UNIT 1 OVERVIEW OF SYSTEM ANALYSIS AND DESIGN

Structure

1.0 INTRODUCTION

The study of "SYSTEMS" is by no means a new or even recent endeavour. Systems have been in use for the last thousands of years. The Egyptians used bookkeeping system over 5000 years ago for keeping their accounts, while Phoenician astronomers tried to study the systems of stars for making predictions.

People freely talk of different types of system in their day to day life. However, we shall only concern ourselves with those systems which are of direct and immediate concern to a business in the processi'ng of information to generate useful and meaningful results for management. In other words, we can say that systems analysts will refer to the analysis of business systems.

Systems today are very helpful in running the business efficiently. But a system can function in an effective way only if the users such as the accountants, business manager and other responsible individuals within the company make it function in a proper way. Many times, managers are told that they only need to know how to retrieve required information, thus making them ignorant of the operations of the system as a whole. In accepting such advice, these managers are, in essence, relinquishing a substantial part of the control of the organisation to the system's designers. It is, therefore, necessary that these potential systems analysts should clearly understand many other things also such as what a system is, what its objectives are, what kinds of systems there are, what goes with their creation and maintenance, what are their costs and benefits and how to analyse and monitor systems.

1.1 OBJECTIVES

After going through his unit, you should bc able to:

- dcfinc system, systems study. systcms analysis and systems approach
- state the common characteristics in all the systcms
- describe the basic elcments in systems analysis
- classify different types of systems
- explain what is system devclopmcnt and what is system devclopmcnt life cycle
- illustrate the role of a systcms analyst

1.2 AN OVERVIEW

Systems analysis and design refers to the process of examining a business situation with the intent of improving it through better proccdurcs and methods. Systems devclopmcnt can generally be thought of as having two major components: Systems Analysis and Systcms Design. Systems design is the process of planning a new system or rcplacc or complement an existing system. But before this planning can bc done, wc must thoroughly understand the existing system and determine how computers can best bc used to make its operation more effective. Systems analysis, then, is the process of gathering and interpreting facts, diagnosing problems and using the information to recommend improvement to the system. In brief, we can say that analysis specifies what the system should do. Design states how to accomplish the objective.

1.2.1 What is a systcm?

The word "SYSTEM" covers a very broad spectrum of concepts. This is derived from the Greek word systema, which means an organised relationship among the functioning units or components. In our daily life, we come into contact with the transportation systcm, the communication systcm, the accounting system, the production systcm, the economic system and for over three decades, the computer systcm. Similarly, business systcms arc the means by which business organisations achieve their pre-determined goals. A business system combines policies, personnel, equipment and computer facilities to co-ordinate the activities of a business organisation. Essentially, a business system rcprcsents an organised way of achieving the pre-determined objective of an organisation.

There are various definitions of the word systcm, but most of them seem to have a common idea that suggests that a system is an orderly grouping of interdependent components linked together according to a plan to achicvc a specific goal. The word component may refer to physical parts (engines, wheels of car), managerial steps (planning, organising, controlling) or a subsystem in a multi-level structure. The components may be simple or complex, basic or advanced. They may be a single computer with a keyboard, memory and printer or a series of intelligent terminals linked to a mainframe. In either case, each component is part of the total system and has to do its own share of work lor the systcm to achieve the desired goal,

1.2.2 Systems study, Systems analysis and Systems approach

Systems study may be defined as "a study of the operations of a set of connected elcments and of the inter-connections between these elements". It shows clearly that one cannot ignore any part or element of a systcm without first finding out the effect that element has on the operation of h e systcm as a whole. Wc can understand this with the help of systems analysis.

There is a difference between "systems approach" and "systems analysis" also. The systems approach shows a set of procedure for solving a particular problem. It applies scientific methods to observe, clarify, identify and solve a problem with special care being taken to understand the inter- relatedness between elements and their systcm characteristics. However, systems analysis is a management technique which helps us in designing a new systcm or improving an existing systcm.

