Management Information System

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Table of Contents

Unit-1 and Unit-2

What is MIS?

MIS is the use of information technology, people, and business processes to record, store and process data to produce information that decision makers can use to make day to day decisions.

MIS is the acronym for **Management Information Systems.** In a nutshell, MIS is a collection of systems, hardware, procedures and people that all work together to process, store, and produce information that is useful to the organization.

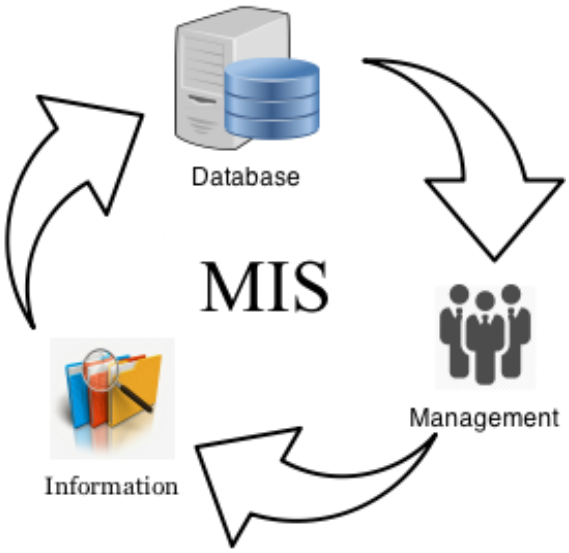
What is MIS?

Simply MIS stand For **Management Information System**. For Simply Understanding Management Information System (MIS) we can divide in to three Word and Understand Part by part

1. **Management: -** "Management is function to do the work at the Right time, by the right Person, For the Right Job."
2. **Information: -** "Information is the Collection of Organized data which plays a Vital Role for decision making."
3. **System:-**"System Consist for a set of elements which Provides a Framework to convert Unorganized (Data) into Organized Information."

Meaning of Management Information System

Management information system refers to such system which provides accurate information to the entire level of management for decision making process. For right job at the right time, by the right person.



Management information System

The need for MIS

The following are some of the justifications for having an MIS system

- **Decision makers need information to make effective decisions.** Management Information Systems (MIS) make this possible.
- **MIS systems facilitate communication within and outside the organization** – employees within the organization are able to easily access the required information for the day to day operations. Facilitates such as Short Message Service (SMS) & Email make it possible to communicate with customers and suppliers from within the MIS system that an organization is using.
- **Record keeping** – management information systems record all business transactions of an organization and provide a reference point for the transactions.

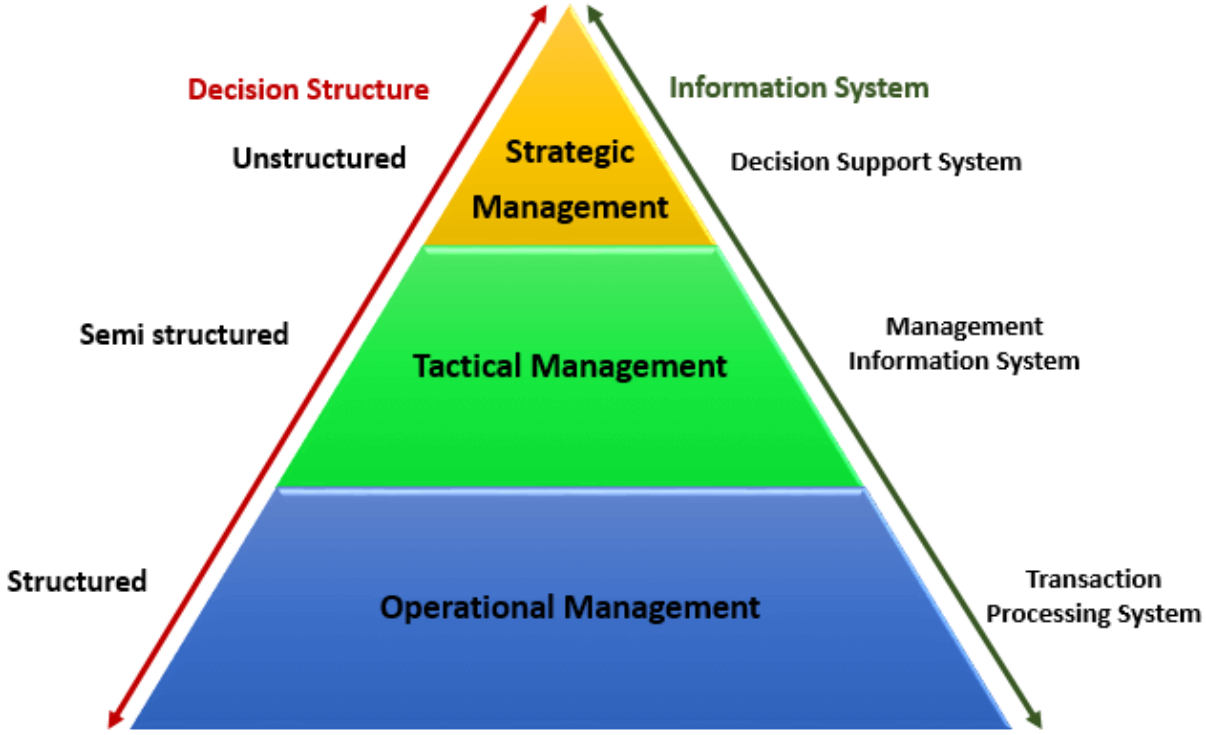
Components of MIS

The major components of a typical management information system are;

- **People** – people who use the information system
- **Data** – the data that the information system records
- **Business Procedures** – procedures put in place on how to record, store and analyze data
- **Hardware** – these include servers, workstations, networking equipment, printers, etc.
- **Software** – these are programs used to handle the data. These include programs such as spreadsheet programs, database software, etc.

Types of Information Systems

The type of information system that a user uses depends on their level in an organization. The following diagram shows the three major levels of users in an organization and the type of information system that they use.



Transaction Processing Systems (TPS)

This type of information system is used to record the day to day transactions of a business. An example of a Transaction Processing System is a Point of Sale (POS) system. A POS system is used to record the daily sales.

Management Information Systems (MIS)

Management Information Systems are used to guide tactic managers to make semi-structured decisions. The output from the transaction processing system is used as input to the MIS system.

Decision Support Systems (DSS)

Decision support systems are used by top level managers to make semi-structured decisions. The output from the Management Information System is used as input to the decision support system. DSS systems also get data input from external sources such as current market forces, competition, etc.

Manual Information Systems VS Computerized Information Systems (MIS)

Data is the bloodstream of any business entity. Everyone in an organization needs information to make decisions. An information system is an organized way of recording, storing data, and retrieving information.

In this section, we will look at manual information systems vs. computerized information systems.

Manual Information System

A manual information system does not use any computerized devices. The recording, storing and retrieving of data is done manually by the people, who are responsible for the information system.

The following are the major components of a manual information system

- **People –**people are the recipients of information system
- **Business Procedures –**these are measures put in place that define the rules for processing data, storing it, analyzing it and producing information
- **Data –**these are the recorded day to day transactions
- **Filing system –** this is an organized way of storing information
- **Reports –**the reports are generated after manually analyzing the data from the filing system and compiling it.

The following diagram illustrates how a typical manual information system works

Advantages and Dis-advantages of a manual information system

Advantages:

The following are the advantages of manual information systems

- **Cost effective –** it is cheaper compared to a computerized system because there is no need to purchase expensive equipment such as servers, workstations, printers, etc.
- **Flexible –**evolving business requirements can easily be implemented into the business procedures and implemented immediately

Disadvantages:

The following are some of the disadvantages of a manual information system.

- **Time consuming –**all data entries need to be verified before filing, this is a time consuming task when done by humans. Retrieving data from the filing system also takes a considerable amount of time
- **Prone to error –** the accuracy of the data when verified and validated by human beings is more prone to errors compared to verification and validation done by computerized systems.
- **Lack of security –** the security of manual systems is implemented by restricting access to the file room. Experience shows unauthorized people can easily gain access to the filing room
- **Duplication of data –**most departments in an organization need to have access to the same data. In a manual system, it is common to duplicate this data to make it easy to accessible to all authorized users. The challenge comes in when the same data needs to be updated
- **Data inconsistency –** due to the duplication of data, it is very common to update data in one file and not update the other files. This leads to data inconsistency
- **Lack of backups –** if the file get lost or mishandled, the chances of recovering the data are almost zero.

Computerized information system

Computerized systems were developed to address the challenges of manual information systems. The major difference between a manual and computerized information system is a computerized system uses a combination of software and hardware to record, store, analyze and retrieve information.

Advantages and Disadvantages of a computerized information system (MIS)

The following are some of the disadvantages of a computerized information system.

Advantages:

The following are the advantages of computerized information systems

- **Fast data processing and information retrieval –** this is one of the biggest advantages of a computerized information system. It processes data and retrieves information at a faster rate. This leads to improved client/customer service
- **Improved data accuracy –** easy to implement data validation and verification checks in a computerized system compared to a manual system.
- **Improved security –** in addition to restricting access to the database server, the computerized information system can implement other security controls such as user's authentication, biometric authentication systems, access rights control, etc.
- **Reduced data duplication –** database systems are designed in such a way that minimized duplication of data. This means updating data in one department automatically makes it available to the other departments
- **Improved backup systems –** with modern day technology, backups can be stored in the cloud which makes it easy to

recover the data if something happened to the hardware and software used to store the data

- **Easy access to information –** most business executives need to travel and still be able to make a decision based on the information. The web and Mobile technologies make accessing data from anywhere possible.

