

Biyani's Think Tank

Concept based notes

Management Information System

(BBA Part-II)

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Preface

I am glad to present this book, especially designed to serve the needs of the students. The book has been written keeping in mind the general weakness in understanding the fundamental concepts of the topics. The book is self-explanatory and adopts the “Teach Yourself” style. It is based on question-answer pattern. The language of book is quite easy and understandable based on scientific approach.

This book covers basic concepts related to the microbial understandings about diversity, structure, economic aspects, bacterial and viral reproduction etc.

Any further improvement in the contents of the book by making corrections, omission and inclusion is keen to be achieved based on suggestions from the readers for which the author shall be obliged.

I acknowledge special thanks to Mr. Rajeev Biyani, *Chairman* & Dr. Sanjay Biyani, *Director (Acad.)* Biyani Group of Colleges, who are the backbones and main concept provider and also have been constant source of motivation throughout this Endeavour. They played an active role in coordinating the various stages of this Endeavour and spearheaded the publishing work.

I look forward to receiving valuable suggestions from professors of various educational institutions, other faculty members and students for improvement of the quality of the book. The reader may feel free to send in their comments and suggestions to the under mentioned address.

Author

Syllabus

B.B.A. Part-II

Management Information System

Introduction to MIS : Meaning and Role of MIS, Definition of MIS, System Approach to MIS, MIS Organization within a Company. Concept of Balanced MIS, Effectiveness and Efficiency Criteria.

Overview of System and Design, Feasibility Analysis, Design, Implementation, Testing and Evaluation. Introduction to Systems Development Life Cycle and its Phases.

MIS Planning : MIS Structure and Components, MIS Features, Problem and Derivation of MIS Plans, Prioritization and Developmental Strategies.

Conceptual Design of MIS : Definition of the Problem, System Objectives and System Constraints, Analysis of Information Source.

Alternative System Design and Selection of Optimal System.

Conceptual System Design Document.

Detailed System Design and Implementation : Application of Basic System Design Concepts to MIS, Involvement of End-User and Role of MIS Department and System Analyst, Role of Top Management during Design and Implementation. System Evaluation Review and Update. Management and Control of MIS Function. Advanced MIS Concept, Decision Support System.

MIS in Operation : (See Note at End) : MIS for Accounting and Finance Function MIS for Personnel Systems, MIS for Marketing Systems, Production & Inventory System.

Note : A STANDARD LAYOUT IS TO BE ADOPTED FOR ALL MIS.

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Chapter-1

Introduction to MIS

Q.1 What is MIS? Discuss in detail?

OR

Describe the three words of MIS: Management, Information, System.

OR

Discuss the objectives and characteristics of MIS.

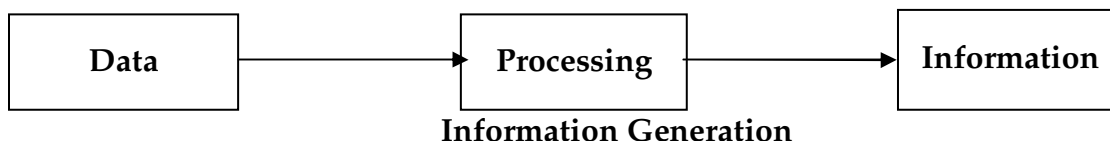
Ans.: Management Information Systems (MIS), referred to as Information Management and Systems, is the discipline covering the application of people, technologies, and procedures collectively called information systems, to solving business problems.

“MIS’ is a planned system of collecting, storing and disseminating data in the form of information needed to carry out the functions of management.”

Academically, the term is commonly used to refer to the group of information management methods tied to the automation or support of human decision making, e.g. Decision Support Systems, Expert Systems, and Executive Information Systems.

Management : Management is art of getting things done through and with the people in formally organized groups. The basic functions performed by a manager in an organization are: Planning, controlling, staffing, organizing, and directing.

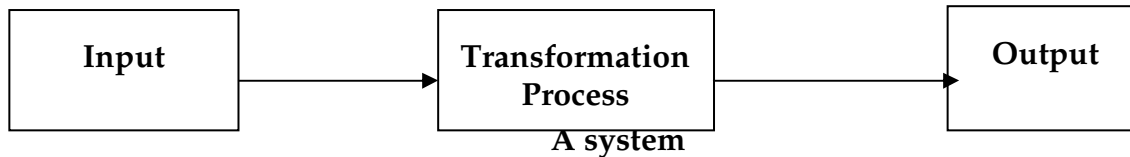
Information : Information is considered as valuable component of an organization. Information is data that is processed and is presented in a form which assists decision maker.



System : A system is defined as a set of elements which are joined together to achieve a common objective. The elements are interrelated and interdependent. Thus every system is said to be composed of subsystems. A system has one or multiple inputs, these inputs are processed through a transformation process to convert these input(s) to output.

These subsystems are interrelated through a process of

Input - Throughput - Output



Objectives of MIS :

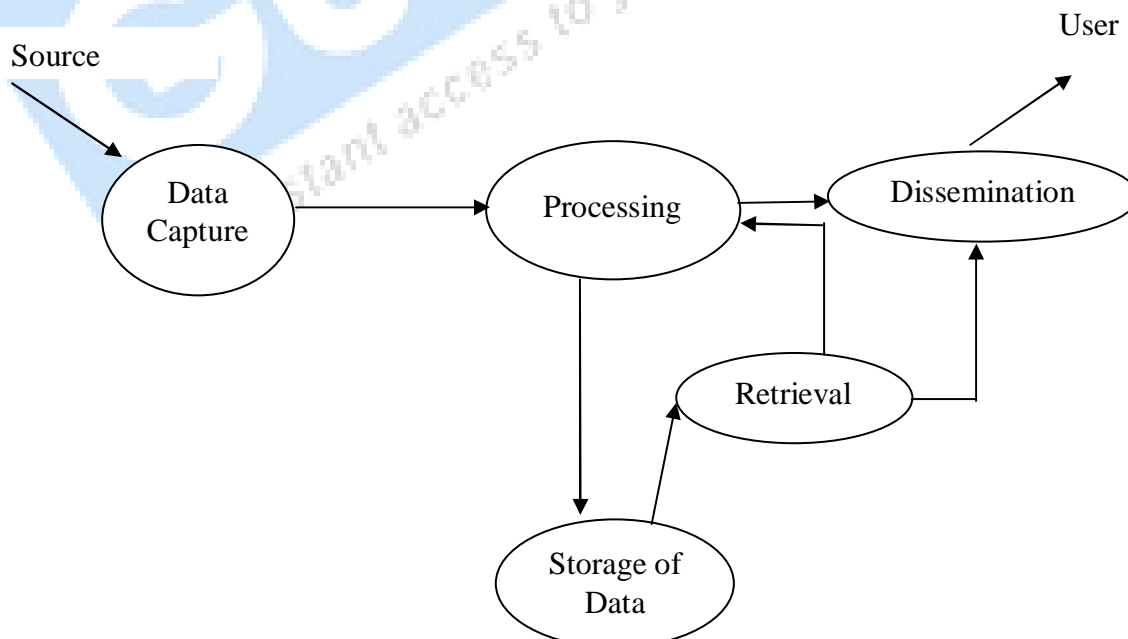
Data Capturing : MIS capture data from various internal and external sources of organization. Data capturing may be manual or through computer terminals.

