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# Software Maintenance and Support Information System

*LMK Resources Pakistan*



*By*

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Department of Computer Center  
Quaid-i-Azam University, Islamabad  
*Pakistan*

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**DEPARTMENT OF COMPUTER CENTRE  
QUAID-I-AZAM UNIVERSITY  
ISLAMABAD**

**Date:** \_\_\_\_\_

**FINAL APPROVAL**

This is to certify that we have read the project report submitted by **Sohail Rashid** and it is our judgement that this project report is of well standard to warrant its acceptance by **Computer Center, Quaid-i-Azam University, Islamabad** for the partial fulfillment of the Post Graduate Diploma in Computer Sciences.

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To  
My  
Ever  
Loving  
And  
Beloved  
Parents

# ACKNOWLEDGEMENT

All the praises are for **ALLAH**. A lord of the universe, the most Benevolent, the most Merciful, Lord of the Day of Judgment and the creator who create from atom to the universe. I found no words to my command to express the deepest sense of gratitude and innumerable thanks to **ALMIGHTY ALLAH**, who in spite of numerous difficulties enabled me to complete this work.

All respects for **HAZRAT MUHAMMAD** (Peace Be Upon Him), who is forever torch of knowledge and guidance to humanity and enabled us to shape our lives according to the teaching of Islam.

I express my deep gratitude to my supervisor **Dr. Abdul Subhan** for valuable suggestions, positive criticism and proper guidance, with out which it would have been almost impossible for me to accomplish this task successfully. I am also thankful for his valuable guidance and moral support during our stay in the department.

I would like to thank all the worthy teachers of department of computer center for providing me an insight into the field of computer science.

I like to extend my gratitude to the co-operative staff at **LMK Resources**. I can never forget the moments which I have spend in this University. My sincere thanks to my loving friends Muhammad Asif Yar, Asim Mahmood, Azeem Faisal and Zahid Reman Abbasi.

I reserve my most cherished words of gratitude for my family members whose prayers gave me passion and courage during my whole life.

**Sohail Rashid**

# PREFACE

Media and information technology are of utmost importance in the present era. the remarkable advancements and discoveries in the computer technology have contributed a lot towards the progress of these two in past decades.

Computer is becoming the need of almost all organizations for data processing system in this stage. What awesome about the computer is its ability to store fantastically large amount of information, to retrieve data in exceedingly short time and to perform a large number of calculations with complete accuracy.

The dissertation under consideration deals with Software maintenance and Support Information System.

The proposed system basically concerned with the following activities.

- Software Information of the Organization
- Users requests of Client Companies
- Developer's solutions of Organization

The first consist of the basic information about the software developed by the LMK Resources.i.e Name, version, Id, and major features etc.

Users Request generally contains the information about the users of different client companies with their requests about any software.

The Developer solutions generally contains the information about the Solutions.against each request and the developer information who resolve the Problem.

I perform my project in Oracle, because it is a powerful package in terms of its ability of user friendly environment.

During all the phase of my study, analysis and design I have kept this thing in my mind that the proposed system should not be cost effective but also accurate, user friendly, time saving requires less manpower and provide better customer's services.

# ABSTRACT

The system described is Software Maintenance and Support Information System for LMK Resources which provides correct, reliable and efficient information to the Organization for decision making. The system provides efficient means of data storage as well as retrieval.

The system deals with different type of queries, printed and on screen reports, which are required by the organization.

The system also provides a user friendly environment for insertion and deletion of data. With the implementation of this system, most of the problems faced by the LMK Resources, will be solved INSHALLAH.

## PROJECT BRIEF

**Project Title** : Software Maintenance and Support Information System

**Client Organization** : LMK Resources

**Under taken By** : Sohail Rashid

**Supervised By** : Mr. Abdul Subbhan

**Institution** : Computer Center  
Quaid-I-Azam University,  
Islamabad.

**Software Used** : PERSONAL ORACLE 7  
FOR WINDOWS 1998,  
DEVELOPER 2000,  
FORM BILDER 5.0

**System Used** : PENTIUM 3, (800 MHz)

**Operating System** : WINDOWS 98



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**SAMPLE PROTOTYPES OF INPUT SCREENS**

*Chapter #*

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## **1.1 About the Organization:**

LMK Resources (previously known as Mathtech Pakistan Ltd.) was established in 1994 and has emerged as a leading upstream service company of Pakistan, offering computer aided exploration services and computerized software development and consultancy services in Pakistan, US and other international markets. The organization has gained recognition by providing state-of-art and high quality services to the energy and information technology sectors.

LMK Resources, which is operating more than a dozen countries in Middle East, Africa and Central Asia, is structured around a self contained team concept where by each development centre is geared to have strong functional depth and expertise providing high qualities solutions in a professional manner. The functional areas of expertise that allow the centers to deliver quality solutions include efficient Project Management, Process Engineering, Analysis and Design, System Development, Quality assurance, Configuration Management, system operations and Support.

## **1.2 Information Technology:**

In this changing world of electronic business, LMK Resources is providing information technology products and services that integrate applications and data within an enterprise and across the industry. By integrating legacy, client/server, web-based applications and data, LMK Resources can build a cohesive, flexible, and cost-effective IT infrastructure for any organization.

The development team follows a team-based product development approach and uses state-of-the-art technology. Each project team is staffed with experienced software engineers who manage, develop, and test the project until completion. An ISO Certified Lead Auditor along with a dedicated R&D team ensure the quality of products and services.

### **1.2.1 Services and Support:**

LMK Resources offer a diverse range of services to fulfill the growing needs of its clients. Experienced and qualified professionals provide support on the entire product line. Keeping in mind its commitment towards technological awareness, training programs are conducted to ensure that clients are kept abreast of the advancements in the industry.

### **1.2.2 GIS Based Applications:**

GIS is one of its key interests due to its vast experience in the Energy Sector. LMKR has developed a number of libraries for rapid integration and robust solutions. It has access to third party software libraries, which help in developing state of the art Data Management and Information System

LMKR has a strong team with vast experience in information management, design and implementation of MIS. This team has designed some very innovative information systems architecture, which are both robust and efficient.

### **1.2.3 E-Commerce Services:**

The organization can enable clients to establish a fully functional on-line business using Active Server Pages and database technology along with a customizable, client specific backend. The development team builds a virtual storefront that provides a personalized shopping experience without sacrificing accessibility to products. Its back-end solutions let the merchants update store contents, prices and much more.

Office Automation using Lotus notes

The company is striving for a paperless office environment and has made substantial achievements in this direction. It's now in a position to offer its expertise to other organization for design and implementation of office automation systems particularly in the field of Oil and Gas.

### **1.2.4 Hardware Installation & Maintenance:**

The hardware team of LMKR consists of certified, experienced engineers who provide installation and support services to major exploration and production companies.

#### **The services include:**

- ❖ Hardware setup and installation
- ❖ Operating System installation and support
- ❖ Installation and support of other peripherals (DLT, tape drives, plotters etc.)
- ❖ Landmark Applications installation
- ❖ Landmark Software License file installation
- ❖ Oracle Support
- ❖ Troubleshooting

Besides providing services to all the major E&P companies in the sector, the hardware team also maintains LMK Resources' and the Ministry of Petroleum's internal hardware consisting of Unix Workstations/servers, NT workstations/servers and other peripherals.

#### **Future plans:**

Incorporation of new categories like nuclear energy, fuel wood energy, viscosity, flow rates, etc.

Releases for Window CE™, Mac™, and Unix™



### 1.3 Geo Technologies:

From a decade of successful operation, LMK Resources has developed a specialized range of products and services that are now in demand for upstream exploration worldwide. The company philosophy is to continuously upgrade the tools, knowledge, and expertise to make energy production more efficient. Supported by its exclusive range and quality of services, companies exploring the energy sector can reduce project turnaround time and cost, and acquire the competitive edge to implement strategies and increase productivity. Improvement in the range of services continues, keeping LMK Resources at the leading edge of innovation and enabling to expand its operations from the US and South East Asia to the Middle East.

#### Services and Support

LMK Resources' presence means constant and consistent support to the E&P companies requiring high levels of accurate and reliable information. Its specialized services and integrated solutions are a valuable resource for any company considering investment in the upstream sector.

- ❖ Management and Archiving Services
- ❖ Welllog services
- ❖ Seismic data processing services
- ❖ G & G Services
- ❖ Data Brokerage services
- ❖ PPIS
- ❖ Onsite Consultancy
- ❖ Training and Support services

### 1.4 Research And Development Activities At LMK Resources:

LMK Resources is actively involved in R&D activities to keep abreast with the latest technology. The scientific, technical and management teams at LMK Resources continuously monitor new trends, requirements and opportunities presented by the technological breakthroughs. LMK Resources has consciously induced and nurtured an atmosphere of research and development in every sphere of its activities. R&D, being a trait of every dynamic enterprise, is a paramount pivot in our corporate culture. Primary areas of development are as follows:

- ❖ Oil & Gas Exploration and Production
- ❖ Seismic Data Analysis
- ❖ Office Automation
- ❖ Information System Development
- ❖ Software Development
- ❖ Graphics and Image Processing
- ❖ Geographic Information System
- ❖ Internet and Distributed Computing

*Chapter #*

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## 2.1 Survey Project Scope and Feasibility:

An engineer would not design a bridge without thoroughly studying the environment that the new bridge will occupy. An architect would not design a building without studying the land and laws that govern the use of the lands. A good business manager will not impose numerous policy changes without understanding the existing policies and their implications. Unfortunately many system analysts and programmers try to build new information systems without thoroughly studying the existing system. As a result, many information systems fail to solve existing problems, meet the needs of end users, or provide cost effective solutions to problem.

## 2.2 Purpose and Objectives of the survey and study phases:

The survey and study phases normally serve the same basic purpose to understand the current system. The study phase is the preliminary investigation of the system, whereas the study phase is much more detailed investigation. A simple project request not is usually enough for making decisions concerning whether to dedicate all the computing resources or not. The investigation should be intended to gain a very general feel for the size and the scope of requested project and the degree of urgency for solving problems, exploiting opportunities, or fulfilling directives.