Disadvantages:

- **It is expensive to set up and configure –** the organization has to buy hardware and the required software to run the information system. In addition to that, business procedures will need to be revised, and the staff will need to be trained on how to use the computerized information system.
- **Heavy reliance on technology –** if something happens to the hardware or software that makes it stop functioning, then the information cannot be accessed until the required hardware or software has been replaced.
- **Risk of fraud –** if proper controls and checks are not in place, an intruder can post unauthorized transactions such as an invoice for goods that were never delivered, etc.

Role of Management Information System

Management information system (MIS) has become Very Necessary due to Emergence of high complexity in Business Organization. It is all to know that without information no Organization can take even one step properly regarding the decision making process. Because it is matter of fact that in an organization decision plays an essential role for the achievement of its objectives and we know that every decision is based upon information. If gathered information are irrelevant than decision will also incorrect and Organization may face big loss & lots of Difficulties in Surviving as well.

- **Helps in Decision making: -** Management Information System (MIS) plays a significant Role in Decision making Process of any Organization. Because in Any organization decision is made on the basis of relevant Information and relevant information can only be Retrieving from the MSI.

- **Helps in Coordination among the Department: -** Management information System is also help in establishing a sound Relationship among the every persons of department to department through proper exchanging of Information's.

- **Helps in Finding out Problems: -** As we know that MIS provides relevant information about the every aspect of activities. Hence, If any mistake is made by the management then Management Information Systems (MIS) Information helps in Finding out the Solution of that Problem.

- **Helps in Comparison of Business Performance: -** MIS store all Past Data and information in its Database. That why management information system is very useful to compare Business organization Performance. With the help of Management information system (MIS) Organization can analyze his Performance means whatever they do last year or Previous Years and whatever business performance in this year and also measures organization Development and Growth.

Characteristics of an Effective Management Information System

Essential characteristics of an effective management information system are 1. MIS is management oriented 2. MIS is developed under the direction of management 3. MIS is an integrated system 4. common data flows 5. MIS is based upon future needs of the business 6. MIS is composed of sub-systems 7. MIS requires flexibility 8. distributed data processing and 9. MIS is mostly computerized.

Management Information System is established in an organization to provide relevant information to the managers to operate effectively and efficiently.

1. MIS is management oriented:

The design of MIS starts with an appraisal of the information needs of the management. The system is usually designed from top to bottom. However, this does not mean that MIS fulfils the information needs of top management only.

It only implies that information needs of the top management will serve as a basis for assessment of information needs of lower level managers. In every case the system should be designed to cater to the information needs of all levels of management.

2. MIS is developed under the direction of management:

Because of management orientation of MIS, it is imperative that, management of an organisation actively directs the development and establishment of the MIS in an organisation. It is rare to find an MIS

where the manager himself, or a high level representative of his department, is not spending a good deal of time in the system design.

It is not a onetime involvement, because continued review and participation are necessary to ensure that the implemented system meets the specifications of the system that was designed. Therefore, management of the organisation should not only take active part in the development of MIS but also play a major role in effecting subsequent changes in the system so that it serves the information needs of the management.

3. MIS is an integrated system:

MIS is an integrated system which blends information from several operational areas to serve the information needs of the management more effectively. It takes a comprehensive view of the interlocking sub-systems which operate within an organisation.

For example, in order to develop an effective production scheduling system, the management must balance such factors as (a) production capacity, (b) work force (c) inventory levels (d) nature of the product (e) demand pattern of the product (f) capital requirements and (g) marketing network. A system that ignores one of these elements will not provide an efficient production schedule.

4. Common data flows:

MIS seeks to avoid duplication and redundancy in data collection, storage and dissemination of information. The designers of MIS are aware that a few key source documents account for much of the information flow and affect many functional areas.

The concept of common data flow requires building and using master files, for recording and reporting information. This concept supports several of the basic principles of system analysis avoiding duplication, combining similar functions and simplifying operations wherever possible.

5. MIS is based upon future needs of the business:

MIS is designed to serve the objectives and needs of the business in an effective manner. The MIS designer must avoid the possibility of system obsolescence before the system gets into operation. If MIS is designed after taking care of future information needs of the business, there remains little chance of its becoming obsolete.

6. MIS is composed of sub-systems:

MIS although viewed as a single entity, must be broken down into sub-systems. The breakdown of MIS into meaningful subsystems sets the stage for a prioritized implementation. It also enables the MIS designer to focus on manageable entities that can be assigned and computerised by selected systems and programming teams.

7. MIS requires flexibility:

MIS is designed to fulfill the information needs of management for future decision making. Despite a careful analysis of future information needs of the management, it is impossible to predict accurately all the events of three to five years ahead.

This is true in most industries and especially in those industries with rapid changing patterns. Therefore, the MIS should be designed in such a manner so as to permit appropriate changes in future, if the

MIS does not allow any modification, it is bound to become obsolete very soon.

8. Distributed data processing:

In case of companies having geographical network of sales offices, distribution points, manufacturing plants, divisions and subdivisions, some form of distributed data processing is necessary, since some of these units may be operated in a completely independent fashion.

The purpose of distributed data processing is to ensure that information is placed in the hands of those who need it at the time when they need it. However, the sub-systems designed for distributed data processing should be considered as the integral parts of the MIS of the company.

9. MIS is mostly computerized:

Now-a-days, all activities of MIS viz., data collection, data processing and data retrieval are accomplished through electronic media. The use of computer assures accuracy and consistency in processing data and speeds up dissemination of information.

Different MIS Functions

MIS is set up by an organization with the prime objective to obtain management information to be used by its managers in decision-making. Thus, MIS must perform the following functions in order to meet its objectives.

1) Data Capturing:

MIS captures data from various internal and external sources of an organization. Data capturing may be manual or through computer terminals. End users, typically record data about transactions on some physical medium such as paper form or enter it directly into a computer system.

2) Processing of data:

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

3) Storage of information:

MIS stores processed or unprocessed data for future use. If any information is not immediately required, it is saved as an organizational record. In this activity, data and information are retained in an organized manner for later use. Stored data is commonly organized into fields, records, files and databases.

4) Retrieval of information:

MIS retrieves information from its stores as and when required by various users. As per the requirements of the management users, the retrieved information is either disseminated as such or it is processed again to meet the exact demands.

5) Dissemination of MI:

Management information, which is a finished product of MIS, is disseminated to the users in the organization. It could be periodic, through reports or on-line through computer terminals.

Pitfalls in MIS Development

- Organization does not have a reliable management system
- Organization has not defined its mission clearly
- Organization's objectives have not been specified
- Management lacks interest in MIS development process &

relies solely on MIS development's specification.

- Communication gap exists between MIS development team

and the management

- MIS development team is incompetent

OR

1 . Poor Existing Management System :-

Even excellent MIS cannot make up poor management system . In fact , the existing management systems are the base for Developing MIS. Whatever Shortcomings are associated with the basic management system ; the same shortcomings can be expected in the developed MIS .

2. Poor Definition of Business :-

In absence of such basic information , MIS development cannot be effective because we have stated in the beginning of the next that MIS borrows its objectives from the mission statement and future strategies of business .

3.Poor Organization of MIS :-

MIS has been neglected in the organization of any business firm .If we analyze organization chart of the business firms , the majority will not have an independent MIS department . Usually MIS functions are performed the accounting department.

4 . Inadequate Resources : -

Due to poor management , an MIS project may be starved of resources . For successful completion of the project , the outlays should be provided separately and once allocated for development of MIS, funds should not be diverted to another users.

Management Information System	
Advantages	**Disadvantages**
• Accuracy of the data • Flexibility of data analysis • Providing data in an appropriate form • Avoid information overload • Allow speedy decisions for urgent situations	• Complexity of the system • Inadequate initial analysis • Inappropriate hardware and software • Lack of professional standards • Poor communications between professionals

Organizational Behaviour

It is very important to study organizational behavior because it provides an understanding of why people behave as they do in organizations.In any organization, importance of organizational behavior has tremendous necessities. Organizational Behavior helps us to study the complex nature of human beings in organizations by identifying causes and effects of that behavior.

Some of the importance of Organizational Behavior (OB) in any type of organizations is as follows:

1. Organizational Behavior helps in understanding Organization and Employees in a better way.

2. Organizational Behavior helps in motivating employees.

3. Organizational Behavior helps in improving Industrial / Labor relations.

4. Organizational Behavior helps in predicting and controlling Human Behavior.

5. Organizational Behavior helps in effective utilization of Human Resources.

1. Organizational Behaviour helps in understanding Organization and Employees in a better way:

Studying Organizational Behaviour helps to understand organization and people in a better way. When we can understand organization and employees, it helps to develop friendly relationship between organization and employees creating a proper working environment in an organization.

Similarly, studying Organizational Behavior topics helps to find out the factor causing the behavior, and helps to apply different strategies to control the critical behavior which harms the organization.

2. OB helps in motivating employees:

Importance of Organizational behaviour cannot be neglected studying. Organizational Behaviour helps managers to motivate the employees bringing a good organizational performance. As every individual differs from each other, therefore Organizational Behaviour helps managers to apply appropriate motivational tools and techniques in accordance with nature of individual employees. This helps achieving organizational goal properly.

3. Organizational Behaviour helps in improving Industrial/ Labour relations:

Studying Organizational Behaviour helps to improve industrial/labour relations. Organizational Behaviour Management helps in understanding the root-cause of problem, predict its future course of action and control its negative consequences. As managers are aware about the positive and negative consequences of the behaviour, it enables managers to maintain friendly relations with their employees which creates peace and harmony in the organization.

