

CHAPTER -I

INTRODUCTION

1.1 General Background

Information technology (IT) during the last decade has played an ever more important role in management decision-making. It has probably also contributed to the recently reported significant increase in labor productivity in some of the technologically most advanced countries, like USA and Japan. In the coming years, investment in IT to support decision-making is likely to grow faster than ever before. This will not only affect the economies of the industrialized countries, but the entire developing world (low and middle income economies), where more than 80 percent of the world population lives, as well. Developing countries will have to cope with the resulting organizational changes and will have to adapt to them to avoid falling behind and risk exclusion from economic and social progress.

We find most of the hospital everything managed manually such as admitting the patient and keeping their medical history on the paper or booklet that would be with patients themselves and keeping the record of brief information of patients. It may not be able to fulfill to make research on medical treatment done on desired keyword/situation at all. Much health organization kept the system to maintain the financial matters like billing the service provided and report the business would have done. The use of patient-specific Decision Support System (DSS) and computer based registration record keeping system may improve the quality and efficiency of health care. The system is largely compatible with the principles of “Evidence Based Medicine”, patient oriented care and time saves for patients or general public.

The concept of MIS gives high regard to the individual and his ability to use the information. An MIS gives information through data analysis. While analyzing the data, it relies on many academic disciplines. These include the theories, principles and concepts from the Management Science, Management Accounting, Operations Research, Organizational Behavior, Engineering, Psychology and Human Behavior, making the MIS more effective and useful. These academic disciplines are used in designing the MIS, evolving the decision support tools for modeling and decision making.

1.2 Concept of Management Information System

Initially the “management information system” was to process data from the organization and presents it in the form of reports at regular intervals. The system was largely capable of handling the data from collection to processing. It was more impersonal, requirement each individual to pick and choose the processed data and uses it for his requirement. This concept was further modified when a distinction was made between data and information. The information is a product of an analysis of data. This concept is similar to the raw material and the finished product. What is needed is an information and not a mass of data. However the data can be analyzed in a number of ways, producing different shades and specifications of information as a product. This individual oriented system was further modified, that the system should present information in such a form and format that it creates an impact on its user, provoking a decision, an action or an investigation. It was later realized that even though such impact was a welcome modification, some sort of selective approach was necessary in the analysis and reporting. Competitive environment and is ever changing, fixation of the norm for an exception becomes a futile exercise at least for people in a higher echelons of the organization. The concept was then evolved that the system should be capable of handling a need based exception reporting. This need may be either for an individual or a

group of people. This called for keeping all data together in such a form that it can be accessed by anybody and can be processed to suit his needs. The concept is that the data is one but it can be viewed by different individuals in different ways. This gave rise to the concept of DATABASE, and the MIS based on the DATABASE proved much different.

Over a period of time, when these conceptual developments were taking place, the concept of the end user computing using multiple databases emerged. This concept brought a fundamental change in MIS. The change was decentralization of the system and the user of the information becoming independent of computer professionals. When this becomes a reality, the concept of MIS changes to decision making system. The concept of MIS in today's world is a system which handles the databases, provides computing facilities to the end user and gives a variety of decision making tools to the user and gives a variety of decision making tools to the user of the system. An MIS gives information through data analysis. While analyzing the data, it relies on making many academic disciplines. These include the theories, principles and concepts from the Management Science, Management Accounting, Operations Research, Organization Behavior, Engineering, Computer Science, Psychology and human behavior making the MIS more effective and useful. These academic disciplines are used in designing the MIS, evolving the decision support tools fro modeling and decision-making.

A Management Information System is systematic planning and design. It calls for an analysis of a business, management views and policies, organization culture and the management style. Therefore it include following activities:

-) Handling of a voluminous data.
-) Conformation of validity of data of transactions.

-) Quick search and retrieval.
-) Mass storage.
-) Communication of the information system to the user on time.
-) Fulfilling the changing needs of the information.

1.3 Introduction of Dhulikhel Hospital

Dhulikhel Hospital is a non-profit, non-government community conceived and supported quality health service provider. It was established in 1996 as a result of a joint initiative by Dhulikhel Health Service Association, Dhulikhel Municipality and NepaliMed. It is providing affordable and quality health care for all. Since that time it has become a preferred choice for health care services and medical education in the country. This hospital is involved in a range of activities from basic community health programmes at the grass roots level to modern university teaching hospital with basic research facilities.

Dr. Ram K.M. Shrestha service as the coordinator of the project and remains as the Medical Director of the Dhulikhel Hospital. The Hospital is guided by the principles of social equity, sustainable development and harmony with nature. Through its trained staff, it provides cost effective, compassionate and quality health care services. The hospital believes in the fact that quality health services need not always be an expensive commodity and limited only to those who are rich enough to afford. The hospital covers the population of approximately 1.9 million people from Kavrepalanchowk, Sindhu-palchowk, Dolakha, Sindhuli, Ramechhap, Bhaktapur and other surrounding districts. Nevertheless, Dhulikhel Hospital has already provided services to people from more than 50 out of 75 districts of the country. Dhulikhel hospital is also the university hospital for all the medical programs run under the collaboration with Kathmandu University (constituent medical programs of Kathmandu University)

1.4 Services providing by Dhulikhel Hospital

1) Outpatient and Inpatient Services

-) Internal Medicine (comprising Cardiology, Gastroenterology, Pulmonology & Nephrology)
-) General Surgery; Urosurgery; Paediatrics
-) Obstetrics and Gynaecology
-) Orthopaedics
-) Dermatology, Venereology and Cosmetology
-) Otorhinolaryngology
-) Ophthalmology
-) Psychiatry
-) Dental
-) Family Planning
-) Immunization

2) Investigative and Therapeutic Services

-) Laboratory (Histopathology, Biochemistry, Microbiology, Haematology, Parasitology)
-) Radiology
-) Ultrasonography and Colour Doppler
-) Cardiac investigations (Electrocardiography, Echocardiography and Colour Doppler, Treadmill Test (Exercise ECG), Holter (Ambulatory ECG), Ambulatory

Blood Pressure); Endoscopy (Upper Gastroendoscopy, Colonoscopy, Bronchoscopy, ERCP); CT Scan; Arthroscopy; Pharmacy; Physiotherapy.

- 3) Health Manpower Training
- 4) Outreach Primary Health Care Programs
- 5) Outreach Primary Health Care Services
- 6) Health Insurance coverage for employees of the organization and students of the institutions.

1.5 Statement of the Problems

The MIS is a system to support the decision making function in the organization. However, in today's world, the MIS is a computerized business processing system generating information for the people for the organization to meet the information needs for decision making to achieve the corporate objectives of the organization.

In any organization, small or big, a major portion of the time goes in data collection, processing, documenting and communicating it to the people. Hence, a major portion of the overheads goes into this kind of unproductive work in the organization. Every individual in an organization is continuously looking some information which is needed to perform his/her task. Hence the information is people-oriented and it varies the nature of the people in the organization. Hence due to lack of application of technologies, lack of trained manpower, traditional organization structure and importance of systematic data or information system affects for formulation of strategic planning, management control, operational control and transaction processing. There could be many factors for the failure of the organization. Some of them are noted in this study.

-) Lack of awareness of MIS implementation.
-) Lack of technology utilization.

) Lack of integration of activities due to continuation of traditional technology.

1.6 Objective of the study

The main objectives of the study are scope of Management Information System and its actual application as well as analysis of existing system adopted by Dhulikhel Hospital. The specific objectives are as follows:

- To examine the present system and information flow within organization.
- To show the present capacity and possible capacity utilization by Dhulikhel Hospital.
- To develop and design the effective Hospital management information system.
- To provide the valuable suggestions and recommendation on the basis of the study.

1.7 Significance of the study

The overall study of Management Information System of the Dhulikhel Hospital is significance for several reasons, which is as follows:

- a) The management as well as policy maker recognized as a major resource like capital, time and capacity and manage well through MIS.
- b) This will provide necessary recommendations and suggestions to the related department for development and implementation of the MIS.
- c) It explores the problems and the potentialities of the implementation of MIS.
- d) It shows the actual implementation of MIS performance and variance in Dhulikhel Hospital.
- e) Developments of system and starts integrating them with other systems enlarging the system scope and meeting the varying information need by Dhulikhel Hospital.

1.8 Focus of the Study

The prime focus of the study is to observe the existing system of Hospital Management and designing computer based information flow which really avoids all the demerits of using existing system of DHMS. It is designed to describe the purpose of the different kinds of system used, how they are come in force and assisted in implementation. This study is intended to classify the purpose effective implementation of MIS and to identify the person responsible for different design of system.

1.9 Limitation of the Study

The study is confined to the Management Information System of Dhulikhel Hospital. Having reliable and sufficient data and necessary alternative constraints the limitations of this study are as follows.

- a) This study covers the analysis of existing management of information system.
- b) Analysis is concentrated almost in technologies and human resource and it doesn't cover the other area of Dhulikhel Hospital. The study is based on primary data as well as secondary data. (i.e. interview, published books, websites, annual report etc.)
- c) Due to limited time and resources constraints, this study is neither the comprehensive nor that extensive.
- d) The main concern of this study is to cover the present services status in terms of their information technologies as well as adoption of new technology.

1.10 Research Methodology

The research design of this study will be descriptive as well as analytical and based on secondary data but wherever necessary the primary data also collected through interviews with medical officers, administrative staffs and other employees of the organization.

Research is conducted through:

- a) Field study, direct observation, annual report.
- b) Magazines, newspaper, websites, booklets, published and unpublished documents of the enterprise.
- c) Government reports, bulletins and other published statements.
- d) Previous studied made in this field.

1.11 Chapter Plan

Chapter - I: Introduction

The introduction gives the general background of MIS and the background of organization being study in starting. Later, it has incorporated statement of the Problem, focus of the study, significance of the study, objectives of the study, limitation and methods of research.

Chapter - II: Review of Literature

The conceptual framework of management of information system and the Hospital management information system has been incorporated in detailed, followed by the review of related articles, the thesis of master degree of Tribhuwan University and finally justification of the study has been presented.

Chapter - III: Research Methodology

To achieve the objectives of the study, research design model, data collection techniques and data presentation techniques and possibility of implementing new system through feasibility study has been conducted in this research methodology chapter.

Chapter - IV: Data Presentation and Analysis

This is the core part of the research study. The chapter has been divided into four parts. First part deals with overview of existing systems and the problems with conventional system. Second part deals with the computerize Hospital Management System with the support of data flow diagram and entity relationship diagram. In third part of the chapter includes the data tables with the software designed for Hospital Management.

Chapter - V: Summary, Conclusion and Recommendations

The summary, conclusion and the recommendation of this research study have been presented under this chapter.

CHAPTER - II

REVIEW OF LITERATURE

2.1 Conceptual Framework of Management Information System

Management Information Systems is the application of information technology to support business activities. Management information systems are those systems that allow managers to make decisions for the successful operation of businesses. Management information systems consist of computer resources, people, and procedures used in the modern business enterprise.

In most general terminology, it is a computer-based system that transforms data into information useful in the support of decision making. MIS can be classified as performing three functions:

- 1 To generate reports. For example, financial statements, inventory status reports, or performance reports needed for routine or non-routine purposes.
- 2 To answer what-if questions asked by management.
- 3 To support decision making. This type of MIS is appropriately called “Decision Support System (DSS)”. DSS attempts to integrate the decision maker, the data base, and the quantitative models being used.

Though mostly observed and generally accepted as computer based systems, management information systems do not necessarily have to be computerized. Today, the need for an effective management information system is of primary concern to the business organization. Managers use MIS operations for all phases of management, including planning, organizing, directing, and controlling. (McLeod, 1995: 214)

There are certain goals and objectives that an organization implementing MIS targets. In process of developing information systems that fill users' needs, the methodology must have made elaborate attempts to understand organizational structures, business objectives, and business operations (including processes and the flow of data between processes), ways to communicate effectively with users, and concepts formulated on how to design systems that support their activities. The prime objective is to help an organization realize the maximum benefit from its investment in equipment, personnel, and business processes. This process may include planning and developing new computer systems or devising ways to apply existing systems resources to additional operations.

It has been understood and described in a number of ways. So to make it more clearly about MIS, firstly it is necessary to be clear about the management, information and the component of a system.

2.1.1 Management

According to Mary Follet, "Management is the art of getting things done through people". It is all about what managers do. A manager is defined as a person who achieves the organization's goals by motivating others to perform-not by performing himself.

The management is the process that visualizes the future, sets goals and targets to be accomplished, has the ability to effectively coordinate the existing financial, human and technical resources, decentralization operation., builds goal team and has social responsibility towards the nation and its people .In other words management consists of five core function: Planning, Organizing, Staffing, Directing and Controlling. These are the five core function of management.

The above five function of management are briefly defined as follows:

1) Planning

Plan refers what to do in future. It is a basic to all managerial function. Without effective planning other function of management will not be effective that really hampers the set targets. It is a decision making process determining in advance what to do, how to do, when to do, and by whom to do. Planning creates the frame of activity and events which are to happen or a runway for achieving organization's goals, objectives and targets.

2) Organizing

Organize refers to the grouping of people and activities in order to facilitate the achievement of the organizational objectives. It is an important step in the managerial process and relates to the people and activities in the organization. It deals with a quantitative and qualitative aspect of manpower in terms of placement the roles they play and the relations amongst hem, with the aim that they work together effectively towards the accomplishing the goals, objectives and the set targets.

3) Staffing

Right man for right place is the key principle of management. This function of management deals with managing the organization as per the organizational structure so that they together implement the process of the management. Staffing involves not only selection of a person but also their appraisal and development by using various tools and techniques of management.

4) Directing

As discuss earlier, manager is a key person for mobilizing these function of management. It refers how the managers direct their subordinate so as to achieve set goals. It is all about the leadership techniques.

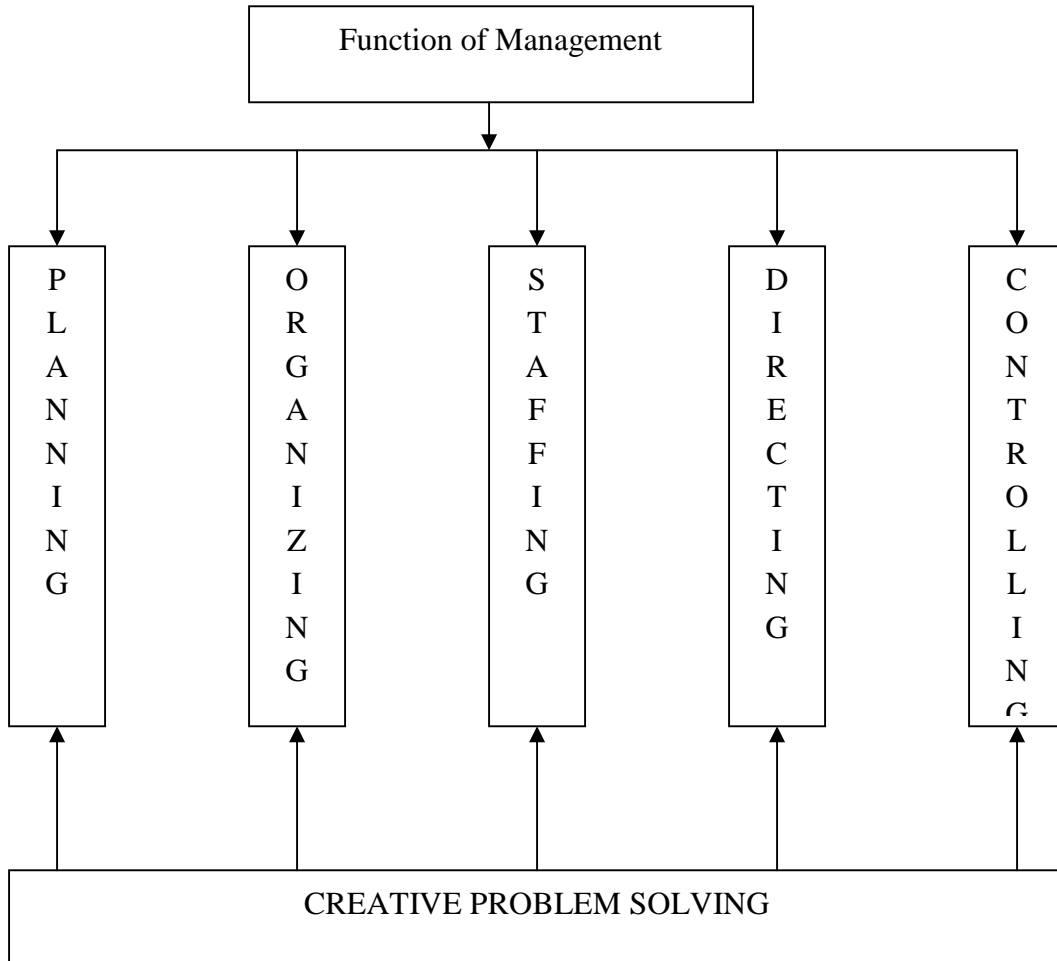
5) Controlling

Control is a mode of checking the progress of plans as per set standard. If found any deviation with standard it needs to be rectified as soon as possible. Without control, the process becomes unproductive. The purpose of control is to regulate the process in such a way that the management process continuously strives for the achievement of the goals and set targets.