1.2.3 Characteristics of a System

Based on the definition of a system, it is observed that following characteristics are present in all systems:

a) **Organisation**: Organisadon implies structure and order. It is the arrangcmcnt of components that helps to achieve objectives. In the design of a business systcm. for example, the hierarchical relationships starting with the president on top and leading downward to the blue-collar workers represents the organisation structure. Likewise a computer systcrn is dcsigncd around an input device, a central processing unit, an output device and one or more storage units. When these units are linked together, they work as a wholc system for generating information.

h) **Interaction**: Interaction refers to the procedure in which each component functions with other components of the system. In an organisation, for example, purchasing must interact with production, advertising with sales and payroll with personnel. In a computer systcm also, the central processing unit must interact with other units to solve a problem. In turn, the main memory holds program, and the data that the arithmetic unit uses for computation. The inter-relationship between these components cnablcs t. e computer to perform.

c) Interdependence: Interdependence means that component of the organisation or computer systcm dcpcnd on one another. They are coordinated and linked together in a planned way to achieve an objcctivc.

d) Integration: Integration is concerned with how a system is tied together. It is more than sharing a physical part or locations. It mcans that parts of the systcm work together within the systcm cvcn though each part performs a unique function. Successful integration will typically produce a bcttcr result as a whole rather than ifcach component works independently.

c) Central Objective: Central objcctivc is the last characteristic of a systcrn. Objectives may bc real or stated. Although a stated objective may be the real objcctivc, it is quite common that 'organisationmay set one objcctivc and operate to achicvc another. The important point is that users must bc aware about the central objective well in advance.

1.2.4 Elements of Systems Analysis

There arc four basic elements in systems analysis. Brief description of each element has been given hclow:

a) Outputs: First of all, wc must dclcrminc what the objectives or goals arc, what do we intend to achieve, what is the purpose of our work; in othcr words, what is the main aim behind the systcm. Defining aim is very vital in system work. If we do not know where wc want to go, we will not know when wc have rcachcd there. Wc shall be unnecessarily wasting our time and energy in the process. Once we know our aim, wc can try to achieve it in the best possihlc way. The user department has to define thcsc objectives in terms of their needs. Thcsc bccomc the outputs which the systems analyst keeps into mind.

b) Inputs: Once wc know the output, wc can easily determine what the inputs should be. Somctimcs, it may happen that the required information may not bc readily available in the proper form. This may bc bccause of the existing forms arc not properly designed. Somctimcs, it may not bc possible to get the required information without the help of top management. If the information is vital to the systcm, wc should make all possible efforts to make it available. Sometimes, it might bc too costly to get the desired information. It would bc bcttcr in such cases to prepare a cost-benefit analysis lo convince the management of the necessity for acquiring the information. The essential clcmcnts of inputs arc:

i) Accuracy: If the data is not accurate, the outputs will be wrong.

ii) Timeliness: If data is not obtained in tirnc, the entire system falls into arrears.

iii) Proper format : The inputs must bc availablc in proper format.

iv) Economy: The data must be produced at the least cost.

c) Files: As the word implies files are used to store data. Most of the inputs necessary for the system may be historical data, or it may be possible that these are generated from within the system. These are stored in files either in terms of isolated facts or in large volumes.

d) **Processes:** Here we come to the details of how the inputs and files are converted into outputs. This involves the programs and the way in which data is processed through the computer. The processing involves a set of logical steps. These steps are required to be instructed to the computer and this is done by a series of instructions called "programs".

1.2.5 Types of Systems

Systems have been classified in different ways. Common classifications are:

i) Physical or abstract systems

ii) Open or closed syslcms

iii) Deterministic or probabilistic systems

iv) Man-made information systcms

(i) Physical or Abstract Systems: Physical systems are tangible entities that may be static or dynamic in operation. Abstract systems are conceptual or non-physical entities which may be as straightforward as formulasof relationships among sets of variables or models - the abstract conceptualization of physical situations.

