
Unit 7 □ Software System

Structure

7.0 Objectives

7.1 Introduction

7.2 General Purpose Database Packages

7.2.1 MS-SQL

7.2.2 PostgreSql

7.2.3 CDS/ISIS

7.3 Integrated Library Management Software

7.3.1 LibSys

7.3.2 SOUL

7.3.4 Virtua

7.4 Exercise

7.0 Objectives

The objectives of the Unit are to discuss :

- General purpose database software
- Bibliographic database software
- Integrated library and information management software

7.1 Introduction

Software is computer programmes; instructions that cause the hardware—the machines—to do work. The two primary software categories are operating systems (system software), which control the workings of the computer, and application software, which addresses the multitude of tasks for which people use computers. System software thus handles such essential, but often invisible, chores as maintaining disk files and managing the screen, whereas application software performs word processing, database management, and the like. Different application software has been discussed in the following sections.

7.2 General Purpose database Packages

7.2.1 MS-SQL : SQL Server 2005

Microsoft SQL Server is a relational database management system produced by Microsoft. It supports a superset of Structured Query Language SQL, the most common database language. It is commonly used by businesses for small to medium sized databases, and in the past 5 years large enterprise databases, and competes with other relational database products for this market segment.

7.2.1.2 History

The code base for Microsoft SQL Server originated in Sybase SQL Server, and was Microsoft's entry to the enterprise-level database market, competing against Oracle, IBM, and Sybase. Microsoft, Sybase and Ashton-Tate teamed up to create and market the first version named SQL Server 4.2 for OS/2 (about 1989) which was essentially the same as Sybase SQL Server 4.0 on Unix, VMS, etc. Microsoft SQL Server v6.5 was the first version of SQL Server that was architected for NT and did not include any direction from Sybase.

About the time Windows NT was coming out, Sybase and Microsoft parted ways and pursued their own design and marketing schemes. Microsoft negotiated exclusive rights to all versions of SQL Server written for Microsoft operating systems. Later, Sybase changed the name of its product to Adaptive Server Enterprise to avoid confusion with Microsoft SQL Server. Until 1994 Microsoft's SQL Server carried three sybase copyright notices as an indication of its origin.

Several revisions have been done independently since with improvements for SQL Server. SQL Server 7.0 was the first true GUI based database server, and a variant of SQL Server 2000 was the first commercial database for the Intel IA64 architecture. During this time there was a rivalry between Microsoft and Oracle's servers for winning the market over enterprise customers.

The current version, Microsoft SQL Server 2000, was released in August of 2000. Microsoft is beta testing its successor, SQL Server 2005. This is scheduled to launch during the week of 7th November 2005, alongside Visual Studio 2005 and BizTalk Server 2006. The June CTP (Community Technology Preview) release is currently available for free download. Different versions for Windows are :

- 1992-SQL Server 4.2
- 1993-SQL Server 4.21 for Windows NT

- 1995-SQL Server 6.0, codenamed SQL95
- 1996-SQL Server 6.5, codenamed Hydra
- 1999-SQL Server 7.0, codenamed Sphinx
- 1999-SQL Server 7.0 OLAP, codenamed Plato
- 2000-SQL Server 2000 32-bit, codenamed Shiloh
- 2003-SQL Server 2000 64-bit, codenamed Liberty
- 2005-SQL Server 2005, codenamed Yukon (not released yet)

7.2.1.3 Description

MS SQL Server uses a variant of SQL called T-SQL, or *Transact-SQL*, a superset of SQL-92 (the ISO standard for SQL, certified in 1992). T-SQL mainly adds additional syntax for use in stored procedures, and affects the syntax of transactions support. (Note that SQL standards require (ACID) Atomic, Consistent, Isolated, Durable transactions.) MS SQL Server and Sybase/ASE both communicate over networks using an application-level protocol called Tabular Data Stream (TDS). The TDS protocol has also been implemented by the Free TDS project in order to allow more kinds of client applications to communicate with MS SQL Server and Sybase databases. MS SQL Server also supports Open Database Connectivity (ODBC).

