
UNIT 4 INTRODUCTION TO APPLICATIONS SOFTWARE

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4.0 OBJECTIVES

After studying this Unit, you will be able to:

- understand the generic concepts relating to software;
- distinguish between systems software and applications software;
- know the capabilities of each of the above mentioned types of software;
- understand the methods by which computer software is developed; and
- identify software packages to meet most of your requirements.

4.1 INTRODUCTION

Software is the means by which a general purpose computer system is made to perform specific tasks. It contains a complete and clear description of each task in terms of available operations of the computer. In other words, software may be conceived as a set of programs for a computer. Each program is a complete specification of the processing to be performed on the data supplied to the computer.

The 'importance of software cannot be over emphasised because it is the software which supplies power of the computer to the user's problems. It has been stated that the rapid increase in the capabilities of computer systems has not been matched by corresponding increases in availability and quality of software. Hence, there appears to be a software 'backlog'. This may be due to the fact that computers demand completeness and precision in their instructions. Computers do only what they are told to and therefore, their orders cannot contain any ambiguity. Writing software involves a firm understanding of the application domain and also a knowledge of the technology domain such as of computer system and programming languages; also an ability to communicate and observe; and talent for innovation and integration. Software development requires many skills and varieties of knowledge. These might perhaps be the reasons for the existence of software 'backlog'.

Software is generally grouped into two categories: systems software and applications software. Applications software consists of the programs that allow users to get the work done through the computers. The biggest change in this area has been prompted by the huge number of users brought into the field due to the arrival of personal computers as a result of advances taking place in computer hardware technology.

This particular Unit is intended to provide you with the elementary concepts relating to applications software and its use to library and information science professionals.



4.2 SOFTWARE DEVELOPMENT

Software development is a human activity. It involves a clear understanding of the field of application, such as library and information science; knowledge of the technology such as of the computer system and a knowledge of the programming languages; an ability to communicate and observe; and a talent for invention and integration. Writing software would have been an extremely difficult task if it had to be done in the binary code (i.e., the language of Os and Is as it is the basic and only level of communication that a computer understands). Fortunately, computer scientists have developed specialised languages which enable them to construct a set of commands for the machine, without dealing directly with strings of binary digits. In other words, many programming languages exist, each with its distinctive grammar and syntax, and each intended for particular type of tasks. But, not any one of these languages can claim all round utility. This is to say that a language designed for scientific or business applications may not be suitable for writing programs to solve library problems. Therefore, choice of appropriate high level language is one of the first steps connected with developing a software. The programmer will have to express the job to be performed try the computer as also the method of doing it, in a step-by-step fashion, in the form of an algorithm. The logic of the algorithm must be faultless or else the program simply will not run. Another important aspect to be considered in this context, is the type or types of data that the computer is expected to handle and the ideal method of storing this data and retrieving it fen processing. By making the right decisions regarding the language, logic and programming techniques, the programmer can harness the power of the computer with maximum effectiveness. Writing software requires highly developed individual skills, and there is no universal approach to this problem, which will yield perfect programs in all cases.

The human and financial costs of developing new computer applications 'such as those for library and information processing and retrieval activities; are dominated by the cost of developing the necessary software. Experience shows that a large proportion of software costs is attributable to the maintenance (error detection, correction and other modifications) of software already produced. A disciplined approach is therefore recommended, in all the steps such as task definition, program design, coding, testing and fault detection associated with software development activity. It may also be mentioned that high quality documentation is essential at all stages. All this is a time consuming, labour-intensive and capital-intensive activity, which discourages development of new computer applications in different areas of information services. It is for this reason that a practising librarian or information professional should be exposed to readily available 'packaged' software.