(ii) Open or Closed Systems: An open systcm continually interacts with its environments. It receives inputs from and delivers outputs output to the outside. An information system belongs to this category, since it must adapt to the changing demands of the user. In contrast, a closed systcm is isolated from environmental influences. In reality completely closed systcms are rare.

(iii) Deterministic or Probabilistic Systems: A deterministic system is one in which the occurrence of all events is perfectly predictable. If we get the description of the system state at a particular time. the next state can be easily predicted. An example of such a systcm is a numerically controlled machine tool. Probabilistic systcm is one in which the occurrence of events cannot be perfectly predicted. An examplc of such a system is a warchousc and its contents.

(iv) Man-made Information Systems: It is generally bclicvcd that information reduces uncertainty about a state or event. For example, information that the wind is calm reduces the uncertainly that a trip by boat will be enjoyable. An information system is the basis for interaction between the uscr and the analyst. It determines the nature of relationship among decision makers. In fact, it may be viewed as a decision-centre for personnel at all levels. From this basis, an information system may be defined as a set of devices, procedures and operating systems designed around user-based criteria to produce information and communicate it to the uscr for planning, control and performance. Many practitioners fail to recognise that a business has several information systems; each is dcsigncd for a specific purpose. The major information systcrns arc :

- formal information systcms
- informal information systems
- computer based information system

A Formal information system is based on the organisation represented by the organisation chart. The chart is a map of positions and their authority relationships, indicated by boxes and connected by straight lines. It is concerned with the pattern of authority, communication and work flow.

An Informal information systcm is an employee-based system dcsigncd to meet personnel and vocational needs and to help in the solution of work-related problems. It also funnels information upward through indirect channels. In this way, it is considered to be a useful system because it works within tlic framework of the business and its stated policies

Third category of information systcrn dcpcnds mainly on the cornputcr for handling businccss applications. Syslcms analysts dcvclop scvcral different types of information systems to meet a variety of businccss needs. There is a class of systems known collectively as Computer Based Information Systems. As we have different types of transportation systems such as highway syslcms, railway syslcms and airline syslcms, cornputcr based information syslcms arc of too many types. They arc classified as;

- Transaction Processing Systems (TPS)
- Management Information Syslcms (MIS)

  Decision Support Syslcms (DSS)
- Office Automation Systems (OAS).

The figure 1.1 shows the organisation chart of computer based information system (CBIS) and figure 1.2 shows the hierarchical view of CBIS.

