode with only the found records being displayed.

A search can be very simple, based on a single keyword or a phrase in a single field. The user selects the field to be searched from an option menu. When a field is selected the program displays a browsable list of field entries arranged alphabetically. The program responds with one or more bibliographic records for the selected field value.

The system is not case sensitive since field values may be entered in upper, lower or mixed case characters. Sometime a more accurate research has to be carry out on more set of criteria, sometimes it is easier to find what you want by establishing negative criteria that is finding criteria that do not match certain criteria.

The only change from regular request is to make use of the *Omit* box in the status area. The programs will subtracts those records that match the criteria in the *Omit* request. If you may want to narrow the search to exclude many items which do not really interest you or to obtain better results fill in more fields, search on a phrase instead on a single word and limit the time period with start date and end date.

Broadening a search by redefining search criteria to search more broadly if the initial search results were too narrow. Searching more broadly means simplifying the search criteria. Use any of the following techniques; search on fewer fields; delete the entries in some fields to remove some of the limits; broaden the time period searched. You can search by time period for items depending on the time period specified by entering either the starting date or ending date or both dates in any format.

Now I examine the sorting of information with the system. Database are used not only to store information but also to manipulate the information by search routines to sort the records by a common denominator to locate specific information. When the database file is running the program stores the data in the order of entry but when you ask the program to execute a sort

command, the program looks at the index of all the text that it has accumulated and from that index it arranges the records in the order requested.
Say for example you may want to have your library catalog records sorted in the order of authors, as in the traditional card catalogue, or in the order of publishers or in the date of publication. The *sort* command is located under the *select menu* and the keyboard shortcut is Command-S. The sorting command can effect all the field into a hierarchy of order and in an ascending or descending order. All the sorted records will remain sorted until a new record is added or the *Unsorted* command is given.

2.3 Browsing index

Browse if you do not know what to enter in a field, if are looking for keywords search, if you don't know how to spell word, or if you want to know how many time the term occurs in the database. If you are not sure what to enter in a field, browse the index for that field. All fields can be browsed.
The program looks for all records that contain the string specified. You can enter a search items into a field by browsing the index of the field from the list of entries. The index is an alphabetical list of all the values for the selected field that occur in the database, along with the number of times each value occurs. The system automatically maintains an index of every entry in every field of every record. This helps avoid the task of creating an index processing. Of course the index can be accessed to browse and help the retrieval search. The *paste special from the index* from the menu command shows a complete list of all entries in the field currently used. To select terms with keystrokes, use arrow keys to reach desired term, then click the return key to enter the term and start the search.
The view index list contains every world entered in the selected field so when an user needs to correctly enter a name the View Index presents an alphabetized list of all the entries used so far and the only task, in order to avoid and eliminate trouble, is pasting it without typing.

3 Acquisition, Circulation And Networking

3.1 The acquisition module

To support the automation of a modern library and fit the operating environment in the library the system must be feature-rich. These features should be essential capabilities that give the librarian the tools and information to manage an automated library to allow the librarian to utilize all features of the system.

The acquisition policy must be determined in relation to the policy and objectives of the research institution which the library serves.
The acquisition budget determines what is possible to achieve within that policy and the policy itself leads to guidelines for use when selecting materials for the library.
The selection process may be aided by the use of various electronic bibliographic tools and works of reference which help keeping up to date with what material is being published.
The users may suggest books for purchase. When a book is considered for selection the librarian might ask who will use this book; what kind of books support the research. Selection leads naturally on to ordering process.
Buying books can be an expensive process. There is not just the cost of the book itself but there is the cost of ordering it, of verifying when it arrives that is the correct one and of ensuring that it is processed and paid for. The process start with a form which identifies the author, title, publishers, ISBN, imprint information, discount and total amount. When a book arrives in the library it must be matched with a copy of the order to ensure if it is the correct item, then the invoice must be passed for payment and the book for cataloguing and labeling.
Accurate records have to be kept so that wasteful duplication is eliminated and the progress of a book can be traced at all times. It is the manager's responsibility to design procedures that are effective and efficient.
The functions of the acquisitions module allow; acquire materials quickly; avoid unwanted duplication; answer queries from suppliers and users; keep track of items acquired; review unreceived items on order; list newly receive items; organize vendor information.
The acquisition module monitors all acquisition records. It stores data about vendors, lets you know what was ordered, when, for whom, the cost, if and when it arrived. Provide a comprehensive purchasing and service for all aspects of library acquisition, giving an efficient way to track purchasing, fund and budget accounting, track multiple funds and provide reports that show the status of funds and orders.
It can generates claiming and cancellation notices for overdue items, print a variety of preconfigured reports, including lists of items requested for purchase, list of items on order, vendor roster, fund status reports and lists of delivery address.
Searching can be done by different keyword for instance author, title, ISBN, ISSN and order history can be called up for review at any time.