Processing of Data : The captured data is processed to convert into required information. Processing of data is done by such activities as calculating, sorting, classifying, and summarizing.

Storage of Information : MIS stores the processed or unprocessed data for future use. If any information is not immediately required, it is saved as an organization record, for later use.

Retrieval of Information : MIS retrieves information from its stores as and when required by various users.

Dissemination of Information : Information, which is a finished product of MIS, is disseminated to the users in the organization. It is periodic or online through computer terminal.



Objectives of MIS

Characteristics of MIS :

Systems Approach : The information system follows a systems approach. Systems approach means taking a comprehensive view or a complete look at the interlocking sub-systems that operate within an organization.

Management Oriented : Management oriented characteristic of MIS implies that the management actively directs the system development efforts. For planning of MIS, top-down approach should be followed. Top down approach suggests that the system development starts from the determination of management's needs and overall business objective. To ensure that the implementation of system's policies meet the specification of the system, continued review and participation of the manager is necessary.

Need Based : MIS design should be as per the information needs of managers at different levels.

Exception Based : MIS should be developed on the exception based also, which means that in an abnormal situation, there should be immediate reporting about the exceptional situation to the decision –makers at the required level.

Future Oriented : MIS should not merely provide past of historical information; rather it should provide information, on the basis of future projections on the actions to be initiated.

Integrated : Integration is significant because of its ability to produce more meaningful information. Integration means taking a comprehensive view or looking at the complete picture of the interlocking subsystems that operate within the company.

Common Data Flow : Common data flow includes avoiding duplication, combining similar functions and simplifying operations wherever possible. The development of common data flow is an economically sound and logical concept, but it must be viewed from a practical angle.

Long Term Planning : MIS is developed over relatively long periods. A heavy element of planning should be involved.

Sub System Concept : The MIS should be viewed as a single entity, but it must be broken down into digestible sub-systems which are more meaningful.

Central database : In the MIS there should be common data base for whole system

Q.2 Highlight the Salient Features of Computer which makes it an essential component of MIS

OR

With the Penetration of Computer in Business Society, Information System has got a new meaning, explain.

Ans.: Characteristics of Computerized MIS :

- (i) Ability to process data into information with accuracy and high speed. It involves complex computation, analysis, comparisons and summarization.
- (ii) Organizing and updating of huge amount of raw data of related and unrelated nature, derived from internal and external sources at different periods of time.
- (iii) The information processing and computer technology have been so advanced that managers are able to obtain real time information about ongoing activities and events without any waiting period.
- (iv) The input data in computer can be converted into different output formats for a variety of purpose. The system is so organized that managers at different levels and in different activity units are in a position to obtain information in whatever form they want , provided that relevant “ programmes” or instructions have been designed for the purpose.
- (v) Super-human memory, tremendous volume of data and information and the set of instructions can be stored in the computer and can be retrieved as and when needed. Management can get bit of stored information from the computer in seconds.

Advantages of Computer : The usage of computer gives following advantages in comparison to manual MIS :

- a) **Speed :** The speed of carrying out the given instructions logically and numerically is incomparable between computers and human beings. A computer can perform and give instructions in less than a millionth of second
- b) **Accuracy :** Computer can calculate very accurately without any errors.
- c) **Reliability :** The information stored in the computer is in digital format. The information can be stored for a long time and have long life. A user may feel comfortable and be rely on, while using information stored in computer.
- d) **Storage :** Computer can store huge data for a long time in comparison to human brain.

- e) **Automaticity** : Computers perform automatically in user friendly and menu driven program.
- f) **Repetitiveness** : Computer can be used repetitively to process information without any mental fatigue as in case of human brain.
- g) **Diligence** : A computer is an electronic device. It does not suffer from the human traits of lack of concentration.
- h) **No Feeling** : Computers are devoid of any emotions. They have no feelings and no instincts because they are machines.

Limitations of Computer :

- a) **Lack of Common Sense** : Computer is only an electronic device. It can not think. If we provide an incorrect data, it does not have a commonsense to question the correctness of the data.
- b) **Memory Without Brain** : Computer can store data in its memory; however, if a wrong instruction is given to computer it does not have a brain to correct the wrong instruction.

Q.3 Discuss an Organizational Need for MIS in a Company?

Ans.: To facilitate the management decision making at all levels of company, the MIS must be integrated. MIS units are company wide. MIS is available for the Top management. The top management of company should play an active role in designing, modifying and maintenance of the total organization wide management information system.

Information system and Information technology have become a vital component of any successful business and are regarded as major functional areas just like any other functional area of a business organization like marketing, finance, production and HR. Thus it is important to understand the area of information system just like any other functional area in the business. MIS is important because all businesses have a need for information about the tasks which are to be performed. Information and technology is used as a tool for solving problems and providing opportunities for increasing productivity and quality.

Information has always been important but it has never been so available, so current and so overwhelming. Efforts have been made for collection and retrieval of information, However, challenges still remain in the selection analysis and interpretation of the information that will further improve decision making and productivity.

MIS for a Business Organization :

Support the Business Process : Treats inputs as a request from the customer and outputs as services to customer. Supports current operations and use the system to influence further way of working.

Support Operation of a Business Organization : MIS supports operations of a business organization by giving timely information, maintenance and enhancement which provides flexibility in the operation of an organizations.

To Support Decision Making : MIS supports the decision making by employee in their daily operations. MIS also supports managers in decision making to meet the goals and objectives of the organization. Different mathematical models and IT tools are used for the purpose evolving strategies to meet competitive needs.

Strategies for an Organization : Today each business is running in a competitive market. MIS supports the organization to evolve appropriate strategies for the business to assented in a competitive environment.

Q.4 Discuss the Prerequisites of an Effective MIS?

Ans.: Essential Requirement of an Effective MIS :

- (i) **Qualified System and Management Staff :** The prerequisite of an effective MIS is that it should be managed by qualified officers. These officers should have a mutual understanding about the roles and responsibilities of each other. be understand clearly the view of their fellow officers. For this, each organization should have two categories of officers :
 - (a) **System and Computer Experts** who in addition to their expertise in their subject area , they should also be capable of understanding management concepts to facilitate the understanding of problems asked by concern. They should also be clear about the process of decision making and information requirements for planning.
 - (b) **Management experts** who should also understand quite-clearly the concepts and operations of a computer. This basic knowledge of computer will be useful will place them in a comfortable position, while working with systems, technicians in designing or other wise, of the information system.
- (ii) **Futuristic Perspective :** An effective MIS should be capable of meeting the future requirements of its executives as well. This capability can be achieved by regular monitoring and updating the MIS.

- (iii) **Support of Top Management :** For a management information system to be effective, it must receive the full support of top management. The Reasons for this are :
- (a) Subordinate managers are usually lethargic about activities which do not receive the support of their superiors.
 - (b) The resources involved in computer based information system are larger and are growing larger and larger in view of importance gained by management information system.
- (iv) **Common Database :** It is an integrated collection of data and information which is utilized by several information subsystems of an organization. A common database may be defined as a super file which consolidates and integrates data records formerly stored in a separate data file. Such a database can be organized as an integrated collection of data records into a single super file or it can be organized as an integrated collection of several data file.
- (v) **Control and maintenance of MIS :** Control of the MIS means the operation of the system as it was designed to operate. Some times, users develop their own procedures or short cut methods to use the system which reduces its effectiveness.