4.3 APPLICATIONS SOFTWARE

As has been mentioned earlier, software may conveniently be divided into: systems software (i.e., programs designed to control the execution of other programs and to utilise hardware effectively) and applications software (i.e., programs to solve users problems). Systems software is generally supplied by hardware manufacturers. In this section, let us look at some general points on applications software. Applications software comprises the procedures and instructions which enable computer systems to do what the user requires. Software design essentially involves three abstract concepts. These are: algorithms, data structures, and file structures. Algorithms are procedures, or recipes, for computation. They may either be numerical or non-numerical, for example, sorting, text searching, etc. Data structures on the other hand, indicate the way in which information is organised in the computer's memory, for example, in array or in tree structure.

File structures indicate the way in which large amounts of information is stored for example: sequential, direct access or inverted file. Although, users need not have an in-depth knowledge of these concepts, it is desirable to have some understanding of the terminology, since it is often used in the literature of software vendors. Once a software procedure is expressed in these terms, it can be coded into a form which the computer can use, by means of programming languages of which there are a variety in use. It may be mentioned here that it is not necessary for users of a package to have any knowledge of the language in which it is written.

There are literally thousands of applications programs deigned to help the user use the computer to accomplish some task or the other. A growing number of programmers the world over, are working alone s'n teams developing new applications in response to the



demand for software. The potential is really boundless, and new applications are being developed for solving different problems in new areas using computers. Even so five types of computerised applications are widely used in all professions. These are generally identified as: word processing file, database management, spread sheets, graphics and communications. When they are sensibly integrated into the work environment by well trained and experienced users, these applications tend to be powerful productivity tools. This is as true of US profession as of other professions.

Increased competition among software companies has provided the user with a wide selection of software that not only addresses new needs but also allows choice among a series of offerings in the major application areas. These include library and information science. Trends towards making applications software easy to use, have further added to benefits that end-users enjoy.

Although the bulk of applications software is still character based, an increasing percentage is following Graphic User Interface (GUI) formats. This adds to the ease of use of the software and allows the beginners to utilise it. In other words, the applications software that is being currently developed is more user-friendly. In the present situation software developers have been financially motivated to listen to the demands of the users, and the users are asking for simpler and better software.

4.4 NATURE AND TYPES OF SOFTWARE PACKAGES

Software packages are commercially supplied products which typically provide *solutions* to a particular range of software development or applications problems. Since they are developed for commercial sale in a competitive market for use by a variety of customers, a great amount of skill and effort is put into their development. Therefore, they are reliable, easy to use and in many instances, well documented. Ready-made 'Packaged' software is now becoming available for an increasing range of applications such as Office Automation Systems and Library Automation and Information Retrieval Operations. In *this* Unit, we shall restrict our discussion to software packages limited to library automation and information retrieval functions.

Library and Information personnel are primarily concerned with software packages for text or information retrieval. In addition to special purpose retrieval packages, there are also a number of general purpose packages which offer some information retrieval functions. The different types of software can be identified as: (i) basic software, (ii) word processing software, (iii) database management systems (DBMS), (iv) text-retrieval packages, (v) software associated with online library retrieval systems, and (vi) inhouse library keeping.



A brief description of each of the above mentioned types of software is furnished in the following paragraphs.

4.4.1 Basic Software

The basic software is also referred to as utilities. Basic software packages are available for performing operations such as data entry and validation, sorting and merging files and editing data. A data entry and validation software typically allows the user to define a format to be displayed on a screen (VDU) and by using other prompts enables data to be entered in the specific format defined by the user. Some simple checks on the data entered are also possible with this software, for instance, ensuring that there are no alphabetic characters in a numerical data field, etc. File sorting and file merging facilities are provided in such packages. Some sophisticated packages *offer* editing capabilities of certain specific lines in the text or even full screen editing facilities as well as automatic input and output.

4.4.2 Word Processing Software

Word processing is one of the most wide spread applications software types in use today. Developed as a successor to primitive text-editors that re only possible on mainframe computers, word processing program allows interactive editing of documents, enabling easy redrafting and merging of chunks of existing documents, without the need for extensive retyping. Most of the popular programs contain features such as spell checks, outlining, choice of fonts, line drawing and page layout facilities. Word processing software permits the user to manipulate the text. This is a very handy feature when laying out tables or columns of the text.