I have conducted a preliminary investigation of about one week after the project request, my purpose was to draw conclusion whether I should intimate requested project or not, whether the project is cost beneficial? Why current system is not fulfilling all the requirements and needs of the organization. What are the actual problems in the current system?

For above purpose, I arrange meetings with the management and end-users of the current system.

## 2.3 Study the existing system:

After the survey phase the next should be the detailed study of the current system. The task of the detailed study phase is to learn hoe the current system operates, I need to understand what the current system is doing.

A significant amount of factual data about the current system, problems, constraints, opportunities and needs should be collected during this task. So fact finding is a very important skill fort this task but fact finding can be useless without verifications.

## 2.4 Drawbacks of the Existing System or Problem Analysis:

After the detailed study of the current system, the following problem, opportunities were perceived and it was noticed that as all existing procedures being carried out in institution were almost manual due to which the end-users have to face many difficulties and problems which are given as under.



- i) Paper Work and Work Force:
- ii) At present all existing system of Software Maintenance and Support Information System operated as manually.
- iii) All records for each request needs the separate file.
- iv) The solution to each request needs separate file.
- v) Different software that is developed need different files for record.
- vi) Wastage of time:

A lot of time is wasted due to the manually work keep record in maintenance and support information project. There is no ready information of the software's. If any body wants to see the previous information there will be waste of lot of time in searching of entry in record.

#### **2.4.1 Keeping Huge Amount:**

Large space was required to maintain a huge volume of paper work. Every shelf was full of registers, files and reports etc. one person was required just to maintain files of paper work. Searching process for the progress of just a request or for any other transaction etc. was slow and full of errors.

#### **2.5 Deficiencies of the Existing System:**

- **Security of Data:**

The records are handled manually and there is no security of data. During the manual work data can be lost or changed by any one.

- **On Line Report:**

Due to manually work there is no on line report for the top management or a daily statement, due to this management is facing the problem.

- **Lack of Reports:**

In the existing system there is lack of reports.

*Chapter #*

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### 3.1 System development Life cycle:

System development life cycle (SDLC) is management tool used by the system analyst or the software engineer to study and analyze any system. For this purpose following techniques are used and their dramatic representation is given as follows.

#### 3.1.1 Classic Life Cycle:

The life cycle is a project management tool. It defines the phase and tasks that are essential for systems development, no matter what type or size of system one tries to build. For instance, we should always identify problems, define requirements, evaluates alternative solutions and design the system and so forth.

Before establish the software development there is necessary to understand the step of life cycle of software development that is called according to traditional "water fall" method as below

Feasibility Study  
 Analysis  
 Design  
 Code  
 Testing  
 Maintenance

#### 3.1.2 4<sup>th</sup> GL (4<sup>th</sup> Generation Language):

In this type 4<sup>th</sup> generation languages are use after the requirement gathering and design strategy, for the implementation.

Requirement gathering			
Design Strategy			
Implementation	using	4	GL
Product			

#### 3.1.3 Prototyping:

An alternative approach to requirement definition to prototyping. When end user has difficulty defining requirements, the analyst uses powerful new computer tools to build prototype, or small scale working model of the final system

Requirement gathering  
 Quick Design  
 Build Prototype



Evaluate Redefine Requirements  
Engineer Product

### 3.1.4 Combination:

In this technique all the previous technique are combined together to give final product.

Requirement gathering

Prototyping  
Apply 4 GL Prototypes

Classic life cycle

## 3.2 Project Accomplishment and Constraints:

Prior to consideration of method that is to be used in designing it is necessary to look the general objective of design and some of its constraints. The objectives are concerned with operational system.

The general objectives are:

### 3.2.1 Performance:

For better performance system design should exploit the capabilities off hardware used. Further the system tends to have appropriate data structure manipulated by the efficient programs, closely related for fast processing.

### 3.2.2 Storage Requirements:

Minimized storage requirement is the part of the design effort. For this purpose complex packing and unpacking routines are available. This technique saves storage space but requires processors time.

### 3.2.3 Security:

Security of the system, including the privacy of the data, may be important. This will lead to extra processing requirements and data storage to control access programs and data.

### 3.2.4 Portability:

Portability such that a system can be run different of hardware, is a special type of flexibility. It may be a significant to a person developing a package; on organization with mixture of hardware at different sites, or a company that thinks it may be changes its

hardware or software in future. It is virtually impossible to develop a truly portable system. But it is impossible to concentrate the software and hardware dependent routines in one module.

### **3.2.5 Reliability:**

Reliability of the system can be achieved in term of hardware reliability and data integrity. The system should behave properly with the passage of time.

### **3.2.6 Integration:**

Integration with existing system and planned system is often high on list of objectives. This may well mean the designer is limited in the hardware and software that can be.

### **3.2.7 Modifiability:**

To design the new and best system there are numerous ways presents. It is fact each thing and approach is not perfect. So it is better that always adopt such way by which we may get better result than other do. System cannot develop without thoughts. Tools need selecting and applying carefully. The system analyst has great responsibility that he chooses the better design methods, strategies and methodologies. For this purpose the system analyst has to aware about tools.

## **3.3 Design Approaches:**

### **3.3.1 Top down Approach:**

In this method a global view of the total system is taken that is the system team proceeds from more general top-level requirement tot the more detailed lower level requirement.

During this phase the analyst analysis phase is mixed with the design the system and how the requirements are met provide phase that is what function. As a result back tracking may prove to be difficult.

### **3.3.2 Bottom Level Approach:**

In this strategy the system is study from bottom level to top level. This strategy is good because analyst may better consider the problems. Id there becomes some errors he may better get approach for solving its solutions. Analyst designs the system step by step and he designs the system to top level requirements.



### **3.4 System OF Administration:**

There are many strategies for designing a system, some of the strategies are:

#### **3.4.1 Management Survey strategy:**

All possible data is collected. In this strategy the data is input oriented rather than output oriented. So as a result, the cost of data processing generally becomes too large composed top benefits of the system.

#### **3.4.2 Data Collection Strategy:**

In this strategy all possible data is collected, compiled and covered in a special report for management needs. Obviously potential is used for collecting large volume of data that could never be beneficial, thus creating inefficiency in the processing of data

#### **3.4.3 Organization Chart Approach:**

In this strategy an information system is designed for each functional area of organization as the need arises. So each system is separate, mutually exclusive and parallel and to other system of organization causes great duplication of information.

### **3.5 Processed System Strategy:**

The strategy to design the new system is the data collection strategy. The data will be collected from all the sources both on the paper and the magnetic media. It will be then be manipulated to generate useful information in the form of reports for the management

### **3.6 Database Designing:**

To design a computer based project, the main step is to the database correctly and completely.

With a complete database we can design a system very easily and according to the requirement of the user. It should include all the possible fields.

Database design means the data stores where the data will be kept and accessed later, to be presented in the useful form.

Database designing is the most crucial part of the project development. Actually it is the base of the whole project. Programming depends on the structure of the database. If the database is designed properly, then the project turns out to be a success. On the other hand the best programming can not overcome a deficient design. So a flaw in the design

may result in the total waste of the project. Therefore the designer should be very careful while designing the database

### 3.7 Possible approaches to database design:

There are three approaches of the database design:

- Network Approach
- Hierarchical Approach
- Relational Approach

#### 3.7.1 Network Approach:

In network model a special data item can be accessed directly from the control module by creating appropriate path called sets. Network approach is good for repetitive reports. It also requires predetermine structuring of paths or links.

#### 3.7.2 Hierarchical Approach:

This approach structures data in the rigid owner/member relationship. Only following a path from the owner to the member record can access any specific data item in the model. This approach requires a predetermined structuring of data links of paths. This approach is efficient for repetitive reports or format but less efficient for adhoc queries.

#### 3.7.3 Relational Approach:

In relational approach different files exist in separate relation. A relation is two dimensional tables with the following properties.

- ✓ Entries in tables are single values i.e., no array are allowed.
- ✓ Entries in any column are all the same type
- ✓ No two rows in a table are identical.
- ✓ Order of rows and columns are immaterial

The data structure is not predetermined and relations can be added or deleted with out effecting other relations

There may other approaches like entity relationship model that is hybrid between network and relation models.

### 3.8 Problem Tackling Approach Adopted:

We have adopted the relational database design. The advantages of selecting the approaches are

- ⇒ The data is no more redundant
- ⇒ The related data is kept together.
- ⇒ It is entered that data is not lost when related data is deleted.

### **3.9 Design to Include:**

We followed the steps to design the database that are as follows:

#### **3.9.1 Process of Problem Analysis:**

The origin of any system study can always be traced to the reiterate of problems often the user encounters difficulties and tasks for help. The process of problems definition is integrative in nature.

To study the existing problem the interview session is completed with the organization. The interview session is divided into two steps:

1. Interview different levels of organization.
2. Review current operations manual and available reports.

To analyze the problem from top level to the bottom level management, a complete interview session should be organized.

- Interview with top level management.
- Interview with middle level management.
- Interview with bottom level management.

For the top level management the study of the major problems that occurs into existing system is done. They should be asked about the general requirement they want in the proposed system.

To look up the problem in the depth, here have to take an interview session with the middle and bottom level management.

#### **3.9.2 Database Include:**

After the complete review of problems, definitions and feasibility study the database are designed that will be included into the proposed system.

#### **3.9.3 Identical Entries:**

Once the problems and design have been understood, these entries may eventually be represented as tables in the database.

### 3.9.4 Define Perimeters:

In each table some identifies are needed which distinguish each record. The basic rule of designing database is not to allow duplication in each database. There must be a way to ensure that each record is primary key. The primary key can't be blank or null. The values that are used to differentiate among the records are identified to ensure the requirement that duplicates will be rejected.

### 3.9.5 Identifies Foreign Keys:

Foreign key is a field in the database used to relate the database with the other database. Essentially the foreign key is used to associate a record to a value in other table.