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Chapter-2

Information System for Decision Making

Q.1 What do you understand by Decision Making? Discuss the nature and characteristics of Decision?

Ans.: The word “**decision**” is derived from the Latin word “**decido**”. Which means “A decision, therefore is

- A Settlement
- A fixed intuition to bringing to a conclusive result
- A judgment
- A resolution

Decision : A decision is the choice out of several options made by the decision maker to achieve some objective in a given situation.

Business Decision : Business decisions are those which are made in the process of conducting business to achieve its objective in a given situation.

Characteristic of Business Decision Making :

- a) Sequential in nature.
- b) Exceedingly complex due to risk and trade off.
- c) Influenced by personal values.
- d) Made in institutional setting and business environment.

Rational Decision Making : A rational decision is the one which, effectively and efficiently, ensure the achievement of the goal for which the decision is made .In reality there is no right or wrong decision but a rational decision or irrational decision which depends on situation.

Type of Rationality :

Objectively : Maximum the value of the objectives.

Subjective : If it is minimize the attainment of value in relation to the knowledge and awareness of subject.

Consciously : Extent the process of the decision making is a conscious one

Organizationally : degree of the orientation towards the organization.

Personal: Rational to the extent is achieve's an individual's personal reason (goals).

Type of Decision Making System : There are two types of decision making system on the basis of knowledge about the environment.

(i) **Closed :** If the manager operates in a known environment then it is called closed decision making system.

Conditions :

- a) Manager knows the set of decision alternative and know their outcome in term of values.
- b) Manager has a model, by which decision alternatives can be generated, tested and ranked.
- c) The manager can choose one of them, based on some goal or objective.

(ii) **Open :** If the manager operates in unknown environment then it is called open decision making.

Conditions :

- a) Manager does not know all alternatives.
- b) Outcome is not known.
- c) No methods or models are used.
- d) Decide objective or goal; select one where his aspirates or desire are met best.

Types of Decision : Types of decision are based on the degree of knowledge about the out come of the events which are yet to take place.

Certainty : If the manager has full knowledge of event or outcome then it is a situation of certainty.

Risk : If the manager has partial knowledge or probabilistic knowledge then it is decision under risk.

Uncertainty : If the manager does not have any knowledge, it is decision making under uncertainty

MIS converts the uncertainty to risk and risk to certainty. The decision at the low level management is certain, at middle level of the management the decision is under risk and at the top level management the decision is in under uncertain.

Nature of decision : Decision making is a complex task. To resolve the complexity the nature of decision are of two types :

Programmed and Non-Programmed Decision :

- a) If a decision can be based on a rule, methods or even guidelines, it is called the programmed decision.
- b) A decision which can not be made by using a rule or model is the non-programmed decision.

Q.2 Discuss the essential steps in process of Decision Making?

Ans.: Decision making process is same as Hebert Simon Model.

Q.3 What is DSS? What is the purpose of Decision Support System in MIS.

Ans.: Decision Support System refers to a class of systems which support in the process of decision making and does not always give a decision it self.

Decision Support Systems (DSS) are a specific class of computerized information system that supports business and organizational decision-making activities. A properly designed DSS is an interactive software-based system intended to help decision makers compile useful information from raw data, documents, personal knowledge, and/or business models to identify and solve problems and make decisions

DSS is an application of Hebert Simon model, as discussed, the model has three phases :

- i) Intelligence
- ii) Design
- iii) Choice

The DSS basically helps in the information system in the intelligence phase where the objective is to identify the problem and then go to the design phase for solution. The choice of selection criteria varies from problem to problem.

It is therefore, required to go through these phases again and again till satisfactory solution is found.

In the following three phase cycle, you may use inquiry, analysis, and models and accounting system to come to rational solution.

These systems are helpful where the decision maker calls for complex manipulation of data and use of several methods to reach an acceptable solution using different analysis approach. The decision support system helps in making a decision and also in performance analysis. DSS can be built around the rule in case of programmable decision situation. The rules are not fixed or predetermined and requires every time the user to go through the decision making cycle as indicated in Herbert Simon model.

Attributes :

- i) DSS should be adaptable and flexible.
- ii) DSS should be interactive and provide ease of use.
- iii) Effectiveness balanced with efficiency (benefit must exceed cost).
- iv) Complete control by decision-makers.
- v) Ease of development by (modification to suit needs and changing environment) end users.
- vi) Support modeling and analysis.
- vii) Data access.
- viii) Standalone, integration and Web-based

DSS Characteristics :

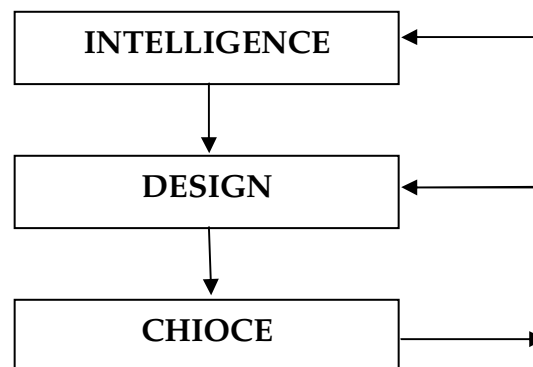
- i) Support for decision makers in semi structured and unstructured problems.
- ii) Support managers at all levels.
- iii) Support individuals and groups.
- iv) Support for interdependent or sequential decisions.
- v) Support intelligence, design, choice, and implementation.
- vi) Support variety of decision processes and styles

Q.4 Discuss in brief the Hebert A. Simon 'Decision Support System Model'. Define the term Intelligence, Design and Choice as Model.

OR

Discuss the essential steps in process of decision making.

Ans.: There are three phases in Hebert Simon model :