4. Organizational Behaviour helps in predicting and controlling Human Behaviour:

Studying organizational Behaviour helps to predict and control human behaviour. It is the one of the most important reason for studying Organizational Behaviour. Knowledge of Organizational Behaviour is very much important for the management students who are going to

have careers as a successful manager. If all the organizational behaviour theories is studied properly then it helps to bring organizational effectiveness.

5. Organizational Behaviour helps in effective utilization of Human Resource:

Studying Organizational Behaviour helps in effective utilization of Human Resources. Knowledge of Organizational Behaviour helps managers to manages people effectively in the organization. Likewise, it enables managers to inspire and motivate employees toward higher productivity and better results as the manager is able to analyse and understand nature and behaviour of his employees.

Classical Organizational Theory

As the first step towards a systematic study of organizations, the Classical Organizational Theory is very important.

It primarily deals with the anatomy of formal organizations and also views one as a machine and the employees as parts of the machine.

Therefore, in order to increase the efficiency of the organization, each employee working in it must become efficient.

6 Pillars of Classical Organizational Theory

The main pillars or elements of the Classical theory are as follows:

1. **Division of Labour** – In order to obtain a clear specialization in order to improve the performance of individual workers, the organization must divide work.
2. **Departmentalization** – The organization must group various activities and jobs into departments. This allows it to minimize costs and also facilitate administrative control.
3. **Coordination** – The organization must ensure harmony among diverse functions. This allows it to arrange the group effort in an orderly manner which provides unity of action while pursuing a common purpose.
4. **Scalar and Functional Processes** – A scalar chain is the series of superior-subordinate relationships from the top to the bottom in an organization. It facilitates the delegation of authority or command, communication or feedback, and also remedial action or decision.
5. **Structure** – Structure is the logical relationship of functions in an organization. Further, these functions are arranged for effective objective accomplishment.

6. **Span of Control** – This is the number of subordinates that a manager can effectively supervise.

Process of Converting From a Manual to a Computerized Accounting System(2Option)

Many companies start their business using a manual accounting system. For most entrepreneurs, this route allows the business to start operating without requiring a large investment for a computerized accounting system. The costs of installing a computerized accounting system include purchasing the system, labor to install the system and training costs to learn the system. A manual system involves writing each transaction in an accounting notebook and calculating all numbers manually. Many times, a business recognizes a need to convert from the manual system to a computerized accounting system.

Install New System

The first step to convert from a manual accounting system to a computerized accounting system involves installing the accounting system onto the company's computer. The business owner reviews different software packages to determine which meets his business needs and purchases that software. The owner downloads the software onto the computer where the accounting work will occur.

Finalize Data in Manual System

The second step to convert requires the business owner to finalize the data. Once the computerized system is loaded onto the computer, the owner needs to finalize all of the data contained in the manual system. The owner ensures that all transactions appear in the accounting records and that all calculations appear correct. She may choose to hire an accounting firm to audit the manual financial records.

Transfer Balances to New System

With final account numbers recorded in the manual system, the owner can transfer the ending balances to the computerized system. The owner sets up each account in the computerized system by entering an account name, the type of account and the beginning balance. After entering each balance, the owner needs to compare the balances to the manual system balances to verify that all data is entered in the system accurately.

Run Parallel Systems

The fourth step requires the owner to use both the manual system and the computerized system for a temporary period of time. This allows the owner to ensure that the new system operates as expected.

Discontinue Manual System

At the end of the trial period, the owner discontinues the manual system. The owner needs to focus on using the computerized accounting system. All of the records from the manual system can be packed up and stored.

OR

CONVERSION OF MANUAL SYSTEM INTO COMPUTERISED SYSTEM

Today is the world of information technology. In business lots of complexity and competition are there. In order to reduce this, we are using information technology in business. So, we are converting manual system to computerized system. The steps involved in conversion are:-

1. SYSTEM DESCRIPTION:- Is is usually prepared after preliminary investigation and definition of the problem. The description is essentially a statement of major input, output, processing operation and files needed.

2. INPUT DOCUMENT:- After the system description is completed. It is necessary to specify how the information will be put into the form that is acceptable to the computer. Volume of information, frequency, accuracy and verification requirement and the handling of the information are considered in the selection of input format.

3. OUTPUT DOCUMENT:- Outputs are subject to much the same considerations as input document but the output format should be treated with additional care because It represents the objective and purpose of entire operation. It is the output document with which the management is almost exclusively concerned and because of its critical nature care should be taken in its design.

4. FILE DESIGN:- The logic required to control the flow of data through the system is a part of system design and the flow is in turn dependent upon the design of data files. In this we consider the type of equipment, storage capacity, nput and output media and format.

5. PROGRAM LOGIC AND COMPUTER PROGRAM:- Although there are numerous means of thinking through and document programming logic, we will use flow-chart because they are easy to depict and understand. The program flow-chart is the program logic of step-by-

step representation of how the computer program will accomplish the job. It's the blue print of the program.

6. SYSTEM VERIFICATION:- After the program has been written and run through the compilation process. It's placed memory in binary form and is ready to process the file on disk and print the required report. The verifications means to check the work is done according to the specifications or not. If not, what steps are to be taken to meet specifications?

7. DOCUMENTATION:- The documentation is a complete written format of whole activities. It is manual. It helps in understanding the system easily. When a person is new to the system and does not know how to use the system but by reading the documentation he can easily understand and use the system.

What is batch processing?

Jobs that can run without end user interaction, or can be scheduled to run as resources permit, are called batch jobs. Batch processing is for those frequently used programs that can be executed with minimal human interaction.

A program that reads a large file and generates a report, for example, is considered to be a batch job.

The term batch job originated in the days when punched cards contained the directions for a computer to follow when running one or more programs. Multiple card decks representing multiple jobs would often be stacked on top of one another in the hopper of a card reader, and be run in batches.

Online Analytical Processing.

Stands for "Online Analytical Processing." OLAP allows users to analyze database information from multiple database systems at one time. While relational databases are considered to be two-dimensional, OLAP data is multidimensional, meaning the information can be compared in many different ways. For example, a company might compare their computer sales in June with sales in July, then compare those results with the sales from another location, which might be stored in a different database.

In order to process database information using OLAP, an OLAP server is required to organize and compare the information. Clients can analyze different sets of data using functions built into the OLAP server. Some popular OLAP server software programs include Oracle Express Server and Hyperion Solutions Essbase. Because of its powerful data analysis capabilities, OLAP processing is often used for data mining, which aims to discover new relationships between different sets of data.

What does Real-Time Data Processing mean?

Real-time data processing is the execution of data in a short time period, providing near-instantaneous output. The processing is done as the data is inputted, so it needs a continuous stream of input data in order to provide a continuous output. Good examples of real-time data processing systems are bank ATMs, traffic control systems and modern computer systems such as the PC and mobile devices. In contrast, a batch data processing system collects data and then processes all the data in bulk in a later time, which also means output is received at a later time.

Real-time data processing is also known as stream processing.

Distributed processing

Distributed processing is a phrase used to refer to a variety of computer systems that use more than one computer (or processor) to run an application. This includes parallel processing in which a single computer uses more than one CPU to execute programs.

More often, however, distributed processing refers to local-area networks (LANs) designed so that a single program can run simultaneously at various sites. Most distributed processing systems contain sophisticated software that detects idle CPUs on the network and parcels out programs to utilize them.

Software

Computer hardware is virtually useless without computer software. Software is the programs that are needed to accomplish the input, processing, output, storage, and control activities of information systems.

Computer software is typically classified into two major types of programs: system software and application software.

System Software

Systems software are programs that manage the resources of the computer system and simplify applications programming. They include software such as the operating system, database management systems, networking software, translators, and software utilities.

Application Software

Application software are programs that direct the performance of a particular use, or application, of computers to meet the information processing needs of end users. They include Aoff-the-shelf@ software such as word processing and spreadsheet packages, as well as internally or externally developed software that is designed to meet the specific needs of an organization.

Decision Support System

Decision support systems (DSS) are interactive software-based systems intended to help managers in decision-making by accessing large volumes of information generated from various related information systems involved in organizational business processes, such as office automation system, transaction processing system, etc.

DSS uses the summary information, exceptions, patterns, and trends using the analytical models. A decision support system helps in decision-making but does not necessarily give a decision itself. The decision makers compile useful information from raw data, documents, personal knowledge, and/or business models to identify and solve problems and make decisions.

Programmed and Non-programmed Decisions

There are two types of decisions - programmed and non-programmed decisions.

Programmed decisions are basically automated processes, general routine work, where −

- These decisions have been taken several times.
- These decisions follow some guidelines or rules.

For example, selecting a reorder level for inventories, is a programmed decision.

Non-programmed decisions occur in unusual and non-addressed situations, so −

- It would be a new decision.
- There will not be any rules to follow.
- These decisions are made based on the available information.
- These decisions are based on the manger's discretion, instinct, perception and judgment.

For example, investing in a new technology is a non-programmed decision.

Decision support systems generally involve non-programmed decisions. Therefore, there will be no exact report, content, or format for these systems. Reports are generated on the fly.

Attributes of a DSS

- Adaptability and flexibility
- High level of Interactivity
- Ease of use
- Efficiency and effectiveness
- Complete control by decision-makers
- Ease of development
- Extendibility
- Support for modeling and analysis
- Support for data access
- Standalone, integrated, and Web-based

Characteristics of a DSS

- Support for decision-makers in semi-structured and unstructured problems.
- Support for managers at various managerial levels, ranging from top executive to line managers.
- Support for individuals and groups. Less structured problems often requires the involvement of several individuals from different departments and organization level.
- Support for interdependent or sequential decisions.
- Support for intelligence, design, choice, and implementation.
- Support for variety of decision processes and styles.
- DSSs are adaptive over time.