Management is Creative Problem Solving

This creative problem solving is accomplished through four functions of management: planning, organizing, leading and controlling. The intended result is the use of an organization's resources in a way that accomplishes its mission and objectives.

Fig 2.1
Function of Management



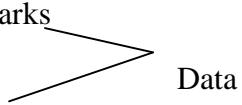
Source: (Malhotra, Y, 1993: 85)

2.1.2 Information

Data are based on facts. It considered as raw fact and figure that are meaningless to user.

Data is the presentation given to the basic fact and entity, example: age, salary, name etc.

Data is information that has been translated into a format that is more convenient to process.

Name	Address	Class	Date of Birth	Computer Marks	
Preshita	Balaju	X	July 16 th	96	

The processed data is information. Information is the result or product of processing data. It provides knowledge and intelligence. It is the set of data which has been converted or organized into a more useful or intelligence from direct utilization of mankind. Information is an occurrence or set of occurrence which carry message when perceived by the recipients via any or the sense and increase their state of knowledge. For example, "96" has several meaning such as age of person, mark obtain by in an examination, roll no of a student etc. But if "The mark obtain by Preshita in Computer is "96" has been written, it will have been considered as real information. First thing conveys that Preshita is a student, she obtain 96 marks in Computer in a particular examination.

“Whatever is inputted to computer is data and what ever is comes form input after processing is called output or information”

2.1.2.1 Features of Information

Information as a concept bears a diversity of meanings, from everyday usage to technical settings. Generally speaking, the concept of information is closely related to notions of constraint, communication, control, data, form, instruction, knowledge, meaning, mental

stimulus, pattern, perception, and representation. Information is the writing of knowledge of any subject. Further, information processing is a major societal activity. It is an important resource in all walks of life today whether it is industry, commerce, defense, banking, education, politics or economics. Information is needed everywhere.

Let's considered some of the features of the information:

a) Availability

Information is to be collected in minimum possible time with minimum possible spending both in terms of money and labor. It should be nearby, classified, index to reduce retrieval time.

b) Timeliness

Timelines is the ability to provide information as needed for decision making. It is of no use to get the message across to the doctor to visit the patient when the patient has already died. Similarly the information that is received late will not be any help to the manager because he would not be able to take any timely action.

c) Accuracy

Information should be accurate. The percentage of correctness from the total amount of information produced over a period of time is known as accuracy. For example, out of 100 reports only 75 give correct result, then accuracy is 75 %. If the information is 100% correct, the desire result can easily be achieved without any deviation.

d) Completeness

Information should be complete. Because of complete information helps the manager to take timely decision. The information should be relevant to the problem for which you are collecting the information. For example, if shoe shop has been wanted to open in the market,

the information about the town, population density, road access, presence of competitors will be included in the information.

e) Meaningful and Action Oriented

Information should be relevant to the problem for which are collecting. For example: if the information about no of toilets constructed in Dailekh is needed and the information gives the no of water points of Surkhet, then, the entire information effort is wasted. It means information received in a particular matter is meaning full only if that information is required.

f) Brevity

The information should be summarized. When important information is mixed with relatively useless data, then the assimilation of the important information may become difficult. This situation is known as brevity. Then the managers are faced problem of exacting those items of information that they needed. Hence, concise information is needed in the reports that summarized relevant data useful in business. This is not only saves time for the users but also help to understand the content easily.

2.1.2.2 Value of Information

Information is the output of processed data. It is a manipulation of raw data and figure. If it has these kinds of features such as availability, meaningful and action oriented, timeliness, completeness, brevity and accuracy then it becomes real information. But utilization of information needs some standard which is called value of information. Example: to get admission in BCA, BIT the entrance examination must be passed. Like this, these are some standard which must be included in information.

Form Utility

Information helps to make decisions. It should be needed format. If managers are looking for a graphical representation of the sales history, the graphical information is needed instead of descriptive. The managers appreciate receiving the data in the graphical form rather than in a tabular form.

Time Utility

Information should be prompt. It should be available whenever required. The information that receives late will not be any help manger to take timely decisions. It has greater value to the decision making.

Place Utility

The source of information should be right. Information has grater value if it can be accessed or delivered easily on line system maximize both time and place utility. It is very important that the information should be available at desire place.

Possession Utility

The possession utility of information is that it should be distributed to the right places. Information is power or rather one who has information is power

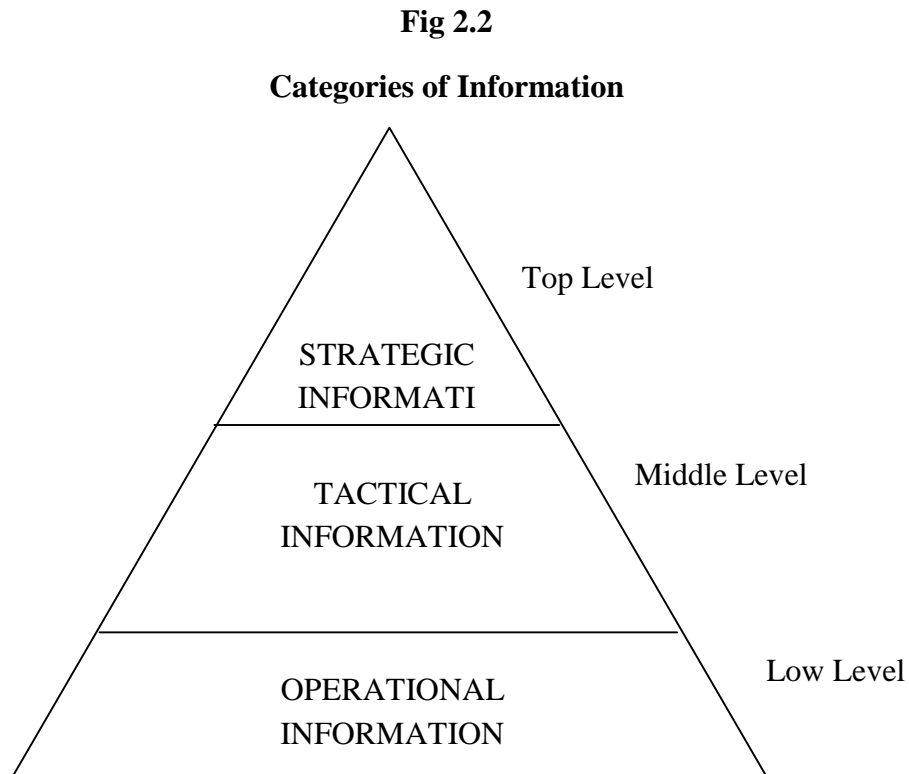
2.1.2.3 Categories of Information

Computer is an information processor. It has a same structure like organization structure. In an organization the information is flowing upward to downward, downward to upward, one department to another. In organization top level management make strategy to determine longer range goal setting to achieve a specific goal. Middle level management implements the top level plans and low level management operates the works on these strategies.

Like this, there are some categories of information such as strategic information, tactical information and operational information:

Strategic Information

In order to understand the requirements of the strategic information, it is better to understand the term strategy first. Strategy is the desired configuration of the firm at a future specific date. Therefore, the information i.e. desired for future protection is known as strategic information. Strategic information is made by top level management. It is used to determine the long range goal setting and formulate policies to achieve objectives. It makes policies and frame plans to determine goals. There are few people who make this information. It is also a creative task, as well.



Source: (Agrawal, G.R, 2002: 93)

Tactical Information

Middle level managers are responsible for making tactical decisions that will allocate the resource and establish the control need to implement the top level plans. For this, middle level management needs the type of information which is known as tactical information. For example, consider the middle level manager who has been assigned the target to meet a certain amount of sales within a month. This will require him to know the location and the customer for increasing sales target. This information may be available with some agencies that are specialist in the field or managers may need to develop the information himself by sending the market research team in the field.

Operational Information

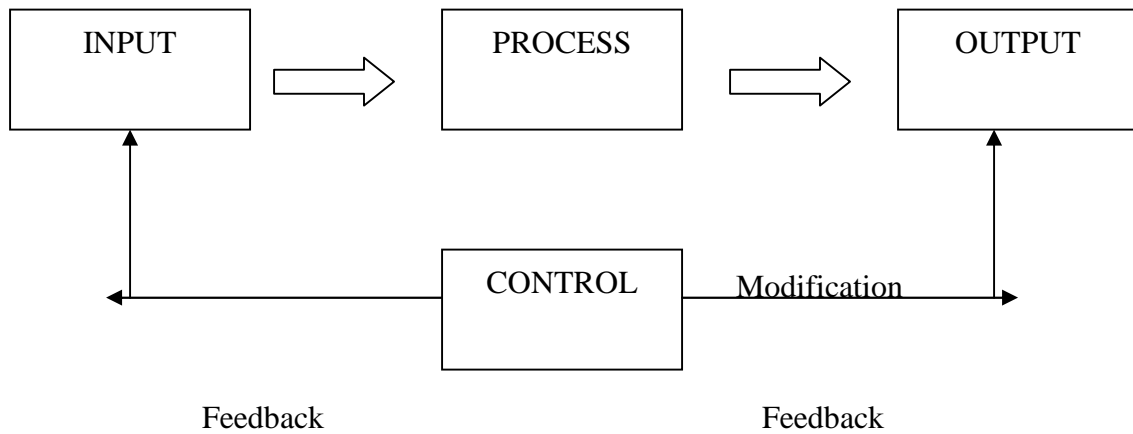
The information that lower level managers are going to face while fulfilling the targets set by middle level managers are known as operational information. Low level management operates or works on top level planning. It works what information has been circulated by middle level management.

2.1.3 System

System is defined as a set of elements arranged in an orderly manner to accomplish objectives. It is to be noted that a system is not a randomly arranged set. It is arranged with some logic governed by rules, regulations, principles and policies. Such an arrangement is also influenced by the objectives the system desires to achieve. For example, if a computer system is designed to perform commercial data processing, then the elements will be the data entry devices, a CPU, a disk, a memory, application programs and a printer. If a computer system is designed to achieve the objectives of design, engineering and drawing processing, then the elements will be graphic work stations, the graphic processor and the languages suitable for engineering and design application, and plotters for drawing the output.

A system may have single input and multiple outputs or may have several inputs and outputs. For example: a business has several inputs and multiple objectives such as profit, service, and growth and so on. The choice of inputs and processing methodology is governed by the objectives set for the system.

Fig 2.3
Parts of System



Source: (Jawadekar, W.S, 1998:54)

The main components of system are:

Input : Machine, manpower, raw materials, time, money etc.

Process : Policies, procedures and operations that convert data into information.

Output : Information in the right format, conveyed at the right time and place right person

Feedback: Data about the performance of the system

Control : Processing the feedback and taking necessary action

There are varieties of systems where system analysis would be required. The needs can be symbolically represented in terms of the type or the kind of systems. The Systems can be classified as shown in table.

Table 2.1
Types of System

Data Processing Systems	The data already exists but needs processing to achieve certain result. The focus is on computing.
Transaction Processing System	Processing of transaction using some stored data and business rules. The focus is on the transaction execution.
Functional System	The production, sales, purchase and finance systems, where several transactions and stored data is used to produce certain information. The focus is on the operation management.
Integrated System	More than one system is processed together to produce an updated status and business result, where the systems are net worked and interfaced. The focus is on process management across the business function.
Enterprise Management	It is a set of systems functioning in the respective areas, playing a local service role, as well as providing service inputs to other systems in the organization. The focus is on decision support for strategic management to achieve enterprise goals and mission.

Source: (Jawaekar, 2nd edition: 125)

2.1.4 Information System

An information system is an organized combination of people, hardware, software, communication networks and data resources that collects, transforms and disseminates information in an organization. People have relied on information system to communicate with each other using variety of physical devices (hardware), into processing instructions and procedures (software), communication channels (networks) and data (data warehouse) since the dawn of civilization. An information system collects processes, stores, and analyses and disseminates information for specific purpose. The information system turns data into information.

The information system include following components:

- Hardware and System software
- Procedure
- Documentation and training materials
- Job roles associated with the system
- Control to prevent theft, fraud and errors

A sound information system has following process:

- Identifying information need
- Gathering / collecting information from various sources
- Storing / recording collected information
- Selecting appropriate information from collected information.
- Disseminating the information to right person.

2.1.4.1 Types of Information System

a) Transaction Processing Systems

A transaction processing system (TPS) is designed to capture data related to various transactions within the organization and is well suited to highly structured and routine tasks that support operational decision making. The output of the TPS becomes the input to the MIS.

b) Management Information Systems

Management Information Systems supplement transaction –processing systems with management reports required to plan, monitor and control business operations. A management information system is an information system application that provides for management – oriented reporting in a predetermined, fixed format.

c) Decision Support System

A decision support system (DSS) is a set of well-integrated, user-friendly computer-based tools that combine data with various decision-making models (both quantitative and qualitative) to solve semi structured and unstructured problems. Such a system solves a specific problem or class of problems, such as scheduling, planning, resource allocation and forecasting. The main function of DSS is "what-if" analysis, model building, goal seeking and graphical analysis.

A DSS can be standalone or integrated with existing systems, such as TPS and MIS. They can support individual decision making or group decision making. A system that supports group decision making is called a group decision support system (GDSS).

d) Executive Information System

The system that helps top managers with strategic, unstructured decision making is an executive information system (EIS). An EIS is a set of computer-based tools with features such as color graphics, touch screen, voice-activated commands and natural-language

interfaces that help managers to quickly retrieve, analyze, navigate, summarize and disseminate large volumes of data. An EIS frequently connected with online information services so that top managers can quickly access external data as well. The primary goal of an EIS is the delivery and display of information rather than the analysis or diagnosis of problems and possible solutions.

Table 2.2

The Difference and Similarities among TPS, MIS, DSS and EIS

Description	TPS	MIS	DSS	EIS
Target Audience	Operational management	Operational management	Middle management	Top management
Primary Purpose	Capture transaction data	Generate summary and exception reports	Facilitate decision making	Generate clear, concise, enterprise-wide information
Nature of Task	Highly Structured	Highly Structured	Semi- or unstructured	semi- or unstructured
Kind of Data	Internal	Internal	Internal and External	Internal and External

2.1.4.2 Computer Based Information System

Information is one of the crucial resources for the manager to make a sound decision. It can be managed just as any other resources, importance of this resource is increased because of two reasons, one is complexity and another is rapidly developing in technology.

The output of computer is information it can be used by managers, non-managers and persons and the organizations within the firm's environment. All levels of manager are beneficial from

the computer based information system. For access of information managers should be familiar with the system.

Organization itself is big system which includes all the subsystem in the organization. The organization is a physical system, but managed through the use of a conceptual system. The conceptual system consists of an information processor that transforms data into information and represents physical resources.

The first major computer application was the processing of accounting data. The application was followed by four others: transactional processing system, management information system, decision support system and executive information system. All of this application composes the computer based information system. Therefore, for the handling its complexity it requires different expertise such as system analysts, database administrator, networks specialists, programmers and operators.