Hebert Simon Model

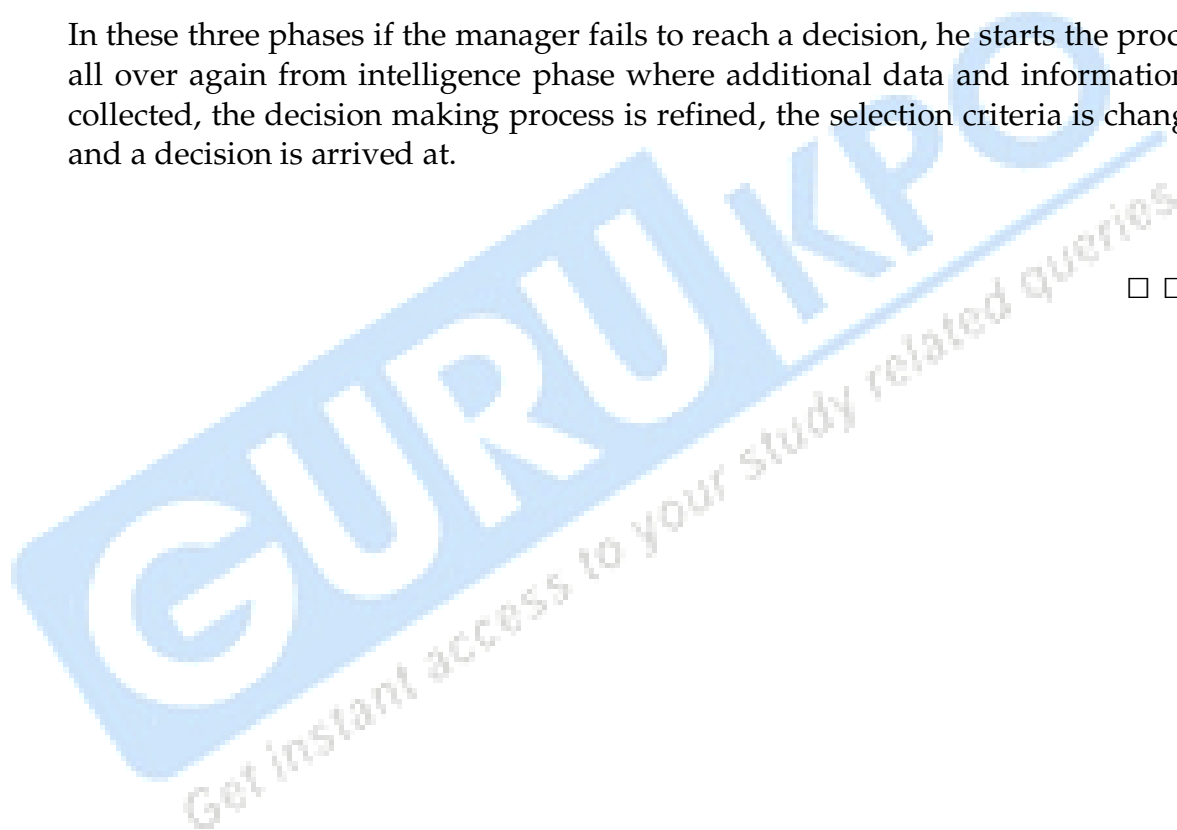
Intelligence : In this phase MIS collects the raw data. Further the data is sorted and merged with other data and computation are made, examined and presented. In this phase, the attention of the manager is drawn to the entire problem situation, calling for a decision.

Design : Manager develops a model of problem situation on which he can generate and test, summarizing the different decision alternatives and test the feasibility of implementation. Assess the value of the decision outcome.

Choice : In this phase the manager evolves a selection criterion and selects one alternative as decision based on selection criteria.

In these three phases if the manager fails to reach a decision, he starts the process all over again from intelligence phase where additional data and information is collected, the decision making process is refined, the selection criteria is changed and a decision is arrived at.

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Chapter-3

Information

Q.1 What do you understand by Information? What are the characteristics of Information?

Ans.: Data : Data is raw facts. Data is like raw material. Data does not interrelate and also it does not help in decision making. Data is defined as groups of non-random symbols in the form of text, images, voice representing quantities, action and objects.

Information : Information is the product of data processing. Information is interrelated data. Information is equivalent to finished goods produced after processing the raw material. The information has a value in decision making. Information brings clarity and creates an intelligent human response in the mind.

According to Davis and Olson : "Information is a data that has been processed into a form that is meaningful to recipient and is of real or perceived value in the current or the prospective action or decision of recipient."



Information Generation

It is a most critical resource of the organization. Managing the information means managing future. Information is knowledge that one derives from facts placed in the right context with the purpose of reducing uncertainty.

Characteristics of Information :

The parameters of a good quality are difficult to determine for information.

Quality of information refers to its fitness for use, or its reliability.

Following are the essential characteristic features :

- i) **Timeliness :** Timeliness means that information must reach the recipients within the prescribed timeframes. For effective decision-making, information must reach the decision-maker at the right time, i.e. recipients must get information when they need it. Delays destroys the value of information. The characteristic of timeliness, to be effective, should also include up-to-date, i.e. current information.

- ii) **Accuracy** : Information should be accurate. It means that information should be free from mistakes, errors &, clear Accuracy also means that the information is free from bias. Wrong information given to management would result in wrong decisions. As managers decisions are based on the information supplied in MIS reports, all managers need accurate information.
- iii) **Relevance** : Information is said to be relevant if it answers especially for the recipient what, why, where, when, who and why? In other words, the MIS should serve reports to managers which is useful and the information helps them to make decisions..
- iv) **Adequacy** : Adequacy means information must be sufficient in quantity, i.e. MIS must provide reports containing information which is required in the deciding processes of decision-making. The report should not give inadequate or for that matter, more than adequate information, which may create a difficult situation for the decision-maker. Whereas inadequacy of information leads to crises, information overload results in chaos.
- v) **Completeness** : The information which is given to a manager must be complete and should meet all his needs. Incomplete information may result in wrong decisions and thus may prove costly to the organization.
- vi) **Explicitness** : A report is said to be of good quality if it does not require further analysis by the recipients for decision making.
- vii) **Impartiality** : Impartial information contains no bias and has been collected without any distorted view of the situation.

Q.2 What are the different types of Information?

Ans.: Classification of Information : The information can be classified in a number of ways provide to better understanding.

Jhon Dearden of Harvard University classifies information in the following manner :

- (1) **Action Verses No-Action Information** : The information which induces action is called action **Information**. 'No stock' report calling a purchase action is an action information.
The information which communicates only the status is **No-Action Information**. The stock balance is no-action information.
- (2) **Recurring Verses No-Recurring Information** : The information generated at regular intervals is **Recurring Information**. The monthly sales reports, the stock statement, the trial balance, etc are recurring information. The

financial analysis or the report on the market research study is **no-recurring** information.

- (3) **Internal and external information** : The information generated through the internal sources of the organization is termed as **Internal Information**, while the information generated through the govt. reports, the industry survey etc., termed as **External Information**, as the sources of the data are outside the organization.

The information can also be classified, in terms of its application :

- **Planning Information** : Certain standard norms and specifications are used in planning of any activity. Hence such information is called the **Planning Information**. e. g. Time standard, design standard.
- **Control Information** : Reporting the status of an activity through a feedback mechanism is called the **Controlling Information**. When such information shows a deviation from the goal or the objective, it will induce a decision or an action leading to control.
- **Knowledge Information** : A collection of information through the library records and the research studies to build up a knowledge base as an information is known as **Knowledge Information**.
- **Organization Information** : When the information is used by everybody in the organization, it is called **Organization Information**. Employee and payroll Information is used by a number of people in an organization.
- **Functional/ Operational Information** : When the information is used in the operation of a business it is called **Functional/Operational Information**.
- **Database Information** : When the information has multiple use and application, it is called as **database information**. Material specification or supplier information is stored for multiple users.

Q.3 Explain the level of business activity with reference to information required?

Ans.: While developing an information management strategy within an organization, it is useful to consider informations need at on three levels :

- Corporate (Top Level)
- Team, Division, Business Unit (Middle Level)
- Individual (Low Level)

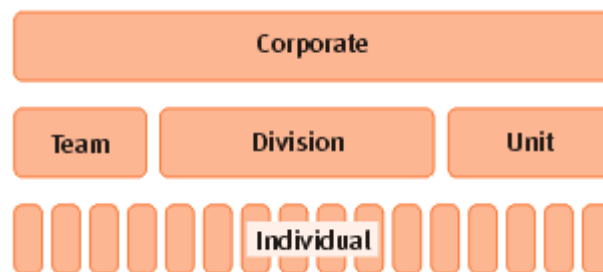
The needs of each of these three levels must be met if a coordinated and effective solution is to be maintained in the long-term.