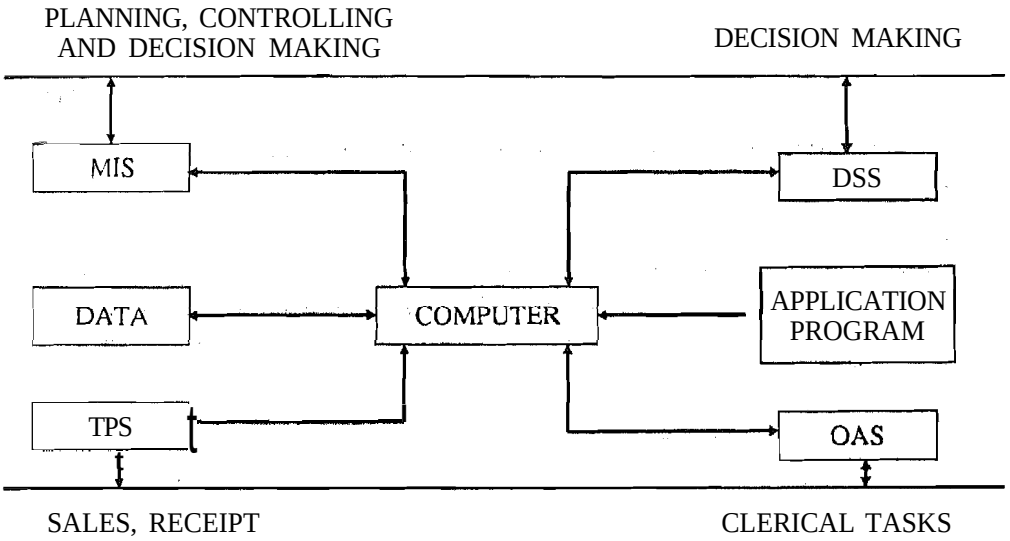

Figure **1.1:** CBIS in an Organisational Context

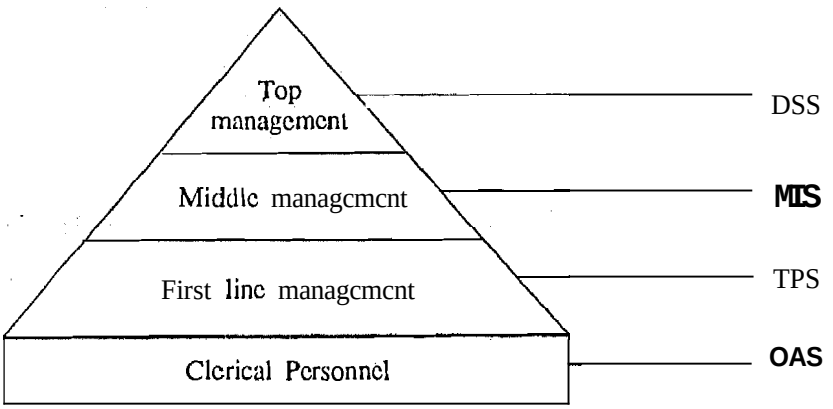

Figure 1.2: **The** Hierarchical **View of** CBIS

Transaction Processing Systems:

The most fundamental computer bascd system in an organisation pertains to the processing of businccss transactions. **A** transaction processing system can bc defined as a cornputcr based system that captures, classifies, stores, maintains, updates and retrieves transaction data for record keeping and for input to other types of CBIS. Transaction Processing Systems are aimed at improving the routine business activities on which all organisations depend. A transaction is any event or activity that affects the whole organisation. Placing orders, billing customers, hi Ang of cmployccs and depositing chcqucs are some of the common transactions. The types of transactions that occur vary from organisation to organisation.

But this is true that all organisations process transactions as a major part of their daily business activities. The most successful organisations perform this work of transaction processing in a very systematic way. Transaction processing systems provide speed and accuracy and can bc programmed to follow routines without any variance.

Management Information System:

Data processing by computers has been extremely effective because of several reasons. The main reason being that huge amount of data relating to accounts and other transactions can bc processed very quickly. Earlier most of the computer applications were concerned with record keeping and the automation of routine clerical processes. However, in recent years, increasing attention has been focussed on computer applications providing information for policy making, management planning and control purposes. MIS are more concemcd with management function. MIS can bc described as information system that can provide all levels of management with information essential to the running of smooth business. This information must be as relevant, timely, accurate, complete and concise as is economically feasibl

Decision Support Systems:

It is an information system that offers the kind of information that may not bc predictable, the kind that business professionals may need only once. These syslcms do not produce regularly scheduled management reports. Instcad, they arc designed to respond to a wide range of requests. It is true that all the dccisions in an organisation are not of a recurring nature. Decision support systems assist managers who must make dccisions that are not highly structured, often called unstructured or semi-structured dccisions. A dccision is considered unstructured if thcrc arc no clear procedures for making the dccision and if not all the factors to be considered in the dccision can bc readily identified in advance. Judgement of the manager plays a vital role in decision making where the problem is not structured. The decision support system supports, but docs not replace, judgement of manager.

Office .Automation Systems:

Office automation systems are among the newest and most rapidly expanding computer bascd information systems. They arc being dcvclopcd with the hopes and expectations that they will incrcasc the efficiency and productivity of office workers-typists, secretaries, administrative assistants, staff professionals, managers and the like. Many organisations have taken the first step toward automating their offices. Often this step involves the use of word processing equipment to facilitate the typing, storing, revising and printing of textual materials. Another dcvclopmcnt is a computcr bascd communications system such as clcctronic mail which allows people to communicate in an electronic mode through computer terminals. An office automation system can be described as a multi-function, integrated computer bascd system that allows many office activities to be performed in an electronic mode.