A stripped-down version of Microsoft SQL Server known as **MSDE** (Microsoft SQL Server Desktop Engine) is distributed with products such as Visual Studio, Visual FoxPro, Microsoft Access, MS Web Matrix, and other products. MSDE has some restrictions : a limit of 2 GB databases, and it comes with no tools to administer it. It also has a workload governor which reduces its speed once you exceed 8 concurrent workloads on the engine.

Microsoft recently announced the successor to MSDE, dubbed **SQL Server Express**. Similar to MSDE, SQL express includes all the core functionality of SQL Server but places restrictions on the scale of databases. It will only utilize a single CPU, 1 GB of RAM, and imposes a maximum size of 4 GB on databases. SQL Express also doesn't include enterprise features such as Analysis Services, Reporting Services, Data Transformation Services and Notification Services. A beta version of SQL Server Express is now available for download. The following table presents important characteristics of the **SQL Server 2005** in a cryptic way.

Scalability and Performance

Feature	Express	Workgroup	Standard	Enterprise	Comments
Number of CPUs	1	2	4	No Limit	Includes support for multi-core processors
RAM	1 GB	3 GB	No Limit	No Limit	
64-bit support	Windows on Windows (WOW)	WOW			
Database Size	4 GB	No Limit	No Limit	No Limit	
Partitioning					Support for large-scale databases
Parallel Index Operation					Parallel processing of indexing operations
Indexed Views					Indexed view creation is supported in all editions. Indexed view matching by the query processor is only supported in Enterprise Edition.

Note : 1 Single REDO thread and the safety setting is always on, 2 Supports only two nodes, 4 Subscriber only

7.2.2 PostgreSQL

PostgreSQL is a sophisticated Object-Relational DBMS, supporting almost all SQL constructs, including sub-selects, transactions, and user-defined types and functions. It is the most advanced open-source database available anywhere. Commercial Support is also available. **PostgreSQL** is a free object-relational database server (database management system), released under the flexible BSD-style license. It offers an alternative to other open-source database systems (such as MySQL and Firebird), as well as to proprietary systems such as Oracle, Sybase, IBM's DB2 and Microsoft SQL Server. PostgreSQL's unusual-looking name gives some readers pause in trying to pronounce it, especially those who pronounce **SQL** as “sequel”. PostgreSQL's developers pronounce it “post-gress-Q-L”. It is also common to hear it abbreviated as simply “postgres.”

7.2.2.2 History

PostgreSQL has had a lengthy evolution, starting with the Ingres project as UC Berkeley. The project leader Michael Stonebraker had left Berkeley to commercialize Ingres in 1982, but eventually returned to academia. After returning to Berkeley in 1985, Stonebraker started a post-Ingres project to address the problems with contemporary database systems that had become increasingly clear during the early 1980s. The code bases of Postgres and Ingres started (and remain) completely separated.

The team released version 1 to a small number of users in June 1989, followed by version 2 with a re-written rules system in June 1990. 1991's version 3 rewrote the rules system again, but also added support for multiple storage managers and for an improved query engine. By 1993 a huge number of users existed and began to overwhelm the project with requests for support and features. After releasing a Version 4—primarily as a cleanup—the project ended.

Although the Postgres project had officially ended, the BSD license (under which Berkeley had released Postgres) enabled Open Source developers to obtain copies and to develop the system further. In 1994 two UC Berkeley graduate students, Andrew Yu and Jolly Chen, added a SQL language interpreter to replace the earlier Ingres-based QUEL system, creating Postgres95. The code was subsequently released to the web to find its own way in the world. 1996 saw a re-naming of the project in order to reflect the database's new SQL query language, Postgres95 became **PostgreSQL**.

The first PostgreSQL release formed version 6.0. Subsequently a group of database developers and volunteers from around the world, coordinating via the Internet, have maintained the software. Since version 6.0, many subsequent releases have appeared, and many improvements have occurred in the system; on January 19, 2005 version 8.0 became the current release.