Failure to address any one of the levels will lead to areas of the business or individuals finding their own solution, which may not fit well within the strategic goals of the organization.

Corporate (Top Level Information) : At the top level corporate information that is useful for the whole organization. This 'global' information is generally well addressed by the corporate intranet. Examples of corporate information include policies and procedures, HR information, online forms, phone directory, etc. Interestingly, there may be a limited amount of truly global information, and it may not deliver the greatest (measurable) business benefits.

Team, division, business unit (Middle level) : The middle level is perhaps the most important, as it covers all the information shared within teams, divisions, business units, etc. This information may be critical to the day-to-day activities of the group, but of little interest to the rest of the organization. Examples include project documentation, business unit specific content, meeting minutes, etc. This level is generally poorly-served within organizations, although collaboration tools are increasingly being used to address team information needs. It is also being recognized that it is this 'local' information that may be the most valuable, in terms of driving the day-to-day activity of the organization.

Levels of Informations Need



Individual (Low Level) : At the lowest level the personal information need of staff exists throughout the organization. Examples include correspondence, reports and spreadsheets. In most organizations, staff must struggle with using e-mail to meet their information management needs. While staff generally recognizes the inadequacy of e-mail, they have few other approaches or technologies at their disposal.

Managing the Levels : While managing the information at each of the three levels, consider aspects need consideration:

- An information management solution must be provided for staff at each of the three levels.

- If corporate solutions aren't provided, then staff will find their own solutions. This is the source of poor-quality intranet sub-sites, and other undesirable approaches.
- A clear policy must be developed, outlining when and how it will apply at all the three levels and how information should be managed at each level.
- Processes must be put in place to 'bubble up' or 'promote' information from lower levels to higher levels. For example, some team-generated information will be critical for the whole organization.
- As much as possible, a seamless information management environment should be delivered that covers all the three levels.

Q.4 What do you understand by Information System? Discuss various type of Information.

Ans.: A business has several information systems :

- (A) Formal Information System
- (B) Informal Information System
- (C) Computer Based Information System

Formal Information System : It is based on organizational chart represented by the organization.

Informal Information System : It is an employee based system designed to meet personal and vocational needs and to help in the solution of work-related problems. It also funnels information upward through indirect channels. It works within the framework of the business and its stated policies.

Computer Based Information System (CBIS) : This category of information system depends mainly on the computer for handling business application. System analysis develops different types of information system to meet variety of business needs. There is class of system known as collectively as computer based information system. They can be classified as :

- Transaction Processing System (TPS)
- Management Information System(MIS)
- Decision Making System (DSS)
- Office Automation System (OAS)

Q.5 What do you mean by Value of Information?

Ans.: Dimensions of Information : There are three most common dimensions of information for MIS :

- (i) **Economic Dimension :** Economic dimension of information refers to the cost of information and its benefits. Generation of information costs money. Measuring cost and benefit of information is difficult because of intangible characteristic of information.

Cost of Information : Cost of information may include: Cost of acquiring data, Cost of maintaining data, Cost of generating information and Cost of communication information. Cost related to the response time require to generate information and communicating it. Thus, for **system with low response time, the cost is high**. The cost is depends on accuracy, speed of generation etc.

Value of Information : Information has a cost for its acquisition and maintenance. Thus before a particular piece of information is acquired, decision maker must know its value. The information has a perceived value in terms of decision making. The decision maker feels more secured when additional information is received in case of decision making under uncertainty or risk.

Perfect Information : The information is called a **Perfect Information**, if it wipes out uncertainty or risk completely. However, perfect information is a myth.

The value of information is the value of the change in decision behavior because of the information. The change in the behaviour due to new information is measured to determine the benefit from its use. To arrive at the value of information, the cost incurred to get this information is deducted from the benefit.

$$\text{Value of information} = \text{Cost to get information-benefit}$$

Given a set of possible decisions, a decision maker will select one on the basis of the available information. If the new information causes a change in the decision, then the value of information is the difference in the value between outcome of the old decision and that of new decision, less the cost obtaining the new information. The value of the additional information making the existing information perfect (VPI) is:

$$\text{VPI} = (V_2 - V_1) - (C_2 - C_1)$$

Where V is the value of the information and C is the cost of obtaining the information. V_1 and C_1 relate to one set of information V_2, C_2 relate to the new set.

In MIS, the concept of the value of information is used to find out the benefit of perfect information and if the value is significantly high, the system should provide it. If the value is insignificant, it would not be worth collecting the additional information.

- (ii) **Business Dimension** : Different types of information are required by managers at different levels of the management hierarchy. The information needs of managers at strategic planning level are altogether different than those of operational control managers. It is because of the fact that managers at different levels are required to perform different functions in an organization.
- (iii) **Technical Dimension** : This dimension of information refers to the technical aspects of the database. It includes the capacity of database, response time, security, validity, data interrelationship etc.

Q.6 What is the difference between Data Processing and Information Processing?

Ans.: Data Processing : Data Processing is a process that converts data into information or knowledge. The processing is usually assumed to be automated and running on a computer. Because data are most useful when well-presented and actually informative, data-processing systems are often referred to as information systems to emphasize their practicality. Nevertheless, both terms are roughly synonymous, performing similar conversions; data-processing systems typically manipulate raw data into information, and likewise information systems typically take raw data as input to produce information as output.

Data processing is that a business has collected numerous data concerning an aspect of its operations and that this multitude of data must be presented in meaningful, easy-to-access presentations for the managers who must then use that information to increase revenue or to decrease cost. That conversion and presentation of data as information is typically performed by a data-processing application.

Information Processing : Information processing is the change or processing of information in any manner detectable by an observer.

Information processing may more specifically be defined in terms by Claude E. Shannon as the conversion of latent information into manifest information. Latent and manifest information is defined through the terms of equivocation,

remaining uncertainty, what value the sender has actually chosen, dissipation uncertainty of the sender what the receiver has actually received and transformation saved effort of questioning - equivocation minus dissipation.

Practical Information Processing can be described as a cycle, where data which may have no inherent meaning to the observer is converted into information, which does have meaning to the observer.

Q.7 What are the different methods for Data Collection?

Ans.: Methods of Data and Information Collection : Several methods are available for the collection of data. The choice of method will have an impact on the quality of information. Similarly the design of data collection method also decides the quality of data and information.

Following are the **methods** of data collection :

- i) Observation
- ii) Experiment
- iii) Survey
- iv) Subjective Estimation
- v) Transaction Processing
- vi) Purchase from Outside
- vii) Publication
- viii) Government Agencies

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Chapter-4

Development of MIS

Q.1 What is MIS Planning? Discuss the need and objectives of MIS Planning.

OR

What are the objectives and need of MIS Planning?

Ans.: The plan for development and its implementation is a basic necessity for MIS. In MIS the information is recognized as major resource like capital and time. If this resource has to be managed well, it calls upon the management to plan for it and control it, so that the information becomes a vital resource for the system. The management information system needs good planning. This system should deal with the management information not with data processing alone. It should provide support for the management planning, decision making and action. It should provide support to the changing needs of business management.

A long range MIS plan provides direction for the development of the system and provides a basis for achieving the specific targets or tasks against time frame.