### 3.9.6 Data Type of Each Table:

In this step the data types are specified for each field. A list of data types is as follows;

- 1- Number
- 2- Character
- 3- Date
- 4- Logical
- 5- Memo
- 6- Varchar
- 7- Varchar2

# *Chapter #*

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## DESIGN PHASE

### 4.1 Introduction:

Software Design phase is the realization of the proposals developed in the requirement analysis phase of system analysis, so system designing is the most challenging job of all the phases in the system life cycle. Design is the first step in the development phase for any engineered product or system. It may be defined as “the process of applying various techniques and principles for the purpose of defining a device, a process or a system in sufficient detail to permit its physical realization”.

Software Design is the first of the three technical activities: design, coding and testing—that are required to build and verify software.

The importance of software design can be stated with a single word—*quality*. Design is the place where quality is fostered in software development. design provides us with representations of software that can be assessed for quality. Design is the only way that can accurately translate a customer’s requirements into a finished software product or system.

Software Design can be categorized into the following phases:

- ⇒ Data Design
- ⇒ Architectural Design
- ⇒ Interface Design
- ⇒ Procedural Design

The data design transforms the information domain model created during analysis into the data structures that will be required to implement the software. The data objects and relationships defined in the Entity-Relation Diagram and the detailed data content depicted in the Data Dictionary provide the basis for the data design activity.

The *architectural design* defines the relationship among major structural elements of the program

The *interface design* establishes the layout and mechanism for human machine interaction.

The *procedural design* transforms structural elements of the program architecture into a procedural description of software components.

### 4.2 Software Design Characteristics:

The characteristics that serve as guide for the evaluation of a good design are as follows:

The design must implement all the explicit requirements contained in the analysis model and it must accommodate all the implicit requirements desired by the customer.

The design must be a readable, understandable guide for those who generate code and for those who test and subsequently maintain the software.

The design should provide a complete picture of the software, addressing the data, functional and behavioral domains from an implementation perspective.

### **3.3 Data Design:**

Data design is the first of the three activities that are conducted during software engineering. The impact of data structure on program structure and procedural complexity causes data design to have profound influence on software quality.

The primary activity during data design is to select logical representation of data objects (data structures) identified during requirements analysis and specification phase. Regardless of the design techniques to be used, well-designed data can lead to better program structure, effective modularity and reduced procedural complexity.

### **3.4 Code and IDs Design:**

Codes and IDs are required to reduce the storage and number of typing strokes. To avoid any error, code should be small and simple. Codes and IDs designed for the Privatization Process Information System explicitly defines the particular entity.

**The codes and IDs used in the system are as follows:**

- SW\_id
- Version
- Dept\_id
- Env\_id
- User\_id
- Dev\_id
- Site\_id
- Sol\_No
- Req\_id
- Req\_no

### **3.5 Software Engineering Process:**

No doubt, a complete understanding of software requirements is essential to the success of a software development effort. No matter how well designed or well coded a poorly analyzed and specified program will disappoint the user and brings grief to the developer.



The requirements analysis task is a process of discovery, refinement, modeling and specification. The software scope, initially established by the system engineer and refined during software project planning, is refined in detail.

### 3.6 Obstacles in Analysis Phase:

As we know both the developer and client take an active role in requirements analysis and specification. The client attempts to reformulate a sometimes-nebulous concept of software function and performance into concrete details. The developer acts as interrogator, consultant, and problem solver.

Requirement analysis and specification may appear to be a relatively simple task but as we know appearances are always deceptive. Communication content is very high. Chances for misinterpretation or misinformation abound. Ambiguity is probable. The dilemma that confronts a software engineer may best be understood by repeating the statement of an ambiguous customer. "I know you believe you understood what you think I said, but I am not sure you realize that what you heard is not what I meant".

### 3.7 Requirement Analysis:

Requirement analysis is a software engineering task that bridges the gap between the system-level software allocation and software design. Generally software requirements analysis may be divided into five areas of efforts:

- ⇒ Problem recognition
- ⇒ Evaluation and synthesis
- ⇒ Modeling
- ⇒ Specification
- ⇒ Review

Initially the analyst studies the software project plan. Next, communication for analysis must be established so that problem recognition is ensured. The goal of analyst is recognition of basic problematic elements as perceived by the user or customer.

Problem evaluation and solution synthesis is the next major area of the efforts for the analyst. The analyst must define all externally observable data objects, evaluate the flow and content of information; define and elaborate all software functions; understand software behavior in the context of events that effect the system; establish system interface characteristics; and uncover additional sign constraints. Each of these tasks serves to describe the problem so that an overall approach or solution may be synthesized.

If we take into consideration the SM&SIS, the first thing which should be made clear is that why organization need the automation of this system as organization already have an efficient data entry system being run by the management and administration quite efficiently. The fact which becomes obvious is that the need of the time with the growth in the business and to cope with the



increasing requirements of the organization. That is why we have developed an automated system for the management and administration to be able to cope with the needs and requirements of the progress of organization.

Interaction with the client is first and for most elements in requirement analysis phase. This phase has its critical and crucial importance. The client wants to convey all his requirements in one meeting and the system engineer is also willing to get information as much as he can. This phase consists of many levels of abstractions. So I have to make several visits to related Departments of organization to get all necessary information about proposed system. Then we have to distinguish between relevant and irrelevant information to handle the systematic procedure carefully. After getting all the required information, we have to convert it into database management system i.e. defining the involved factors, their mandatory and compulsory relationships and other concepts about entity relationships.

For the preparation of an efficient and dependable system we have used developer2000 and SQL3.3 then the oracle database has been used for the development of database because these tools are latest and are being widely used for the database development. The tables were initially designed in DEVELOPER 2000, the composite and the primary keys of the tables were decided and their relationships were made and after giving final shape of the symbolic database we transferred it into SQL by using Forward Engineering Commands. Later the respective forms were designed in the form builder in the developer 2000. The data was later entered in the forms.

Throughout evaluation and solution synthesis activity, the analyst's primary focus is on "what", not "how". What data does the system produce and consume, what functions must the system perform, what interfaces are defined, and what constraints?

It is important to note that a detailed specification may not be possible at this earliest of evaluation. The user may be unsure of precisely what is required. The developer may be unsure that a specific approach will properly accomplish function and performance. The most commonly used analysis technique to bridge the communication gap between the customer and the developer and to get the communication process started is to conduct a preliminary meeting or interview.

### **3.8 Analysis Modeling:**

At a technical level software engineering begins with a series of modeling tasks that lead to complete specification of requirement and a comprehensive design representation for the software to be built. The analysis model, actually a set of models, is the first technical representation of a system. Structured analysis and object-oriented analysis are the two most commonly used approaches. In structured analysis we create models that depict information that is data and control, content and flow, we divide the system functionally and behaviorally and then we depict the sense of what must be build.

The analysis model must achieve three primary objectives:

- ✓ To describe what the client requires.
- ✓ To establish a basis for the creation of software design.
- ✓ To define a set of requirements that can be validated once the software is built.

### 3.9 Data Modeling:

Data modeling answers a set of specific questions that are relevant to any data processing application. What are the primary data objects to be processed by the system? What is the composition of each data object? What attributes describe the object? Where do the objects currently reside? What are the relationships between each data object and other objects? What is the relationship between the objects and the processes that transform them?

### 3.10 Generating triggers:

A trigger is a named set of precompiled SQL statements stored on the server that is automatically executed when a specified event occurs. For example, a trigger can be executed whenever a row in an existing data table is inserted, updated, or deleted. The trigger tells the DBMS how to process the SQL INSERT, UPDATE, or DELETE commands to enforce the organization's normal business rules.

A referential integrity trigger is a special kind of trigger that is used to maintain integrity between two related tables. For example, if a row in a parent table is inserted, updated, or deleted, a referential integrity trigger (hereafter called an RI trigger) tells the DBMS what to do to rows in other tables that have a foreign key value that matches the primary key in the row being added, updated, or deleted.

*Chapter #*

*5*

## Proposed System

### 5.1 Introduction:

After study the problems, deficiencies and study the objects of the system an analyst looks the logical design of the proposed system. If all the stages are completed truly, the last step becomes the implementation on computer. In this stage programmer design the proposed system in the light of logical system that are done by a system analyst. Now programmer has responsibility that he looks the design in the coding form.

For a programmer coding is a great job and he should be expert in the field, know the language, tools in which he implements the designed system. I tried to design the system after study of different functions of the organization. The whole project is menu driven software program.

### 5.2 System Requirements:

System information is necessary for the user. The most important thing is to find out that what the software and hardware requirements for the user are. It is the responsibility of the system analyst to come up with the most suitable combination which can work efficiently.

I would like to make certain necessary suggestions to run the system efficiently.

### 5.3 Hardware Requirements:

Minimum hardware requirements to run the system effectively are as follows,

- ⇒ P-1 300MHz
- ⇒ 4-GB HD
- ⇒ 64 MB Ram
- ⇒ 80 column Printer
- ⇒ UPS

The system has to manage Oracle Database so for this purpose fast machine is required.

The report generated by this system carry large data which can be represented properly in 80 column report that's why it needs 80 column Printer.

To make the data secure at the time of power failure UPS is required.

### 5.4 Software Requirements:

To implement the proposed system there is required tool so that the different procedures, triggers etc. can be used and stored efficiently and the user may not face any problems to prepare reports for the lower level and the top level management.

## 5.5 Reason to Computerize in Oracle:

Oracle is a powerful package which provides such facilities that can't be achieved through other higher level languages easily

For this system the proposed language is Oracle 7.3, it's a 4<sup>th</sup> generation language with modern database facilities and is ideal for such a system such as

- ⇒ Data security measurements
- ⇒ Network sharing

### ❖ Data Security measurements:

When two users refer to the same data at the same time, and at least one of the user is updating or deleting the parts of the data certain conflicts can arise. Suppose for example the two users read the same data and then both change it and commit it. The changes committed first are lost. Since the other set of changes are based on the data that was read before the first set of changes was made. Many computer systems permit users to prevent such conflicts by locking data that is to be changed. When data is locked then other user's access to that data is restricted. ORACLE supports several types of locks.