Categories of different information systems with their characteristics have been described briefly in table 1.1 :

Table 1.1 : Categories of **Information** Systems

Category of Information System	Characteristics
Transaction Processing System	Substitutes computcr-based processing for manual procedures. Deals with well structured routine processes. Includes record-keeping applications.
Managcmcnt Infonnation System	Provides input to be used in the managerial decision process. Deals with supporting well structured decision situations. Typical information requirements can be anticipated

Decision Support System	Provides information to managers who make judgements about particular situations. Supports decision makers in situations that are not well-structured.
Office Automation System	It is a multi-function, integrated computer based system, that allows many office activities to be performed in an electronic mode.

Check Your Progress 1

1. What is the basic difference between "systems approach" and "systems analysis"?

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2. What are the four basic elements in systems analysis?

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3. What is a Computer Based Information System?

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4. When is a decision considered to be unstructured?

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1.3 SYSTEM DEVELOPMENT LIFE CYCLE

System development, a process consisting of the two major steps of systems analysis and design, starts when management or sometimes system development personnel feel lhat a new system or an improvement in the existing system is required. The systems development life cycle is classically thought of as the set of activities that analysts, designers and users carry out to develop and implement an information system. The systems development life cycle consists of the following activities:

- Preliminary investigation
- Determination of system requirements
- Design of system
- Development of software
- Systems testing
- Implementation, evaluation and maintenance

1.3.1 Preliminary Investigation*

A request to take assistance from information systems can be made lor many reasons, but in each case someone in the organisation initiates the request. When the request is made, the first systems activity the preliminary investigation begins. This activity has three parts:

i) request clarification

ii) feasibility study

iii) request approval

Request Clarification: Many requests from employees and uscrs in the organisations are not clearly defined. Therelore, it becomes necessary that project request must be examined and clarified properly before considering systems investigation.

Feasibility Study: An important outcome of the preliminary investigation is the determination that system requested is feasible. There are three aspects in the feasibility study portion of the preliminary investigation:

(i) Technical Feasibility: Can the work for the project be done with current equipment, existing software technology and available personnel? If new technology is needed, what is the likelihood that it can be developed?

(ii) Economic Feasibility: Are there sufficient benefits in creating the system to make the costs acceptable? Or, are the costs of not creating the system so great that it is advisable to undertake the project?

(iii) Operational Feasibility: Will the system be used if it is developed and implemented? Will there be resistance from uscrs that will undermine the possible application benefits?

The feasibility study is carried out by a small group of people who are Familiar with information systems techniques, understand the parts of the business or organisation that will be involved or affected by the project, and are skilled in the systems analysis and design process.

Request Approval: It is not necessary that all requested projects are desirable or feasible. Some organisations receive so many project requests from employees that only a few of them can be pursued. However, those projects that are feasible and desirable should be put into a schedule. In some cases, development can start immediately, although usually systems staff members are busy on other ongoing projects. When such situation arises, management decides which projects are most urgent and schedules them accordingly. After a project request is approved, its cost, priority, completion time, and personnel requirements are estimated and used to determine whcrc lo add it to any existing project list. Later on, when the other projects have been completed, the proposed application development can be initiated.

A further discussion on preliminary investigation is covered in section 2.5 of unit 2.

1.3.2 Determination of System Requirements

At the heart of systems analysis is a detailed understanding of all important facets of the business area under investigation. The key questions are:

What is being done?

How is it being done?

How frequently does it occur?

- How great is the volume of transactions or decisions?
- How well is the task being performed?
- Docs a problem exist?
- If a problem exists, how serious is it? What is the underlying cause?

To answer the above questions, systems analysts discuss with different category of persons lo

collect the facts about the business process and their opinions of why things happen as they do and their views for changing the existing process. During analysis, data are collected on the available files, decision points and transactions handled by the present system. Some tools are used in analysis like data flowdiagrams, interviews, on-site observations and questionnaires. Detail investigations also require the study of manuals and reports. Once the structured analysis is completed, analyst has a firm understanding of what is to be done?