7.2.2.3 Description

A cursory examination of PostgreSQL might suggest that the system resembles other database systems. PostgreSQL uses the SQL language to run queries on data. That data exists as a series of tables with foreign keys linking related data together. One might characterise the primary advantage of PostgreSQL over some of its competitors as programmability : PostgreSQL makes it much easier to build real-world applications using data taken from the database.

PostgreSQL allows the user to define new types based on the normal SQL types, allowing the database itself to understand complex data. For instance, you can define an address to consist of several strings for things like street number, city and country.

From that point on one can easily create tables containing all the fields needed to hold an address with a single line.

PostgreSQL also allows types to include inheritance, one of the major concepts in object-oriented programming. For instance, one could define a `post_code` type and then create `us_zip_code` and `canadian_postal_code` based on it. Addresses in the database could then take either `us_address` or `canadian_address` form, and specialized rules could validate the data in each case. In early versions of PostgreSQL, implementing new types required writing C extensions and compiling them into the database server; in version 7.4, it became much easier to create and use custom types via `CREATE DOMAIN`.

Most SQL systems allow users to write a *stored procedure*, a block of SQL code that other SQL statements can call. However SQL itself remains unsuitable as a programming language and SQL users can experience great difficulty in constructing complex logic. Worse, SQL itself does not support many of the most basic operations in a programming language, like branching and looping. In PostgreSQL, programmers can write such logic in any one of a considerable set of supported languages.

A built-in language called PL/pgSQL resembles Oracle's procedural language PL/SQL, and offers particular advantages when dealing with query-intensive procedures. Wrappers for popular scripting languages such as Perl, Python, Ruby, and tcl allow harnessing their strengths in string processing and in linking to extensive libraries of outside functions. Procedures requiring the high performance provided by compiling complex logic into machine code can utilise C or C++.

The programmer can insert the code into the server as a *function*, a small wrapper that makes the code resemble a stored procedure. In this way SQL code can call (for instance) C code and vice-versa.

7.2.2.4 Features

Some features of PostgreSQL rarely found in other relational databases include :

- User-defined types
- User-defined operators
- Availability of multiple stored procedure languages, including C, PL/Java, PL/Perl, plPHP, PL/Python, PL/R, PL/Ruby, PL/sh, PL/Tcl, and the native PL/pgSQL
- Support for IP address (including IPv6), CIDR block, and MAC address data types
- Table inheritance (although not fully implemented)

- Rules – a way of implementing server-side logic that allows the application developer to modify the “query tree” of an incoming query
- Concurrency managed via a Multi-Version Concurrency Control (MVCC) design, which largely eliminates the need for read locks, as MVCC allows queries initiated at different points in time to read the version consistent with that point in time
- Expressional indexes – indexes created on the value of an expression, rather than on a single column or set of columns
- Partial indexes – indexes created on a selected portion of the tuples in a table. These can save disk space and improve performance by excluding uninteresting portions of the table from being indexed.

7.2.3 CDS/ISIS

CDS/ISIS is a menu-driven generalized Information Storage and Retrieval system designed specifically for the computerized management of structured non-numerical databases. The name of the software, CDS/ISIS is derived from a Division of UNESCO, The Computer Documentation Service/Integrated Software Information Systems. One of the major advantages offered by the generalized design of the system is that CDS/ISIS is able to manipulate an unlimited number of databases, each of which may consist of completely different data elements. CDS/ISIS offers an integrated programming facility allowing the development of specialized applications and/or the functional extension of the software as originally provided.

7.2.3.1 System functions

The major functions provided by CDS/ISIS allow you to :

- Define databases containing the required data elements
- Enter new records into a given database
- Modify, correct or delete existing records
- Automatically build and maintain fast access files for each database in order to maximize retrieval speed
- Retrieve records by their contents, through a sophisticated search language
- Display the records or portions thereof according to your requirements
- Sort the records in any sequence desired
- Print partial or full catalogues and/or indexes
- Develop specialized applications using the CDS/ISIS integrated programming facility.