3.2 The circulation menu

An important aspect of the library activity is the ability to track and review information about the usage of the collection. The circulation module tracks the entire library collection, streamlines

check-in and check out operations by allowing the library to manage information loan and control the access to the collection operating a full bookings and reservation service.
It is possible to generate reports database for all users and for individual user to understand and serve the information needs and export usage statistics into any spreadsheet or database management system. It tracks the entire library collection, reducing books losses and improving the collection as the systems alerts about overdue items, too many items checked out, item on reserve. Inventory and statistical reports are printed immediately for checking items never circulated, most circulated, not circulated since a specified date and so on. It controls library materials at all times and can locate a particular item instantly. Handles renewal and eliminates errors through easy to use bar-code system. It provides detailed statistics on use of library materials to assist in effective collection development so that the inventory control takes days instead of weeks by simply barwanding materials.
A full range of issue policies may be created using a matrix of borrower category, borrower status. It provides the following transactions features: registration to set up item and borrower, set length loan limit, register new borrower, issue or discharge loans; reservations reserve items for borrower, place item on reserve; overdue items produce due and overdue list; list see circulation history for item, produce charge out list per user; and compile daily status report
Provided a borrower has an authorization to borrow a book, it becomes essential when a book has to be recalled for any reason that the loan record include a unique identification of the borrower. Since it is quite difficult to fine users who return books late the system generate letters to send out to borrowers indicating that their books are overdue.
The reservation procedure can provide useful feedback on the use of items which might lead to a change of availability of particular books either by duplication or by shortening the loan period, as well as providing means of recalling desired items.
The system display upon request statistics on circulation activity. The circulation statistics includes circulation count by users, items checked out, list of reserves and overdue loans, list of items most circulated. All can be modify and sort by different criteria.
This module produces lists per reader so that anyone who wants to know what he's got charged out can get a report. It prepares lists per group end identify items that are due or overdue. How many transactions occurred for the entire collection between any dates are easily obtained.

3.3 Sharing information

Now I consider how the program handles situations in which several people need access to the same file and to share information. Network of terminals for the circulation of the library catalogs can provide more opportunities for communication.

A more efficient means of sharing information is to connect computers with cables into a Local Area Network (LAN). The system supports network operation so that several people can use the same database file at the same time. A LAN area is formed when two o more computers in the same area are connected in order to share resources (hardware, mass storage device, CD ROM drivers, scanners, printers) without resorting to long distance links.
Apple gave a big boost to the whole idea of networking. AppleShare is designed to extend the simple networking of Apple computers to other systems and provide file serving networks that can include PCs as well as Macs. AppleShare features a set of tools for assuring the privacy of folders and documents residing on the file server. This is a very powerful means for protecting sensitive information.
When running an AppleShare LAN one individual is assigned the task of supervising the running of the network. This person is referred to as AppleShare administrator with the task of registering the users and assigning passwords. Only those who are registered are allowed to use all the features of an AppleShare server. To be registered an user must have a register user name and password given by the library administrator.

3.4 Financial implications and expected benefits

Developments over the past twenty years of library automation have resulted in an increase on the number of systems offered by service vendors. The available offerings are still plentiful for the library to choose from. In addition a growing number of small systems vendors, initially offering stand alone personal computers solutions have positioned their products and applications in the market place.
Library automation is a sector of the information systems business and it has shown phenomenal growth over the last two decades although a geographical imbalance in the spread of automation into libraries is evident. The cost that needed to be considered are of capital costs hardware and software; revenue costs expenditure which will continue or recur as the cost of maintenance and system developments and upgrading; staffing costs as setting up a system involves staff training.
While the above mentioned costs are well identified there are also a number of risks which will need to be assessed. Both Information technology and Information industry are evolving rapidly with technologies products and vendors in a state of constant change. In such a climate there is the risk of choosing a product which does not match up expectations or fails to deliver the level of service promised. If an automated library system is installed the library becomes locked in that particular system vendor and therefore subject to the charges made by that vendor for the operation. These cost are becoming a substantial budget item for many libraries.

This process of analyzing requirements lead to a computerized solution of in-house system developed.

The many features and capabilities make the LNS library system, from the users' point of view, an easy to use software that enable user to easily find and list the items they want.

A training program for library staff would be very easy to organize and special practice exercises for those involved in desk clerks can be performed in one day practice. A free application upgrade will be offered in the next future without any financial effort as we will not need to acquire licenses. This will of course minimize significantly the support required by other market system.

Special benefits are the system's ease of use, such as save time by reducing the time spent performing tasks of manual check in and check out, tracking material writing reports and save money by keeping track of entire library collection and reduce book losses. The information needed is at our fingertips and the system can easily calculate statistics to show the pattern of material usage.

Bar-code system can be used, ensuring fast and accurate transactions as well as huge savings of time during inventory. Overdue notices are generated automatically improving control and making the collection of materials more orderly.

The commercial concepts of "added value" is created because the service is specialist as is tailored specifically to an individual users' need and in more depth than the generalist service usually offered.

The impact of new technology will make a difference in this area. It is only a matter of time before collections of books and journals will be in machine readable form. Since virtually the possibilities of information are limitless and the implications of libraries are enormous, the role of conventional libraries will change. Consequently it is essential to keep abreast of these changes in order to fulfill this task since the "library without walls" concept is a direct result of these new technologies capabilities.

Finally a number of enhancements can be expected in the next future in order to keep with the welcomed suggestions from all the users.