A SHARE locks permits other users to query data but not change it. This lock is appropriate when you are querying the tables, but not changing it, and want to ensure that others users can not change the data you are querying during your queries.

SHARE UPDATE locks other users to both query and lock data. This lock is appropriate when you are querying and changing data in a table, and are sharing the table with other users that are doing the same.

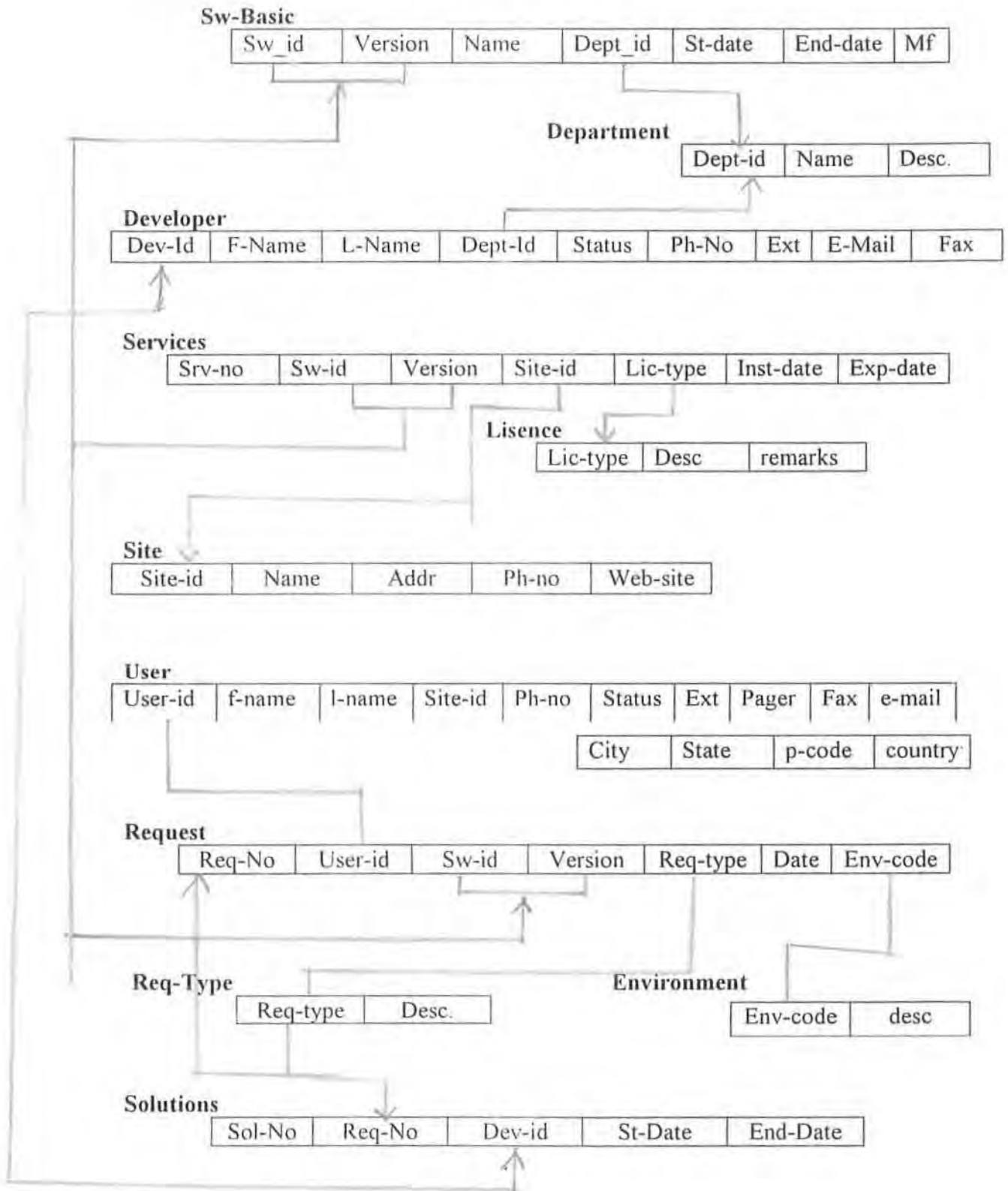
EXCLUSIVE lock permits other users to query data but not update it, it differs from a SHARE lock because it does not permit an other user to place any type of lock on the same data.

### ❖ Network Environment:

When you start ORACLE you identify with your name and password that give you access to your own table and views. But if you want to have more than one user then you have to share the database for that you have to use the connect command for this purpose. For this purpose the basic requirement is that of a SERVER CLIENT configuration. In this configuration the system on which you have your database will be the server from that server you have to assign the name and the passwords to your shared clients along with the privileges to access the data etc.

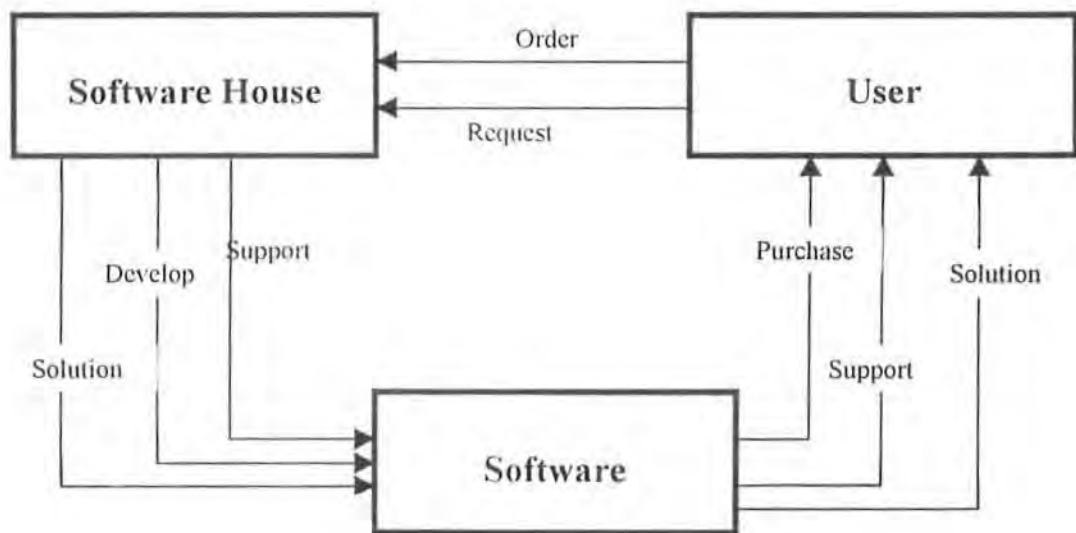
## 5.6 Bachman Diagram:

This diagram is used to show the data integrity



### 5.7 Data Modeling:

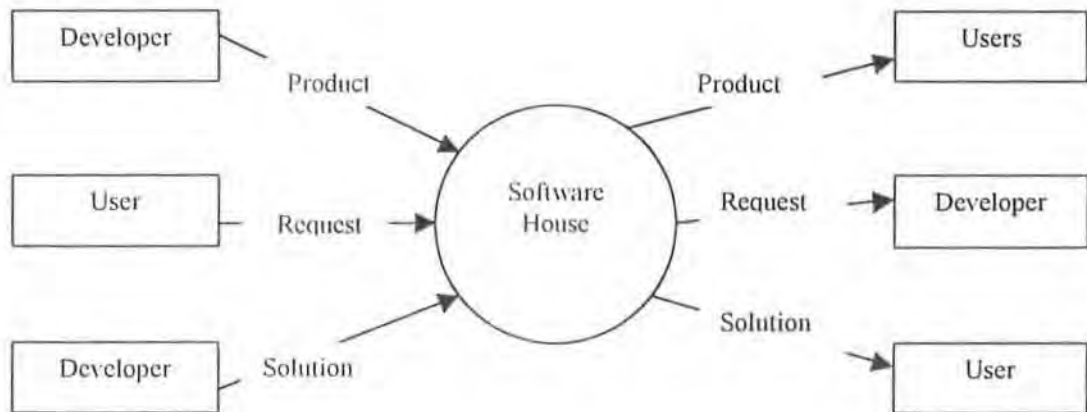
This is the graphical representation of the flow of the system. The system flow chart of Software Maintenance and Support Information System is