4.4.3 Database Management Systems

These are essentially programming frameworks, and can offer good storage and retrieval systems. They are mainly intended for programmers to interact with and need a programmer in order to make them usable to libraries. This is specially applicable in case of network and hierarchical models. DBMS in general terms, have many attractions for the librarian wishing to implement automation on microcomputers.

There are three types of DBMS available to, a micro-computer They are: file or data management systems, relational DBMS and network a hierarchical DBMS. Of these, the first two types are easy to comprehend and do not call for intense Knowledge in programming for developing library applications using them.

4.4.4 Text Retrieval Packages

Text retrieval comprises storage and subsequent retrieval of rat^girds, essentially textual rather than numerical, tabular or graphical. Although, each of the earlier mentioned software can be used for text retrieval purposes to some extent. there re special purpose packages which are written specially for the type of retrieval function related to libraries and information centres. The characteristic features of such software packages are: (a) the software is normally self-contained and can be set up with a minimum involvement of a computer specialist staff; (b) the records in this software are independent, of variable length and are composed mostly of natural language texts; (c) access to data is by content rather than by structural position; (d) primary access is through inverted file of text terms drawn from the records as they are placed on the database. Thus, an important feature of the package Is user interfaces, which allows a non-programmer to understand and use them directly. Search and indexing facilities are the most important features of this type of software.

4.4.5 Software for Searching Online Retrieval Systems

Each of the major online systems has its own software which supports its activities oil a host computer. Many of these hosts have begun to offer private facilities with the help of which end-users can exploit the sophisticated software developed by supporting large databases with many searches. If the user^ls familiar with the command language of the host then a private file on that system avoids the need for familiarisation with a further software package.



Private file facilities are expensive since a telecommunication charge is incurred each time the host computer is used. The second type of software generated in association with online searching of external databases, enables more economical access to host systems. There are a number of packages, mainly for use on micros, which support online interaction with an external .database and permit the development and editing of search profiles and search outputs locally.

The availability of databases on CD-ROM media has influenced the online searching activity to a considerable extent, and obviated the expenditure associated with communications.

4.4.6 Library Housekeeping Software

The market is flooded with a variety of packages specially designed to support library housekeeping operations such as acquisitions, cataloguing, circulation control, serials control, etc. Some of these are integrated packages covering many functions, while others concentrate on individual routines like cataloguing, etc. Library housekeeping operations are discussed in Block 3, Unit-7. Hence, you are advised to refer to that Unit for further details.

4.5 WHY USE A SOFTWARE PACKAGE?

In the earlier sections of this Unit, you were introduced to the concept of applications software and were told about software packages and their types. In other words, the discussion implies that instead of writing your own software package, or commissioning some one to do this job for you, it is sensible to select an already existing package, which meets most of your requirements.

In this section, let us try to understand as to why we should use a commercial package. Software packages which are available for purchase or lease are used by a number of organisations, all of whom are the clients of the same software supplier. Various advantages accrue from this situation. Some of these are mentioned below:

- i) An efficient software package requires at least 4 to 5 man years of programming effort and is very expensive to develop. The investment cost for initial creation of the package is spread over many users and any one user pays only part of this cost.
- ii) Since the package is to be sold, it must be visible in the market place. This implies that the package be well documented. User manuals with test data and guidance on the setting up of the systems employing the software must be readily made available.
- iii) The supplier with a number of clients has sufficient maintenance income to justify the establishment of a sound service.
- iv) Packages, which have been widely used will be thoroughly tested in different environments, and thus any weakness or fault can be quickly identified and rectified.
- v) Many desirable features will be incorporated into a commercial package, which has been refined after application in several organisations, but these features may not be apparent to the user. Such features will include security pass words, back up, restart and recovery programs and integrity checking and skilled and beginner level assistance.
- vi) Existence of a user group allowing the organisation to compare its experience of using the package with others. This certainly provides valuable information, which can be utilized for developing improved strategies for using the package more efficiently as well as for extending the use of the package to new areas.