Benefits of DSS

- Improves efficiency and speed of decision-making activities.
- Increases the control, competitiveness and capability of futuristic decision-making of the organization.
- Facilitates interpersonal communication.
- Encourages learning or training.
- Since it is mostly used in non-programmed decisions, it reveals new approaches and sets up new evidences for an unusual decision.
- Helps automate managerial processes.

Components of a DSS

Following are the components of the Decision Support System −

- **Database Management System (DBMS)** − To solve a problem the necessary data may come from internal or external database. In an organization, internal data are generated by a system such as TPS and MIS. External data come from a variety of sources such as newspapers, online data services, databases (financial, marketing, human resources).
- **Model Management System** − It stores and accesses models that managers use to make decisions. Such models are used for designing manufacturing facility, analyzing the financial health of an organization, forecasting demand of a product or service, etc.

  Support Tools − Support tools like online help; pulls down menus, user interfaces, graphical analysis, error correction mechanism, facilitates the user interactions with the system.

Classification of DSS

There are several ways to classify DSS. Hoi Apple and Whinstone classifies DSS as follows −

- **Text Oriented DSS** − It contains textually represented information that could have a bearing on decision. It allows documents to be electronically created, revised and viewed as needed.
- **Database Oriented DSS** − Database plays a major role here; it contains organized and highly structured data.
- **Spreadsheet Oriented DSS** − It contains information in spread sheets that allows create, view, modify procedural knowledge and also instructs the system to execute self-contained instructions. The most popular tool is Excel and Lotus 1-2-3.
- **Solver Oriented DSS** − It is based on a solver, which is an algorithm or procedure written for performing certain calculations and particular program type.
- **Rules Oriented DSS** − It follows certain procedures adopted as rules.
- **Rules Oriented DSS** − Procedures are adopted in rules oriented DSS. Export system is the example.
- **Compound DSS** − It is built by using two or more of the five structures explained above.

Types of DSS

Following are some typical DSSs −

- **Status Inquiry System** − It helps in taking operational, management level, or middle level management decisions, for example daily schedules of jobs to machines or machines to operators.
- **Data Analysis System** − It needs comparative analysis and makes use of formula or an algorithm, for example cash flow analysis, inventory analysis etc.
- **Information Analysis System** − In this system data is analyzed and the information report is generated. For example, sales analysis, accounts receivable systems, market analysis etc.
- **Accounting System** − It keeps track of accounting and finance related information, for example, final account, accounts receivables, accounts payables, etc. that keep track of the major aspects of the business.
- **Model Based System** − Simulation models or optimization models used for decision-making are used infrequently and creates general guidelines for operation or management.

What is an Information System?

Many organizations work with large amounts of data. Data are basic values or facts and are organized in a database. Many people think of data as synonymous with information; however, information actually consists of data that has been organized to help answers questions and to solve problems. An information system is defined as the software that helps organize and analyze data. So, the purpose of an information system is to turn raw data into useful information that can be used for decision making in an organization.

Typical Components of Information Systems

While information systems may differ in how they are used within an organization, they typically contain the following components:

Hardware: Computer-based information systems use computer hardware, such as processors, monitors, keyboard and printers.

Software: These are the programs used to organize, process and analyze data.

Databases: Information systems work with data, organized into tables and files.

Network: Different elements need to be connected to each other, especially if many different people in an organization use the same information system.

Procedures: These describe how specific data are processed and analyzed in order to get the answers for which the information system is designed.

Differentiate between Management Information System and the Decision Support System

Comparison between the Management Information System and the Decision Support System

S.NO.	MIS	DSS
1.	The main focus is on the structured tasks and the routine decisions.	Focus is mainly on the semi / un-structured tasks, which demand the managerial judgment.
2.	Identifies the information requirement.	Develops certain tools for using in the decision process.
3.	Data storage is of great importance	The main emphasis is on the data – manipulation.
4.	Delivers system depending on the frozen requirements.	Current data can be used in the Decision Support System.
5.	Only the in – direct access to the data by the managers is provided.	Managers enjoy direct access to the data.
6.	Very much dependent on the computer expert.	Depends on the managerial judgment.
7.	Access to the data possibly requiring a 'wait' for the manager's turn.	Waiting is not at all required.

8.	MIS manager may not completely understand the nature of the decision.	Manager possesses the knowledge about the nature of the decision and the decision making environment.
9.	Main stress is on the efficiency.	Main emphasis is laid on the effectiveness.

OR

MANAGEMENT INFORMATION SYSTEM

VERSUS

DECISION SUPPORT SYSTEM

MANAGEMENT INFORMATION SYSTEM	DECISION SUPPORT SYSTEM
An information system that evaluates, analyzes, and processes an organization's data to produce meaningful and useful information based on which the management can take right decisions	An information system that supports business or organizational decision-making activities
Supports structured decision making	Supports unstructured or semi-structured decisions
Provides information to support internal operations	Provides information to support specific situations
Uses a large volume of data as the input and gives a summarized report as the output	Uses a low volume of data as the input and gives a decision analysis as the output
Focuses on operational efficiency	Focuses on making effective decisions
Used by middle and low-level management	Used by senior managers and analysts

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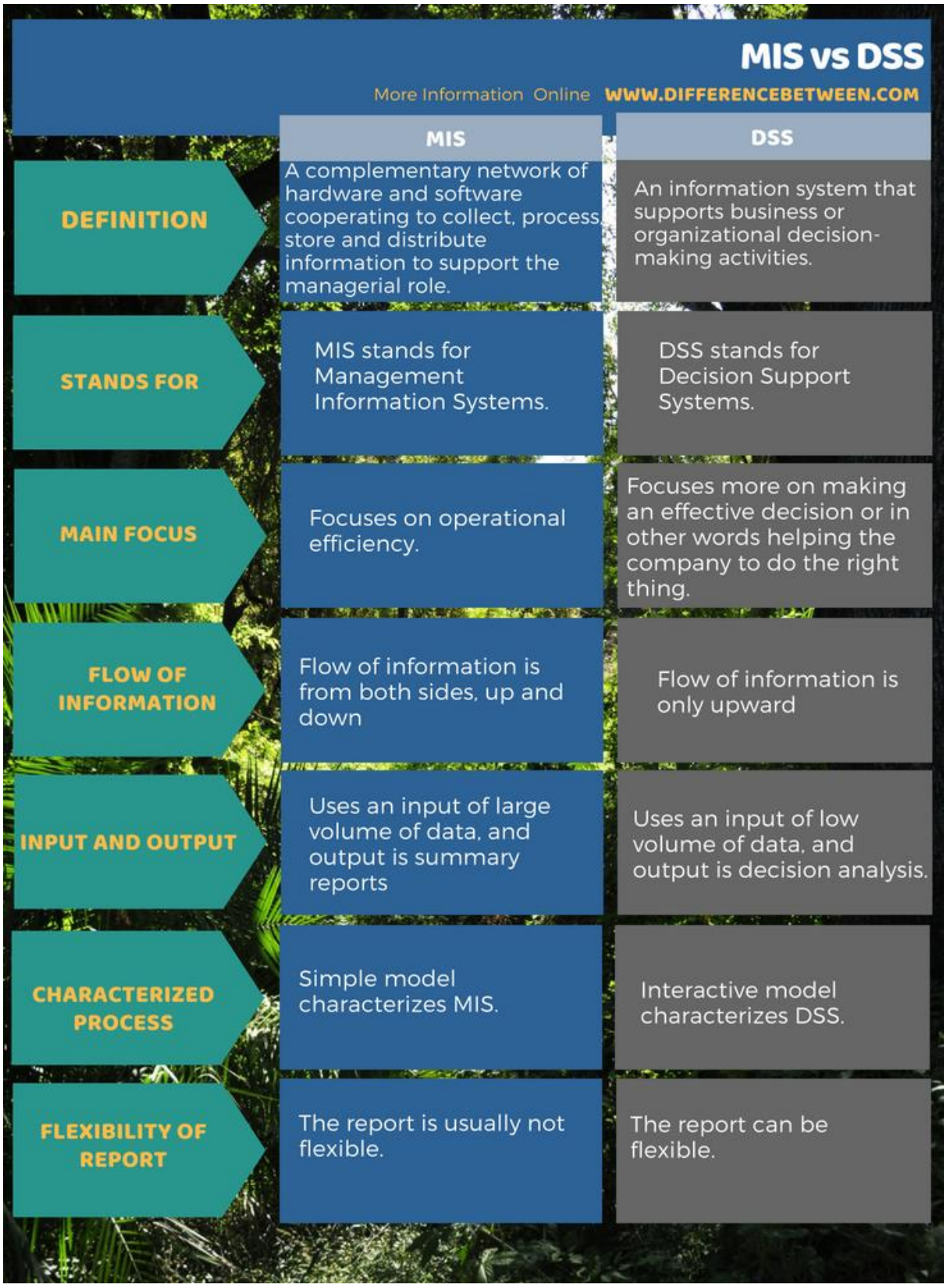

MIS vs DSS
More Information Online WWW.DIFFERENCEBETWEEN.COM
MIS
DSS
DEFINITION
A complementary network of hardware and software cooperating to collect, process, store and distribute information to support the managerial role.
An information system that supports business or organizational decision-making activities.
STANDS FOR
MIS stands for Management Information Systems.
DSS stands for Decision Support Systems.
MAIN FOCUS
Focuses on operational efficiency.
Focuses more on making an effective decision or in other words helping the company to do the right thing.
FLOW OF INFORMATION
Flow of information is from both sides, up and down
Flow of information is only upward
INPUT AND OUTPUT
Uses an input of large volume of data, and output is summary reports
Uses an input of low volume of data, and output is decision analysis.
CHARACTERIZED PROCESS
Simple model characterizes MIS.
Interactive model characterizes DSS.
FLEXIBILITY OF REPORT
The report is usually not flexible.
The report can be flexible.