## 5.8 Data Flow Diagram:

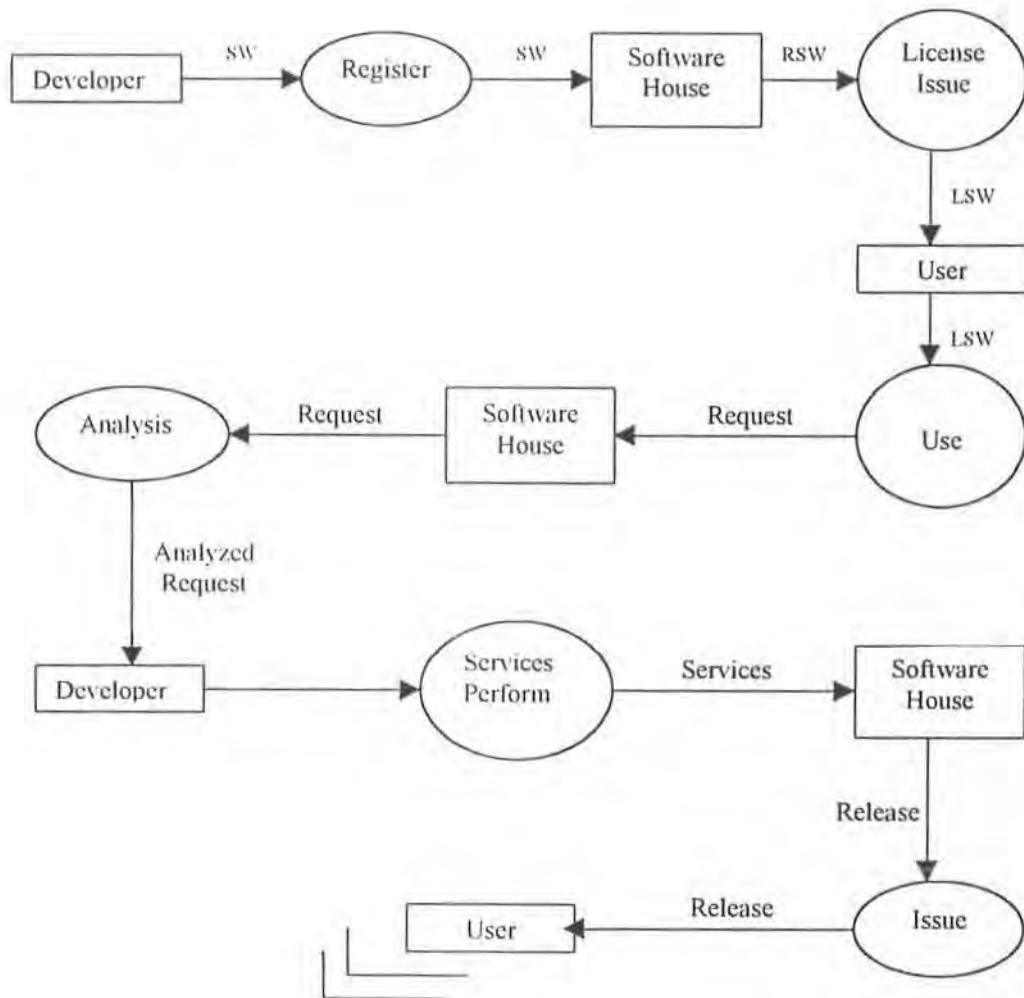
This is the graphical representation of the flow of data. The O-level and I-level DFD for the proposed system are as under.

### O-Level



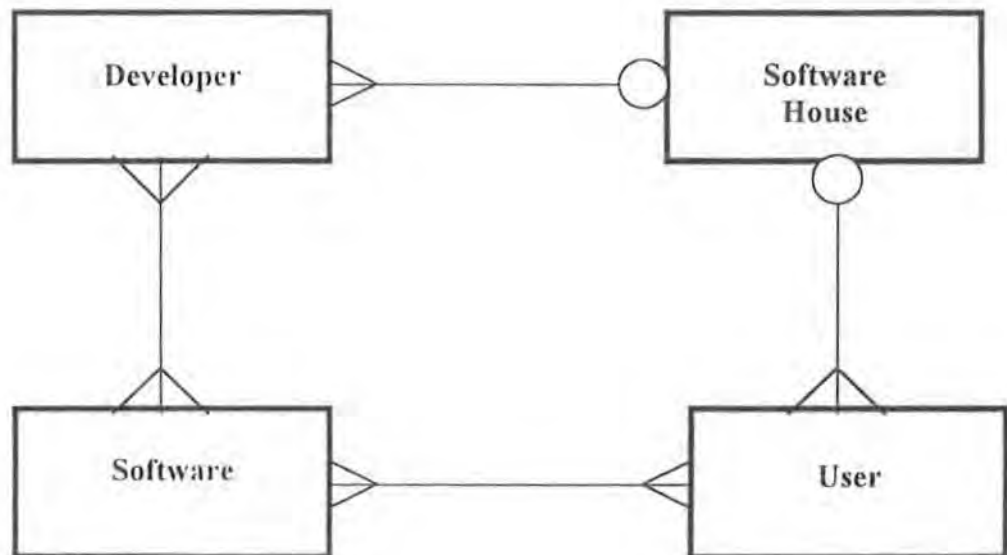


### 1-Level



## 5.9 ERD:

The Entity Relationship Diagram for the proposed system is



## 5.10 Database Design of SM&SIS:

Database design phase is the mandatory phase in the process of system design because the whole system depends upon good database design. While designing the database the fact such as data integration, data sharing, consistency, redundancy and data duplication have been taken care of.

The detailed description of database tables is given bellow;

**Sw\_Basic:**

In this table the basic information about each software developed by the organization has been described briefly:

Primary key << sw\_id, version.

Foreign Key << Dept\_id

Keys	Data type	Data Length	Description
SW_ID	Varchar	5	Identifier for the software.
Name	Varchar	15	Name of the software.
Version	Varchar	5	Identifier for every release of Software.
Dep_ID	Varchar	5	The code for Department.
Start_date	Date		The start date of software development
End_date	Date		End date for software development.
MF	Varchaar	1000	Major features of the software.

**Department:**

In this table the basic information about each department to which a user and developer belongs has been described briefly;

Primary key << Dept\_id

Keys	Data type	Data Length	Description
Dept_id	Varchar	5	Identifier for the department.
Name	Varchar	30	Name of the department.
Desc	Varchar	100	Description of department

**Developer:**

In this table the basic information about the Developers who developed the software has been described briefly;

Primary key << Dev\_ID

Foreign Key << Dept\_id

Keys	Data type	Data Length	Description
Dev_ID	Varchar	5	Identifier for the developer.
F_Name	Varchar	15	First name of Developer.
L_Name	Varchar	15	Last name of Developer.
Dep_ID	Varchar	5	The code for Department.
Status	Varchar	15	Developers job status or designation.
Ph_no	Varchar	15	Phone number of the developer.
Ext	Varchar	5	Extension number of the developer.
Email	Varchar	30	E-Mail address of the Developer.
Fax	Varchar	15	Fax number of the developer.

**License:**

In this table the basic information about licenses installed at different sites has been described briefly;

Primary key << Lic\_type

Keys	Data type	Data Length	Description
Lic_type	Varchar	5	The code of License.
Desc	Varchar	100	Detail of license.
Remarks	Varchar	100	General comments of the record.

### Request:

In this table the basic information about each request that is made by user has been described briefly.

Primary key << Req\_no

Foreign Key << User\_Id, Sw\_id, Version, Req\_type, Env\_code

Keys	Data type	Data Length	Description
Req_no	Varchar	5	Identifier for the Request.
User_id	Varchar	5	Name of the user.
Sw_id	Varchar	5	Identifier for the software.
Dep_ID	Varchar	5	The code for Department.
Version	Varchar	5	Identifier for the version of software.
Req_type	Varchar	5	Type of request made.
Req_date	Date		Date of request received.
Env_code	Varchaar	5	Environment code.

### Services:

In this table the basic information about services of each software that is installed on sites has been described briefly;

Primary key << Serv\_no.

Foreign Key << Site\_id, Sw\_Id, Version, Lic\_type

Keys	Data type	Data Length	Description
Serv_no	Varchar	5	Identifier for the services of software.
SW_ID	Varchar	5	Identifier for the software.
Version	Varchar	5	Identifier for every release of Software.
Site_ID	Varchar	5	The code for Site.
Lic_Type	Varchar	5	Type of License.
Inst_date	Date		Date of installation.
Exp_Date	Date		Expiry date of the Software.

### Sites:

In this table the basic information about each Site to which the organization is providing services has been described briefly;

Primary key << Site\_id

Keys	Data type	Data Length	Description
Site_ID	Varchar	5	Identifier for the Site.
Name	Varchar	15	Name of the Site.
Addr	Varchar	30	Address of client company.
Phone	Varchar	15	Phone number of Site.
Web_site	Varchar	30	Web site of the Site.

**User:**

In this table the basic information about the Users who use the software provided by the organization has been described briefly;

Primary key << User\_ID

Foreign Key << Site\_id

Keys	Data type	Data Length	Description
User_ID	Varchar	5	Identifier for the User.
F_Name	Varchar	15	First name of User.
L_Name	Varchar	15	Last name of User.
Site_ID	Varchar	5	The code for Site.
Status	Varchar	15	Users job status or designation.
Ph_no	Varchar	15	Phone number of the User.
Ext	Varchar	5	Extension number of the User.
Email	Varchar	30	E-Mail address of the User.
Fax	Varchar	15	Fax number of the User.
Pager	Varchar	15	Pager of the user.
City	Varchar	15	City name of User.
State	Varchar	25	State or Province of User.
Country	Varchar	25	Country of User.
Postal_code	Varchar	9	Postal Code.

**Req\_Type:**

In this table the basic information about the type of request has been described briefly;

Primary key << Req\_type

Keys	Data type	Data Length	Description
Req_type	Varchar	5	Identifier for the Request type
Desc	Varchar	100	Description of Request type

**Environment:**

In this table the basic information about the type of environment used by the users has been described briefly;

Primary key << env\_type

Keys	Data type	Data Length	Description
Env_type	Varchar	5	Identifier for the environment type
Desc	Varchar	100	Description of environment type



**Solutions:**

In this table the basic information about each solution made by developer of each request that is made by user has been described briefly;

Primary key << Sol\_no

Foreign Key << Req\_no, Dev\_Id

Keys	Data type	Data Length	Description
Sol_no	Varchar	5	Identifier for the Solution.
Req_no	Varchar	5	Identifier for the Request.
Dev_id	Varchar	5	Identifier for the developer.
S_Date	Date		Start date of solution.
End_date	Date		Completion date of solution.

*Chapter #*

*6*

## SYSTEM DEVELOPMENT AND IMPLEMENTATION

### 6.1 Introduction:

After software design phase is completed, the development phase starts. The system to be developed should be according to proposed system and design specifications. The purpose of the development phase is to transform design into executable computerized software, which may then be tested and implemented as a new system. For software development it is necessary to identify functional requirements of the system. In the development process the basic and very important step is the selection of a programming language (Tool).

The SMSIS is developed in Oracle 7.3 developer 2000, using forms builder.

### 6.2 Why Oracle:

Oracle is chosen as a development tool, because it was the requirement of the organization to use Oracle for the Software Maintenance and Support Information System.