7.2.3.2 Hardware Requirements

The minimum and recommended hardware requirements for running CDS/ISIS are the following :

- CPU : 486 processor at 40 MHz (Pentium at 100 MHz or higher recommended)
- RAM : 8MB (16MB or more recommended)
- 1 floppy disk unit
- 1 hard disk (with at least 4Mb free)
- 1 VGA 640×460 colour (super VGA 800×600 or higher recommended)
- 1 printer (optional)
- Although CDS/ISIS is a Windows 3.1 based programme, it runs under Windows 95 and Windows NT without specific known problems.

7.2.3.3 CDS/ISIS-Product family

Some of the products available in the CDS/ISIS software family are :

- CDS/ISIS for DOS
- CDS/ISIS for Windows (all versions)
- CDS/ISIS for UNIX (character mode)
- JavalSIS, Client - Server Internet suite
- UNESCO/BIREME ISIS_DLL, programming tool
- BIREME WWWISIS/Ibiscus GENISIS
- WinIDIS, the interface to IDAMS

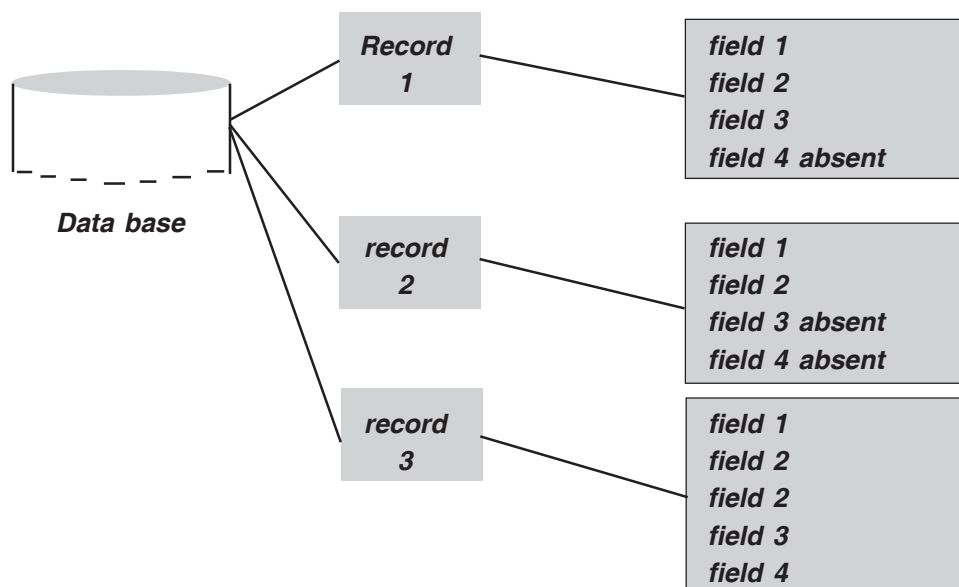
7.2.3.4 Characteristics

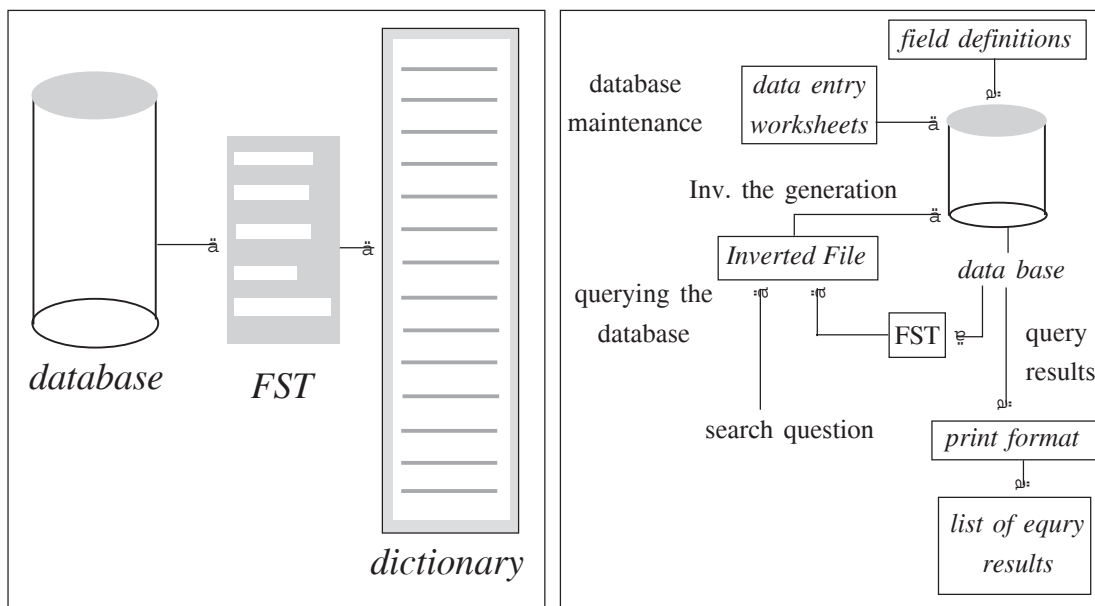
The salient characteristics of CDS/ISIS may be summarized as follows :