The above mentioned aspects are the advantages relating to the use of a commercial software package. There are some disadvantages which need to be looked into. They are:

- i) A commercial software package will have a number of built-in assumptions about the *users*. For example, the educational level of the users, their expertise in handling software, etc. are of speculative nature and hence may not be correct. Software vendors may not fully be aware of the organisational philosophy of different

organisations to whom they sell the software. This situation poses difficulties and some time has to be spent to resolve this difficulty in a counter productive manner before the software is installed and made operational:

- ii) Some compromise will have to be made on the part of the purchasing organisation regarding its requirements as the software package is not a tailor made one. In other words, the package may not meet each and every requirement of the organisation.
- iii) Use of a package may curb the innovative capabilities of staff computer specialists
- iv) Procurement delays and operational delays are not avoidable.

In conclusion, it may be stated that the advantages of using a ready-made commercial software package are many as compared to the disadvantages and that is the reason why many organisations prefer to use such packages rather than develop their own applications software.

While selecting a suitable applications software, some important aspects need to be considered for the evaluation of the package. The most significant aspects are: (i) vendor or producer of the software package, (ii) system output, (iii) system input, (iv) searching, (v) security, (vi) training facilities, (vii) equipment, and (viii) other considerations.

A thorough scrutiny of all the above aspects may help to acquire a satisfactory package..

Self Check Exercise

- 3) Briefly describe the nature of Software Packages,
- 4) Explain the reasons as to why it is sensible to use a readily available software package rather than develop your problems?

Note: i) Write your answer in the space given below
ii) Check your answer with the answers given at the end of this Unit.

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4.6 SUMMARY

This Unit is intended to introduce applications software to the participants of BLIS Programme. To meet this objective, the Unit contains basic information relating to the concepts of systems. Software and a brief exposition pertaining to applications software. The process of software development, the nature and types of applications software have been briefly discussed in the text. The reasons for using commercial software packages, as also the advantages and limitations in using them are briefly explained so as to impart some basic skills to the students. The Self Check Exercises ensure the participation of the students in the learning process. The answers given at the end of the Unit may prove helpful in assessing the level of students' understanding capabilities.



- 1) Software is generally grouped into two categories: i) Systems Software ii) Applications Software.

Applications software consist of programs that allow users to get the work done through the computers. Applications software comprises the procedures and instructions which enable computer systems to do what the user requires.

Increased competition among software companies has provided the user with a wide selection of software that addresses new needs as well as allowing choice among a series of packages *in the* major areas of application such as Library and Information fields. Trends towards making applications software easier to use have further added benefits that end-users enjoy.

Although the bulk of applications software is still character-based, an increasing percentage is following GUI formats. This adds to the ease of use of the software and allows novice users to utilize it.

- 2) There are a number of applications programs designed to help the user to use the computer to accomplish some task or the other. The potential is limitless. Even so, five types of computerised applications are widely recognised in all professions, These are generally identified as: word processing, file and data base management, spread sheets, graphics and communications. When these are sensibly integrated into work environment by trained and experienced users, these applications tend to be powerful productivity tools. This is true even in the case of LIS profession as in other professions.
- 3) Software packages are commercially supplied products which typically provide solutions to a particular range of software development or applications problems. They are developed for commercial sale in a competitive market for use by a variety of customers, A great amount of skill and effort is put into their development. Therefore, they are reliable, easy to use and in many cases well documented. Ready-made 'packaged' software is now available for an increasing range of applications such as Office Automation Systems, Library Automation and Information Retrieval operations, etc,
- 4) Software development is a costly and time consuming activity. It involves clear understanding of the field of application such as library and information science, knowledge of the technology like computer systems and programming languages; an ability to communicate and observe, and a talent for invention and integration.