2.1.5 Management Information System

Management information system is primary meant for providing information from the data after processing them. The information system does not generate data. The data are generated, collected, recorded, stored, processed and retrieved after it has been generated by business operations in an organization. It is a system to support the decision making function in the organization. Today's world we can define MIS as a computerized business processing system generating information for the people in the organization to meet the information needs for decision making to achieve the organizational objectives.

Management information system is a system consisting of people, machine, procedures, and database and data models, as its elements. The system gathers data from the internal and

external environment process it and provide to assist manager in the process of decision making.

MIS is a computer based integrated system based on the database of the organization on evolved for the purpose of providing information to the people in the organization. It supports managerial woks like planning, organizing, staffing, directing, controlling and by giving right information to the right people at right time to the decision maker.

MIS modern management system that combines both man and machine adopt management. It uses a centralized database as information bank and provides the information to low level, middle level or strategic level accordingly. It is an application of principles and practice of management that uses database as a data bank. It has several subsystems that are integrated by MIS application. It continuously interacts with the internal and external environment of the organization and provides a corrective mechanism in the system, so that the changed needs of information are met with effectively.

The MIS has more than one definition, some of which are given below:

- a. The MIS is defined as a system which provides information support for decision making in the organization.
- b. The MIS is defined as an integrated system of man and machine for providing the information to support the operation, the management and the decision making function in the organization.
- c. The MIS is defined as a system based on the database of organization evolved for the purpose of providing information to the people in the organization.
- d. The MIS is defined as a computer-based information system.

Though there are a number of definitions, all of them converge on single point, i.e., the MIS is a system to support the decision making function in the organization. The difference lies in defining the elements of the MIS. However, in today's world, the MIS is a computerized business processing system generating information for the people in the organization to meet the information needs for decision making to achieve the organizational objectives.

2.1.5.1 Historical Development of MIS

The history of MIS is start from the history of management. MIS was exist on the management from it origination but was not defined. Decision maker are using the MIS on manual form but did not know what it is. When decision maker knows the value of information and control in the management they have searched the best way of information management. The history of information system can be divided into three eras.

Manual Record Keeping Era (1940-1965)

Several financial activities like billing, inventory, day books and balance sheets were on paper and files. The concept of electronic data processing (EDP) and thinking of use of electronic devices was introduced to collect and process the large amount of data quickly and accurately. Some analog computers and other electronic devices are introduced for recording the data.

Analysis Era (1965-1980)

Digital computers are introduced on the organization and use them for data analysis for financial and other sector. Sharing of right data and concept on right time to right user helps the organization for group work.

Knowledge ERA (1980 onwards)

The concept of direct communication and use of data by end user with capturing, creating and distributing by using knowledge management was introduced in this era. The concept of integrated system was introduced. This will have the management, information technology and system. Now this concept is widely used for data communication, storing and capturing.

The main development in the 1980s was the introduction of decentralized computing. Instead of having one large mainframe computer for the entire enterprises, numerous PC's were spread around the organization. This meant that instead of submitting a job to computer department for patch processing and waiting for the experts to perform the procedures, each user had their own computer that they could customize for their own purpose.

As people become comfortable with their new skills, they discovered all the things their system was capable of computers, instead of creating a paperless society, as was expected, produced mountains of paper, most of it valueless. Mounds of reports were generated just because it was possible to do so. This information overload was mitigated somewhat in the 1980s with the introduction of "Executive Information Systems". They streamlined the process, giving the executive exactly what they wanted, and only what they wanted.

The 1980s also saw the first commercial application of artificial intelligence techniques in the form of "Expert System". These programs could give advice with a very limited subject area. The promise of decision making support, first attempted in management information system back in 1960s, had step-by – stop, come to fruition.

The 1990s saw the introduction of "Strategic Information System". This was largely because of developments in the subject of strategic management by scholar like M. Porter, J . Reise,

C. Markides, and J. Barney in the 1980s. Competitive advantage became a hot management topic and software developers were happy to provide the tools.

2.1.5.2 Role of MIS

The role of the MIS in an organization can be compared to the role of heart in the body. The information is the blood and MIS is the heart. In the body the heart plays the role of supplying pure blood to all the elements of the body including the brain. The heart works faster and supplies more blood when needed. It regulates and controls the incoming impure blood, processes it and sends it to the destination in the quantity needed. It fulfills the needs blood supply to human body in formal course and also in crises.

The MIS plays exactly the same role in the organization. The system ensures that an appropriate data is collected from the various sources, processed, and sent further to all the needy destinations. The system is expected to fulfill the information needs of an individual, a group of individuals, the management functionaries: the managers and the top management.

The MIS satisfies the diverse needs through a variety of systems such as Query systems, analysis system, modeling system and decision support system. The MIS helps in strategic planning, management control and operational control and transaction processing.

The MIS helps the clerical personnel in the transaction processing and answers their queries on the data pertaining to the transaction, the status of a particular record and reference on a variety of documents. The MIS helps Junior management personnel by providing the operational data for planning, scheduling and control, and helps them further in decision making at the operations level to correct an out of control situation. The MIS helps the middle management in short term planning, target setting and controlling the business

functions. It is support by the use of the management tools of planning and control. The MIS helps the top management in goal setting, strategic planning and evolving the business plans and their implementation.

The MIS plays the role of information generation, communication, problem identification and helps in the process of decision making. The MIS, therefore, plays role in the management, administration and operation of an organization.

Table 2.3

Role of MIS in Various Level of Organization

Level of Management	Nature of Works	Role of MIS
Top Level	Strategic Planning	Overall Management
Middle Level	Tactical	Administration
Operational Level	Operational	Operation of day to day activities

2.1.5.3 MIS and Reporting

The information system department often provides an important support role for the institution’s management information systems. A management information system (MIS) is a process that provides the information necessary to manage an organization effectively. Accurate and timely MIS reports are an essential component of prudent and reasonable business decisions. Many levels of management view and use MIS, which should support the institution's longer-term, strategic goals and objectives. IT management typically sets policies, procedures, and controls to govern database management and report creation to help ensure the effectiveness and usefulness of the organization’s MIS.

Management should design its MIS to:

- Facilitate the management of the business;
- Provide management with an adequate decision support system by providing information that is timely, accurate, consistent, complete, and relevant;
- Deliver complex material throughout the institution;
- Support the organization's strategic goals and direction;
- Ensure the integrity and availability of data;
- Provide an objective system for recording and aggregating information
- Reduce expenses related to labor-intensive manual activities; and
- Enhance communication among employees

MIS supplies decision makers with facts, supports and enhances the overall decision-making process and enhances job performance throughout an institution. At the most senior levels, MIS provides the data and information to help the board and management make strategic decisions. At other levels, MIS allows management to monitor the institution's activities and distribute information to other employees, customers, and members of management.

Advances in technology have increased the volume of information available to management and directors for planning and decision-making. Technology increases the potential for inaccurate reporting and flawed decision making. Because report generation systems can rely on manual data entry or extract data from many different financial and transaction systems, management should establish appropriate control procedures to ensure information is correct and relevant. Since management information systems can originate from multiple equipment platforms and systems, the controls should ensure all information systems have sufficient and

appropriate controls to maintain the integrity of the information and the processing environment.

Sound fundamental principles for MIS review include proper internal controls, operating procedures, safeguards, and audit coverage. To function effectively, as a feedback tool for management and staff, MIS should be useable. The five elements of information technology processing activities that create useable MIS are timeliness, accuracy, consistency, completeness, and relevance. Compromise of any of these elements hinders the usefulness of MIS.

Timeliness

To facilitate prompt decision-making, an institution's MIS should be capable of providing and distributing current information to appropriate users. Developers should design IT systems to expedite the availability of reports. The system should support quick data collection, prompt editing and correction, and meaningful summaries of results.

Accuracy

A sound system of automated and manual internal controls should exist. All information should receive appropriate editing, balancing, and internal control checks. The board should ensure a comprehensive internal and external audit program exists to ensure the adequacy of internal controls.

Consistency

To be reliable, data should be processed and compiled consistently and uniformly. Variations in data collection and reporting methods can distort information and trend analysis. In addition, management should establish sound procedures to allow for system changes. These

procedures should be well defined, documented, and communicated to appropriate employees. Management should also establish an effective monitoring system.

Completeness

Decision makers need complete information in a summarized form. Management should design reports to eliminate clutter and voluminous detail to avoid information overload

Relevance

Information that is inappropriate, unnecessary, or too detailed for effective decision-making has no value. MIS should be relevant to support its use to management. The relevance and level of detail provided through MIS directly correlates to what the board, executive management, departmental or area mid-level managers, etc., need to perform their jobs.

2.2 Review of Related Studies

2.2.1 Review of Project Works

Bhattraï, Nanendra (1992) has conducted a project work entitled "Management Information System of Sajha Bhandar Limited". The researcher found that the information prepared and presented by sub system must confirm the following basic requirements of MIS to get result.

- All the information furnished is accurate and up to date
- The system is cost effective i.e. cost to acquire, maintain, and access data has been kept minimum.
- It is management oriented and management directed
- The element of intuitions is not presented
- It contained remarks for every unusual figure / transaction / information.
- It contained a few words of comment on the past reports and also contains something about the future transaction.
- To solve the stated issues feedback mechanism must be strengthened.

Implementation of MIS is not a one day programs, it needs continuous effort to achieve better result, and it may require a periodic program to reconcile the prepared and kept statement. The reason behind the deviation must be identified. The very success of this new MIS depends on its implementation process and commitment of the employees. It is the mean to achieve the end. So whenever there is change in the environment is should be revised and up dated accordingly.

M. Khalil and A. Siddqui (1997) carried out project works on a "Information System for Modern Management". The study explicate that MIS as set of interrelated process that provide information for monitoring evaluation and decision making. . The researcher notes that the design, implementation and maintenance of MIS all have an impact on the effective use of information for decision making in an organization. Siddiqui defines five main elements of MIS, which are:

- Data collection
- Data analysis
- Feedback
- Implementation
- Period review of information needs and priorities.

2.2.2 Review of Thesis

Yadav, Pradhan (1986) had conducted a research study entitled "A Study on Micro Computer and Computerization in Nepal". The researcher state that the computer has become a very common in USA and Europe, computer have been part of their life because large number of services they receive are computer supported. Computer supports activities involved in business, universities, school, government and the communication media. Scientists, teachers, businessperson, engineers, doctors and other professionals are also getting tremendous amount of help out of it. Manufacturing, design, teaching, planning and

decision-making has aided by the computer. All these employ computers to process vast amount of data. The computer were developed to perform such task of swift calculation and the development progress in these fields would have been impossible in the absence of these extra ordinary machine, which can handle complex and tedious calculation in a short period of time people cannot do or typically do not want to do.

The researcher used the survey, observation and questionnaire for the research methodology. The researcher further present the data nod analysis of present state of computer scenario and computerization in Nepal to some extend and used the survey method to found the price, brand name used and availability of computers.

By the review of literature it has been seen that researcher have studied a number of computer systems and organizational implementation of management information system and its problem in implementation, some that specified area of research and some that from organizational context.

Neupane, Durg Prashad (2002) carried out a research study on "MIS-A Significant Tools for Effective Management of an Organization: A Case Study on RNAC" and concluded that there is no doubt that use of computerized information system in organization can help to boost the efficiency and productivity of the organization. The basic objectives of the study are to study existing information system, flow of information in different department, to study existing decision-making process, and to find out drawback of existing information system of RNAC.

The researcher used both primary and secondary data to achieve the objective of the research and the research is exploratory and descriptive in nature and focus on the behavioral aspect of MIS. The researcher used DFD and system approach to design and achieve the objective and only defines the elements as input, output, process, control, feedback and environment. The researcher had tried to explore all the aspect of system approach and like to suggest on the

effective and efficient information system that is necessary to access right information at the right time in a meaningful way. His conclusions of the study are as follows;

-) MIS satisfies the information needs of the people in the particular at organization pyramid.
-) Network based computerized information system is the first requirement for this organization to maintain modern information system.
-) There is lack of will trained and skilled IT experts and manpower to maintain computerized information system within the organization and departments.
-) MIS is not implemented due to high cost and technical work force.

Bhattra, Ajit (2004) conducted a research study entitled "Performance of Management Information System in Kumari Bank". The basic objectives of the study are – To identify factor affecting performance of MIS and to examine the existing situation of software personnel of the bank and to study the relation of training of end user in the bank for improvement of performance of MIS. The major findings of his study are:

-) Majority of the user of the MIS consider that MIS helps in decision-making and it is directed more towards extraction of current information rather than historical information.
-) MIS is fulfilling the information needs of the user to different degrees of satisfaction and higher management is less satisfied than the middle management is.
-) Further improvement in utilization of MIS need better communication and training between the various stakeholders
-) Management Information System user are comfortable using the product, have a good understanding of the system
-) MIS user is moderately satisfied with the MIS, but there is ample room to increase the use of MIS

-) The factors that will improve the utilization of MIS are 'good communication channel', 'training to end user' and 'training to software personnel'.

Sita, Subba (2008), *Kantipur City College*, had conducted a research study for the implementation of E-Hospital to replace existing manual work and make much of hospital works and patient related works at least semi-automatic. The major findings of the study were:

-) To provide online patient registration to hospital patients as well general public
-) To help hospital managers to analyze their hospital performance
-) To make report valuable for the research.
-) High performance.
-) To help government in making policies in health sectors.

Research Gap

Above mentioned reviews show that most of the studies have only highlighted the study of the existing system, study of hardware and software environment, existing system of the MIS and new model of MIS by showing data flow diagram, entity relationship diagram and flow charts. Most of the data are secondary data on which the concerned organizations had provided. In this thesis, the researcher has not only analyzed the existing system, the new computerize information management is presented with various level of Data Flow Diagram, E-R Diagram, various database tables with screen layout of proposed software. This research is not only based on the secondary data but also used primary data to reach to the root level where actual problem can be encountered with the conventional system. It is clear that computerized management information system heavily reduce the time by avoiding clerical day to day task and the filing of each hard copy.

CHAPTER - III

RESEARCH METHODOLOGY

3.1 Research Design

This research study attempts to analyze the use of new model of Hospital Management information system to systematize various operational works that are done in a Hospital like recording information about the Patients that come, Generating bills, Recording information related to diagnosis given to Patients, Keeping record of the Immunization provided to children/patients, Keeping information about various diseases and medicines available to cure them etc.

3.1.1 Study Phase

This phase provides appropriate understanding of the problem. The requirement analysis of the proposed system was observed. The purpose of the study phase is:

-) Without appropriate understanding of the problem, the problem cannot be solved. This step is very important because I am inexperienced problem solver and this result in either solving the wrong problem, or incorrectly solving the problem or picking the wrong solution. Therefore, to understand the problem I visited Dhulikhel Hospital.
-) Almost all the works are manual so the services hospital provides to its staff and patients are slow and costly.
-) Patient's records are not systematic thus it becomes very difficult to find any particular patient records and corresponding reports.
-) No easy and prompt services for patient to do extensive manual work involved thus increasing the cost involved.

-) No tools to measure employee's performance so that executive staff could not find which workers are performing well who are defying their work. In this way performance of hospital as a whole degrades and its image may be ruined.
-) Improper report management, which may result in a loss, misplacement or damage of some patients report and may sometimes cause conflict between patient and Hospital Management.

During my survey, I took various opinions, comments and suggestions from hospital staff specially doctors and general public. Various pitfalls in current hospital management are given below.

3.1.2 Data Collection Techniques

There are two basic methods of data collection:

3.1.2.1 Primary Data Collection

Primary data, the data that are collected directly from source or focus group has been used in this research study. Different methods have been used to collect the data and information, they are:

-) Questionnaire Method: During the course of research study, some questionnaire has been designed as per the requirement of the research study. The questionnaires had been distributed to 2 employees of Administrative section, Medical recorder, 3 employees of Surgery section and 2 employees of Administrative and Pediatric section respectively.

-) Observation: Closely observation has been made during this research study. The close observation is done almost in all sections and departments with their day to day activities.
-) Interview: Interview methods have also been used as primary data collection techniques. The interview was conducted with various staffs like doctors, nurses, volunteers and internship students. It helped to compare the report generated by new system as compared with old traditional spread sheets methods.
-) Inspection: of existing system and feedback about it.