- CDS/ISIS is a generalized Information Storage and Retrieval System
- It is intended to be used for structured non-numerical databases containing mainly texts
- It may manage stand-alone as well as local network database systems
- It is specialized in handling variable-length
- Unlike Dbase or MS-Access, CDS/ISIS is not a relational database system, although it provides some relational facilities
- CDS/ISIS deals with questions like : “which research projects deal with basic education in India?”
- It may be expanded by advanced users (programmers) for adding new services and tools

- A wide variety of solutions for Internet publishing of data are already available
- CDS/ISIS allows the user to design the record structure of each database
- Once the database has been created, CDS/ISIS allows to :
 - Create new records, to put new information in the archive
 - Keep the stored information up-to-date by adding new data elements, modifying existing ones and deleting unnecessary information
 - Analyze the content of the database to extract searchable information following your own instruction
- Search and retrieve subsets of the stored information
- Display or print the results the way you want
- Records are stored in a file named “Master File” (MST)
- Each record in the database can be referred to by its unique number, called “Master File Number” (MFN)
- The MFN is automatically assigned by the system when a the record is created
- You may access a record not only by its number but its content. For this purpose, you may maintain a dictionary of searchable terms, also called “Inverted File”

The following figure shows the role of the different components of a CDS/ISIS database





7.3.4 LibSys : An Integrated Library System

LibStys (<http://www.libsys.co.in>) for library automation” is the prime mission of New Delhi based software company - Info-Tek Consultants Pvt. Ltd., engaged in providing software solutions for General Insurance and ERP/CRM since 1984.

7.2.4.1 Modules of LibSys

LibSys is an Integrated Library Management software covering almost all the functions of a library in the following areas :

- Acquisition/Ordering
- Cataloguing
- Circulation
- Serials Control
- Article Indexing
- OPAC
- WebOPAC

Built around its own centralized bibliographic database based on MARC standards, LibSys supports both print and non-print materials. LibSys has various formats to describe each material type, using different fields with variable field lengths. It facilitates import/export of data in standard exchange format such as MARC as well as other formats.

LibSys provides online validation of input data prior to updating the database. Prompts and suitable messages are flashed when the data does not match and 'look-up tables' provides help as and when required.

LibSys supports word based free text searching using Boolean operators. An efficient proprietary indexing feature substantially improves response time while searching for bibliographic information in large databases. The bibliographic database searching is integrated with the Circulation and Acquisition operations.

In circulation operations, either bar code or RFID technology may be employed for identification of both borrowers and materials. LibSys permits self-checkout, book drop etc. using LSmart interface.

LibSys implements security by allowing access through passwords. Security is provided for the user as well as for the library staff. For the staff, access can be controlled even at the function level.

The Java/perl based interface in LibSys Web OPAC provides an effective gateway to Internet and Intranet. The Z39.50 compliance in LibSys ensures keeping pace with the developments in international market place.