1.3.3 Design of System

The design of an information system produces the details that clearly describe how a system will meet the requirements identified during systems analysis. Systems specialists often refer to this stage as logical design, in contrast to the process of developing program software, which is referred to as physical dcsign.

Systems analysts begin the design process by identifyingreports and other outputs system will produce. Then the specific data on each are pinpointed. The systems design also describes the data to bc input, calculated or stored. Individual data items and calculation proccdurcs are written in detail. Dcsigncrs select file structures and storage devices, such as magnetic disk, magnetic tape or even paper files. Proccdurcs thcy write tell how to process the data and produce the output. The documents containing the design specifications portray the dcsign in many different ways-charts, tables, and special symbols. The detailed design information is passed on to the programming staff for the purpose of software dcvclopment. Designers are rcsponsiblc for providing programmers with complete and clearly out lined software specificaitons.

1.3.4 Development of Software

Software dcvelopers may install purchased software or they may develop new, custom-designed programs. The choice dcpcnds on the cost of each option, the time available to develop software and the availability of programmers. Generally it has been observed that programmers arc part of permanent professional staff in a big organisation. In smaller organisation, without prograrnmcrs, outside programming services may be hired or retained on a contractual basis. Programmers arc also rcsponsiblc for documenting the program, providing an explanation of how and why certain procedures are coded in specific ways. Documentation is essential to test the program and carry on maintenance once the application has been installed.

1.3.5 Systems Testing

During systems testing, the system is used experimentally to ensure that the software does not fail. In other words, we can say that it will run according to its specifications and in the way users cxpcct. Special test data arc input for processing, and the results examined. A limited number of users may be allowed to use the system so that analyst can see whether thcy try to use it in unforeseen ways. It is dcsirablc to discover any surprises before the organisation implements the systcm and dcpcnds on it,

1.3.6 Implementation, Evaluation and Maintenance

Implementation is the process of having systems pcrsonncl check out and put new equipment into use, train users, install the new application and construct any files of data needed to use it. This phase is less creative than system dcsign. Depending on the size of the organisation that will be involved in using the application and the risk involved in its use, systcms dcvelopers may choose to test the operation in only one area of the firm with only one or two persons. Sometimes, thcy will run both old and new system in parallel way to compare the results. In still other situations, system developers stop using the old syslem one day and start using the new one the next.

Evaluation of the system is performed to identify its strengths and weaknesses. The actual evaluation can occur along any of the following dirnonsions:

(i) Operational Evaluation: Assessment of the manner in which the system functions, including case of use, response time, overall reliability and level of utilization.

(ii) Organisational Impact: Identification and measurement of benefits to the organisation in such areas as financial concerns, operational efficiency and competitive impact.

(iii) User Manager Assessment: Evaluation of the attitudes of senior and user manager within the organisation, as well as end-users.

(iv) Development Performance: Evaluation of the development process in accordance with such yardsticks as overall development time and effort, conformance to budgets and standards and other project management criteria.

Maintenance is necessary to eliminate errors in the working system during its working life and to tune the system to any variations in its working environment. Often small system deficiencies are found as a system is brought into operations and changes are made to remove them. System planners must always plan for resource availability to carry out these maintenance functions. The importance of maintenance is to continue to bring the new system to standards.

Check Your Progress 2

1. What are the activities which complete the system development life cycle ?

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2. In preliminary investigation three types of feasibilities are usually studied. Name those.

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3. What are the areas of operational evaluation ?

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4. Why is maintenance of a system necessary ?

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1.4 SOFTWARE CRISIS

The translation of a familiarity with computer hardware and software into the development of useful commercial or business information systems is not a straight-forward or intuitive task. For the last several decades, tens of thousands of people, usually very intelligent and talented have been involved in the building of computer systems. It is now well-known that the rate at which the hardware has been more and more accessible and at lower and lower prices, has created a matching demand for development of software in a similar scale. But the traditional intuitive and ad-hoc approach fails miserably when the quantities of data involved in information systems exceeds say, 10 MB. This is a typical figure at which systems start crossing the barriers of relatively simple and begin to enter the domain of significant complexity.