Following are the contents of MIS planning :

MIS Goals and Objectives : It is necessary to develop the goal and objectives for the MIS which will support the business goals. The MIS goals and objectives will consider management philosophy, policy constraints, Business risk, internal and external environment of the organization and business. The goals and objectives of the MIS would be so stated that they can be measured. The typical statements of the goals can be providing online information on the stock and market; the query processing should not exceed more than three seconds and the like.

Strategy for Plan Achievement : The designer has to take a number of strategic decisions for the achievement of MIS goals and objectives. They are

- a) **Development Strategy :** Ex. an online, batch , a real time.
- b) **System Development Strategy :** Designer selects an approach to system development like operational verses functional, accounting verses analysis.
- c) **Resources for the Development :** Designer has to select resources. Resources ca be in-house verses external, customized or use of package.
- d) **Manpower Composition :** The staff should have the staffs of an analyst, and programmer.

The Architecture of MIS : The architecture of the MIS plan provides a system and subsystem structure and their input, output and linkage. It spells out in details the subsystem from the data entry to processing, analysis to modeling and storage to printing.

The System Development Schedule : A schedule is made for development of the system. While preparing a schedule due consideration is given to importance of the system in the overall information requirements. This development schedule is to be weighed against the time scale for achieving certain information requirements.

Hardware and Software Plan : Giving due regards to the technical and operational feasibility, the economics of investment is worked out. Then the plan of procurement is made after selecting the hardware and software. One can take the phased approach of investing starting from the lower configuration of hardware going to the higher as development take place. The process needs matching the technical decisions with the financial decisions.

Q.2 What are the stages of Development of MIS?

Ans.: In order to develop a system successfully, it is managed by breaking the total development process into smaller basic activities or phases. Any system development process, in general, is understood to have the following phases :

- i) Systems Planning
- ii) Systems Analysis
- iii) Systems Design
- iv) Systems Implementation
- v) Systems Operation and Support

Q.3 What are different approaches to Development of MIS?

Ans.: There are two basic approaches for development of MIS :

- a) **System development life cycle :** The system development life cycle have following steps of development :
 - i) Systems Planning
 - ii) Systems Analysis
 - iii) Systems Design
 - iv) Systems Implementation
 - v) Systems Operation and Support (System Maintenance)
- b) **Prototyping :** Prototyping is the process of creating an incomplete model of the future full-featured system, which can be used to let the users have a

first idea of the completed program or allow the clients to evaluate the program.

Advantages :

- i) The designer and implementer can obtain feedback from the users early in the project development.
- ii) The client and the contractor can compare that the developing system matches with the system specification, according to which the system is built.
- iii) It also gives the engineer some idea about the accuracy of initial project estimates and whether the deadlines can be successfully met.

The process of prototyping involves the following steps :

- i) Identify basic requirements.
- ii) Develop initial prototype.
- iii) **Review** : The customers, including end-users, examine the prototype and provide feedback for additions or changes.
- iv) **Revise and Enhance the Prototype** : Using the feedback both the specifications and the prototype can be improved. If changes are introduced then a repetition of steps 3 and 4 may be needed.

Types of prototyping : System prototyping are of various kinds. However, all the methods are in some way based on two major types of prototyping :

- **Throwaway Prototyping** : Throwaway or Rapid Prototyping refers to the creation of a model that will eventually be discarded rather than becoming part of the finally delivered system. After preliminary requirements gathering is accomplished, a simple working model of the system is constructed to visually show the users what their requirements may look like when they are implemented into a finished system. The most obvious reason for using Throwaway Prototyping is that it can be done quickly.
- **Evolutionary Prototyping** : Evolutionary Prototyping (also known as **Breadboard Prototyping**) is quite different from Throwaway Prototyping. The main goal when using Evolutionary Prototyping is to build a very good prototype in a structured manner so that we can refine it or make further changes to it. The reason for this is that the Evolutionary prototype, when built, forms the heart of the new system, and the improvements and further requirements will

be built on to it. It is not discarded or removed like the Throwaway Prototype. When developing a system using Evolutionary Prototyping, the system is continually refined and rebuilt.

- **Incremental Prototyping** : The final product is built as separate prototypes. At the end the separate prototypes are merged in an overall design.

Advantages of Prototyping :

- Reduced Time and Costs** : Prototyping can improve the quality of requirements and specifications provided to developers. Early determination of what the user really wants can result in faster and less expensive software.
- Improved and Increased User Involvement** : Prototyping requires user involvement and allows them to see and interact with a prototype; allowing them to provide better and more complete feedback and specifications. Since users know the problem better than anyone, the final product is more likely to satisfy the users desire for look, feel and performance.

Disadvantages of Prototyping :

- Insufficient Analysis** : Since a model has to be created, developers will not properly analyse the complete project. This may lead to a poor prototype and a final project that will not satisfy the users.
- User Confusion for Prototype and Finished System** : Users can begin to think that a prototype, intended to be thrown away, is actually a final system that merely needs to be finished or polished. Users can also become attached to features that were included in a prototype for consideration and then removed from the specification for a final system.
- Excessive Development Time of the Prototype** : A key property to prototyping is the fact that it is supposed to be done quickly. If the developers forget about this fact, they will develop a prototype that is too complex.
- Expense of Implementing Prototyping** : The start up costs for building a development team focused on prototyping may be high. Many companies have to train the team for this purpose which needs extra expensive?

Q.4 Factors responsible for Development of MIS?

Ans.: Factors Responsible for the development of MIS are numerous and have been a prime concern for many Researchers and Practitioners. Both Inter and external

factors must be taken into account when trying to understand and organization's criteria for deciding about technology. The following are the factors which are responsible for development of MIS :

1. External
2. Internal

External Factors : External Factors are conditions that exist in organization's external environment. The factors can be found at the industry level or in national policies.

- (a) **Industry level :** At the industry level, we are looking at characteristics as degree of diffusion of certain technologies, the availability of external know-how, for example, technology suppliers, the degree of innovativeness of the industry, the requirements imposed by major customers and external markets and overall levels of competition and technology sophistication in the industry.
- (b) **National Policies :** For the external factors the national policies also affect the organization that indirectly affects the subsystems of the organization.

Internal Factors : Internal factors internal of the firm that may affect the development of MIS can be grouped into three categories:

- i) **Past Experience with Technology :** The organizations past experience about the technology in terms of exposure and organizational learning ultimately affects its future in developing technology.
- ii) **Organizational Characteristics :** An organization's characteristic like size, influence the adoption of MIS application in organization. The adoption of certain technologies may appear more appropriate for the larger firms because of the large capital investments and the skilled human resources involve in the implementation and operation of such technologies. Smaller firms are less affected by organizational inertia and they show a greater degree of involvement of organizational member's especially top management during implementation. Ready to use software and less expensive equipments of MIS application are more attractive to smaller firms.
- iii) **Organizational Pursued strategy :** Internal factors deal with the organizations pursued strategy on both orientation and technology policy. An organization's strategy reflects its action with market and technology, which ultimately modify its experience and consequently its overall characteristics and capabilities. The need for a strong technology has been advocated by a number of authors and investments in MIS should therefore be closely aligned with overall corporate strategy.

Other Factors :

Customer Satisfaction : Development of MIS is affected by customer satisfaction. Customer of the services should be satisfied by the presented system.