Strategic planning

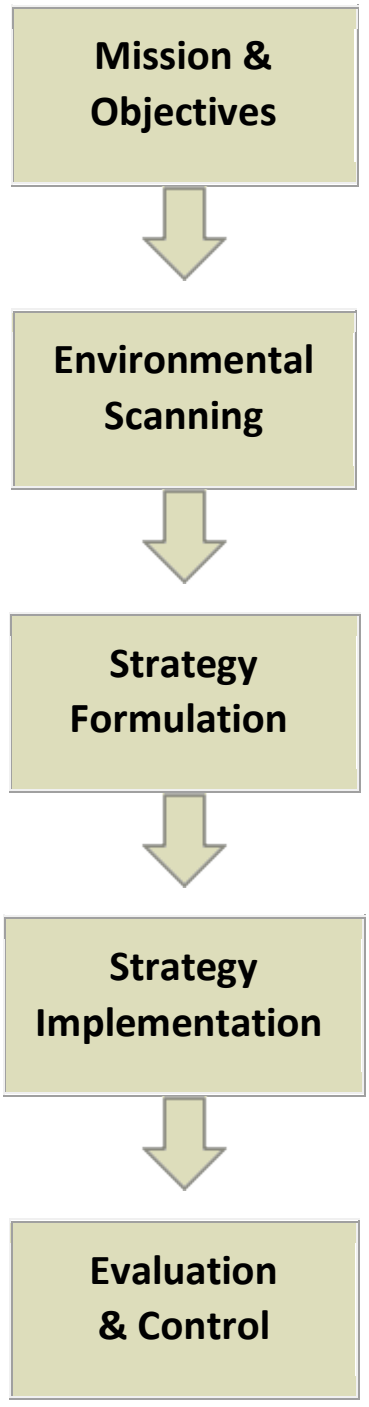
Strategic planning is a process in which organizational leaders determine their vision for the future as well as identify their goals and objectives for the organization. The process also includes establishing the sequence in which those goals should fall so that the organization is enabled to reach its stated vision.

Strategic planning is an organization's process of defining its strategy, or direction, and making decisions on allocating its resources to pursue this strategy. It may also extend to control mechanisms for guiding the implementation of the strategy.

Strategic Planning Process

A simplified view of the strategic planning process is shown by the following diagram:

The Strategic Planning Process



Mission and Objectives

The mission statement describes the company's business vision, including the unchanging values and purpose of the firm and forward-looking visionary goals that guide the pursuit of future opportunities.

Guided by the business vision, the firm's leaders can define measurable financial and strategic objectives. Financial objectives involve measures such as sales targets and earnings growth. Strategic objectives are related to the firm's business position, and may include measures such as market share and reputation.

Environmental Scan

The environmental scan includes the following components:

- Internal analysis of the firm
- Analysis of the firm's industry (task environment)
- External macroenvironment (PEST analysis)

The internal analysis can identify the firm's strengths and weaknesses and the external analysis reveals opportunities and threats. A profile of the strengths, weaknesses, opportunities, and threats is generated by means of a SWOT analysis

An industry analysis can be performed using a framework developed by Michael Porter known as Porter's five forces. This framework evaluates entry barriers, suppliers, customers, substitute products, and industry rivalry.

Strategy Formulation

Given the information from the environmental scan, the firm should match its strengths to the opportunities that it has identified, while addressing its weaknesses and external threats.

To attain superior profitability, the firm seeks to develop a competitive advantage over its rivals. A competitive advantage can be based on cost or differentiation. Michael Porter identified three industry-independent generic strategies from which the firm can choose.

Strategy Implementation

The selected strategy is implemented by means of programs, budgets, and procedures. Implementation involves organization of the firm's resources and motivation of the staff to achieve objectives.

The way in which the strategy is implemented can have a significant impact on whether it will be successful. In a large company, those who implement the strategy likely will be different people from those who formulated it. For this reason, care must be taken to communicate the strategy and the reasoning behind it. Otherwise, the implementation might not succeed if the strategy is misunderstood or if lower-level managers resist its implementation because they do not understand why the particular strategy was selected.

Evaluation & Control

The implementation of the strategy must be monitored and adjustments made as needed.

Evaluation and control consists of the following steps:

1. Define parameters to be measured
2. Define target values for those parameters
3. Perform measurements
4. Compare measured results to the pre-defined standard
5. Make necessary changes

Benefits of Strategic Planning

The volatility of the business environment causes most firms to adopt reactive strategies and not proactive ones. However, reactive strategies are short-term, causing firms to spend a significant amount of resources and time. Strategic planning helps firms prepare beforehand; it lets the company initiate influence instead of just responding to situations.

1. Helps formulate better strategies using a logical, systematic approach

It is still the most important benefit. Some studies show the strategic planning process makes a significant contribution more than the decision itself.

2. Enhanced communication between employers and employees

Communication is crucial to the success of the strategic planning process. It is initiated through participation and dialogue among the managers and employees, which shows their commitment to achieving organizational goals.

Strategic planning also helps managers and employees to show commitment to the organization's goals. It is because they know what the company is doing and the reason behind it. Strategic planning makes organizational goals and objectives real as the employees can understand the relationship between their performance and compensation. As a result, both the employees and managers become innovate and creative, which fosters the growth of the company further.

3. Empowers the individuals working in the organization

The increased dialogue and communication across all the stages of the process strengthens the employee's sense of effectiveness, initiative-taking, and imagination. It explains the need for companies to decentralize the strategic planning process by involving lower-level managers. A good example is that of Walt Disney Co., which dissolved the strategic planning department and assigned the roles to Disney business divisions.

Strategic Planning – Importance

Strategic planning offers the following benefits:

1. Financial Benefits:

Firms that make strategic plans have better sales, lower costs, higher EPS (earnings per share) and higher profits. Firms have financial benefits if they make strategic plans.

2. Guide to Organisational Activities:

Strategic planning guides members towards organisational goals. It unifies organisational activities and efforts towards the long-terms goals. It guides members to become what they want to become and do what they want to do.

3. Competitive Advantage:

In the world of globalisation, firms which have competitive advantage (capacity to deal with competitive forces) capture the market and excel in financial performance. This is possible if they foresee the future; future can be predicted through strategic planning. It enables managers to anticipate problems before they arise and solve them before they become worse.

4. Minimises Risk:

Strategic planning provides information to assess risk and frame strategies to minimise risk and invest in safe business opportunities. Chances of making mistakes and choosing wrong objectives and strategies, thus, get reduced.

5. Beneficial for Companies with Long Gestation Gap:

The time gap between investment decisions and income generation from those investments is called gestation period. During this period, changes in technological or political forces can disrupt implementation of decisions and plans may, therefore, fail. Strategic planning discounts future and enables managers to face threats and opportunities.

6. Promotes Motivation and Innovation:

Strategic planning involves managers at top levels. They are not only committed to objectives and strategies but also think of new ideas for implementation of strategies. This promotes motivation and innovation.

7. Optimum Utilisation of Resources:

Strategic planning makes best use of resources to achieve maximum output.

General Robert E. Wood remarks, “Business is like war in one respect. If its grand strategy is correct, any number of tactical errors can be made and yet the enterprise proves successful.” Effective allocation of resources, scientific thinking, effective organisation structure, co-ordination and integration of functional activities and effective system of control, all contribute to successful strategic planning.

Limitations of Strategic Planning:

1. Lack of knowledge:

Strategic planning requires lot of knowledge, training and experience. Managers should have high conceptual skills and abilities to make strategic plans. If they do not have the knowledge and skill to prepare strategic plans, the desired results will not be achieved. It will also result in huge financial losses for the organisation. This limitation can be overcome by training managers to make strategic plans.

2. Interdependence of units:

If business units at different levels (corporate level, business level and functional level) are not coordinated, it can create problems for effective implementation of strategic plans.

3. Managerial perception:

In order to avoid developing risky objectives and strategies which they will not be able to achieve, managers may land up framing sub-optimal goals and plans. Sometimes, short-term commitments also defer making long-term strategies.

4. Financial considerations:

Strategic planning requires huge amount of time, money and energy. Managers may be constrained by these considerations in making effective strategic plans. These limitations are by and large, conceptual and can be overcome through rational, systematic and scientific planning. Researchers have proved that companies which make strategic plans outperform those which do not do so.

Project planning

Project planning is a discipline for stating how to complete a project within a certain timeframe, usually with defined stages, and with designated resources. One view of project planning divides the activity into:

- Setting objectives (these should be measurable)
- Identifying deliverables
- Planning the schedule
- Making supporting plans

Supporting plans may include those related to: human resources, communication methods, and risk management.

Stages in Project Planning

In brief, the five stages of project management are:

Project Initiation

Project Planning

Project Execution

Project Monitoring

Project Closure

Though all of these different phases are a lot more detailed, at the most basic level, if a project manager is starting out and wondering how to structure their project they can just ask, “what are the five stages of project management?” and then plot their course following this outline.

Project Initiation

The first of the project management stages is all about giving the project a relatively broad definition and establishing whether or not it is feasible. The stakeholders responsible will usually use two methods to decide whether or not the project gets the go-ahead:

Business Case Document: This will set out the justification for the project in terms of what the organization needs, how it will benefit them and produce potential financial profit.