This has lead to the coining of the phrase "software crisis", and the search for methods and techniques to be able to cope with the ever expanding demands for software. The present course, which is an attempt Io teach the ingredients of a structured systems development methodology, and elsewhere in the programme there is a reference to the techniques of software engineering as well. Later on in the subsequent years of the MCA programme, you would also be exposed to a full course on Software Engineering.

However, it is still useful and desirable to have some feel for the kinds of problems which the programmer and the user faces and collectively perceive as the software crisis.

Software crisis can be broadly classified in the following major areas:

1.4.1 From Programmer's Point of View

The following types of problems may contribute in maximum cases to software crisis:

- Problem of compatibility .
- Problem of portability
- Problcm in documentation
- Problem in coordination of work of different people where a team is initiating to develop software.
- Problems that arise during actual run time in the organisation. Some time the errors are not detected during sample run.
- Problem of piracy of software.
- Customers normally expand their specifications after program design and implementation has taken place.
- Problcrn of maintenance in proper manner.

1.4.2 From User's Point Of View

There are many sources of problems that arise out of the user's end. Some of these are as follows:

- How to choose a software from total market availability
- How to ensure which software is compatible with his hardware specifications
- The customerised software generally does not meet his total requirements
- Problem of virus
- Problcm of software bugs, which comes to knowledge of customer after considerable data entry

  Certain softwares run only on specific operating system environment
- The problem of compatibility for user may be because of different size and density of floppy diskettes.
- Problem in learning all the facilities provided by the software because companies give only selective information in manual
- Certain software run and create files which expand their used memory spaces and create problem of disk management.
- Software crisis dcvclops when system memory requirement of software is more than the oxisting requirements and/or availability.

- Problem of different versions of software (user as well a operating system).
- Security problem for protected data in software.

1.5 ROLE OF A SYSTEMS ANALYST

1.5.1 Who is Systems Analyst?

A systems analyst is a person who conducts a study, identifies activities and objectives and determines a procedure to achieve the objectives. Designing and implementing systems to suit organisational needs are the functions of the systems analyst. He plays a major role in seeing business benefit from computer technology. The analyst is a person with unique skills. He uses these skills to coordinate the efforts of different type of persons in an organisation to achieve business goals.

1.5.2 What a Systems Analyst docs?

A system analyst carries out the following job:

(a) The first and perhaps most difficult task of systems analyst is problem definition. Business problems are quite difficult to define. It is also true that problems cannot be solved until they are precisely and clearly defined.

(b) Initially a systems analyst does not know how to solve a specific problem. He must consult with managers, users and other data processing professionals in defining problcms and developing solutions. He uses various methods for data gathering lo get the correct solution of a problem.

(c) Having gathered the data relating to a problem, the systems analyst analyses them and thinks of plan to solve it. He may not come up personally with the best way of solving a problem but pulls together other people's ideas and refines them until a workable solution is achieved.

(d) Systems analysts coordinate the process of developing solutions. Since many problcms have number of solutions, the systems analyst must evaluate the merit of such proposed solution before recommending one to the management.

(e) Systems analysts are often referred to as planners.. A key part of the systems analyst's job is to develop a plan to meet the management's objectives.

(f) When the plan has been accepted, systems analyst is responsible for designing it so that management's goal could be achieved. Systems design is a time consuming, complex and precise task.

(g) Systems must be thoroughly tested. The systems analyst often coordinates the testing procedures and helps in deciding whether or not the new system is meeting standards established in the planning phase.

1.53 Attributes of an effective Systems Analyst

Systems analyst must have the following attributes:

(a) Knowledge of people: Since a systems analyst works with others so closely, he or she must understand their needs and what motivates them to develop systems properly.