Effective : Development should be effective in terms of organizational benefit & user satisfaction.

Efficient : Development should use all the resources, organization values efficiently.

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Chapter-5

Database Management Systems

Q.1 What do you understand by Database Management System? What are its objectives? Discuss the various elements of Database System.

Ans.: A database management system is a collection of interrelated data and a set of program to access those data. The collection of data, usually referred to as the "Database" contains information relevant to an enterprise. The primary goal of a DBMS is to provide a way to store and retrieve database information that is both convenient and efficient.

Database : An organization must have accurate and reliable data for effective decision making. For this, the organization maintains records of various facts of its operation by building appropriate models of the diverse classes of objects of interest. The models capture the essential properties of the objects and records relationship among them. Such related data is called "Database"

Objectives :

- i) The users of the database establish their view of the data and its structure without regards to the actual physical storage of the data.
- ii) That the database establishes a uniform high level of accuracy and consistency. Validation rules are applied by the DBMS.
- iii) The data should be available for use by application and by queries.
- iv) The data item prepared by one application are available to all applications or queries. No data items are owned by an application.
- v) The data base can be evolved according to application usage and query needs.

Elements of DBMS : The elements of database management system are :

- i) **Database :** Databases are banks and is an important constituent of any information system. Data bank for computerized information is organized in the form of a collection of file stored on secondary storage media. A file is a collection of records for each entity in the system. The record being a collection of data items representing the attributes of an entity.

- ii) **People :** The people involved with the database system can be divided into 2 groups: those who use the information system provided by the system and those who design develop and manage the system itself.
- iii) **Database Planning and Design Technique :** Since the database system involves people from all parts of organization with variety of information needs the development and operation of database system must be very carefully planned and managed. The data must be carefully designed to provide efficient excess to information required by different users.
- iv) **Computer Hardware and Software :** Computer hardware and software for DBMS are two different important elements of DBMS. They are technological foundation of DBMS.

Q.2 What is Database Design? And objectives of Database Design?

Ans.: Database design is the process of designing the overall schema of database. This process is mainly divided in four phases: analysis phase, design phase refinement phase and physical design phase.

Analysis Phases : This is the initial phase of database design which includes the specification of data stored; operation applied on the stored data and description of application which use the data stored. This phase also takes care of existing system, its requirements and operation performed, so that expectation from the new system can be understood.

Design Phase : It is not real analysis of enterprise. The output of the design phase is directly converted into real database. This is divided into two parts :

- a) **Conceptual Design :** The information gathered in first phase is converted into data model which is used to specify data stored, data relationship and constraints applied on stored data.
- b) **Logical Design :** Information represented in data model is converted into database schema of chosen DBMS or the conceptual schema mentioned above is applied for implementation from database schema.

Refinement Phase : This phase is used to correct problems which are encountered while analyzing the relations of database schema. This phase is used to

- i) Analyze the relations.
- ii) Identify the anomalies.
- iii) Refine database schema to correct or remove anomalies.

Physical design : This phase is used to create physical schema corresponding to the logical schema. It is used to specify internal storage structure and file organization that is required to store the data.

Q.3 What is Database Management System? Discuss different models of Database. Which is mostly used and why?

Ans.: A data model is not just a way of structuring data: it also defines a set of operations that can be performed on the data. A data model is a mechanism that provides abstraction for the database application. Database modeling is used for representing entities of interest and their relationship in database. It allows the conceptualization of the association between various entities and their attributes.

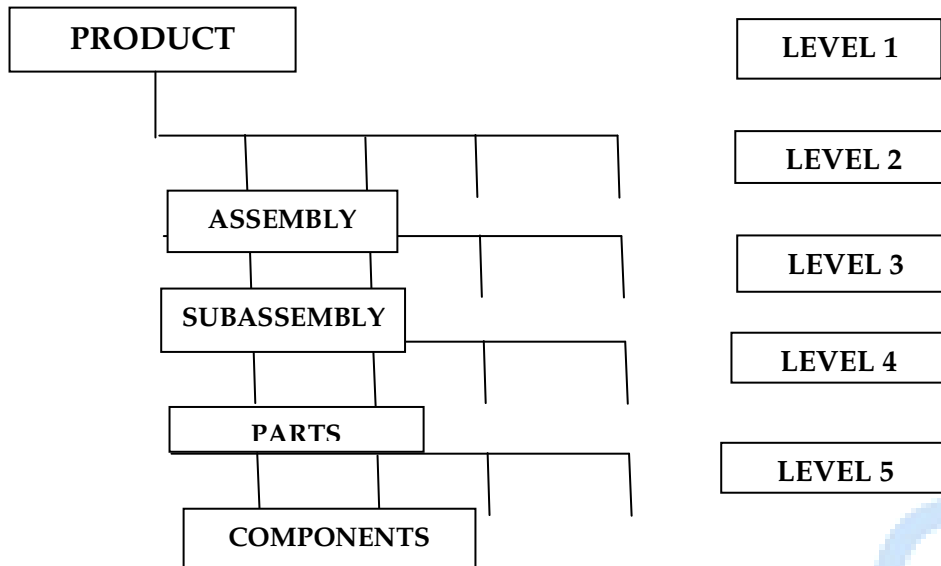
Following are the different models of DBMS :

- Hierarchical Model
- Network Model
- Relational Model

Most database systems are built around one particular data model, although it is increasingly common for products to offer support for more than one model.

Hierarchical Model : In a hierarchical model, data is organized into a tree-like structure, implying a single upward link in each record to describe the nesting, and a sort field to keep the records in a particular order in each same-level list. Hierarchical structures were widely used in the early mainframe database management systems, such as the Information Management System (IMS) by IBM. This structure allows 1 : N relationship between two types of data. This structure is very efficient to describe many relationships in the real world; recipes, table of contents, ordering of paragraphs, any nested and sorted information. However, the hierarchical structure is inefficient for certain database operations when a full path is not included for each record.

One limitation of the hierarchical model is its inability to efficiently represent redundancy in data.

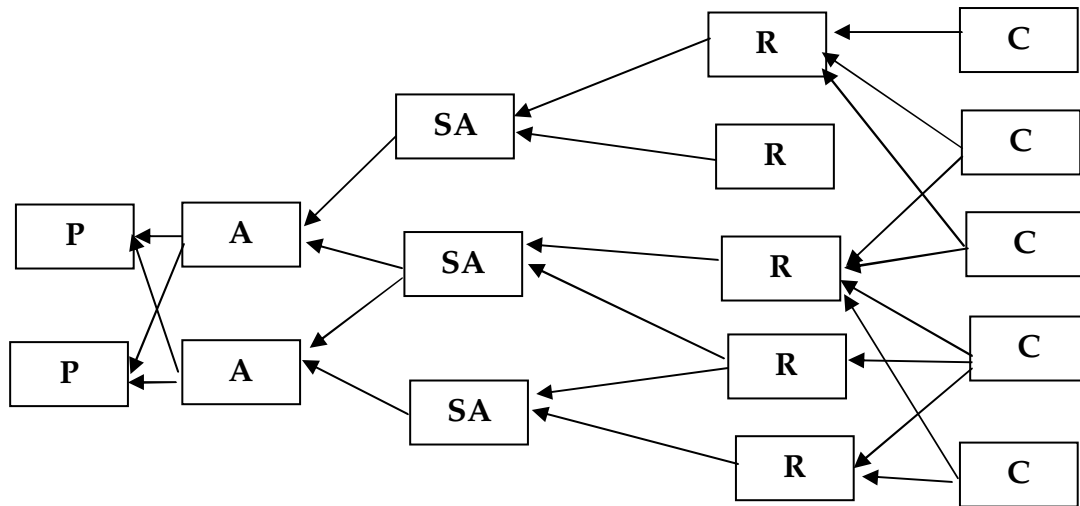


Hierarchical structure of product (HDBMS)

Network Model : The network model organizes data using two fundamental constructs, called records and sets. Records contain fields; Sets define one-to-many relationships between records: one owner, many members. A record may be an owner in any number of sets, and a member in any number of sets.