The programmer will have to express the job to be performed by the computer and also, the method of doing it, in a step-by-step fashion. Writing software requires highly developed individual skills. All this is time consuming, labour-intensive and costly. It is for this reason, that a practising information professional is advised to use a readily available 'packaged' software. There are many advantages in using such a software. Some of them are:

- i) The investment cost for the creation of the package is spread over many users and any one user pays only part of this cost.
- ii) User manuals with test data and guidance on the setting-up of the systems employing the software will be readily made available by the software supplier.
- iii) Sound maintenance service will be available.
- iv) Packages which have been widely used will be thoroughly tested in different environments and any weakness or fault in the package can be quickly identified and rectified without loss of time on the part of the user.
- v) A number of desirable features will be incorporated into a commercial package, which has been refined after application in several organisations.
- vi) Existence of a user group provides to the organisation-an opportunity to compare its experience of using the package with others. This provides valuable information which may be used for developing improved strategies for using the package more efficiently as well as for extending its use to new areas of application.

The above mentioned aspects are some of the advantages associated with the use of a commercial software package.

4.8 KEY WORDS

Algorithm	Procedures or recipes for computation - may be numerical or non-numerical, for example: sorting, text searching. Every algorithm has a beginning and an end.
Applications Software	Programs that enable the user to use the computer for specific tasks such as word processing, etc. They are readily supplied by commercial firms for a price.
DBMS	Database Management System. Software that assists the user in accessing and managing data in a database.
Data Structures	The way in which information is organised in the computer's memory for example array, tree, etc.
File Structures	The method in which large amounts of information are stored, for example, sequential, direct access, inverted file, etc.
GUI	Graphical User Interface. The computer screen that presents the functionality of the computer to the user via pictures, pull-down menus, and point-and-click interaction usually with a 'mouse'
Integrated Software	A single software application that includes several productivity functions -- typically . a word processor, database, spread sheet, graphics, etc.
Inverted File	The inverted file is similar to an index. In the inverted file approach there may, be two separate files. The text file which contains the actual records and the index file, which provides access to these records. These files are used together in database search. Inverted files are created for a number of fields within a record indexes are created only for those fields that are commonly searched. Inverted files are often created for author names, title words, subject indexing terms, etc
Spread Sheet	The component of productivity software especially designed for working with numeric data
Software	The generic term covering the concepts, procedures and instruction which cause computer systems to do useful things.
Software Backlog	It has been clear for some years that the rapid increase in the capability of computer systems has not been matched by corresponding increase in the availability and quality of software This gap is known as 'software backlog'.
Software Design	The methods by which computer software is produced.
Software protection	The use of various methods to protect software against unauthorized use.
Systems Software	Software generally supplied by the hardware manufacturers .it includes operating systems, assemblers, compilers, interpreters and programs for controlling I/O devices , and utilities.



Utility	Operating system program that provides the user with a tool that helps in the management of computerised operations.
Word Processor	The component of productivity software used primarily for working with written communication such as text.

4.9 REFERENCES AND FURTHER READING

Emden, D. and Blakeman, K. (1990). *Going Automated*. London: ASLIB.

Gates, H. (1985). *Directory of Library and Information Retrieval Software for Micro-computers*. Brook-field: Gower Pub. Co.

Lever, V.M. (1985). Library Specific Microcomputer Software. *Library Software Review*. 4 (May-June), 35-38.

Nolan, J.M. (1984). *Micro Software Evaluation*. Torrance CA: Nolan Information Services. Poole, B.J. (1995). *Education for an Information Age*. Wisconsin: WCB Brown & Benchmark.

Rowley, Jennifer (1998). *The Electronic Library, 4th Edition of Computers for Libraries*. London: Library Association Publishing.

Tenopir, Carol (1984), Identification and Evaluation of Software for Micro-computer-based in-house Databases. *Information Technology, and Libraries*. March, 21-34,