LibSys is a powerful software written in 'C/C++' and 'Java' providing user-friendly interface during operations. Although LibSys is based on its own Bibliographic database, it is also available for environment using ORACLE (or SQL Server or MySQL) as back-end RDBMS. Full Graphical User Interface (GUI) front-end is provided for the windows client.

LibSys supports various electronic resources thus making it a modern system with virtual library implementation. Image and multimedia files can be intergrated with LibSys search engine. They may be browsed in multi-windows interface with standard window features. Various formats handled by LibSys include Bitmap (.BMP), TIFF (.TIF), Wave (.WAV), Midi (.MID), Audio-visual Interface (.AVI), etc.

For its LibSys Network (LSNet) activities, LibSys is providing the solution of a Union Catalogue to its users. Software is currently available to link these Union catalogues on-line. This facility of LibSys makes networking of libraries effective and promotes the sharing of resources.

7.2.4.2 Libsys Features

- **Authority files** : Authority files are essential for error free cataloguing. It supports Authority files.
- **Auto Export and Import** : It allows automatic import or export in different bibliographic formats.

- **Automatic Bar Code Generation** : The Bar codes are generated from it itself. Normally one has to buy the software for bar coding separately.
- **Bar code Support for Issue and Return** : Bar codes generated by the system can be used to issue and return the material using the bar code reader. This increases the processing speed of your counters, saves waiting time for the members and reduces manpower as the same counters can handle the increased load.
- **Client Server Technology** : The client Server Technology ensures secure and distributed computing. This technology also prevents viruses from entering the system from the client side into the server. Also only the server needs to be protected. The clients (the users' computers) do not even know the location of the server and thus cannot harm the data.
- **Keyboard Mapping Support** : Keyboard Mapping allows the users to redefine the keyboard according to their wish. This is great in typing with keyboard layouts that one knows and prefers. This benefits the data entry department.
- **WebOPAC over Internet** : A full-fledged WebOPAC is available for the net users.
- **Password Protection for all modules and screens** : The system administrator has the powers to decide who is allowed to do what on the system. This ensures that although all terminals are able to work with LibSys in full-fledged capacity, only certain modules are accessible to certain users.
- **Retrospective Data Conversion Support** : A separate Data Entry option is also provided to do data entries.
- **Multi-lingual support for Indian and International languages/scripts** : Unicode support allows internationalization of the programme for all languages. It also supports ISM Publisher (C-DAC, India) and GIST (C-DAC, India).
- **Support for MARC standards** : It supports MARC21, UNIMARC, CCF etc.
- **Z39.50 Client** : Z39.50 standard of the Library of Congress and the ISO ensures that the library is connected to the libraries across the world and can access their databases.
- **E-mail interface** : Provided email interface for all reports
- **Support for e-Resources** : Support Electronic Resources-URL, Multi-media files (TIFF, GIF, JPEG, Wave, Midi, etc.), PDF file, and other file formats

- **Platform** : LibSys supports open system architecture, from host multi-user system to Client-Server implementation to a total web-based solution. So there are a number of operating platforms to choose from.
- **Server Options** : UNIX, LINUX, Pentium machine with SCO Unix/Unix Ware, SunSparc with SOLARIS, Alpha with OSF/1, RS/6000 with AIX, HP-9000 with HP-UX, SG with IRIX, Windows NT/2000/XP, and Windows 95/98/NT/2000/XP (Stand Alone).
- **Client Options** : Standard Windows (95/98/NT/2000/XP), Web Enabled (Applet-Servlet implementation), Unix Workstations, X-Windows Workstations (xterm), VT220 & compatible terminals, Thin Java clients.
- **RDBMS Options** : LibSys doesn't need an RDBMS as it is built around its own proprietary bibliographic database. However, the option of LibSys with SQL Server, ORACLE, MySQL as back-end RDBMS with odbc interface is also available.

7.2.5 SOUL

SOUL is the state-of the-art library automation software designed and developed by the INFLIBNET. It is user-friendly software developed to work under client server environment. Although looking at the name of the software, one may think that it is meant for university libraries only, but in fact it is flexible enough to be used for automating any type or size of library.