(b) Knowledge of Business functions: Asystems analyst must know the environment in which he or she works. He must be aware of the peculiarities of management and the users at his installation and realize how they react to systems analyst. A working knowledge of accounting and marketing principles is a must since so many systems are built around these two areas. He must be familiar with his company's product and services and management's policies in areas concerning him.

(c) **Knowledge of** Data processing principles: Most systems today are computer based. The systems analyst must fully aware about the potential and limitations of computers.

(d) **Ability** to **communicate:** As a coordinator, a systcms analyst must communicate properly with people of diffcrcnt levels within an organisation. Systems analyst must listen carefully lo what others say and integrate the thoughts of others into the systems development process.

(e) Flexibility: Systems analysts must be flexible in their thinking since they often do not get their own way. Diffcrent factions in an organisation have conflicting needs and most systems arc the result of compromise. The analyst's goal is to produce the system that will bc the best for his organisation. This requires an open mind and flexibility in his ideas.

(f) An analytical mind: It takes an unusual person to see through problems facing an organisation and develop solutions Lhat will work. Systems analysts often find themselves with more data than they can cope with. It requires an analytical mind to select pertinent data and concentrate on them in defining problems and forming solutions.

(g) Well **educated** with **sharp mind:** Systems analysts are called upon to work with people at all levels virtually in every aspect of business. They must know how to work with all of them and gain their confidence. Analysts must have sharp mind to learn quickly how people do their jobs and develop ways for them to do it better.

Check Your Progress 3

1. What do you understand by software crisis?

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2. Suppose a system memory requirement is more than the available memory size. Will you call it a software problem although the crisis is with the hardware? Why?

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3. Which is in your opinion the most difficult job of a system analyst?

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4. List three important attributes of a system analyst.

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1.6 SUMMARY

Before going to study Systems Analysis and Systcms Design, an initial overall idea should bc formed by the learner about what is a system, what are the characteristics of a systems,

what is systems approach, what is systems analysis and what is systems design, what are the different types of a systcm, etc. This unit provides an overview of systems, the components and activities in the life cyclc of a system development, what arc the various sources which contribute a software crisis, and in details a characteristic study of a systcm analyst's attributes, it's different jobs. After studying this unit, you might feel eager to go in details of systems analysis and design.

1.7 MODEL ANSWERS

Check Your Progress 1

1. The systems approach shows a set of procedure for solving a particular problcm. Systems analysis is a management technique which helps in designing a new systcm improving an existing systcm or solving a systcrn problem.

2. The four basic elements in systcrn analysis are: Outputs, Inputs, Files and Processes.

3. Systems analysts develop scvcral different types of informationsyslcms which depend mainly on the computers for handling businccss applications. This class of systems is known as Computer Based Information Systems.

4. A decision is considered unstructured if there arc no clear procedures for making the decision.

Check Your Progress 2

1. The following activities complete the life cyclc:

   (i) Preliminary investigation
   (ii) Determination of systcm requirements
   (iii) Design of systcm
   (iv) Development of software
   (v) Systems testing
   (vi) Implementation, evaluation and maintenance.

2. The three types of feasibilities studied in preliminary investigation are:

   (i) Technical feasibility
   (ii) Economic feasibility
   (iii) Operational feasibility.

3. Assessment of the manner in which the system functions, including case of use, response time, overall reliability and level of utilization.

4. . Maintenance of a system is necessary to eliminate errors in the working system during its working life and to take the system to all variations within the working environment.

Check Your Progress 3

1. There are many sources of problems arises out of the Programmer's end or user's end to the softwares on the systems. These contribute to software crisis.

2. Yes, it is also one kind of software problcm that arises from users' ends, because the available memory size is constant and known Io the system analyst.

3. The most difficult job of a system analyst is Problem- defining, as some business problems are quite difficult to define and no problcm can be solved until it is precisely defined.

4. There are many attributes a systems analyst should have.

Some of which are:

(a) Knowledge of business functions

(b) Knowledge of Data processing principles

(c) Ability Io communicate.

(d) Flexibility

(e) An analytical mind