### 6.3 Features of Oracle:

Oracle provides many features to develop database systems, some of them are given below:

- ⇒ Good security.
- ⇒ Facility of taking backups.
- ⇒ Provides powerful procedural language known as PL/SQL.
- ⇒ Very strong on line help.
- ⇒ Oracle RDBMS is portable on most of the hardware and software.
- ⇒ Provides a number of sophisticated development tools (include) system implementation

### 6.4 System Implementation and Evaluation:

System implementation and evaluation is the final phase in the system development life cycle, after development of the software. Implementation is the process of bringing into operational use, a system that has been developed. This phase start at the beginning of the development phase with a plan, called the implementation plan. Under this plan the new system is tested, converted and replaced by the old system. The new system may be totally new. Replacing an existing one or it may be a major modification to an existing system. In either case proper implementation is essential to provide a reliable system to meet the requirements of the organization.

The major parts of this phase are

- ⇒ System testing
- ⇒ System conversion

#### **6.4.1 System Testing:**

Testing and validation of results is very important to make the system acceptable. Even if the system is developed using correct algorithm, its reliability remains doubtful. The system can not be handed over the user until its accuracy is proved mathematically. System testing is the process of executing a program with the explicit intention of finding errors, i.e., making the program fail and the test cases are prepared with this purpose in mind. A test case is a set of data that the system process as normal input. A successful test is one that finds errors. Every effort has been made to make sure that system does not fail under any condition. The system testing is performed in the following three steps.

##### **⇒ Unit Testing:**

In unit testing, each individual module of the developed system is tested. the purpose is to determine whether each module is working properly and to locate the logical and coding bugs.

##### **⇒ Integration Test:**

After successful unit level testing, all integrated modules were tested together to ensure that interfaces such as calling sequences and common data areas are all arranged correctly. All inter related blocks and forms were tested together to ensure that data movements along the corresponding paths are correct. The main purpose is to determine that the modules are correctly interacting with each other.

##### **⇒ System Test:**

To perform system test, whole system was tested to ensure that it works according to its specification and requirements of the organization. All the forms were tested whether in this test. The test results also gave an indication of the software quality and system design, which in turn helped in locating errors, which required design modification.

#### **6.4.2 System Conversion:**

After the successful completion of testing phase, preparations can be made to switch over to new system. There are four different methods, for performing system conversion ensuring proper working of the system.

- Direct conversion
- Phase in conversion
- Pilot conversion
- Parallel conversion

### 6.4.2.1 Direct Conversion:

In this method the old system is abandoned and the new one starts functioning, no matter how it performs in the long run. In case of new system failure the loss of data may pose several difficulties to the management, if no backup of the old system is present. This is the major drawback of this type of conversion. That is why this approach requires carefully designed implementation plan. This strategy is also called Cut and Start conversion strategy.

### 6.4.2.2 Phase-In Conversion:

The phase-in method is used when it is not possible to install a new system through an organization all at once, i.e. it will be brought in gradually. In this type of conversion long phase-in periods creates difficulties.

### 6.4.2.3 Pilot Conversion:

In this method, the system is first implemented over a small part of the system or some other small system similar to the existing one, to avoid heavy financial loss.

### 6.4.2.4 Parallel Conversion:

In this method, both the systems, existing and designed, work simultaneously for a specific period of time. At the end of the parallel run period, if the new system is approved on the basis of results produced, the existing system will be dropped and the design system will continue from there onward.

## 6.5 SYSTEM EVALUATION:

Another activity to judge whether the developed system has meet the desired objectives of the proposed system, which are set in the system description is called system evaluation. The system description is reviewed and evaluated with respect to its completion and efficiency. It also suggests future enhancements in the developed system.

### ❖ Merits:

Major features of the developed system are:

### ❖ Accuracy:

By accuracy we mean that the inputs are sufficiently precise for their desired output. This new system is accurate because during data entry several data validation checks are provided. However, there is small probability of incorrect data in non transaction files as a user might input wrong spellings and wrong figures.

**❖ Efficiency:**

The new system is efficient as there are well organized databases of which different screens are prepared with validation checks so that the program fulfills the requirements of organization. The program is prepared in windows 98 environment and some utilities are chosen from it to increase the efficiency of the program. The access to information is very fast because of well designed database and this program is user friendly

**❖ Modularity:**

The system is divided into a number of modules integrated together to fulfil user's requirements. These modules are independent of each other. Another major advantage of modularity is the ease of modification and extension of the developed system.

**❖ Easy to Use:**

The developed system is menu driven. Help is provided at every possible point. Data entry, updation and deletion are all provided on a single screen. During data entry, the user can toggle, between almost all fields.

**❖ Consistency:**

Uniform notations within the system are used to ensure that program contents make its purpose clear to other programs.

**6.6 Conclusion:**

In the end, we would like to say that developing this system was an interesting experience, from practical point of view. We learnt a lot during this, because it was not just based on assumptions, but on actual work. The information was collected, by conducting all the phases of the System Life Cycle, at LMK Resources. We hope that with the development of this system some, if not all, problems of LMK Resources will be solved.

**6.7 Future Enhancement:**

As the system has been developed according to requirement of organization, it can be expanded in future according to need of organization. The expected enhancement in near future is security from unauthorized users and to integrate with the network system of the organization.

*Chapter #*

*7*

## User Guide

### 7.1 INTRODUCTION:

The user guide is provided so that user becomes familiar with the new system more easily and quickly. This chapter will provide a comprehensive understanding to operate the Software Maintenance and Support Information System for LMK Resources.

Since the system operates in the multi user environment so it requires the service of DBA to perform certain tasks such that creating new user, giving them privileges, keeping back up of data etc.

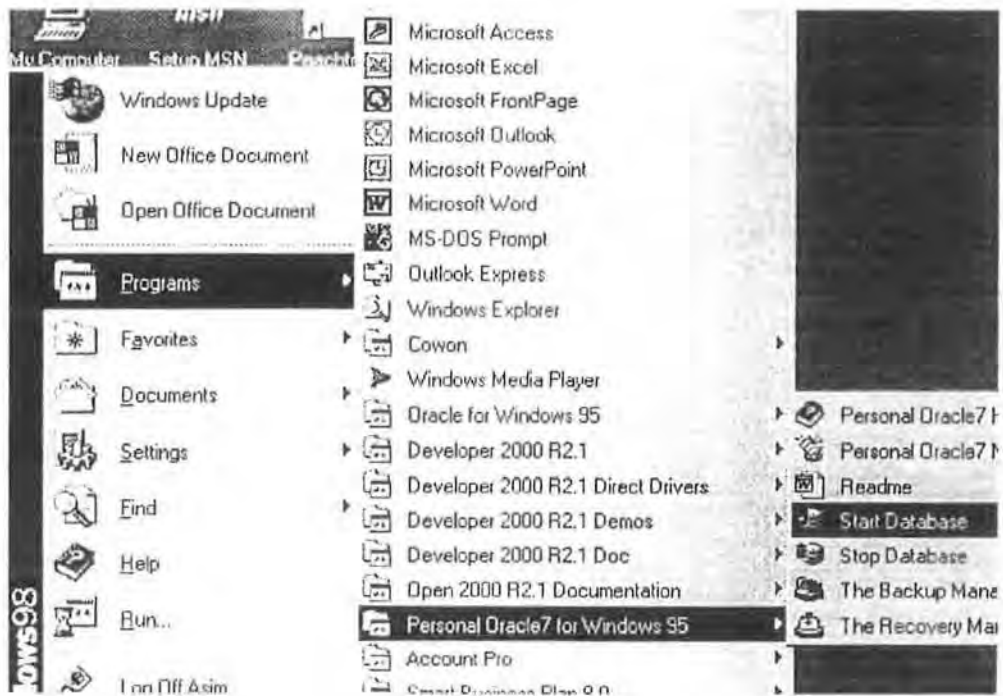
The first and foremost step to the implementation of the newly designed system is installation of windows-98 or a higher version. The second step is the installation of ORACLE 7 which mainly deals with the database. To represent the data in the user friendly environment the tool used is DEVELOPER2000 (R2.1) and this software might be installed along with the ORACLE. The ORACLE functions at the back end where as the DEVELOPER2000 functions at the front end.

After the installation of ORACLE and the DEVELOPER2000, the database administrator will create users identified by their respective passwords.



## 7.2 Getting Start:

Before start working with the front end the user might start the database engine. The database engine is mounted by the adopting the process as shown in the fig. below.



### 7.3 Database:

On clicking this point following messages will appear one by one which tell about the starting of data

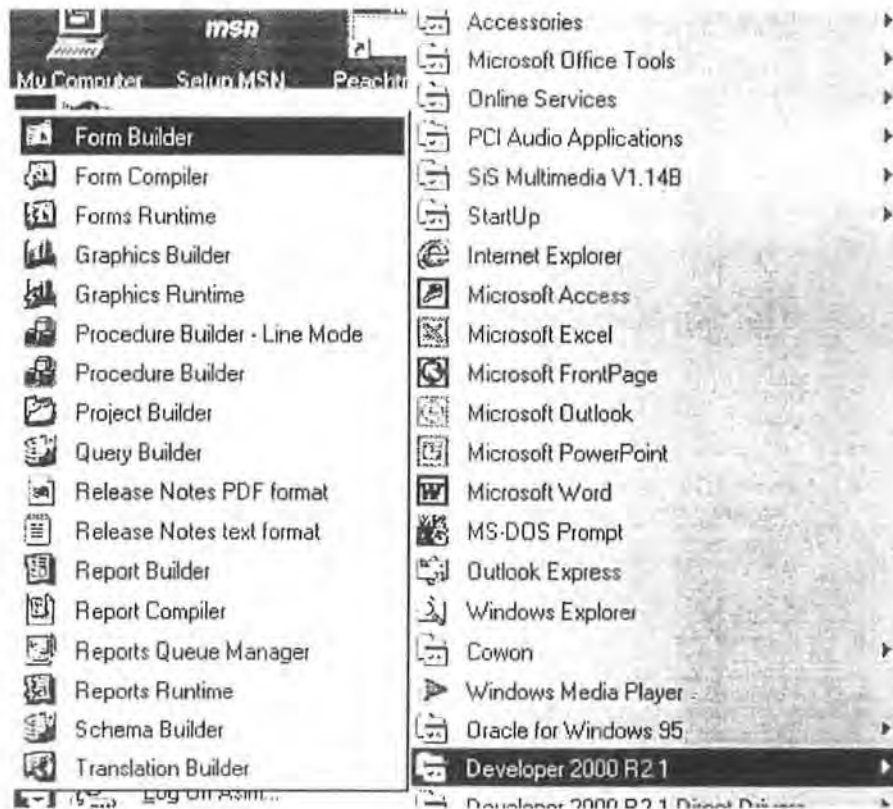


Finally a message box will appear shown as under which shows that database has been started successfully.