7.2.5.1 General Features

University libraries are complex entities, having large collections and serving a huge clientele. To carry out various operations in a library effectively, there is a need for automation. Computer and communication technologies have brought revolutionary changes in the information acquisition, processing, storage, retrieval and dissemination. Keeping in view the latest trends in Information Technology (IT), INFLIBNET Center has developed Windows based Library Management Software “SOUL”, which provides total solution for Library Automation. SOUL is designed using Client-Server Architecture, which imparts extra strength to storage capacity, multiple access to single database, various levels of security, backup, and storage facilities etc. This software has been designed after a comprehensive study of different library related functions practiced in university libraries. It has MS-SQL Server 7.0 or higher as the backend. This user-friendly software is quite easy to work with. SOUL handles Indian languages/scripts using ISM Publisher of C-DAC. There is an effort is going on to develop a new version of software based on MARC 21 and Unicode standards and RFID protocols for electronic surveillance. The software comprises following modules.

Acquisition

Catalogue

Circulation

OPAC

Serial Control

Administration

The in-built network of the software will allow multiple libraries of the same university to function together as well as access to the distributed databases installed at various university libraries and union catalogue mounted at INFLIBNET using VSAT network.

7.2.5.2 System Requirement

Network Version

The software can work with minimum hardware and software configuration given below, however higher or latest configuration may be purchased to have efficiency of the software.

System for Server :

- Pentium @933 MHz with 128 MB RAM
- 40 GB HDD
- 48xCD-ROM Drive
- 1.44" MB Floppy Drive
- Colour Monitor (SVGA)
- Ethernet card 10/100 Mbps
- Windows-NT/Windows 2000 server (Operating System)
- MS-SQL Server 7.0/Advance server 2000 (RDBMS)
- Personal Web Server or Windows NT IIS with option pack 4.0 installed OR Windows 2000 as server for Web OPAC

System for Client :

- Pentium @ 933 MHz with 64 MB RAM
- 2GB HDD with 10 MB Free space
- 1.44" MB Floppy Drive
- Colour Monitor (SVGA)
- Ethernet card 10/100 Mbps
- Windows-95/98/2000/XP/NT (Operating System)

College Version

- **System for Server/Client :**
- Pentium @ 933 MHz with 128 MB RAM
- 20 GB HDD with 200 MB Free space
- 48×CD-ROM Drive
- 1.44" Floppy Drive
- Colour Monitor (SVGA)
- Ethernet card 10/100 Mbps
- Windows-98/ME/NT/2000/XP/2003 (Operating System)

7.2.5.3 Standards supported by SOUL Software

SOUL is state of the art library management software widely used across India and neighboring countries. SOUL adheres to internationally acceptable standards like **AACR-2, CCF, MARC 21** and **ISO 2709**. Adoption of Standards in SOUL makes user's database globally acceptable and interchangeable.

7.2.6 Virtua

Virtua is a standards based, flexible, open, and Integrated Library System. With visionary features like FRBR (Functional Requirements for Bibliographic Records), User Reviews & Ratings, and a Smart Device interface to the catalogue. Virtua sets a new standard of excellence for the library world. Virtua offers integrated functionality between modules, including the system's cataloguing, acquisitions, serials, circulation and reporting functions. With fully integrated single-client approach, switching from one module to another is seamless as a keystroke or a click of the mouse.

Functional Requirements for Bibliographic Records (FRBR) is the next dimension in meaningful information—a fresh approach to traditional cataloguing that features a more intuitive way of organizing and retrieving information. With FRBR, user only have to search once to retrieve all related materials, even if those materials are catalogued in different languages or editions, or with different subject headings.