Feasibility Study: This document assesses the resources necessary for the project to be completed and compares them to what the organization has available. In this way the project is judged on its timeline and cost and whether it is the right option for the organization.

If the project passes these two checks, then the next part of the initiation phase is drawing up a project charter or project initiation document (PID) to give a summary of the project's objectives, the stakeholders involved and its business case.

Project Planning

In the project planning stage, a more in-depth outline of the project's goals and requirements is created. This is where a project manager really brings their skills to bear. Project planning includes:

Defining the scope of the project

Identifying what exactly needs to be done

Finalizing the timeline for deliverables

Organizing a work flow schedule

Assessing and arranging necessary resources

Just as it is vital for a PM to know what the five stages of project planning are, it is during the project planning phase that your team will be given their roadmap of what's required for project success.

Project Execution

This is the beginning of the creative stage, where the carefully laid project plans are turned into tangible deliverables. There will usually be a kick-off meeting to give everyone an overview of what their objectives are and after which, each team member will be aware of what is expected of them.

For you and your team, project execution includes:

Creation of individual task strands

Procuring required resources

Assigning tasks to team members

Executing assignments

Providing deliverables within deadlines

Updating project progress

Project Monitoring

The project manager is a key point of contact between the project team working at the "coalface" and the other stakeholders who are more removed from the day-to-day details of what's happening. For this reason and to make sure that everything is progressing as it should, a project manager needs to be able to effectively measure and communicate project progress.

There are several metrics or Key Performance Indicators (KPIs) which can be used to monitor a project's performance, such as adherence to timelines, keeping to the planned budget, success of deliverables and many others. Any combination of these can be used, but the most important thing is that they are measurable and used consistently so stakeholders can easily understand how the project is going at a glance.

Project Closure

This is the last of the project management stages, when the final deliverables are handed over or go live. This stage provides you, your team and stakeholders with an opportunity to evaluate how successful the project was and what lessons were learned during the process. It is also wise to create an ongoing process to capture this knowledge and formally and feed it back into your project management system. Tools that give you an audit trail and a way of recording what's taken place are useful for leveraging past projects and team efforts. Flexible systems that can easily incorporate change are especially powerful as they can be optimized quickly and immediately take advantage of new knowledge.

Following project closure, the resources of the project can be reassigned, and team assessments drawn up. Many project managers hold an official closing meeting or even a more informal closing party to congratulate the team.

OR

1. Project Initiation

Initiation is the first phase of the project lifecycle. This is where the project's value and feasibility are measured. Project managers typically use two evaluation tools to decide whether or not to pursue a project:

Business Case Document – This document justifies the need for the project, and it includes an estimate of potential financial benefits.

Feasibility Study – This is an evaluation of the project's goals, timeline and costs to determine if the project should be executed. It balances the requirements of the project with available resources to see if pursuing the project makes sense.

Teams abandon proposed projects that are labeled unprofitable and/or unfeasible. However, projects that pass these two tests can be assigned to a project team or designated project office.

2. Project Planning

Once the project receives the green light, it needs a solid plan to guide the team, as well as keep them on time and on budget. A well-written project plan gives guidance for obtaining resources, acquiring financing and procuring required materials. The project plan gives the team direction for producing quality outputs, handling risk, creating acceptance, communicating benefits to stakeholders and managing suppliers.

The project plan also prepares teams for the obstacles they might encounter over the course of the project, and helps them understand the cost, scope and timeframe of the project.

3. Project Execution

This is the phase that is most commonly associated with project management. Execution is all about building deliverables that satisfy the customer. Team leaders make this happen by allocating resources and keeping team members focused on their assigned tasks.

Execution relies heavily on the planning phase. The work and efforts of the team during the execution phase are derived from the project plan.

4. Project Monitoring and Control

Monitoring and control are sometimes combined with execution because they often occur at the same time. As teams execute their project plan, they must constantly monitor their own progress.

To guarantee delivery of what was promised, teams must monitor tasks to prevent scope creep, calculate key performance indicators and track variations from allotted cost and time. This constant vigilance helps keep the project moving ahead smoothly.

5. Project Closure

Teams close a project when they deliver the finished project to the customer, communicating completion to stakeholders and releasing resources to other projects. This vital step in the project lifecycle allows the team to evaluate and document the project and move on the next one, using previous project mistakes and successes to build stronger processes and more successful teams.

Although project management may seem overwhelming at times, breaking it down into these five distinct cycles can help your team manage even the most complex projects and use time and resources more wisely.

What Is Conceptual Design?

Conceptual design is the first step of the multiphase process involved in creating a new product. Whether it's a building, software application or gadget, it's important to come up with a general concept before proceeding. The conceptual design phase is immediately followed by the schematic design phase. Conceptual design involves a team convincing the project owner that the idea is worth pursuing. Schematic design means ensuring the concept as sold is actually feasible.

That doesn't mean that a team can't determine feasibility before attempting to sell the concept. In fact, often design teams are working from an initial project brief, and the concept stage involves gathering information and researching the market. Many project plans now combine the conceptual and schematic design phases using the term "concept" to describe this stage of project development.

What is conceptual design?

Basically, conceptual design is the very first stage of the product design process, where drawings and other illustrations or models are used. It serves to provide a description of the proposed product, in terms of a set of integrated ideas and concepts about what it should do, behave and look like in a way that is understandable for users. It is the design of interactions, experiences, processes and strategies and is the point at which people, knowledge, products, services, processes, and profitability meet vision and endless possibilities, each acting as a distinct color on the canvass of the designer. It's grounded in more abstract thinking until a detailed design is ready to be created.

Tasks In Conceptual design of a system:

In the conceptual design, the feasibility of meeting the management objectives for the MIS is assessed and a broad picture of the system is analyzed. It involves the following steps:

1) Define problem:

The first step in conceptual design is to clearly understand and define the problem to be solved. The information needs of the organization are to be identified and understood in this step, which can be determined by understanding the mission, objectives and operating plans for the business.

2) Set system objectives:

System objectives should be stated in quantitative terms. For example, 'pay salary to 100 percent employees by the last day of the month'.

3) Identify constraints:

System constraints may be classified into two categories:

a) External constraints

These are external to the organization. For example constraints imposed by the customers, the government and the suppliers.

b) Internal constraints

These are imposed from within the organization. For example, non-cooperation and lack of support from top management, resource constraints like manpower, time and money etc.

4) Determine information needs:

For determination of information needs, users should specify:

a) What they want out of an information system and

b) Items of information that are needed to achieve the predetermined objectives.

5) Determine information sources:

Sources of information may be classified as given below:

a) Internal and external records:

The internal records may be in written form like files, inputs and outputs, correspondence, reports etc., whereas external records may include trade publications, government statistics, etc.

b) Managers and operating personnel:

User-managers and operating staff may be an important source. However, gathering data from the source involves interviewing the managers and operating personnel, which requires proper planning and skill.

6) Develop various designs:

More than one alternative conceptual designs are to be developed which are compared to select the optimum one, which:

a) Meets the requirements of the users/organizations and

b) Is cost effective

Various criteria can be adopted as a basis for evaluating the designs such as economic, performance, operational etc.

7) Documentation of the conceptual design:

The documentation involves:

a) Overall system flow

b) System inputs

c) System outputs, and

d) Other documentations like activity sheet and system description, etc.

8) Report preparation:

The report prepared should mention the problem, objectives and an overall view of the system. Justifications for selecting the alternatives and many more.

Conceptual Design Vs. Detailed Design in Product Development

During the product development process, the engineering services team will likely be dealing with both conceptual designs and detail designs. Understanding the difference between the two, and what their role is in the product design process, is critical to the success of bringing any product idea to life.

What is conceptual design?

Basically, conceptual design is the very first stage of the product design process, where drawings and other illustrations or models are used. It serves to provide a description of the proposed product, in terms of a set of integrated ideas and concepts about what it should do, behave and look like in a way that is understandable for users. It is the design of interactions, experiences, processes and strategies and is the point at which people, knowledge, products, services, processes, and profitability meet vision and endless possibilities, each acting as a distinct color on the canvass of the designer. It's grounded in more abstract thinking until a detailed design is ready to be created.

What is detailed design?

Detailed design is the phase where the design is refined and plans, specifications and estimates are created. Detailed design can include outputs such as 2D and 3D models, cost build up estimates, procurement plans etc. This phase is where the full cost of the project is identified in most cases. Detailed design is such a fundamental necessity to manufacturers that it exists at the intersection of many product development processes. Shortening product development lifecycles and increased product complexity, companies are feeling immense pressure to improve their detailed design process.

Detailed System Design

The main objective of the detailed system design is to prepare a blue print of a system that meets the goals of the conceptual system design requirements. Detailed system design involves the following phases.

Project planning and control.

Involve the user

Define the detailed sub-system.

Input/Output design.

Feedback form the user

Database design.

Procedure design.

Design Documentation

1) Project planning and control

In order to ensure an effective and efficient design of an MIS, it is very important that a detailed design process should in itself be considered a complete project. Therefore, the first step in the detailed design is planning and controlling, so that standards may be established and a proper follow-up is made. Some of the main points, which are important in planning and control of a detailed design, are given below.

Project planning

1. Formulate the project objectives.
2. Define the project tasks.
3. Prepare a network diagram of all events and activities so as to specify sequential and parallel events.
4. Schedule the work as per the requirements of the user.
5. Prepare a budget for the project.

Project control

Get a feedback of the actual performance of the project with respect to time, cost and work of the project and compare it with schedules, budgets and technical plans.

Take corrective action where required so as to maintain control.