3.1.2.2 Secondary Data Collection

The data that are already published or ready made by an organization or individual is known as secondary data, has also been used to achieve the objectives of the research study such as magazines, thesis, broacher, Dhulikhel Hospital Annual Reports, Dhulikhel Hospital booklet and websites.

Here, in this research purpose, secondary data is the major method of data collection but still some primary data has also been used for the comparison.

3.2 Data Analysis Tools

To achieve the objectives of this research study following data analysis tools has been used.

3.2.1 Table, organizational Charts and Screen

A table is a presentation of data in column and row form. These types of table and some graphical charts have also been used for the presentation and analysis of data. Furthermore, some Screens of spread sheets and new system (DHMS) have also been used for same.

3.2.2 Data Flow Diagram (DFD)

In the late 1970s data-flow diagrams (DFDs) were introduced and popularized for structured analysis and design. DFDs show the flow of data from external entities into the system, showed how the data moved from one process to another, as well as its logical storage. There are only four symbols used in DFD:

Squares: Representing external entities, which are sources or destinations of data.

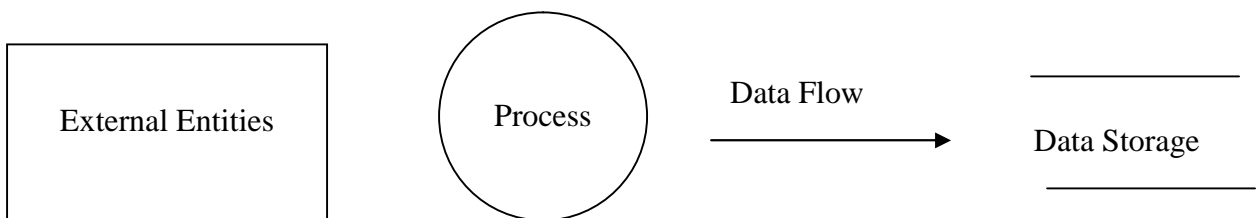
Rounded: Rectangles representing processes, which take data as input, do something to it, and output it.

Arrows: It represents the data flows, which can either, be electronic data or physical items.

Open-ended Rectangles: representing data stores, including electronic stores such as databases or XML files and physical stores such as or filing cabinets or stacks of paper.

Fig 3.1

Symbols Use for Data Flow



Source: (Malhotra, Y.1993:22)

There are several common modeling rules that the researcher has followed while creating DFDs:

-) All processes must have at least one data flow in and one data flow out.
-) All processes should modify the incoming data, producing new forms of outgoing data.
-) Each data store must be involved with at least one data flow.
-) Each external entity must be involved with at least one data flow.
-) A data flow must be attached to at least one process.

3.2.3 Entity Relationship (ER) Diagram

ER diagram is a graphical representation used to display object or events within a system and their relationship to one another. ER diagram helps to make database. It shows the relationship between entities and attributes.

Entity: An entity is person, place, object, events or concept in a user environment in which organization wishes to maintain data.

Person : Employee, Student, Patient

Place : Store, warehouse, state

Object : Machine, Building

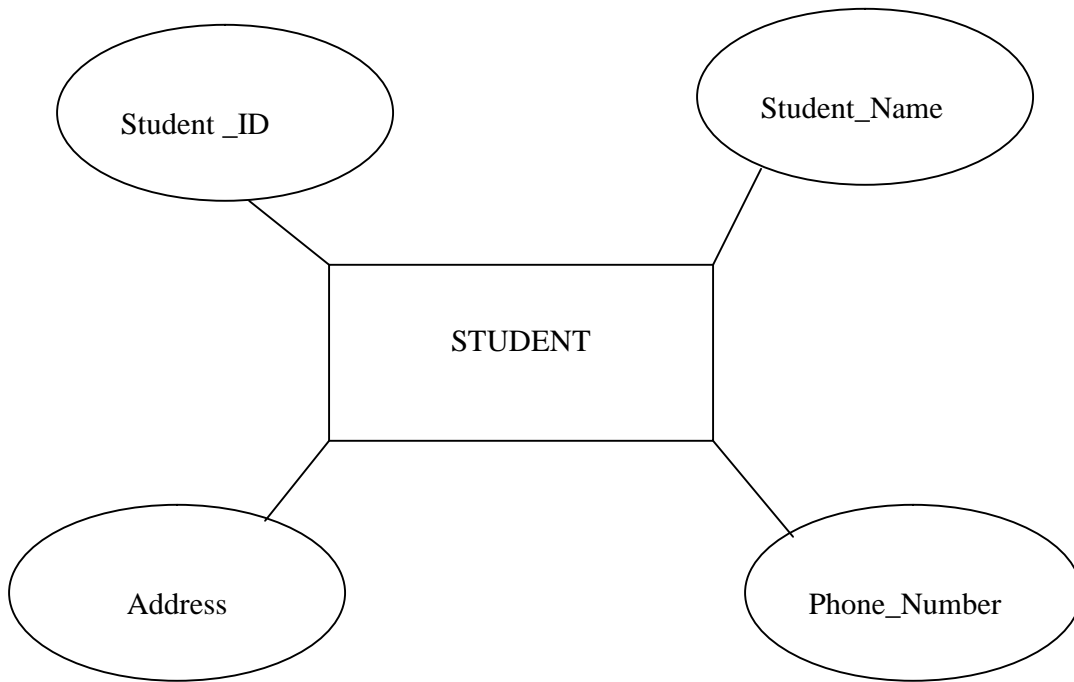
Event : Sale, Registration, Renewal

Concept : Account, Course, Work Center

Attributes: The properties of entities are attributes. Each entity has own set of characteristics or attributes associated with. Following are some typical entity types and associated attributes.

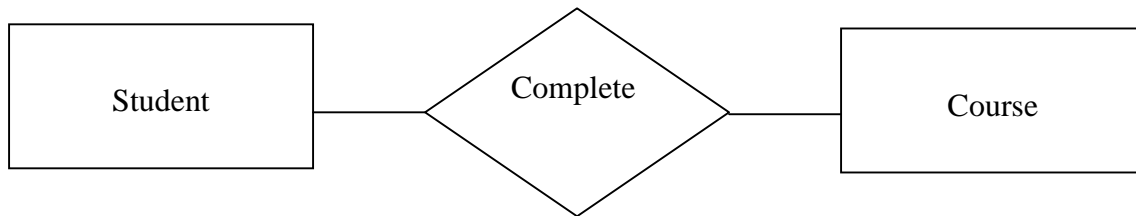
Student: Student_ID, Student_Name, Address, Phone_Number

Diagram 3.1
Entity Relationship (ER) Diagram



Relationship: A relationship is an association between the instances of one or more entity types that is of interest of organization. It shows the type of relationship between entities.

Diagram 3.2
Relationship



3.3 Feasibility Study

Depending on the results of the initial investigation the survey is now expanded to a more detailed feasibility study. “*FEASIBILITY STUDY*” is a test of system proposal according to its workability, impact of the organization, ability to meet needs and effective use of the resources. It focuses on these major questions:

-) What are the user’s demonstrable needs and how does a candidate system meet them?
-) What resources are available for given candidate system?
-) What are the likely impacts of the candidate system on the organization?
-) Whether it is worth to solve the problem?
-) During feasibility analysis for this project, following primary areas of interest are to be considered. Investigation and generating ideas about a new system does this.

3.3.1 Steps in feasibility analysis

Eight steps involved in the feasibility analysis are:

-) Form a project team and appoint a project leader.
-) Prepare system flowcharts.
-) Enumerate potential proposed system.
-) Define and identify characteristics of proposed system.
-) Determine and evaluate performance and cost effective of each proposed system.
-) Weight system performance and cost data.
-) Select the best-proposed system.
-) Prepare and report final project directive to management.

3.3.2 Technical feasibility

A study of resource availability that may affect the ability to achieve an acceptable system. This evaluation determines whether the technology needed for the proposed system is available or not.

-) Can the work for the project be done with current equipment existing software technology & available personal?
-) Can the system be upgraded if developed?
-) If new technology is needed then what can be developed?

This is concerned with specifying equipment and software that will successfully satisfy the user requirement. The technical needs of the system may include:

3.3.3 Front-end and back-end selection

An important issue for the development of a project is the selection of suitable front-end and back-end. When we decided to develop the project we went through an extensive study to determine the most suitable platform that suits the needs of the organization as well as helps in development of the project.

The aspects of our study included the following factors.

3.3.3.1 Front-end selection

1. It must have a graphical user interface that assists employees that are not from IT background.
2. Scalability and extensibility.
3. Flexibility.
4. Robustness.
5. According to the organization requirement and the culture.
6. Must provide excellent reporting features with good printing support.
7. Platform independent.
8. Easy to debug and maintain.

9. Event driven programming facility.
10. Front end must support some popular back end like Oracle.

According to the above stated features we selected VB6.0 as the front-end for developing our project.

3.3.3.2 Back-end Selection

1. Multiple user support.
2. Efficient data handling.
3. Provide inherent features for security.
7. Operating System compatible.
8. Various drivers must be available.
9. Easy to implant with the Front-end.

According to above stated features we selected Oracle as the backend.

The technical feasibility is frequently the most difficult area encountered at this stage. It is essential that the process of analysis and definition be conducted in parallel with an assessment to technical feasibility. It centres on the existing computer system (hardware, software etc.) and to what extent it can support the proposed system.

3.3.4 Economical feasibility

Economic justification is generally the “Bottom Line” consideration for most systems.

Economic justification includes a broad range of concerns that includes cost benefit analysis. In this we weight the cost and the benefits associated with the candidate system and if it suits the basic purpose of the organization i.e. profit making, the project is making to the analysis and design phase.

The financial and the economic questions during the preliminary investigation are verified to estimate the following:

-) The cost to conduct a full system investigation. The cost of hardware and software for the class of application being considered.
-) The benefits in the form of reduced cost.
-) The proposed system will give the minute information, as a result the performance is improved which in turn may be expected to provide increased profits.

This feasibility checks whether the system can be developed with the available funds. The **Hospital Management System** does not require enormous amount of money to be developed. This can be done economically if planned judiciously, so it is economically feasible. The cost of project depends upon the number of man-hours required.

3.3.5 Operational Feasibility

It is mainly related to human organizations and political aspects. The points to be considered are:

-) What changes will be brought with the system?
-) What organization structures are disturbed?
-) What new skills will be required? Do the existing staff members have these skills? If not, can they be trained in due course of time?

The system is operationally feasible as it very easy for the End users to operate it. It only needs basic information about Windows platform.

3.3.6 Schedule feasibility

Time evaluation is the most important consideration in the development of project. The time schedule required for the developed of this project is very important since more development time effect machine time, cost and cause delay in the development of other systems.

A reliable **Hospital Management System** can be developed in the considerable amount of time.

CHAPTER - IV

DATA PRESENTATION AND ANALYSIS

4.1 Introduction

The prime focus of this study is to analyze the existing system of the organization as well as to analyze the possibility of introducing new and effective technology for effective information management through software.

This section has been divided into four parts. The first parts deals with the analysis of existing system of the organization. A simple presentation of existing structure and its operational capacity has discussed. Similarly, the seconds parts deals with the new model of Hospital Management System with software for overall management of the organization in same projects. Dataflow diagram, ER diagram are used to analyze the new system.

Similarly, the third part shows the data tables and the layout of screen view of software. Brief findings of the research have been illustrated in the final section, which is the base for final chapter i.e. summary, conclusion and recommendation.

4.2 Introduction of existing system and its analysis

Dhulikhel hospital is guided by the principles of the social equity, sustainable development and harmony with nature. Through its trained staff, it will provide cost effective, compassionate and quality health care services. Dhulikhel Hospital believes that collaboration between health care professionals is essential throughout the process of care.

When opened in 1996, the Hospital was able to provide only basic treatments to a small number of patients. Now its services have grown to include:

Services:

1. Ambulance service

2. Diagnosis services-

) Laboratory,

) Radiology,

) Cystoscopy

) Bronchoscopy,

) Endoscopy,

) Electrocardiography and

) Ultrasonography.

3. Therapeutic Services

) Pharmacy

) Out-patient clinics

) Mother and child health services

) Emergency obstetric services

4. Health manpower Training

) Traditional Birth attendants

) Community health volunteers

) Laboratory Technicians

) Ophthalmic Assistants

) Staff Nurses

) Health assistants and

) Physiotherapist

Primary health care, focusing on prevention of disease and promotion of health, as well as curative activities, is the main focus of its work outside the hospital. Most common diseases are preventable or easily managed and patients should not need to travel long distances to access this basic but essential healthcare. It Supports and manages five Primary Health Care Centers as well as many health camps and local health initiatives.

5. Outreach Primary Health Care Programs: Dhulikhel Hospital has managed six villages Outreach Primary Health Care Programs like:
 - Baluwa Health Center, Kavre
 - Bahunipati Health Center, Sindhupalchowk
 - Bolde Phediche Health Center, Kavre
 - Godamchaur Health Center, Lalitpur
 - Dhading chhatredeurali Health Center, Dhading
 - Solambu Health Center, kavre
6. Outreach Primary Health Care Services: Mobile Blood Donation Programs, Mobile rural Health clinics, Primitive and Preventive Health services in partnership with local non profit –Government Organizations and non-formal education in health for community services providers. Continuing Education for Health Manpower Educational Conferences for Physicians, Nurse and Dhulikhel Medical Institute Faculty; Dhulikhel Hospital Nurses gaining experience of Canadian hospitals; Health Assessment upgrading courses; Physiotherapy Assistant training.
7. Dhulikhel Hospital works with other organizations on various collaborative projects:
Dhulikhel medical organization in collaboration with Kathmandu University trains different categories of manpower.
8. Health insurance coverage for employees of the Organization and students of the institutions: Student of Kathmandu University School Of Medical Science and other

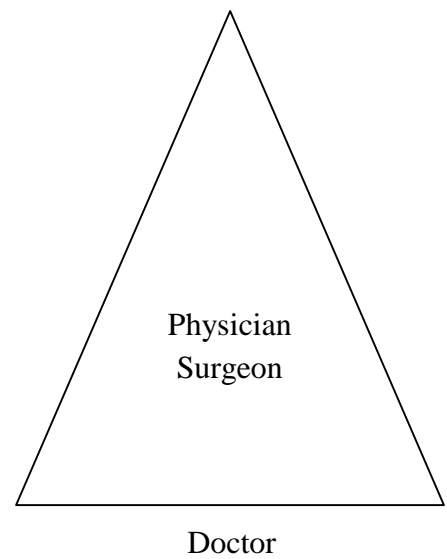
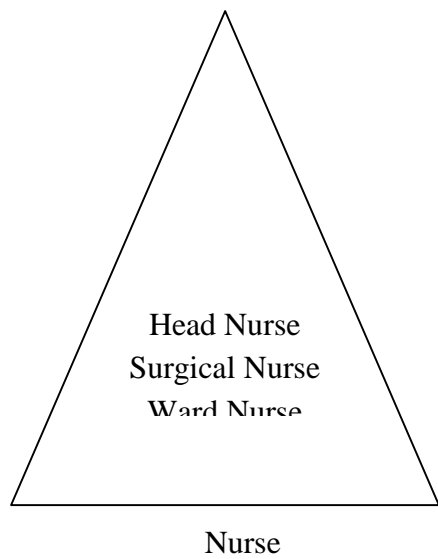
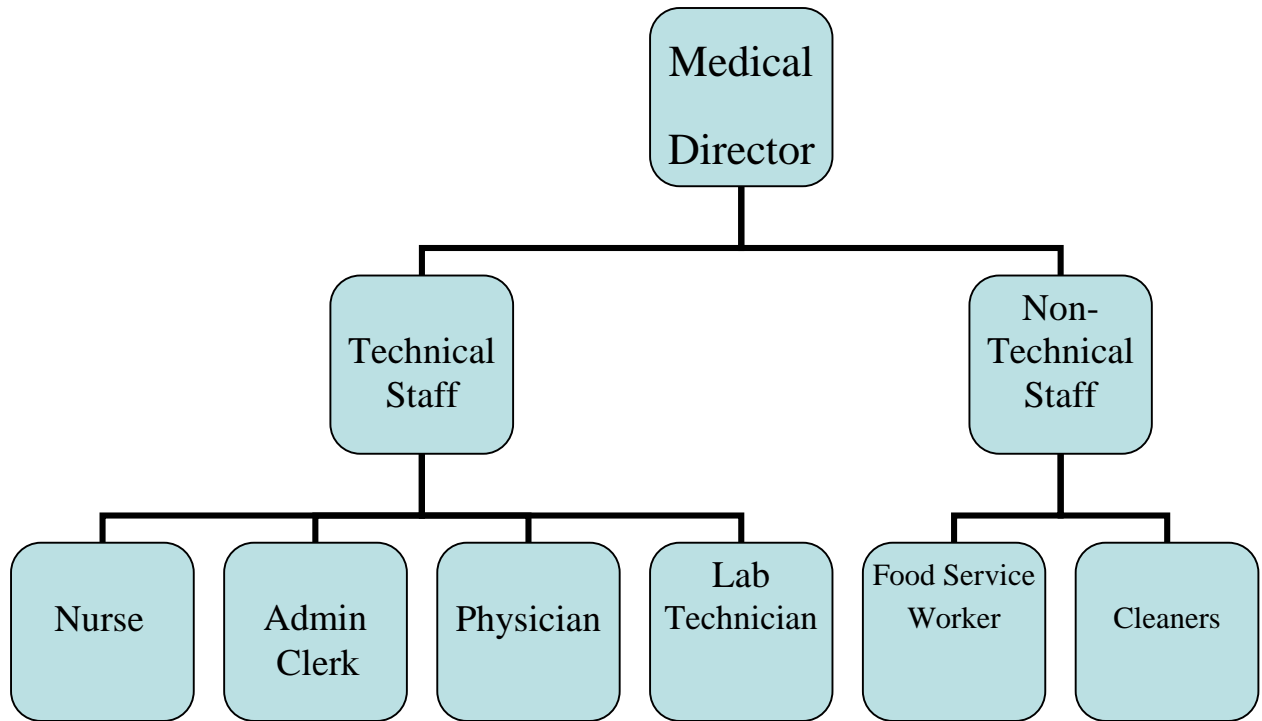
sister organizations like Kathmandu University High School are provided medical insurance as well as for the employee of those organization are taking the facilities of that.