Press OK to clear this box.

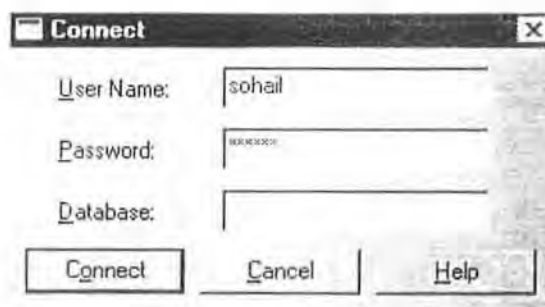
Now in order to open the DEVELOPER\2000 FORMS/5.0  
The following path should be followed.



The form builder will start functioning and then user can use the form builder

## 7.4 Security:

Before getting started with the front end the user should enter the user name and password for the security purpose of the database.



## 7.5 Important Considerations:

The user must know the following terminologies and their functionality;

### 7.5.1 Console:

Console is the general name for the standard features that provide essential user information at run time. It appears at the bottom of the screen. Console includes the status line and the message line.

### 7.5.2 Status Line:

The status line is the console component that indicates the verity of indicators to reflect the current sate of form module. The indicators along with their meanings are described bellow

INDICATOR	MEANING
Count	The number of records retrieved and displayed by the query
*	The last record have been retrieved
^	There are records above the current one
V	Records bellow the current one
Enter Query	The current record is in the enter query mode and no record has been retrieved
<List>	The list of values(LOV)is associated with the current item

### 7.5.3 Message Line:

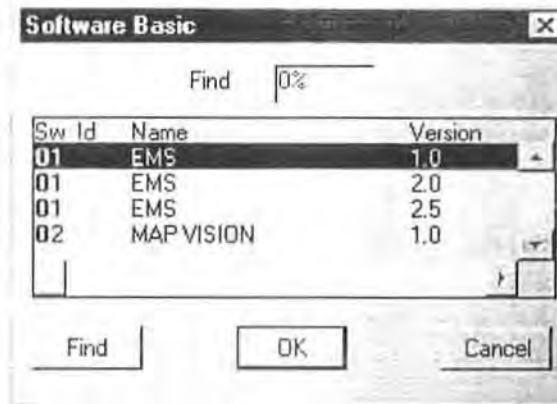
The message line is the console component that displays the Oracle Forms and application specific messages. For example, different error messages and additional help may be displayed when ever needed.

### 7.5.4 Customized Menu:

The customized menu is the menu which is automatically used by all Oracle Forms for the current application. It provides an alternative method to use those key stroke operations.

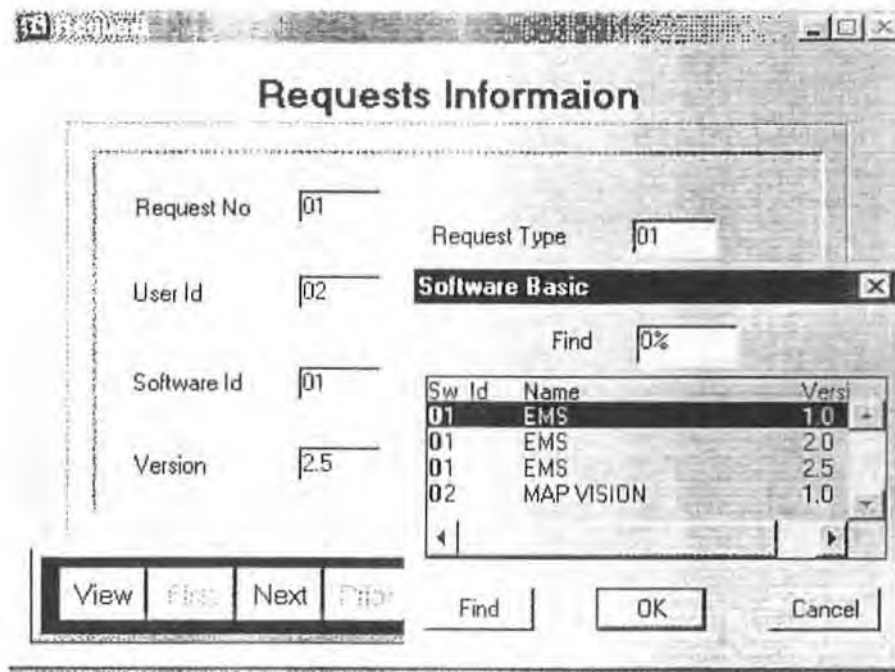
### 7.5.5 List of Values (LOV's)

During data entry, often a user has to enter data which already exist in some other table. Oracle provides a method via which list of values for a column can be provided. The method is called list of values or LOV. A list of window is an object which opens up a separate window displaying the values from one or more tables when the user clicks on the appropriate key sequence.



### 7.5.6 Form with LOV:

The following fig shows the use of LOV in the form to call the required data



## 7.6 Menu Bar:

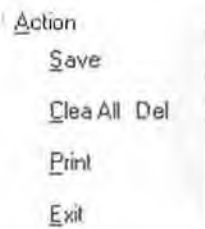
Menu bar is present on every form and has all the functionalities which are required to interact with the software. The customized menu bar is shown in the figure

Action Edit Block Query Record Field Reports - Utilities Help Window

### 7.6.1 Action

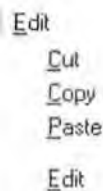
This menu option has the following functionalities as shown in the fig. bellow:

<b>Save:</b>	To save the entered record.
<b>Clear All:</b>	To clear the selected field.
<b>Print:</b>	To print the active area.
<b>Exit:</b>	To exit from the active window.



### 7.6.2 Edit:

This menu option has the following functionalities as shown in the fig. bellow: These menu options are used to cut, copy, paste and edit the records.



### 7.6.3 Block:

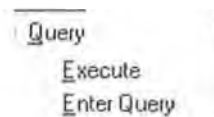
This menu option is used to navigate through different forms as per requirement.



### 7.6.4 Query:

This menu option has the following functionalities as shown in the fig. bellow:

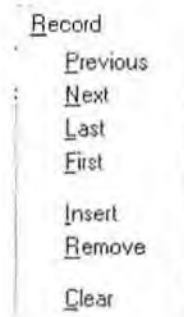
**Enter Query:** this functionality is used to view the particular record  
**Execute query:** this functionality is used to view the first record



### 7.6.5 Record:

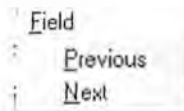
These menu options allow the user to navigate, insert or delete the records.

<b>Previous:</b>	To view the previous record.
<b>Next:</b>	To view the next record.
<b>Last:</b>	To view the last record.
<b>First:</b>	To view the first record.
<b>Insert:</b>	To insert the new record.
<b>Delete:</b>	To delete the particular record.
<b>Clear:</b>	To clear selected field.



### 7.6.6 Field:

It has options to navigate in the fields of active window.



### 7.6.7 Reports:

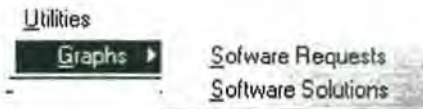
This menu has options to open the different reports as per requirement.





### 7.6.8 Utilities:

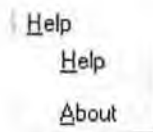
This menu has the options which have the functionalities to draw the graphs across the different records mentioned by the user as per requirement.



### 7.6.9 Help:

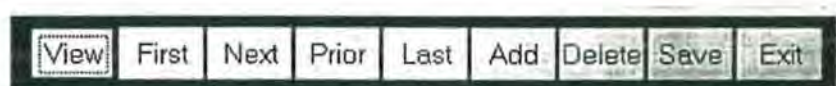
This menu has the following functionalities;

- Help:** This function opens the contents of user guide.
- About:** About the software.



### 7.9 Horizontal Tool Bar:

The horizontal tool bar is shown.



- View:** This command button is used to view the very first record in the active window.
- First:** This command button is used to view the first record at any time in the active window.
- Next:** This command button is used to view the very next record at any time in the active window.



- Prior:** This command button is used to view the very previous record at any time in the active window.
- Last:** This command button is used to view the last record at any time in the active window.

*(Note: The above four navigation buttons has the enable/disable property such that when the user will be on the last record the LAST and NEXT command buttons will become disable, similarly when the user is at the first record the FIRST and the PRIOR command buttons will become disable.)*

- Add:** This command button is used to add the new record at any time in the active window.
- Delete:** This command button is used to delete any record at any time in the active window.
- Save:** This command button is used to save the record or changes made in the form at any time in the active window.
- Exit:** This command button is used to exit from the active window.

## 7.10 Alerts:

An alert is displayed as a modal window. It gives information to the user that requires a response before processing can continue either an acknowledgement or an answer to a question.

One more than one message is waiting to show on the message line, the current message also appears as an alert. In addition to the system alerts, different self designed alerts can be displayed on the screen to take response from the user before processing.

## 7.11 Record Manipulation:

Four general operations can be performed on the record, namely, insertion, retrieval, modification and deletion. The basic condition for these operations to perform is that the form on which the operation is to be performed must be displayed on the screen.

### 7.11.1 Insertion:

The record can be inserted in the database table by adopting the following procedure:

Form <Record> menu, click on <Insert>. The form will appear blank. This can also be done by clicking the <Clear> option from the menu..

Enter the data in the form.

Press <save> button to save it in the work space.

To insert the more records, repeat the above steps.

Click on the <exit> button to return on the main page.