2) Involve the user

System designers must inform the user regarding the new information system being developed and gain their support and acceptance. In this phase, users are assured that changes will benefit them or that they will not be at disadvantage because of the new system.

3) Detailed sub system definition

In detailed system design, every system needs to be broken down to ascertain all activities required and their respective inputs and outputs. In some of the cases, sub systems are broadly defined in the conceptual design phase, but at this stage they are specifically defined

to work out every detail concerning the sub-system. Decomposition of the system to operational activities in general is carried out as follows.

System

Sub System

Functional component

Task

Sub Task

Operation element

4) Output/Input Design

Having defined the subsystem well, by way of flow diagrams and a through discussion with the users of MIS, the system designers now define the specifications of outputs and inputs for each sub-system, in more detail. These specifications will later be used by programmers to develop programs to actually produce the output/input.

5) Feedback from the user

Having specifically defined sub-system, output and inputs, the designers once again involve the user to get feedback. This step will increase the acceptance of the MIS being designed. The system analyst should demonstrate the proposed MIS to the users of the system/sub-system. This step will also reassure the top management of the user organization that the detailed design project is processing as per plans.

6) Database design

A database is an orderly arrangement of all the records related to each other. It servers as a data resource for the MIS of an organization. To have optimum performance, storage and fast retrieval of data, database design is an important phase in the detailed design of a system. For designing a database, the designer should keep the following points in mind.

Identify all data tables and record types.

Identify fields for each table, the key fields for each table and relations between various tables.

Determine the data type and width for each field of the tables.

Normalize the data tables.

Properly document data dictionary.

7) Procedure design

Procedures are the rules, standards or methods designed to increase the effectiveness of the information system. The procedures detail about the tasks to be performed in using the system. They serve as the ready recovers for the designers as well as for the users. Sometimes they perform the task of a supervisor over operators. There are a wide variety of procedures, which include:

Data entry procedures.

Run time procedures.

Error handling procedures.

Security and back up procedures.

Software documenting procedures.

In designing procedures, designers should:

Understand the purpose and quality standards of each procedures

Develop a step-by-step direction for each procedure, and

Document all the procedures.

8) Design Documentation

Detailed design starts with the performance specifications given by the conceptual design and ends with a set of design specifications for the construction of MIS. The outputs from the detailed design, i.e. design specifications, are handed over to the programmers for writing codes to translate system specifications into a physical MIS. Therefore, the system analyst should very carefully document the detailed design. In fact, design documents should consist of comprehensive details of all the design phases. Design documentation of detailed design report, generally, consists of

System objectives,

Design constraints,

Inputs/outputs,

Data files,

Procedures (manuals)

Proposed system (a summery and detailed flow charts),

Input/Output specifications,

Program specifications,

Database specifications,

Cost of installation and implementation, and

System test conditions.

Hardware Selection Criteria

- Hardware must support current software as well as software planned for procurement over the next planning interval [year, 18 months, three years]
- Hardware must be compatible with existing or planned networks
- Hardware must be upgradeable and expandable to meet the needs of the next planning interval
- Hardware warranties must be of an appropriate length
- Hardware maintenance must be performed by [local/remote vendor, in-house personnel]
- Whenever feasible, hardware standards will dictate procurement of like brands and configurations to simplify installation and support
- Routine assessments of installed infrastructure will feed an upgrade/replace decision process

Software Selection Criteria

- Software must be compatible with current and future hardware over the next planning interval
- Software maintenance and warranties must be of appropriate length and cost
- Sotware help desk must be maintained by [vendor, third party, in-house personnel]
- Software must be standardized throughout the business to improve purchasing power, simplify training, and facilitate support
- Software must comply with current standards set by technology leadership
- Software must support and enhance business goals

In addition to these hardware and software selection criteria, StratVantage will evaluate the proposed vendors on several criteria, including:

Stability — Vendor's attributes such as length of operations, size of customer base, size of income and revenue, company size, leadership, stock history and more can affect a technology purchasing decision

Proven Track Record — A vendor's experience not only in the broader market but in your business' specific industry can be key

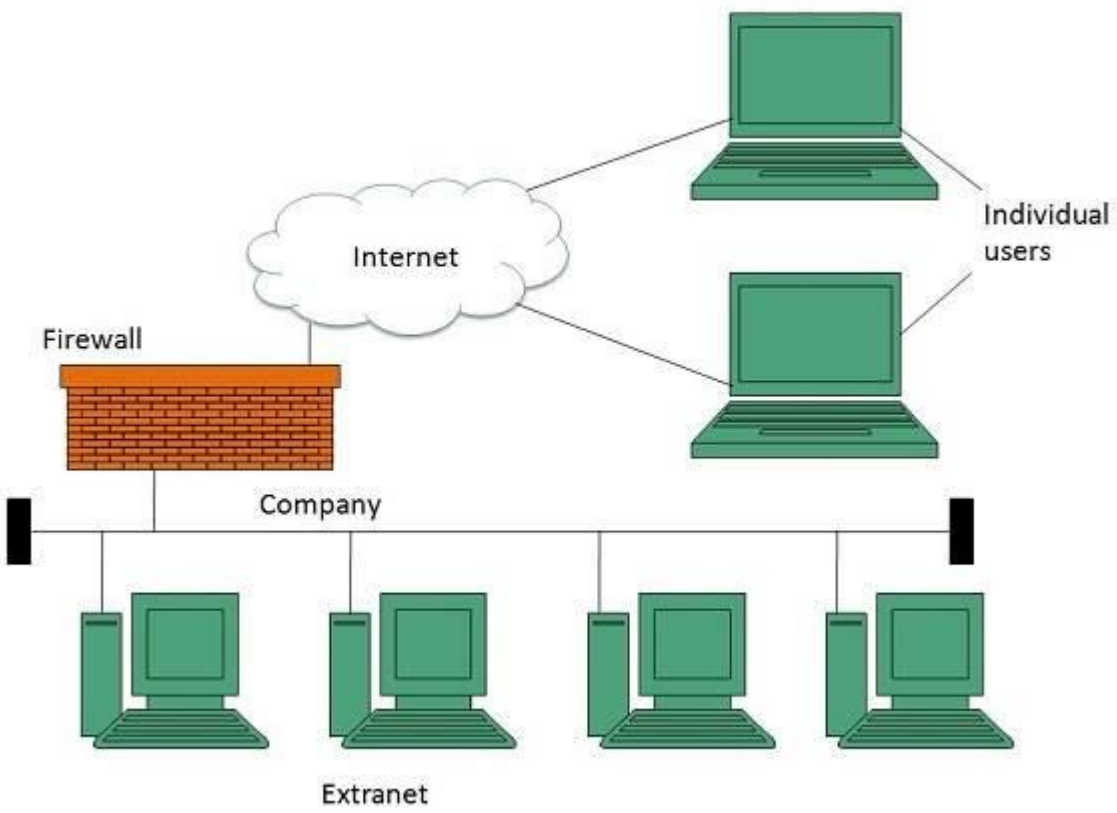
Business Model Fit — If the vendor is offering, for example, software as a service, but your business isn't always Internet-connected, this business model mismatch could rule out the vendor

Mature Technology — You want to see continuity in the vendor's offerings. If the vendor has been through a series of acquisitions and is just now integrating new technology with an old line of business, you may want to obtain assurances on the longevity of the vendor's solution.

Service Level Agreements — Unfortunately, most vendor Service Level Agreements (SLAs) aren't worth the paper they are printed on. We'll help you understand the vendor's SLA and negotiate a service level partnership instead.

Extranet

Extranet refers to network within an organization, using internet to connect to the outsiders in controlled manner. It helps to connect businesses with their customers and suppliers and therefore allows working in a collaborative manner.



OR

Extranet

An extranet is a private network that uses Internet technology and the public telecommunication system to securely share part of a business's information or operations with suppliers, vendors, partners, customers, or other businesses. An extranet can be viewed as part of a company's intranet that is extended to users outside the company. It has also been described as a "state of mind" in which the

Internet is perceived as a way to do business with other companies as well as to sell products to customers.

An extranet requires security and privacy. These can include firewall server management, the issuance and use of digital certificates or similar means of user authentication, encryption of messages, and the use of virtual private networks (VPNs) that tunnel through the public network.

Data mining

Data mining is the process of sorting through large data sets to identify patterns and establish relationships to solve problems through data analysis. Data mining tools allow enterprises to predict future trends.

OR

Definition - What does Data Mining mean?

Data mining is the process of analyzing hidden patterns of data according to different perspectives for categorization into useful information, which is collected and assembled in common areas, such as data warehouses, for efficient analysis, data mining algorithms, facilitating business decision making and other information requirements to ultimately cut costs and increase revenue.

Data mining is also known as data discovery and knowledge discovery.

Difference between Unit Testing and Integration Testing

Unit Testing:

Unit Testing is defined as a type of software testing where individual components of a software are tested.

Unit Testing of software product is carried out during the development of an application. An individual component may be either an individual function or a procedure. Unit Testing is typically performed by the developer. It is a testing method using which every independent modules are tested to determine if there are any issue by the developer himself.

Integration Testing:

Integration testing is the process of testing the interface between two software units or modules. Its focus is on determining the correctness of the interface. The purpose of the integration testing is to expose faults in the interaction between integrated units. Once all the modules have been unit tested, integration testing is performed.

Difference between Unit and Integration Testing:

UNIT TESTING	INTEGRATION TESTING
In unit testing each module of the software is tested separately.	In integration testing all modules of the the software are tested combined.