4.2.1 Human Resources

Dhulikhel Hospital believes that collaboration between health care professionals is essential throughout the process of care. There are 146 fulltime employees including 35 doctors, 64 nurses and 39 paramedics providing services in different departments. Also volunteers from different countries have been providing services in Pediatrics, Physiotherapy, Surgery and Anesthesia department.

To the detail tabulated structure of current recourses and plan analysis is given in *Appendix I*.

4.2.2 Organizational Chart



4.3 Analysis of Existing working mechanism

With the detail study of the existing system I have come to know that a hospital is a place where Patients come up for general diseases where the Hospitals provide facilities like:-

-) Consultation by Doctors on Diseases.
-) Diagnosis for diseases.
-) Providing treatment facility.
-) Facility for admitting Patients (providing beds, nursing, medicines etc.)
-) Immunization for Patients/Children.

Various operational works that are done in a Hospital are:-

-) Recording information about the Patients that come.
-) Generating bills.
-) Recording information related to diagnosis given to Patients.
-) Keeping record of the Immunization provided to children/patients.
-) Keeping information about various diseases and medicines available to cure them.

These are the various jobs that need to be done in a Hospital by the operational staff and Doctors. All these works are done on papers.

The work is done as follows:-

-) Information about Patients is done by just writing the Patients name, age and gender. Whenever the Patient comes up his information is stored freshly.
-) Bills are generated by recording price for each facility provided to Patient on a separate sheet and at last they all are summed up.
-) Diagnosis information to patients is generally recorded on the document, which contains Patient information. It is destroyed after some time period to decrease the paper load in the office.

-) Immunization records of children are maintained in pre-formatted sheets, which are kept in a file.
-) Information about various diseases is not kept as any document. Doctors themselves do this job by remembering various medicines.

All this work is done manually by the receptionist and other operational staff and lot of papers are needed to be handled and taken care of. Doctors have to remember various medicines available for diagnosis and sometimes miss better alternatives as they can't remember them at that time.

4.4 Problem with conventional system

1. **Lack of immediate retrievals:** -The information is very difficult to retrieve and to find particular information like- E.g. - To find out about the patient's history, the user has to go through various registers. This results in inconvenience and wastage of time.
2. **Lack of immediate information storage:** - The information generated by various transactions takes time and efforts to be stored at right place.
3. **Lack of prompt updating:** - Various changes to information like patient details or immunization details of child are difficult to make as paper work is involved.
4. **Error prone manual calculation:** - Manual calculations are error prone and take a lot of time this may result in incorrect information. For example: calculation of patient's bill based on various treatments.
5. **Preparation of accurate and prompt reports:** - This becomes a difficult task as information is difficult to collect from various registers.

4.5 Goals of proposed system:

1. **Planned approach towards working:** - The working in the organization will be well planned and organized. The data will be stored properly in data stores, which will help in retrieval of information as well as its storage.

2. **Accuracy:** - The level of accuracy in the proposed system will be higher. All operation would be done correctly and it ensures that whatever information is coming from the center is accurate.

3. **Reliability:** - The reliability of the proposed system will be high due to the above stated reasons. The reason for the increased reliability of the system is that now there would be proper storage of information.

4. **No Redundancy:** - In the proposed system utmost care would be that no information is repeated anywhere, in storage or otherwise. This would assure economic use of storage space and consistency in the data stored.

5. **Immediate retrieval of information:** - The main objective of proposed system is to provide for a quick and efficient retrieval of information. Any type of information would be available whenever the user requires.

6. **Immediate storage of information:** - In manual system there are many problems to store the largest amount of information.

7. **Easy to Operate:** - The system should be easy to operate and should be such that it can be developed within a short period of time and fit in the limited budget of the user.

4.6 Proposed model design of DHMS

Detail system design of new DHMS is illustrated below.

Context level diagram below explains about the Entities like patient, provincial healthcare network, doctors, insurance provider and finance. These are the main entities to be actively linked with the proposed system where immediate information flow in right time is very important. The entire DHMS software is providing the different hierarchal data integrity to various levels with reliable data storage system for better and quick updated information flow.

Diagram 4.1
Context Level DFD

4.1 Context Level DFD:

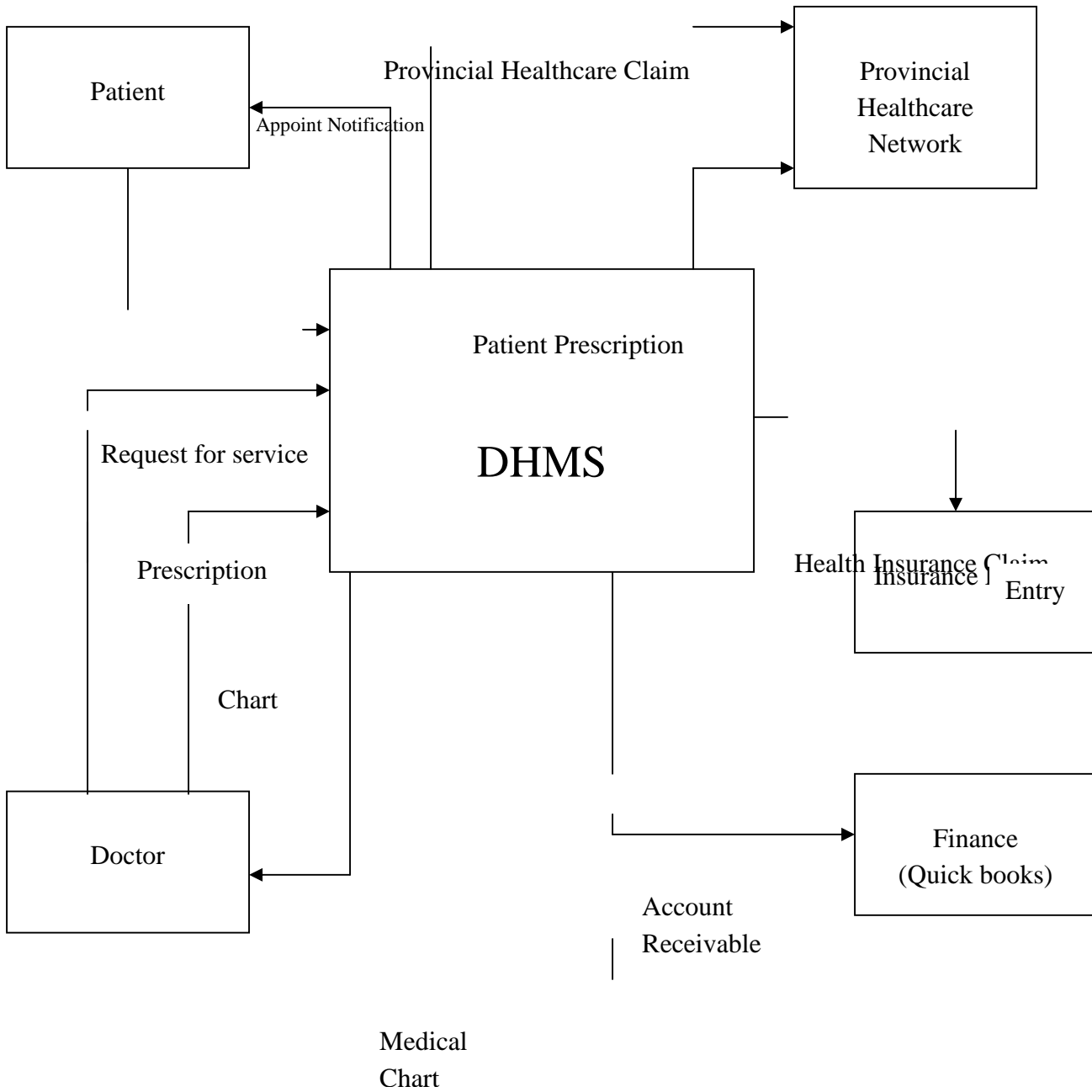
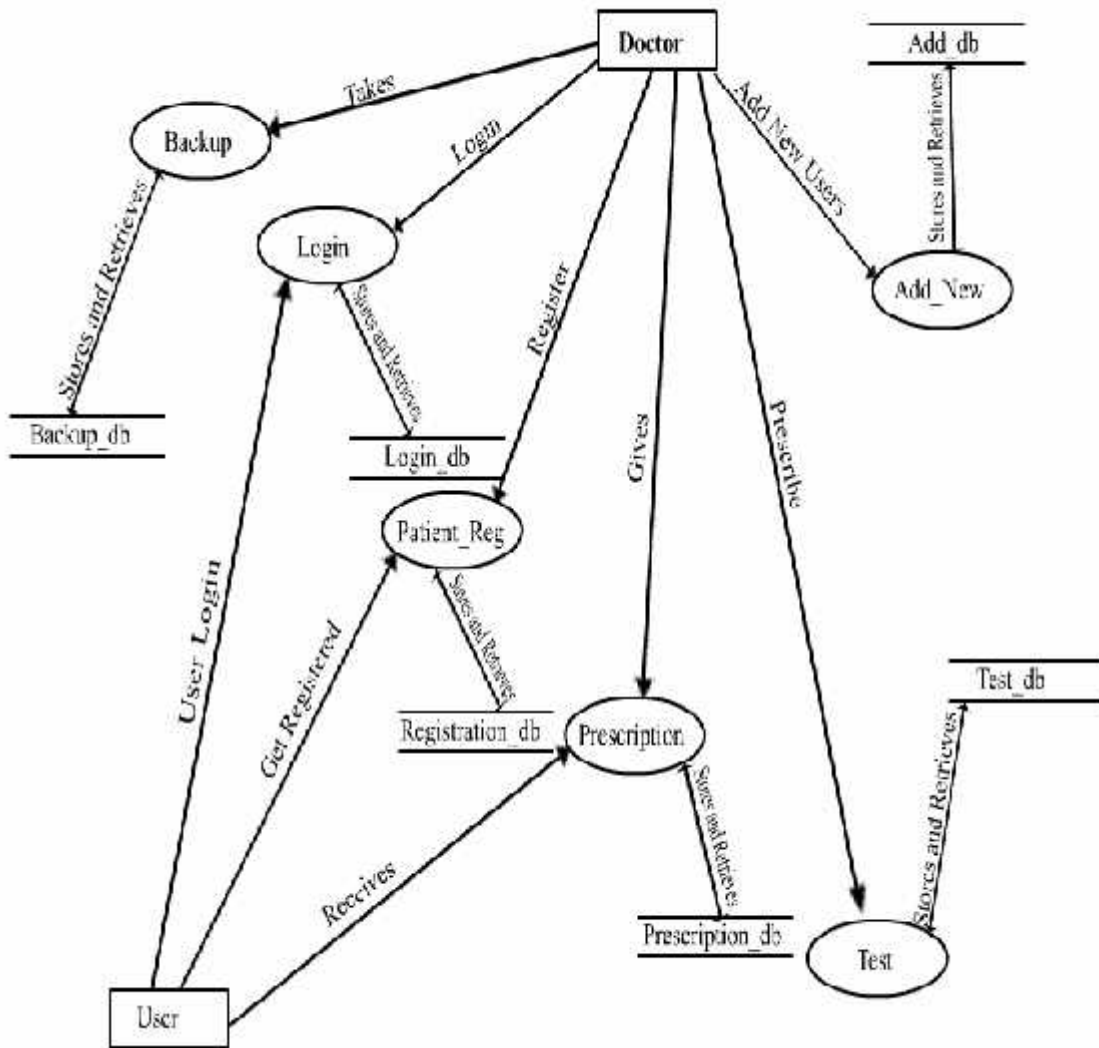


Diagram 4.2

Data Flow Diagram:

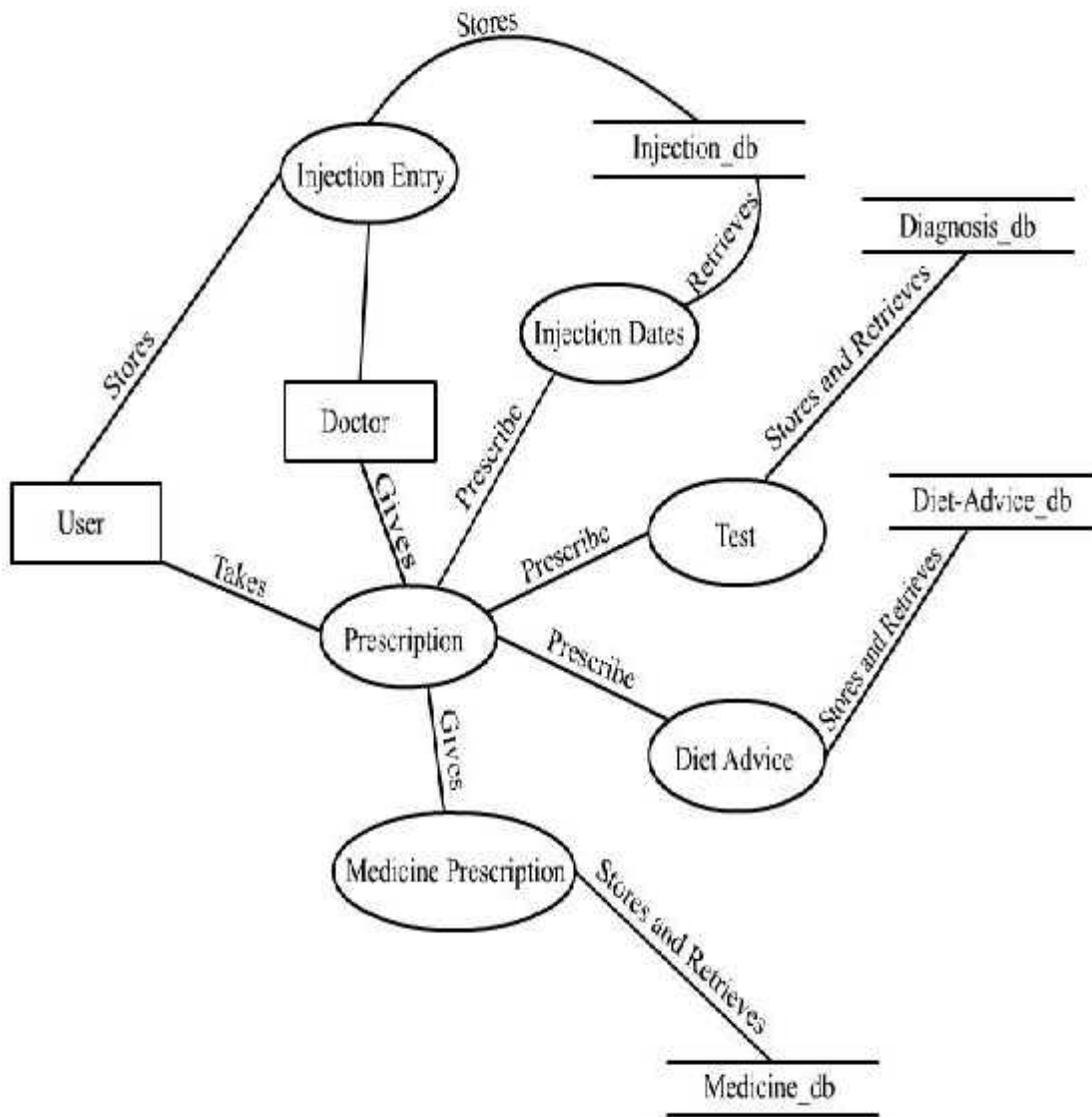


DFD: Level 0

DFD: Level 1

Diagram 4.4

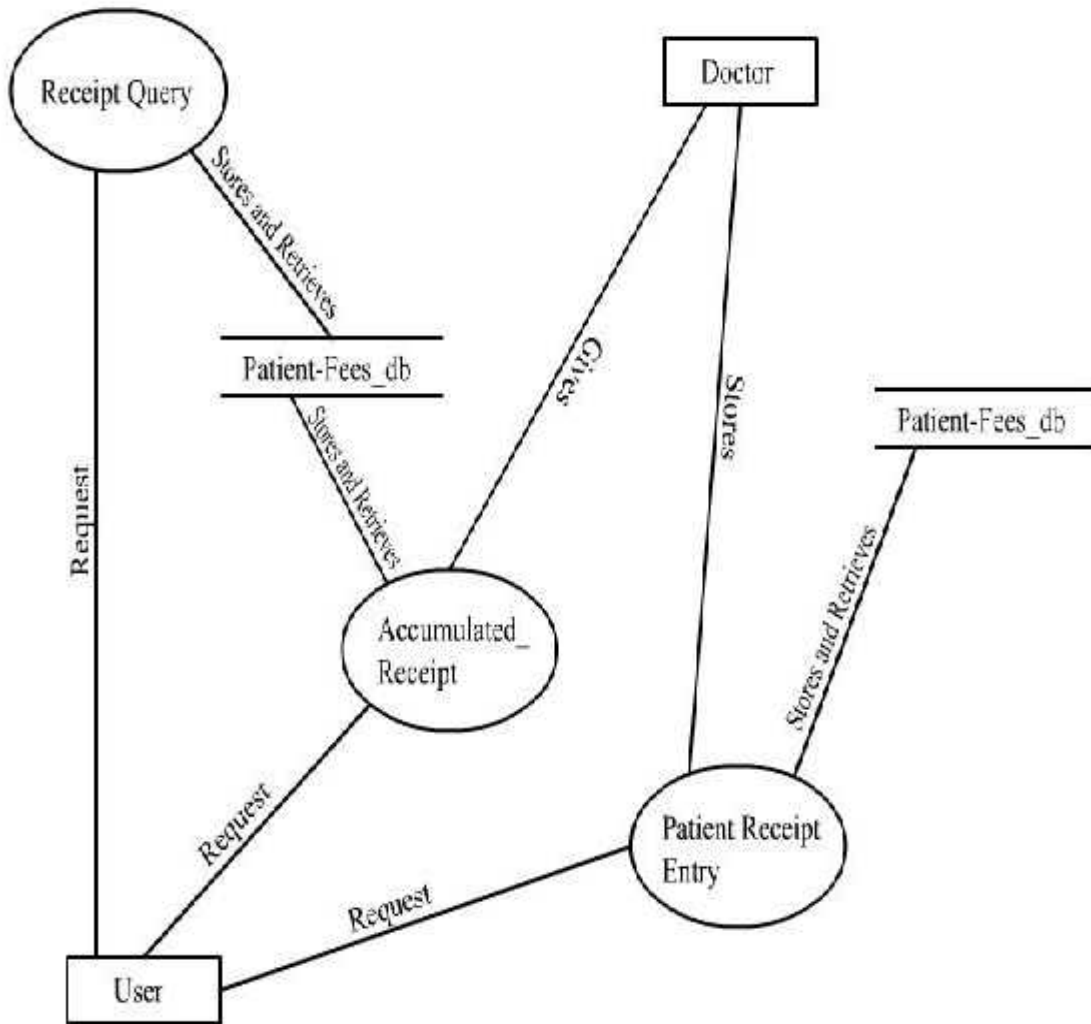
Data Flow Diagram:



DFD: Level 2

Diagram 4.5

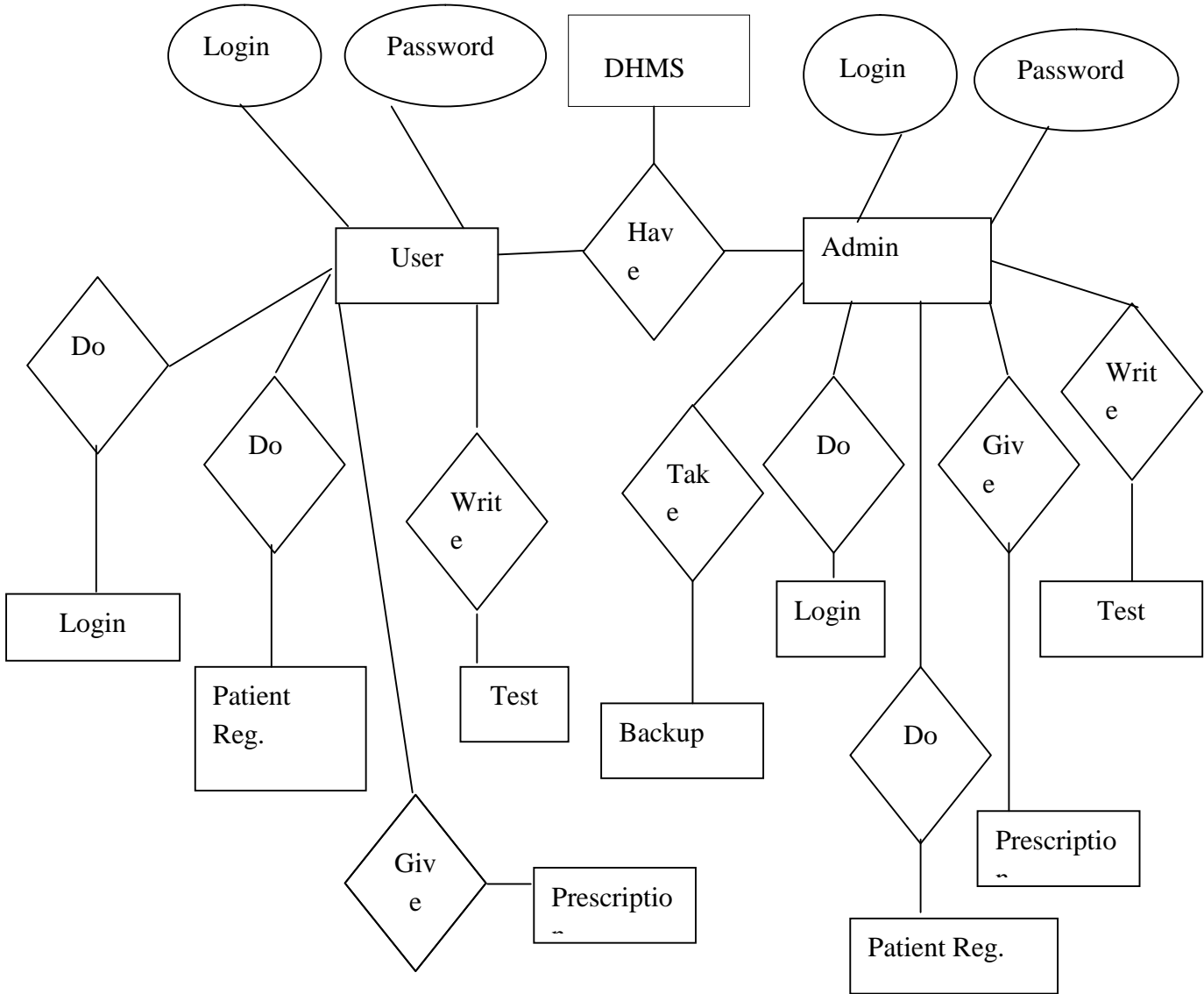
Data Flow Diagram:



DFD: Level 3

Diagram 4.6

4.6 Entity Relationship Diagram



4.7 Program Used to Develop New System

4.7.1 Visual Basic NET

In order to avoid the drawbacks of existing system of the organization, this research study attempts to develop the new model of Hospital management information system by using Visual Basic as a front end application. These capabilities make it easier than ever to create .NET applications, including Windows applications, web services, and web applications.

As of November 2007, there are four versions of Visual Basic .NET that were implemented by Visual Basic Team.

Visual Basic .NET (VB 7)

Visual Basic .NET 2003 (VB 7.1)

Visual Basic 2005 (VB 8.0)

Visual Basic 2008 (VB 9.0)

4.7.2 Oracle Database

Due to the complexity of the required PMIS, requirement of a strong database management has been realized. Therefore, oracle database management system has been used as a backend application of DHMS.

The Oracle Database (commonly referred to as Oracle RDBMS or simply as Oracle), a relational database management system (RDBMS) software product released by Oracle Corporation, has become a major factor in database computing.

The Oracle RDBMS stores data logically in the form of table spaces and physically in the form of data files. Table spaces can contain various types of memory segments; for example, Data Segments, Index Segments etc. Segments in turn comprise one or more extents. Extents comprise groups of contiguous data blocks. Data blocks form the basic units of data storage.

At the physical level, data-files comprise one or more data blocks, where the block size can vary between data-files.

In the market for relational databases, Oracle competes against commercial products such as IBM's DB2 UDB and Microsoft SQL Server. Oracle and IBM tend to battle for the mid-range market (especially on UNIX and Linux platforms), while Microsoft tends to compete in the low-end market (on Microsoft Windows platforms).

4.8 Security Management

Database administrator creates the hierarchical access authority of data like: creating, editing, updating, presenting and deleting as per the requirement.

For the backup management:

-) All disk files updated or created by the user are copied when the user signs off. All newly created or modified files not previously dumped are copied to tapes once per hour.
-) System even maintains backup copies of data through the paging system.
-) CD, DVD, Pen Drive or Tape is used for daily backup.
-) Online database storage is done as an entire database backup and recovery purpose.
-) An antivirus protection system and firewall system is used to protect data from any unethical and damage and malfunctioning.

CHAPTER V

SUMMERY, CONCLUSION AND RECOMMENDATIONS

5.1 SUMMARY

The prime focus of this research study is to analyze the existing information management in Hospital further added by developing the new computerized Hospital Management System.

To achieve the first objective of this research study, a detailed presentation and analysis of existing hospital management is discussed. The presentation included the existing system of hospital management with its organizational chart, existing human resource and potentiality of operational capabilities. The project was focused on the handling of the employee (doctor) and patients activities it health sectors. The project covered the concept and implementation of decision support system for the doctor registration system for patient and general public. The project work was full of the observations including preliminary analysis, problem definitions and the requirements in the existing system while designing the new system. New system analysis like feasibility study, DFD analysis and design, ER Diagrams and screen form layout are the major research activities of this project.

The product of this project work made to overcome the problem related to the existing system and meet the user requirement of the new system. This research is made to enhance the conventional medical model used by physicians for patient management in an intensive care environment. It uses previous patients experiences recorded in a large clinical database with new patients and generates output which may be helpful for physicians in their decision making. This approach may be applicable to other patient care environments and current efforts are focused in generalizing the tools and theory for wider applications in the future.

This research study attempts to analyze the use of new model of Hospital Management information system to systematize various operational works that are done in a Hospital like recording information about the Patients that come, Generating bills, Recording information related to diagnosis given to Patients, Keeping record of the Immunization provided to children/patients, Keeping information about various diseases and medicines available to cure them etc. Healthcare organization must anticipate and be prepared to handle a diverse array of changes that will occur during the implementation process itself. Therefore the organization needs to be able to operate normally on schedule while operating the implementation as well. By phasing in the systems implementation and anticipating problems proactively, the hospital should be able to reduce the number of negative experience associated with the introduction of a new system.

5.2 CONCLUSION

The project Dhlikhel Hospital Management System (HMS) is design for computerizing day to day activities especially for data storing, presenting, report generating and analysing for better health services. With the help of software developed for effective Hospital information management it is considered that data will be stored properly in data stores, which will help in retrieval of information as well as its storage provide for a quick and efficient retrieval of information. Any type of information would be available whenever the user requires. The software takes care of all the requirements of an average hospital and is capable to provide easy and effective storage of information related to patients that come up to the hospital.

It generates test reports; provide prescription details including various tests, diet advice, and medicines prescribed to patient and doctor. It also provides injection details and billing facility on the basis of patient's status whether it is an indoor or outdoor patient. As doing regular work to make improvement on the system so far, the system will fulfil the user goal,

make and easy to use and also used in retrieving data from repository, increase the accuracy of critical documents. The system also provides the facility of backup as per the requirement. Under the able guidance of my supervisor Shankar Nath Adhikary and Shree Bhadra Neupane, I have successfully completed the analysis, design and coding for the system. Still looking to do further development.

5.3 RECOMMENDATIONS

The following are the recommendation that the researcher have found during the research study.

-) Applying new model of DHMS will be more effective for the organization as compared with existing system of Information Management.
-) Use of computerized software is very essential for every organization. Therefore, the organization's awareness for the Information Management is required for effective and efficient handling of different data, reports and their appropriate analysis.
-) Use of software really reduces the time by avoiding regular clerical works. The organization should get the advantages of reduction time and mobilized their personal with skill manpower.
-) The management of organization needs to develop new model of DHMS by consulting with their technical staffs.
-) The management of DH should implement the new model of DHMS to ensure the value of time and health for better service.