### 7.11.2 Retrieval:

To retrieve the record,

Click on <VIEW> button or the QUERY option from the menu.

If the key value for required record is entered, then the particular record will be displayed, otherwise first record will be displayed. Keep on pressing <Next> key to scroll the records until the desired record is retrieved. Click on the <Exit> button to go back on the main menu.

### 7.11.3 Modification:

Repeat first two steps of retrieval operation,

Enter new data in the displayed editing fields, where values are to be modified. Press <Save> button to save the changes in the database.

### 7.11.4 Deletion:

Repeat first two steps of retrieval program.

Click on the <Remove> in the <Record> menu. The desired record will be deleted. Click the <Save> button to save the modification. Other records can be deleted by adopting the same procedure.

## 7.12 Implementing the Security:

Any computerized database system should be sure enough to be accessed by authorized persons. Database administrator (DBA) implements such securities. One of the duties of the DBA is to provide access to the computer system to users to use the Oracle database. For that, one must have access to the computer and the operating system through an identification and password to ensure valid access to the oracle database that are valid for the underlying database.

Oracle DBA can create new users with different privileges assigned to them according to their status. Each user has his own domain of privileges and operations that he/she can perform. All this handled by DBA. Hence the security is promptly implemented by DBA.

### PRECAUTIONS

Before switching off the computer, the oracle database engine, working at the back end, should be properly shutdown i.e. the Oracle database should be dismounted by selecting *Start program personal oracle for win95 >> stop database.*

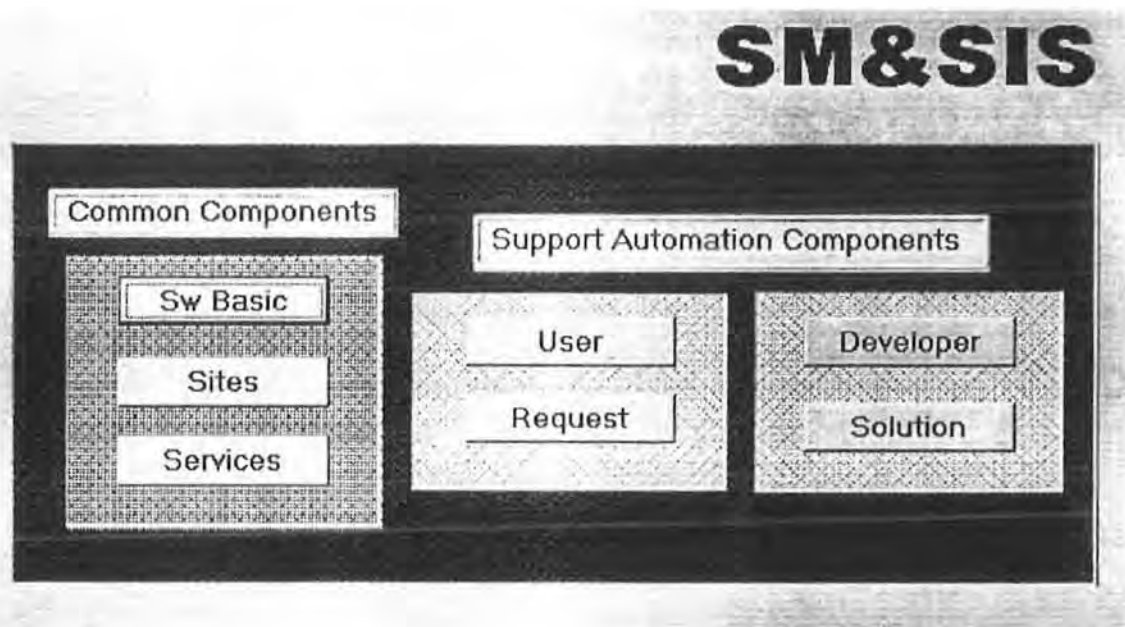
# *Appendix*



## Sample Prototypes of Input Screens

### MAIN PAGE

This main page is used to move other windows. Whenever the user exits from any data entry/view form he will be again at this window.



## SW-BASIC

This form is the data entry form for the software basic information and this information can be viewed here also.

The screenshot shows a window titled "SOFTWARE\_INFO" with a sub-header "Software Basic Information". The form contains several input fields and a text area. The "Name" field is filled with "EMS". The "Sw Id" field is filled with "01". The "Version" field is filled with "1.0". The "Dept Id" field is filled with "11". The "Software Duration" section contains two date fields: "Start Date" filled with "01-JAN-1994" and "End Date" filled with "01-FEB-1996". The "Major Features" section contains a text area with two numbered items: "1- Complete geographical information system" and "2- Seismic, wells, production and Lease information data can be entered through Data manager and can be viewed through information." At the bottom of the window is a toolbar with buttons for "View", "First", "Next", "Prior", "Last", "Add", "Delete", "Save", and "Exit".

Name	EMS
Sw Id	01
Version	1.0
Dept Id	11
Start Date	01-JAN-1994
End Date	01-FEB-1996

**Major Features**

- 1- Complete geographical information system
- 2- Seismic, wells, production and Lease information data can be entered through Data manager and can be viewed through information.

View First Next Prior Last Add Delete Save Exit

## DEVELOPER

The following form is the data entry form for the developer information. Also the information about the different developers can be viewed from this form.

**Developer**

### Developers Information

<b>Identification</b>	<b>Communications</b>
First Name: <input type="text" value="Soha"/>	Telephone No: <input type="text" value="11101101"/> Ext: <input type="text" value="784"/>
Last Name: <input type="text" value="Rasheed"/>	Fax No: <input type="text" value="2611000"/>
Developer Id: <input type="text" value="01"/>	E Mail Addresses: <input type="text" value="shashid@imki.com"/>
Department Id: <input type="text" value="03"/>	
Job Status: <input type="text" value="Developer"/>	

View First Next Prev Last Add Delete Save Exit



## USER

This form is used as data entry form for the user's information and also the information about any particular user can be queried from this form.

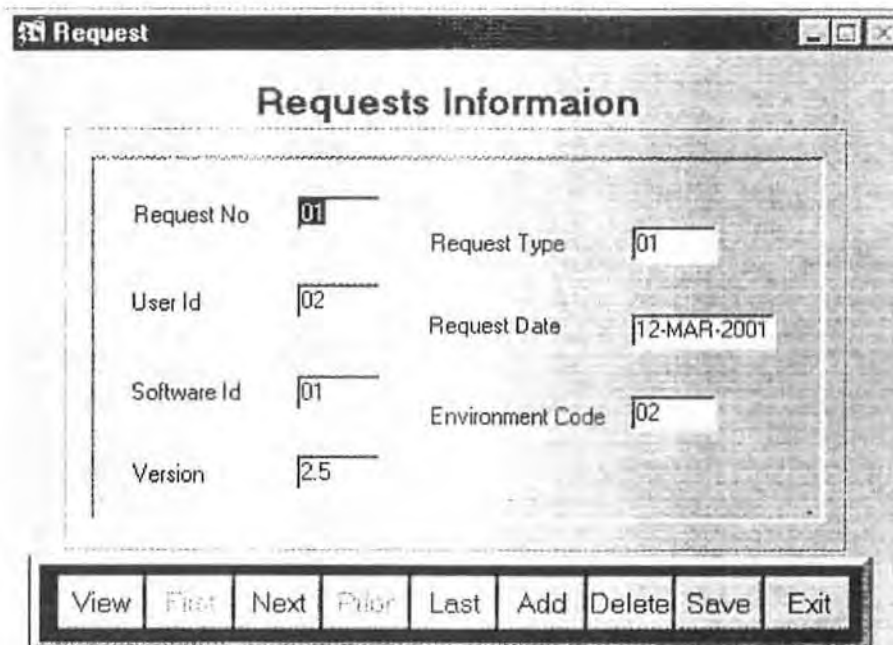
**Users Information**

Identification	Communications
First Name: Muhammad	Phone No: 563214      Ext: 2563
Last Name: Shakeel	Pager: 2659841      State: Punjab
User Id: 01	Fax No: 3652314      Country: Pakistan
Site Id: OPI	City: Islamabad      Postal Code: 2563
Job Status: Geologist	E Mail Addresses: M_Shakeel@OPI.com

View   First   Next   Previous   Last   Add   Delete   Save   Exit

## REQUEST

This form contains information about the requests that are sent by the users to the software house for the solutions of their difficulties. The information about any request can be checked at any instant.



The screenshot shows a window titled "Request" with a sub-header "Requests Informaion". The form contains several input fields for request details. Below the form is a control bar with buttons for navigation and actions.

Request No	01	Request Type	01
User Id	02	Request Date	12-MAR-2001
Software Id	01	Environment Code	02
Version	2.5		

View First Next Prior Last Add Delete Save Exit

## SITES

This form is used to enter data and view information about different client sites which use the software developed by the organization.

The screenshot shows a window titled "Sites" with a standard Windows-style title bar. The main content area is titled "Sites" and contains several input fields and a text area. Below the form is a control bar with buttons for "View", "First", "Next", "Prior", "Last", "Add", "Delete", "Save", and "Exit".

<b>Name</b>	Orient Petroleum Inc.
<b>Site Id</b>	OPI
<b>Tel No</b>	9502235
<b>Url</b>	WWW.OPI.COM
<b>Address</b>	Orient Petroleum Pakistan, Diplomatic Enclave, ISB

View First Next Prior Last Add Delete Save Exit

## SOLUTION

This form contains information about the solutions to each request along with the information about the user who sent the request and developer who solved the problem.

**Solutions**

Solution No  Start Date

Request No  End Date

Developer Id

View First Next Previous Last Add Delete Save Exit

## SERVICES

This form contains information about the services provided to different client sites along with the information of software used by the site and type of license issued to that particular site.

**Services**

Classification		Software Identification	
Serv No	01	Lic Type	01
Site Id	0PI	Inst Date	18-AUG-1998
Sw Id	01	Exp Date	30-JUN-1999
Version	1.0		

**Remarks**  
Software is Installed for Five users and it will be expire at the end of

View First Next Filter Last Add Delete Save Exit