UNIT TESTING	INTEGRATION TESTING
In unit testing tester knows the internal design of the software.	In integration testing doesn't know the internal design of the software.
Unit testing is performed first of all testing processes.	Integration testing is performed after unit testing and before system testing.
Unit testing is a white box testing.	Integration testing is a black box testing.
Unit testing is basically performed by the developer.	Integration testing is performed by the tester.
Detection of defects in unit testing is easy.	Detection of defects in integration testing is difficult.

UNIT TESTING	INTEGRATION TESTING
It tests parts of the project without waiting for others to be completed.	It tests only after the completion of all parts.
Unit testing is less costly.	Integration testing is more costly.

Differences between Verification and Validation

Prerequisite – Verification and Validation

Verification is the process of checking that a software achieves its goal without any bugs. It is the process to ensure whether the product that is developed is right or not. It verifies whether the developed product fulfills the requirements that we have. Verification is static testing.

Verification means Are we building the product right?

Validation is the process of checking whether the software product is up to the mark or in other words product has high level requirements. It is the process of checking the validation of product i.e. it checks what we are developing is the right product. it is validation of actual and expected product. Validation is the dynamic testing.

Validation means Are we building the right product?

The difference between Verification and Validation is as follow:

VERIFICATION	VALIDATION
It includes checking documents, design, codes and programs.	It includes testing and validating the actual product.
Verification is the static testing.	Validation is the dynamic testing.

VERIFICATION	VALIDATION
It does *not* include the execution of the code.	It includes the execution of the code.
Methods used in verification are reviews, walkthroughs, inspections and desk-checking.	Methods used in validation are Black Box Testing, White Box Testing and non-functional testing.
It checks whether the software conforms to specifications or not.	It checks whether the software meets the requirements and expectations of a customer or not.
It can find the bugs in the early stage of the development.	It can only find the bugs that could not be found by the verification process.

VERIFICATION	VALIDATION
The goal of verification is application and software architecture and specification.	The goal of validation is an actual product.
Quality assurance team does verification.	Validation is executed on software code with the help of testing team.
It comes before validation.	It comes after verification.

Difference between Testing and Debugging

Here you will learn about difference between testing and debugging.

Testing is a process of finding bugs or errors in a software product that is done manually by tester or can be automated.

Debugging is a process of fixing the bugs found in testing phase. Programmer or developer is responsible for debugging and it can't be automated.

Lets differentiate both terms in tabular form.

Difference between Testing and Debugging

Testing	**Debugging**
The purpose of testing is to find bugs and errors.	The purpose of debugging is to correct those bugs found during testing.
Testing is done by tester.	Debugging is done by programmer or developer.
It can be automated.	It can't be automated.
It can be done by outsider like client.	It must be done only by insider i.e. programmer.

Most of the testing can be done without design knowledge.	Debugging can't be done without proper design knowledge.

OR

When it comes to software testing, the battle between tester and developer is never-ending due to the different approaches to perfect product definition. Testing and debugging become the "weapons" that are used in that endless battle. But in fact, these terms are usually mistaken to be the same.

In order to provide you a deeper view of the distinctions between them, in this article, we will be talking about the differences between testing and debugging and some tips that can help you get eager to debug more effectively.

1. The Differences Between Testing and Debugging

What Is Testing?

Basically, testing is a process of exploring the system to find defects present in the software, and not only that, this process has to locate the defects and define what will happen once these defects occur. This process is performed in the testing phase by testing team, and after this phase, they will report to the developer team to debug.

Some popular testing tools: Selenium, Katalon Studio, TestComplete…

What Is Debugging?

Once Development team received the report from the testing team, they will start debugging. The purpose of this phase is to locate the bug and rids the software of it. It is a one-off process and is done manually. In this process, a special tool called debugger is used in locating the bugs, most of the programming environments have the debugger.

Some popular Debugger tools: WinDbg, OllyDbg, IDA Pro,…

Testing	**Debugging**
Performed by testers	Performed by developer or development team
Can be done manually or automatically	Can only be done manually
Can be predefined when starting testing. The test result could be predicted	Start with unknown conditions and it is hard to predict the result
Find the programming failure	Demonstrate that it's only an unattended small mistake
Could be done automatically by using automated testing tools	Automatic debugging of software is still a dream of programmers

The purpose is to find the bug	The purpose is to find the cause of a bug

Gantt chart

A Gantt chart is a horizontal bar chart. Frequently used in project management, a Gantt chart provides a graphical illustration of a schedule that helps to plan, coordinate, and track specific tasks in a project.

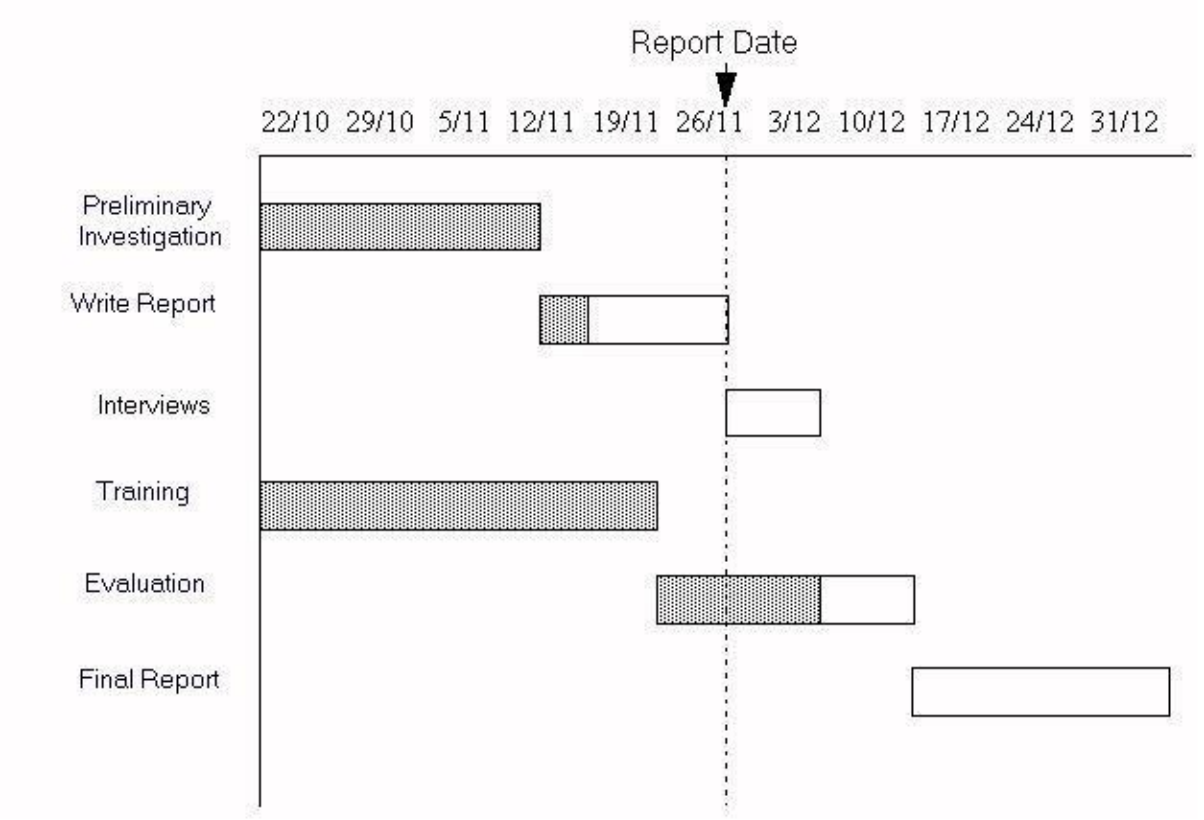


Figure 1: Gantt Chart

Gantt charts may be simple versions created on graph paper or more complex automated versions created using project management applications such as Microsoft Project or Excel.

A Gantt chart is constructed with a horizontal axis representing the total time span of the project, broken down into increments (for example, days, weeks, or months) and a vertical axis representing the tasks that make up the project (for example, if the project is outfitting your computer with new software, the major tasks involved might be:

conduct research, choose software, install software). Horizontal bars of varying lengths represent the sequences, timing, and time span for each task. Using the same example, you would put "conduct research" at the top of the verticle axis and draw a bar on the graph that represents the amount of time you expect to spend on the research, and then enter the other tasks below the first one and representative bars at the points in time when you expect to undertake them. The bar spans may overlap, as, for example, you may conduct research and choose software during the same time span. As the project progresses, secondary bars, arrowheads, or darkened bars may be added to indicate completed tasks, or the portions of tasks that have been completed. A vertical line is used to represent the report date.

Important questions

Unit-1

Q. What is management information system? Characteristics of Effective MIS?

Q. Classical theory and contingency theory

Q Impact of MIS

Q Organizational Behaviour? Benefits of organizational study

Q Pros and cons of mis

Unit-2

Q What do you understand by information system? Explain DSS

Q. Batch processing

Q. Online Analytical processing

Q Real Time Processing

Q. Distributed Processing

Q. What do you understand by DSS? Give main difference between MIS and DSS?

Q. Drawbacks of manual information system

Q. Describe the steps of conversion from manual to computerized system

Unit-3

Q. What is strategic planning? Importance of strategic planning?

Q. What are the different stages of project planning?

Q Conceptual System Design? Various Tasks performed during conceptual Design.

Unit-4

Q What do you understand by detailed design? Explain

Q. Elaborate the parameters of hardware selection

Q. Pitfalls of management information system?

4 marks questions

Data Dictionary

Dfd

Feasibility study

Extranet

Data mining

Components of computer

Conceptual vs detail system design

Unit vs Integration testing

Verification vs validation

Project Planning

Utility vs system software

Decision table vs decision tree

Gantt chart

THANK YOU