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Appendix

Annex- I

Current Resources and Plan Analysis of Dhulikhel Hospital

	Existing	By 2011
Bed capacity:	150	200
Occupancy Rate	85%	
% of free beds	20%	
Departments	Surgery	Surgery
	Medicine	Medicine
	OBGNY	OBGNY
	Emergency/Trauma	Emergency/Trauma
	Community Health	Community Health
Departments	MCH & FP	MCH & FP
	Pathology	Pathology
	Radio Diagnosis	Radio Diagnosis
	Pediatric	Pediatric
	Dentaal	Dentaal
		Eye
		ENT
		Orthopedics

No of Doctors:	Existing	By 2011
(with specialist in)	35	50
Surgery	4(fulltime)	6(fulltime)
OBGNY	2(fulltime)	3(fulltime)
Medicine	2(fulltime)	3(fulltime)
Anesthesiology	2(fulltime)	3(fulltime)
Community Medicine	2(fulltime)	6(fulltime)

Pediatrician	2(fulltime)	4(fulltime)
Pathologist	2(fulltime)	4(fulltime)
Resident Medical Officer	19(fulltime)	21(fulltime)

Consultation Available	Existing	By 2011
Radiology	-	-
Orthopedics	-	-
Pathology	-	-
Eye and ENT	-	-
Total nurses:	84	120
M.Sc Nurse	5	8
B.Sc Nurse	15	25
Staff Nurse	40	55
ANM	24	32
Paramedics:	39	56
Lab Technologist	3	5
Lab Technician	3	7
Lab Assistant	6	6
Radiographer	1	2
Radiology Assistant	2	4
USG/Endoscopy Assistant	2	3
Health Assistant	6	14
CMAs	10	8
Pharmacy Assistant	3	4
Operation Theater Assistant	3	3

4.9 Data Tables

Average No of Patient	Existing	By 2011
Outpatient	200/day	300/day
Admission(Inpatient)	20/day	30/day
Emergency	25/day	35/day
Department wise OPD visit(average)		
Surgery	25/day	28/day
OBGNY	22/day	30/day
Medicine	40/day	40/day
Paediatric	15/day	25/day
MCH/FP	18/day	27/day

Department wise Hospital beds	150	200
Surgery	40	65
OBGYN	30	35
Internal Medicine	30	40
Paediatric	15	20
Emergency/ Observation/ICU	20	25
Labour Room	5	15

4.1 Login Table:-

Field Name	Data Type	Description
User_Name	Text	
Password	Text	
Hint_Question	Text	
Hint_Answer	Text	
User_Type	Text	

4.2 Patient Detail Table:-

Field Name	Data Type	Description
Registration_No	Text	
Registration_Date	Date/Time	
Name	Text	
Address	Text	
City	Text	
TelePhone_Mobile_No	Text	
Marital_Status	Text	
Religion	Text	
Gender	Text	
Father_Husband_Name	Text	

Field Name	Data Type	Description
Status	Text	Indoor / Outdoor
Age	Number	

4.3 Patient Diagnosis Table:-

Field Name	Data Type	Description
Dignosis_No	Text	
Registration_No	Text	
Dignosis_Date	Date/Time	
Provisional_Dignosis	Text	
Remark	Text	
BioChemistry	Yes/No	
Stool	Yes/No	
Blood	Yes/No	
Colonoscopy	Yes/No	
Gastroscopy	Yes/No	
Urine	Yes/No	
XRay	Yes/No	
SONOGRAPHY	Yes/No	
Others	Text	
Reconsultation_Advice_Week	Text	Week Wise
Reconsultation_Advice_Date	Date/Time	
FINAL_Diagnosis	Text	
ECG	Yes/No	

For rest of the data tables see *Annex II*

Annex II

1. Patient Diet Advice Table:-

Field Name	Data Type	Description
Dignosis_No	Text	
Diet_Advice	Text	

2. Patient Medicine Table:-

Field Name	Data Type	Description
Dignosis_No	Text	
Medicine_No	Number	
Medicine_Name	Text	
Precaution	Text	Medicine Related Hindi Words
No_of_Doses	Number	

3. Patient Injection Dates Table:-

Field Name	Data Type	Description
Dignosis_No	Text	
Injection_Date	Date/Time	
Status	Text	Injection Taken or Not

4. Biochemistry Test Table:-

Field Name	Data Type	Description
Registration_No	Text	
Test_Date	Date/Time	
Glucose_Fasting_R	Text	70-110 mg %
Two_Hr_Pg_Pp	Text	< 100 mg %
Blood_Urea	Text	10-40 mg %
Creatinine	Text	0.6-1.5 mg %
S_Cholesterol	Text	130-250 mg %
Total_Protein	Text	6.0-8.0 gm %
Albumin	Text	3.5-5.0 gm %
Globulin	Text	2.3-3.6 gm %
A_G_Ratio	Text	? 1.5 ;,-2.3:1
Gamma_Gt	Text	11-50 UL
Alkaline_Ptase	Text	10-90 U/L Adult
Bilirubin_Direct	Text	0.0-0.8 mg %
Bilirubin_Indirect	Text	0.0-0.6 mg %
Bilirubin_Total	Text	0.2-1.0 mg %
Sgot	Text	0-40 U/L
Sgpt	Text	0-40 U/L
Half_Hr_Pg_Pp	Text	< 110 mg %
One_Hr_Pg_Pp	Text	< 160 mg %
One_And_Half_Hr_Pg_Pp	Text	< 140 mg %

Field Name	Data Type	Description
Bun	Text	8-20 mg %
Hdl_Cholesterol	Text	30-55 mg %
Ldl_Cholesterol	Text	60-165 mg %
Vldl_Cholesterol	Text	0-60 mg %
Triglycerides	Text	0-60 mg %
S_Total_Lipids	Text	400-700 mg %
S_Amylase	Text	25-125 U/L
S_Lipase	Text	8-54 Ug/L
Sodium	Text	136_146 mEq/L
Potassium	Text	3.5-5.0 mEq/L
Chloride	Text	94-111 mmo l/L
Calcium	Text	8.5-11.0 mg/dl
Ldh_Total	Text	230-461 U/L
Ck_Nac_Activated	Text	0-190 U/L
Ck_Mb_Nac_Activated	Text	< 12 U/L
Uric_Acid	Text	4-6 mgdl
Urine_Sugar1	Text	
Urine_Sugar2	Text	
Urine_Sugar3	Text	
Urine_Sugar4	Text	
Acid_Ptase	Text	
Glucose_R_PP	Text	
T3	Text	0.3-2.5 ul U/L

Field Name	Data Type	Description
T4	Text	4.5-12 uI U/L
TSH	Text	0.4-4.0 uI U/L

5. Blood Test Table:-

Field Name	Data Type	Description
REGISTRATION_NO	Text	
TEST_DATE	Date/Time	
HAEMOGLOBIN	Text	13-15 GMS%
TLC	Text	4500-10500 CELLS/CU MM
NEUTROPHILS	Text	DLC , 45-68%
LYMPHOCYTES	Text	DLC , 25-45%
EOSINOPHIL	Text	DLC , 2-6%
MONOCYTES	Text	DLC , 1-4%
BASOPHILS	Text	DLC , 1-2%
OTHERS	Text	DLC
ESR	Text	0-10 MM IST Hr
PERIPHERAL_BLOOD_FILM_1	Text	
PERIPHERAL_BLOOD_FILM_2	Text	
HAEMATOCRIT_PCV	Text	
TOTAL_RBC	Text	MIL/C.MM
PLATELETS	Text	CU.MM
COLOUR_INDEX	Text	

Field Name	Data Type	Description
MCHC	Text	
MCV	Text	FI
MCH	Text	PG
TEC	Text	CU.MM
VEC	Text	
PARACYTES	Text	
BLOOD_GROUPING	Text	
RH_FACTOR	Text	
RH_ANTIBODY_TILER	Text	
DIRECT	Text	
INDIRECT	Text	
PLASMA_FIBRINOGEN	Text	150-400 mg%
HIV	Text	
HBSAG	Text	
WIDAL	Text	
FOETAL_HAEMOGLOBIN	Text	
RETICULOCYTES	Text	
BLEEDING_TIME_MIN	Text	
BLEEDING_TIME_SEC	Text	
CLOTING_TIME_MIN	Text	
CLOTING_TIME_SEC	Text	
PROTHROMBIN_TIME_CONTRO L	Text	
SECS_PATIENT_1	Text	

Field Name	Data Type	Description
SECS_PATIENT_2	Text	
PTTK_CONTROL	Text	
HAEMOLYSIS_START_FROM	Text	
SALINE_COMPLETE_AT	Text	
CLOT_RETRACTION_TIME_CRT	Text	
LE_CELLS	Text	
ESR_PLATELETS	Text	

6. Colonoscopy Test Table:-

Field Name	Data Type	Description
REGISTRATION_NO	Text	
TEST_DATE	Date/Time	
ANAL_CANAL	Text	
RECTUM	Text	
SIGMOID_COLON	Text	
DESCENDING_COLON	Text	
SPLENIC_FLEXURE	Text	
TRANSVERSE_COLON	Text	
HEPATIC_FLEXURE	Text	
ASCENDING_COLON	Text	
CAECUM	Text	
TERMINAL_ILEUM	Text	

Field Name	Data Type	Description
BIOPSY	Text	
OPINION_1	Text	
OPINION_2	Text	

7. Gastroscopy Test Table:-

Field Name	Data Type	Description
Registration_No	Text	
Test_Date	Date/Time	
Esophagus	Text	Esophagus
Fundus	Text	Stomach
Corpus	Text	Stomach
Antrum	Text	Stomach
Blub	Text	Deuodenum
First_Part	Text	Deuodenum
Second_Part	Text	Deuodenum
Biopsy	Text	
Opinion_First	Text	
Pylorospasm	Text	
Biliary_Reflux	Text	
Gut_Hypomotility	Text	
Opinion_second	Text	

8. Sonography Test Table:-

Field Name	Data Type	Description
Registration_No	Text	
Test_Date	Date/Time	
L_Size	Text	Liver
L_Echotexture	Text	Liver
Focal_Pathology	Text	Liver
lhbr	Text	Liver
Pv	Text	Liver
Cbd	Text	Liver
G_Size	Text	Gall Bladder
Wall_Thickness	Text	Gall Bladder
Lumen	Text	Gall Bladder
P_Size	Text	Pancreas
P_Shape	Text	Pancreas
P_Echotexture	Text	Pancreas
S_Size	Text	Spleen
S_Shape	Text	Spleen
S_Echotexture	Text	Spleen
K_Size_Rt	Text	Kidneys
K_Size_Lt	Text	Kidneys
K_Shape_Rt	Text	Kidneys
K_Shape_Lt	Text	Kidneys

Field Name	Data Type	Description
K_Cortex_Rt	Text	Kidneys
K_Cortex_Lt	Text	Kidneys
K_Corticomedullary_Differentiation_Rt	Text	Kidneys
K_Corticomedullary_Differentiation_Lt	Text	Kidneys
K_Pcs_Rt	Text	Kidneys
K_Pcs_Lt	Text	Kidneys
K_Calculus_Rt	Text	Kidneys
K_Calculus_Lt	Text	Kidneys
Aorta	Text	Petroperitoneal Structures
Ivc	Text	Petroperitoneal Structures
Pre_Paraortic_Lymphadenopathy	Text	Petroperitoneal Structures
Fluid_In_Peritoneal_Cavity	Text	Petroperitoneal Structures
Visualised_Bowel	Text	Petroperitoneal Structures
U_Status	Text	Urinary Bladder
U_Wall_Thickness	Text	Urinary Bladder
U_Calculus	Text	Urinary Bladder
Prevoid_Urinary_Vol	Text	Urinary Bladder
Postvoid_Urinary_Vol	Text	Urinary Bladder
Pr_Size	Text	Prostate
Pr_Echotexture	Text	Prostate

Field Name	Data Type	Description
Pr_Capsule	Text	Prostate
U_Size	Text	Uterus
U_Position	Text	Uterus
U_Echotexture	Text	Uterus
U_E_Cavity	Text	Uterus
U_Endometrium	Text	Uterus
O_Size_Rt	Text	Ovaries
O_Size_Lt	Text	Ovaries
O_Shape_Rt	Text	Ovaries
O_Shape_Lt	Text	Ovaries
O_Echotexture_Rt	Text	Ovaries
O_Echotexture_Lt	Text	Ovaries
O_Adenexal_Mass_Rt	Text	Ovaries
O_Adenexal_Mass_Lt	Text	Ovaries
Free_Fluid_In_Pouch_Douglas	Text	Ovaries
Impression	Text	

9. Stool Test Table:-

Field Name	Data Type	Description
Registration_No	Text	
Test_Date	Date/Time	
Color	Text	Physical
Consistency	Text	Physical

Field Name	Data Type	Description
Mucus	Text	Physical
Blood	Text	Physical
Wbc_Hpf	Text	Microscopic
Rbc_Hpf	Text	Microscopic
Mecrophages	Text	Microscopic
Trophozoite	Text	Parasites
P_Ova	Text	Parasites
P_Cyst	Text	Parasites
C_Ova	Text	Concentration Method
C_Cyst	Text	Concentration Method
Occult_Blood	Text	Special Test
Ph	Text	Special Test
Red_Sub	Text	Special Test

10. Urine Table

Field Name	Data Type	Description
REGISTRATION_NO	Text	
TEST_DATE	Date/Time	
APPEARANCE	Text	ROUTINE
SP_GRAVITY	Text	ROUTINE
REACTION	Text	ROUTINE
ALBUMIN	Text	ROUTINE ,mg%
SUGAR	Text	ROUTINE

Field Name	Data Type	Description
RBCS_HPE	Text	MICROSCOPIC
WBCS_HPF	Text	MICROSCOPIC
EPITH_CELLS_HPF	Text	MICROSCOPIC
CRYSTAILS_HPF	Text	MICROSCOPIC
CAST_HPF	Text	MICROSCOPIC
AMORPHOUS_SEDIMENTS	Text	MICROSCOPIC
SPERMATOOZOA	Text	MICROSCOPIC
OTHERS	Text	MICROSCOPIC
BILE_SALT	Text	SPECIAL_TEST
BILE_PIGMENT	Text	SPECIAL_TEST
UROBILINOGEN_HPF	Text	SPECIAL_TEST
PORPHOBILINOGEN	Text	SPECIAL_TEST
ACETONE	Text	SPECIAL_TEST
OCCULT_BLOOD	Text	SPECIAL_TEST
PKU	Text	SPECIAL_TEST
BECE_JONES_PROTEINS	Text	SPECIAL_TEST
AMINO_ACID	Text	SPECIAL_TEST
24HRS_URINARY_PROTEIN	Text	SPECIAL_TEST
24HRS_URINARY_17_KETOST ERIOD	Text	SPECIAL_TEST
24HRS_URINARY_VMA	Text	SPECIAL_TEST
TOTAL_VALUE	Text	SPECIAL_TEST
PREGNANCY_TEST	Text	SPECIAL_TEST

11. USG Table

Field Name	Data Type	Description
Registration_No	Number	
Test_Date	Date/Time	
LIV	Text	
LIV1	Text	
LIV2	Text	
GALL	Text	
GALL1	Text	
COMM	Text	
COMM1	Text	
PORT	Text	
PORT1	Text	
PAN	Text	
PAN1	Text	
SPLE	Text	
SPLE1	Text	
KIDN	Text	
KIDN1	Text	
KIDN2	Text	
RK	Text	
LK	Text	
BOTH	Text	
BOTH1	Text	

Field Name	Data Type	Description
URIN	Text	
URIN1	Text	
N	Text	
N1	Text	
UTER	Text	
LONG	Text	
ANTE	Text	
TRAN	Text	
N3	Text	
ADNE	Text	
OTH	Text	
ECHO	Text	

12. X-Ray Table

Field Name	Data Type	Description
Registration_No	Text	
Test_Date	Date/Time	
X_Ray_Name	Text	
Remark_1	Text	
Remark_2	Text	
Remark_3	Text	
Remark_4	Text	
Remark_5	Text	

Field Name	Data Type	Description
Remark_6	Text	
Remark_7	Text	
Remark_8	Text	
Remark_9	Text	
Remark_10	Text	
Remark_11	Text	
Opinion	Text	

13. X-Ray Values Table

Field Name	Data Type	Description
X_Ray_Name	Text	
Remark_1	Text	
Remark_2	Text	
Remark_3	Text	
Remark_4	Text	
Remark_5	Text	
Remark_6	Text	
Remark_7	Text	
Remark_8	Text	
Remark_9	Text	
Remark_10	Text	
Remark_11	Text	
Opinion	Text	

14. Patient Fee Table

Field Name	Data Type	Description
Receipt_No	Text	
Registration_No	Text	
Receipt_Date	Date/Time	
F_Total_Fees	Number	Total Fees in Figure
W_Total_Fees	Text	Total Fees in Words
Receipt_Name	Text	SELF / Cheque
Dignosios_Fees	Number	
XRay_Fees	Number	
ECG_Fees	Number	
Lab_Test_Fees	Number	
Gastroscopy_Fees	Number	
USG_Fees	Number	
Indoor_Injection_Fees	Number	
Colonoscopy_Fees	Number	

4.10 Form Layout

4.10.1. Patient Entry Form

The Patient Entry Form is a web-based interface with a blue header and a light blue background. It contains the following fields and controls:

- Registration Number**: Text input field.
- Registration Date**: Text input field.
- Patient Name**: Text input field.
- City**: Text input field.
- Patient Address**: Text area with a vertical scrollbar.
- TelePhone / Mobile Number**: Text input field.
- Marital Status**: Dropdown menu with "GPatD" selected.
- Gender**: Dropdown menu with "GPatD" selected.
- Religion**: Dropdown menu with "GPatD" selected.
- Status**: Dropdown menu with "GPatD" selected.
- Father's / Husband's Name**: Text input field.
- Age**: Text input field followed by "Yrs." label.

At the bottom, there is a horizontal bar containing five buttons: **Add**, **UpDate**, **Exit**, **Search**, and **Exit**.