7.2.6.1 Salient Features

Certain important features of different versions of the software may be summarized as flows :

- The Functional Requirements for Bibliographic Records (FRBR) Model is an innovative alternative to traditional cataloguing—and Virtua is the first ILS on the market today that supports it. The advanced cataloguing/data-handling

standard of FRBR consolidates related information from disparate resources into a tree structure. The basic FRBR record consists of three entities—work, expression and manifestation. In addition, item records (holding records) can be attached to the manifestation. For example, Beethoven’s Fifth Symphony independently catalogued. The performance of the symphony by, for example, the New York Philharmonic Orchestra represents an “expression” of the work. A CD by Columbia Records containing the particular performance represents a “manifestation” of the work. Two copies of the CD in the library represent two “items” of this manifestation. FRBR Offers a more intuitive way of organizing and retrieving information, which translates to easier cataloguing for professional, and more complete search results for users. With FRBR, users only have to search once to find all related materials, even if those materials are catalogued in different languages or editions, or with different subject headings.

- Extensive policy matrices easily manage single or multiple-branch library requirements. It’s easy to set up an unlimited number of user profiles, item types, locations, and loan periods specific to each library branch. A comprehensive system of alerts and blocks provides flexibility when dealing with patron delinquencies.
- Create a “community” of readers with User Reviews and Ratings : A forum for patrons to write reviews and rank titles. The library has the option of approving a review before it’s posted.
- Virtua takes full advantage of the special strengths of Oracle™, including its support of Unicode™, backup and recovery capabilities, rollback features, and indexing capabilities. This makes for a very structured Virtua implementation, with better performance that is easier to install and manage.
- Virtua is the first ILS to fully comply with the Unicode™ standard on both the client and server levels. Users can view and print records in any language.
- Showcase your library’s unique identity. The flexibility of VECTORS allows you to change the entire face of the software. Patrons can view the catalogue through their preferred interface—whether that interface is designed for the advanced user, student, or child. News, weather feeds, blogs and other local information can be seamlessly included, making the library’s portal a central spot for all information—bringing your library users back to the Portal as their primary source for information.
- Give users a “rich” experience through content enrichment. Allow linking to book cover images, full electronic table of contents, published book reviews, video trailers for DVDs, and many other resources.

- Virtua complies with EDI, a timesaving technology standard that allows for electronic transmission of documents such as invoices, purchase orders, and claims. Virtua acquisitions include easy support for blanket orders, memberships and standing orders. For speedy management of serials, Virtua's automatic compression of the 863 serials tag saves you countless hours spent manually editing these tags.
- For speedy and accurate record creation, Virtua offers the following cataloguing shortcuts :
 - Batch processing for record importing
 - Keyboard commands for moving seamlessly between windows
 - Cut-and-paste and point-and-click capabilities decrease editing time and reduce data entry errors
 - Automatic validation of records at the client and server levels—validation that is based on MARC 21, but editable by the library for local practice
 - Online importing of any Z39.50-compliant MARC record
 - Ready-to-use work forms or record templates that you can customize
 - Simple global headings changes that instantly update every affected record
 - Support for multiple thesauri
 - Indexing tailored for the library's specific needs
- Fully-featured : Reserve Book Room handles multiple reserve locations with varying open and closed schedules, loan periods, and loan privileges. Items can be placed on reserve for several instructors and courses. Students have instant online access to course reserves by instructor name, course name, and course ID.
- Self-Check Units-Designed from the ground up to be robust yet attractive units, users self-check frees staff for other duties, taking on in some cases up to 85% of all circulation. Members can checkout multiple items accurately and quickly without assistance from the library staff. The self-check units also feature automatic offline circulation, and a Remote Patron Assistance Service.
- Allows libraries to significantly reduce their notice production costs by delivering overdue and hold pick-up notices by phone. Members are also able to renew their loan periods, automatically, over the phone, with no staff involvement, 24 hours per day.
- Materials Booking-Makes it easy for library staff and members to reserve library equipment, meeting rooms, and materials such as : conference rooms,

computers, DVD players, VCR's, overhead projectors, and course reserve materials. Members simply choose the items of interest, check against the calendar for availability, and book the time required.

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7.4 Exercise

1. What is database software? Discuss general-purpose software in details.
2. Discuss the salient features of CDS/ISIS.
3. Describe with examples applications of different indexing techniques of CDS/ISIS.
4. Discuss any one library management software.