The network model is a variation on the hierarchical model, to the extent that it is built on the concept of multiple branches emanating from one or more nodes. The model differs from the hierarchical model as in network model branches can be connected to multiple nodes. The network model is able to represent redundancy in data more efficiently than in the hierarchical model.

Although it is not an essential feature of the model, network databases generally implement the set relationships by means of pointers that directly address the location of a record on disk. This gives excellent retrieval performance, at the expense of operations such as database loading and reorganization.



Product Database in NDBMS

Relational Model : Three key terms are used extensively in relational database models : **relations, attributes, and domains.** A **relation** is a table with columns and rows. The named columns of the relation are called attributes, and the domain is the set of values the attributes are allowed to take.

The basic data structure of the relational model is the table, where information about a particular entity is represented in columns and rows, also called tuples. Thus, the "relation" in "relational database" refers to the various tables in the database; a relation is a set of tuples. The columns enumerate the various attributes of the entity and a row is an actual instance of the entity that is represented by the relation. As a result, each tuple of the employee table represents various attributes of a single employee.

All relations in a relational database have to adhere to some basic rules to qualify as relations. First, the ordering of columns is immaterial in a table. Second, there can't be identical tuples or rows in a table. And third, each tuple will contain a single value for each of its attributes.

Product database:			
Component number	Component name		
100	Washer		
102	nut		
109	bolt		
111	screw		

Part component table:			
Component number	Part number	Usage of component in the part	Component name
100	10	3	Washer
102	11	2	nut
109	12	1	bolt
111	14	4	screw
100	10	3	Washer
109	10	4	bolt
111	12	6	screw

Product database in RDBMS

The flexibility of relational databases allows programmers to write queries that were not anticipated by the database designers. As a result, relational databases can be used by multiple applications in ways the original designers did not foresee, which is especially important for databases that might be used for a long time. This has made the idea and implementation of relational databases very popular with business organization.

Q.4 Discuss the different views of Database System.

OR

Throw the light on conceptual, external and internal view of Database System. Also discuss the relationship among them.

Ans.: There are three levels of DBMS architecture :

- a) **Internal** : Also known as storage level. This level is closest to physical storage. That it is the one concerned with the way data is stored inside the concept system. Internal level is defined in terms of machine oriented constructs such as bits and bytes.

- b) **Conceptual** : Conceptual level is defined in terms of user oriented constructs such as records. This is also called community logical level. It is a level of direction between the other 2 levels.
- c) **External Level** : Also called user logical level. External level is the one closest to the users, that is , it is the one concerned with the way the data is seen by individual user.

Ex :

Internal		Conceptual	External
Stored employee	BYTES=20		
PPEFIX	BYTE=6	EMPLOYEE	Struct employee
EMP#	BYTE=6	EMPLOYEE_NUMBER	char emplno(6)
DEPT#	BYTE=4	DEPARTMENT_NUMBER	char dptno(4)
PEY	BYTE=4	SALARY	int salary

Q.5 Who is the Database Administrator? Discuss the various functions of Database Administrator?

Ans.: A **Database Administrator (DBA)** is a person who is responsible for the environmental aspects of a database. An effective administrator skills include :

- **Recoverability** - Creating and testing Backups
- **Integrity** - Verifying or helping to verify data integrity
- **Security** - Defining and/or implementing access controls to the data
- **Availability** - Ensuring maximum uptime
- **Performance** - Ensuring maximum performance
- **Development and testing support** - Helping programmers and engineers to efficiently utilize the database.

The role of a database administrator has changed according to the technology of database management systems as well as the needs of the owners of the databases. For example, although logical and physical database designs are traditionally the functions of a **Database Analyst** or **Database Designer**, a DBA may be tasked to perform those duties.

Function of DBA : The responsibilities of a database administrator vary and depend on the job description, corporate and Information Technology (IT) policies and the technical features and capabilities of the DBMS being administered. They nearly always include disaster recovery (backups and testing of backups), performance analysis and tuning, data dictionary maintenance, and some database design.

Some of the roles of the DBA may include :

- **Installation of New Software :** It is primarily the job of the DBA to install new versions of DBMS software, application software, and other software related to DBMS administration. It is important that the DBA or other IS staff members test this new software before it is moved into a production environment.
- **Configuration of Hardware and Software with the System Administrator :** In many cases the system software can only be accessed by the system administrator. In this case, the DBA must work closely with the system administrator to perform software installations, and to configure hardware and software so that it functions optimally with the DBMS.
- **Security Administration :** One of the main duties of the DBA is to monitor and administer DBMS security. This involves adding and removing users, administering quotas, auditing, and checking for security problems.
- **Data Analysis :** The DBA will frequently be called on to analyze the data stored in the database and to make recommendations relating to performance and efficiency of that data storage. This might relate to the more effective use of indexes, enabling "Parallel Query" execution, or other DBMS specific features.
- **Database Design (Preliminary) :** The DBA is often involved at the preliminary database-design stages. Through the involvement of the DBA, many problems that might occur can be eliminated. The DBA knows the DBMS and system, can point out potential problems, and can help the development team with special performance considerations.
- **Data Modeling and Optimization:** By modeling the data, it is possible to optimize the system layout to take the most advantage of the I/O subsystem.
- Responsible for the administration of existing enterprise databases and the analysis, design, and creation of new databases.

Q.6 Write short note of Data Access.

Ans.: Data Access: how data can be access from secondary storage device or physical storage device.

There are 3 methods for data access:

- a) **Sequential Data Access:** In this method data access one after another. Records are identified by field called "key field". It is easy method and easy to design and understand. This method is used in batch processing environment.

- b) **Direct Access:** It is also called random access. In this method each record is identified without reading intermediate records. Every record is assigned an address; whenever a particular record is to be read, altered and deleted this address is used to perform the operation.
- c) **Index Sequential Access Method:** It is used in batch and online processing. In this method each record has a key and index associated with it. Records are stored sequentially by the key field while the index permits direct access to selected record without requiring a full search of entire file. It combines positive aspects of direct and sequential methods.

Database Access : Any access to stored data is done by data manager in database structure. A user's request for data is received by the data manager, which determines the physical record required. The decision as to which physical record is needed may require some preliminary consultation of database and/or the data dictionary to the access of the actual data itself. The data manager sends the request for a specific physical record to the file manager. The manager decides the physical block of secondary storage device which contains the required record and sends the request for appropriate block to the disk manager. A block is a unit of physical input/output operations between primary and secondary storage. The disk manager retrieves the block and sends it to the file manager, which sends the required record to the data manager.

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