4.10.2. Prescription Entry Form

The Prescription Entry Form is a web-based interface with a blue header and a light blue background. It contains the following fields and controls:

- Registration Number**: Text input field with a **Submit** button next to it.
- Name**: Text input field.
- Diagnosis Date**: Text input field.
- Provisional Diagnosis**: Text input field.

Below these fields are four tabs: **TEST**, **DIET ADVICE**, **INJECTION DATES**, and **MEDICINE PRESCRIBED**. The **TEST** tab is active, showing a section titled "Tests For Patient" with the following options:

- Biochemistry
- Stool
- Blood
- Colonoscopy
- Gastroscopy
- Urine
- X-RAY
- Sonography
- ECG

There is also an **Other Test** text input field with a vertical scrollbar.

Below the tests section are the following fields and controls:

- Remark**: Text area with a vertical scrollbar.
- Reconsultation Week**: Text input field.
- Reconsultation Date**: Text input field.
- Final Diagnosis**: Text input field with an **Update** button next to it.

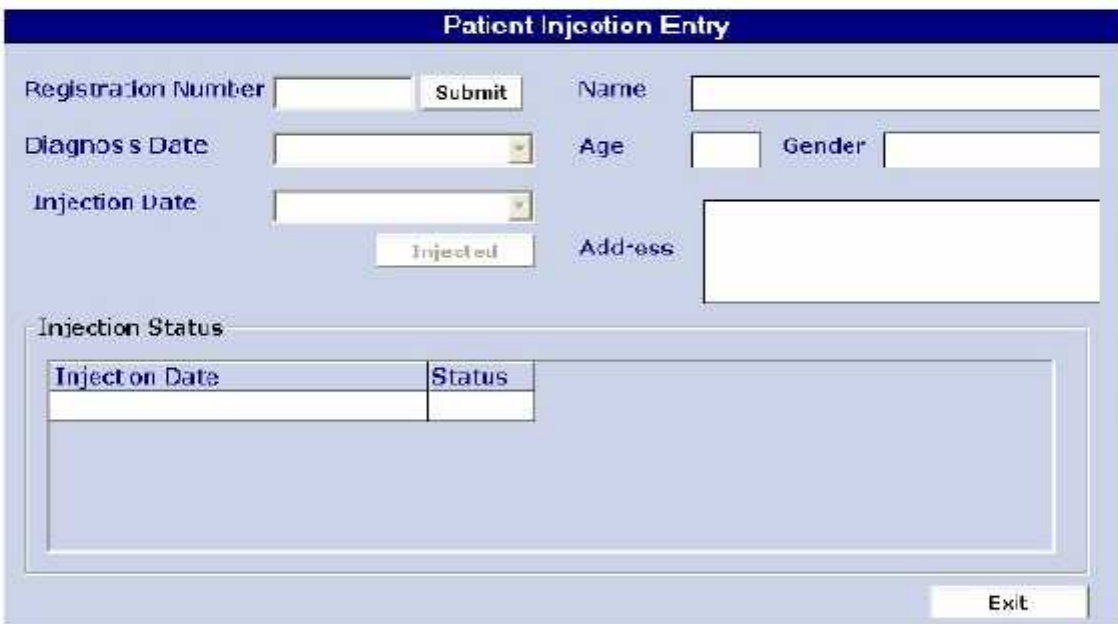
At the bottom, there is a horizontal bar containing five buttons: **Add New**, **Edit**, **Print First**, **Print Second**, and **EXIT**.

4.10.3. Patient Diagnosis History Form



The screenshot shows a web form titled "Patient Diagnosis History Form". It features a dark blue header with the title in white. The form has a light blue background. On the left, there is a "Registration Number" field with a "Submit" button next to it. Below it is a "Diagnosis Date" field. On the right, there is a "Name" field, an "Age" field, and a "Gender" field. At the bottom, there are two buttons: "DETAILS..." and "Exit".

4.8.10.4 Patient Injection Entry Form



The screenshot shows a web form titled "Patient Injection Entry". It features a dark blue header with the title in white. The form has a light blue background. On the left, there is a "Registration Number" field with a "Submit" button next to it. Below it are "Diagnosis Date" and "Injection Date" fields, each with a dropdown arrow. On the right, there is a "Name" field, an "Age" field, and a "Gender" field. Below these is a large "Address" text area. In the center, there is an "Injected" button. At the bottom, there is an "Injection Status" section containing a table with two columns: "Injection Date" and "Status". The table has one empty row. At the bottom right, there is an "Exit" button.

Injection Date	Status

For rest of the User Interfaces see *Annex III*

Annex III

1. Patient Receipt Entry Form

Patient Receipt Entry					
Registration Number	<input type="text"/>	<input type="button" value="Submit"/>	Name	<input type="text"/>	
Receipt No	<input type="text"/>		Age	<input type="text"/>	Gender <input type="text"/>
Receipt Date	<input type="text"/>				
Test Fees					
Diagnosis Fees	<input type="text"/>	Lab Test Fees	<input type="text"/>	Indoor Injection Fees	<input type="text"/>
X-RAY Fees	<input type="text"/>	Gastroscopy Fees	<input type="text"/>	Colonoscopy Fees	<input type="text"/>
E.C.G. Fees	<input type="text"/>	USG Fees	<input type="text"/>		
Total Fees in Number	<input type="text"/>				
Total Fees in Word	<input type="text"/>				
<input type="button" value="Add"/> <input type="button" value="Update"/> <input type="button" value="Edit"/> <input type="button" value="Print"/> <input type="button" value="Exit"/>					

2. Accumulated Receipt Form

Accumulated Receipt					
Registration No.	<input type="text"/>	<input type="button" value="SUBMIT"/>	Name :	<input type="text"/>	
Receipt Start Date	<input type="text"/>		Age :	<input type="text"/>	Gender : <input type="text"/>
	{MM/DD/YYYY}		Address :	<input type="text"/>	
Receipt End Date	<input type="text"/>				
	{MM/DD/YYYY}				
Days	<input type="text" value="0"/>				
Bed Charges	<input type="text" value="0"/>				
	(Per Day)				
<input type="button" value="PRINT"/> <input type="button" value="DISPLAY"/> <input type="button" value="EXIT"/>					

2. Patient Receipt Query Form

Patient Receipt Query					
Registration Number	<input type="text"/> <input type="button" value="Submit"/>	Name	<input type="text"/>		
Receipt Date	<input type="text"/>	Age	<input type="text"/>	Gender	<input type="text"/>
Total Fees in Number	<input type="text"/>	Address	<input type="text"/>		
Diagnosis Fees	<input type="text"/>				
Total Fees in Word	<input type="text"/>				
<input type="button" value="Complete Receipt Details...."/>				<input type="button" value="Exit"/>	

3. Gastroscopy Test Form

Gastroscopy Test					
Registration Number	<input type="text"/> <input type="button" value="SUBMIT"/>	Patient Name	<input type="text"/>		
Test Date	<input type="text"/>	Age	<input type="text"/>	Gender	<input type="text"/>
<input type="button" value="Gastroscopy Test Entry"/>		<input type="button" value="Gastroscopy Test Entry2"/>			
Esophagus <input type="text"/>					
Stomach					
Fundus	<input type="text"/>	Duodenum			
Corpus	<input type="text"/>	Eulb	<input type="text"/>		
Antrum	<input type="text"/>	First Part	<input type="text"/>		
		Second Part	<input type="text"/>		
<input type="button" value="NEW"/> <input type="button" value="SAVE"/> <input type="button" value="EDIT"/> <input type="button" value="CLEAR"/> <input type="button" value="PRINT"/> <input type="button" value="EXIT"/>					

4. Biochemistry Test Form

Biochemistry Test							
Registration Number	<input type="text"/>	<input type="button" value="SUBMIT"/>	Patient Name	<input type="text"/>			
Test Date	<input type="text"/>		Age	<input type="text"/>	Gender <input type="text"/>		
Biochemistry & RFT & Lipid Profile	LFT	Miscellaneous	GTT				
Biochemistry			Lipid Profile				
Glucose Fasting	<input type="text"/>	mg%	70-110 mg %	S.Cholesterol	<input type="text"/>	mg%	130-250 mg %
Glucose R/PP	<input type="text"/>	mg%	100 to 140 mg%	HDL Cholesterol	<input type="text"/>	mg%	30-55 mg %
RFT			Normal Values				
Blood Urea	<input type="text"/>	mg%	10-40 mg %	LDL Cholesterol	<input type="text"/>	mg%	60-165 mg %
Creatinine	<input type="text"/>	mg%	0.6-1.3 mg %	VLDL Cholesterol	<input type="text"/>	mg%	0-60 mg %
BUN	<input type="text"/>	mg%	8-20 mg %	Triglycerides	<input type="text"/>	mg%	60-165 mg %
				S.Total Lipids	<input type="text"/>	mg%	400-700 mg %
<input type="button" value="NEW"/> <input type="button" value="SAVE"/> <input type="button" value="EDIT"/> <input type="button" value="CLEAR"/> <input type="button" value="PRINT"/> <input type="button" value="EXIT"/>							

5. Colonoscopy Test Form

Colonoscopy Test					
Registration Number	<input type="text"/>	<input type="button" value="SUBMIT"/>	Patient Name	<input type="text"/>	
Test Date	<input type="text"/>		Age	<input type="text"/>	Gender <input type="text"/>
ANAL CANAL	<input type="text"/>	<input type="button" value="NEW"/>	HEPATIC FLEXURE	<input type="text"/>	
RECTUM	<input type="text"/>	<input type="button" value="NEW"/>	ASCENDING COLON	<input type="text"/>	
SIGMOID COLON	<input type="text"/>	<input type="button" value="NEW"/>	CAECUM	<input type="text"/>	
DESCENDING COLON	<input type="text"/>	<input type="button" value="NEW"/>	TERMINAL ILCUM	<input type="text"/>	
SPLENIC FLEXURE	<input type="text"/>	<input type="button" value="NEW"/>	BIDPOY	<input type="text"/>	
TRANSVERSE COLON	<input type="text"/>	<input type="button" value="NEW"/>	OPINION	<input type="text"/>	
<input type="button" value="NEW"/> <input type="button" value="SAVE"/> <input type="button" value="EDIT"/> <input type="button" value="CLEAR"/> <input type="button" value="PRINT"/> <input type="button" value="EXIT"/>					

6. Blood Test Form

Blood Test																																									
Registration Number :	<input type="text"/>	<input type="button" value="SUBMIT"/>	Patient Name :	<input type="text"/>																																					
Test Date :	<input type="text" value="5/24/2008"/>		Age :	<input type="text"/>	Gender : <input type="text"/>																																				
<div style="display: flex; justify-content: space-between;"> Page 1 Page 2 Page 3 Page 4 </div>																																									
<table border="1" style="width: 100%;"> <tr> <td>Haemoglobin :</td> <td><input type="text"/></td> <td>gms% (13-15 gms%)</td> <td>T.L.C. :</td> <td><input type="text"/></td> <td>Cells/Cu (-500-10500/C)</td> </tr> <tr> <td colspan="6">D.I.C</td> </tr> <tr> <td>Neutrophils :</td> <td><input type="text"/></td> <td>% (45-68%)</td> <td>Basophils :</td> <td><input type="text"/></td> <td>% (1-2%)</td> </tr> <tr> <td>Lymphocytes :</td> <td><input type="text"/></td> <td>% (25-45%)</td> <td>Platelets :</td> <td><input type="text"/></td> <td>/Cu.mm</td> </tr> <tr> <td>Eosinophil :</td> <td><input type="text"/></td> <td>% (2-6%)</td> <td>Other's :</td> <td><input type="text"/></td> <td></td> </tr> <tr> <td>Monocytes :</td> <td><input type="text"/></td> <td>% (1-4%)</td> <td></td> <td></td> <td></td> </tr> </table>						Haemoglobin :	<input type="text"/>	gms% (13-15 gms%)	T.L.C. :	<input type="text"/>	Cells/Cu (-500-10500/C)	D.I.C						Neutrophils :	<input type="text"/>	% (45-68%)	Basophils :	<input type="text"/>	% (1-2%)	Lymphocytes :	<input type="text"/>	% (25-45%)	Platelets :	<input type="text"/>	/Cu.mm	Eosinophil :	<input type="text"/>	% (2-6%)	Other's :	<input type="text"/>		Monocytes :	<input type="text"/>	% (1-4%)			
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Monocytes :	<input type="text"/>	% (1-4%)																																							
<input type="button" value="NEW"/> <input type="button" value="SAVE"/> <input type="button" value="EDIT"/> <input type="button" value="CLEAR"/> <input type="button" value="PRINT"/> <input type="button" value="EXIT"/>																																									

7. Stool Test Form

Stool Test Form																																			
Registration Number :	<input type="text"/>	<input type="button" value="SUBMIT"/>	Patient Name :	<input type="text"/>																															
Test Date :	<input type="text"/>		Age :	<input type="text"/>	Gender : <input type="text"/>																														
<div style="display: flex; justify-content: space-between;"> Physical & Microscopic Concentration Method & Parasitic & Special Test </div>																																			
<table border="1" style="width: 100%;"> <tr> <td colspan="3">Physical</td> <td colspan="3">Microscopic</td> </tr> <tr> <td>Color :</td> <td><input type="text"/></td> <td></td> <td>WBCs/HPF :</td> <td><input type="text"/></td> <td></td> </tr> <tr> <td>Consistency :</td> <td><input type="text"/></td> <td></td> <td>RBCs/HPF :</td> <td><input type="text"/></td> <td></td> </tr> <tr> <td>Mucus :</td> <td><input type="text"/></td> <td></td> <td>Macrophages :</td> <td><input type="text"/></td> <td></td> </tr> <tr> <td>Blood :</td> <td><input type="text"/></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>						Physical			Microscopic			Color :	<input type="text"/>		WBCs/HPF :	<input type="text"/>		Consistency :	<input type="text"/>		RBCs/HPF :	<input type="text"/>		Mucus :	<input type="text"/>		Macrophages :	<input type="text"/>		Blood :	<input type="text"/>				
Physical			Microscopic																																
Color :	<input type="text"/>		WBCs/HPF :	<input type="text"/>																															
Consistency :	<input type="text"/>		RBCs/HPF :	<input type="text"/>																															
Mucus :	<input type="text"/>		Macrophages :	<input type="text"/>																															
Blood :	<input type="text"/>																																		
<input type="button" value="NEW"/> <input type="button" value="SAVE"/> <input type="button" value="EDIT"/> <input type="button" value="CLEAR"/> <input type="button" value="PRINT"/> <input type="button" value="EXIT"/>																																			

10. Urine Test Form

Urine Test			
Registration Number	<input type="text"/>	<input type="button" value="SUBMIT"/>	Name <input type="text"/>
Test Date	<input type="text"/>	Age <input type="text"/>	Gender <input type="text"/>
Routine & Microscopic		Special Tests	
Routine		Microscopic	
Appearance	<input type="text"/>	RBCs/HPE	<input type="text"/>
Sp. Gravity	<input type="text"/>	WBCs/HPE	<input type="text"/>
Reaction	<input type="text"/>	EPITH Cells/HPE	<input type="text"/>
Albumin	<input type="text"/> mg%	Crystals/HPE	<input type="text"/>
Suger	<input type="text"/>	Cast/HPE	<input type="text"/>
		Amylase	<input type="text"/>
		Sediments	<input type="text"/>
		Spermatozoa	<input type="text"/>
		Others	<input type="text"/>
<input type="button" value="NEW"/> <input type="button" value="SAVE"/> <input type="button" value="EDIT"/> <input type="button" value="CLEAR"/> <input type="button" value="PRINT"/> <input type="button" value="EXIT"/>			

11. Test Reports Form

TEST REPORTS			
Registration Number :	<input type="text"/>	<input type="button" value="SUBMIT"/>	Name : <input type="text"/>
Test Date :	<input type="text"/>	Age : <input type="text"/>	Gender : <input type="text"/>
	(MM/DD/YYYY)		
Test Name :	<input type="text"/>	Address :	<input type="text"/>
<input type="button" value="PRINT"/> <input type="button" value="DISPLAY"/> <input type="button" value="EXIT"/>			

