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Systems Analysis & Design

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Ch:1 Introduction to information system development

1. What is system analysis and design?
2. System analyst's work
3. Who are the users?
4. Categories of information systems
5. System development strategies



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Que:1 Define: System Analysis & System Design

System analysis and design is a process of examining business organizations for their problems and to improve it through better and systematic procedure. System analysis design refers to bringing the solution using computer based information system.

The whole process is divided in two steps

1. System analysis
2. System design

System analysis involves following process

- Examining existing system
- Identifying problems
- Identifying requirements
- And specifying solutions

System design is a process of identifying input output requirements preparing forms, database design, file design and software design. Thus, it is a process of planning the new business information system.



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Que:2a Explain the functions of system analyst.

The System analyst has to perform various functions in development process. He coordinates all activities in project development. In addition to that, Information gathering is major function to know about the operations of organization. He is also expected to play role of problem solver as well as guide to his sub-ordinates. He is also involved with the legal aspect of contract signing and system standardization certification.

Defining Requirements:

By asking direct questions or by the interview the -system analyst has to find the need of the organization. He should understand the problems as well as the requirement of the user. This is the important and essential task of system analyst.

Fact Gathering:

Analyst has to find data facts. As well, analyst is responsible to take opinions of manager. He has to consult the lower level users to project level all the related persons to find their problems.

Analysis and Evaluation:

To know appropriate operations of the system, the system analyst has to make analysis. During this phase analyst has to understand requirements of the user and then after he evaluates collected information related to project.

Solves Problems:

The system analyst has to find many alternative solutions for different requirements of user. He suggests client best solution available for the problem. As a role he draws Up Specifications for the stated requirements:

- Draws precise and detailed specification of problem
- Maintains accounts of changes
- Collect specifications from user and transform it into real system

System Design and Implementation:

Identify information entities, objects and carry out the normalization and prepare design plan. Co-ordinate the work during development and design process with project related developers as well users. He has to supervise whole design and

implementation of the project as well as overall process of the system. At last, he looks forward to testing of the application.

Evaluation of design:

He has to prepare periodic evaluation plan of the project to achieve work completion in time frame. To evaluate the performance of the information system analyst coordinate with development team. He suggests as well as modifies the system as needed.



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Que:2b Role of System Analyst

The system analyst is a person, which has to work with the people related to system development. The system analyst should be a multifaceted personality. There are many characteristics, which the system analyst should possess. There is a wide roll, which can be played by system analyst during the system development process.

Following are various difference rolls, which is to be played by system analyst.

1. Change Agent
2. Architect
3. Motivator
4. Psychologist
5. Sales person
6. Monitor & investigator
7. Politician

1. Change Agent

The system Analyst has to be work for the organization, who want to change and improve their existing system may call system analyst. Thus, system analyst has to perform the roll of improver to solve the problem and to bring the change in client system.

There may be some resistance within the organization against expected change. Irrespective of this resistance, the system analyst has to convince for and to create positive environment. That is why he calls change agent.

2. Architect

The major roll of architect is to prepare the design according to the requirement of the customer. The system analyst is also expected to prepare the new system design as a solution of

organizational problem. He is expected to find the problem. He is expected to find the requirement of organization. He prepares the blue print of the whole design on the paper.

3. Motivator

The System analyst has to motivate the people of client organization, so they support to the system development without resistance. They can be explained about their benefit due to Information System. System analyst is the person who motivates system development team and co-ordinates for the same. He has role of motivator in bi-directional way.

4. Sales-Person

The Sales person has skill to sell any thing with the full satisfaction, of Customer. Same way the System analyst should have the skill to convince the customer, to identify the need of customer as well as to provide full satisfaction. Thus, he should have very good communication skill and convincing power about the benefits of Information System for client environment.

5. Psychologist

It is very important for system analyst to understand the human behavior. Thus, he should have the knowledge of Human psychology. Some person from organization may lie if he asked some questions, at this time system analyst should be able to identify that he is lying.



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6. Politician

The politicians are tactical speakers. They may lie, sometime they may reveal, sometime they may hide and sometime they may speak half-truth. They only think in terms of their advantage. The System analyst also possesses these qualities. For example He should not declare the information when it is Harmful to do so.

7. Monitor and Investigator

System analyst is leader of the team. He has to supervise whole process of system development. Thus, he has to be like monitor. He should have also very good investing ability. He must be able to derive from human being even through some is trying to hide.



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Que:3 Explain user and types of users.

The word "USER" refers to the person who may directly or indirectly using the information system. For example the managers and employees of organization are users of the system. There are various types of user, which can be classified as given below.

End user

Indirect user

Managers

Senior Managers

End users:

The people who are directly using the system are End users. To perform their day to day task they use information system. They are not information system specialist. They are just operators of the system. Some may use the system rarely where as some may be frequent user. For example, the customer of bank is an End user of an ATM (All Time Money) system.

Indirect users:

Some people may not be using system directly but they may take the benefit of information system. For example, the chief executive officer of any business organization may not use information system directly but the processed reports about the production of company can help him to take the decisions. Direct end user work for indirect users of the information system.

Managers:

Those who are involves in management activities are third type of users. They continuously use the system for day to day planning as well as other managerial functions.

Senior Managers:

Senior managers have big burden of responsibilities on their shoulder. The best management organization can improve very fast, thus senior managers are the persons who use information system for the development of organization.



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Que:4 What is an information system? Explain various categories of the information system.

AN INFORMATION SYSTEM:

One can use computers, when the complex problems of organization are required to solve. The computer system accept input data, process and provide useful information. Thus a system, which is capable of inputting, Processing, Outputting and storing useful information, is said to be an information system.

For example: A railway reservation system of Indian Railway can be called an information system. The data, Input, Output, Process, Feedback, and Information etc are the basis components of information system. There are various categories of information systems can be classified on basis of their nature or data gathering and their use. For different organizations, requirement of information system many vary. In broad, organizations look forward to information system when transaction to be process are too high, expect to manage day to day activity or to take decision on various matters. To classify information system we have three broad categories:

Transaction control system

β

Management information system

β

Decision support system

β

Every information system has its own benefit and usage. Let us take quick tour to each of them.

Transaction control system

β

The most fundamental Computer-based system in any organization is transaction control system. They are used to improve the routine business activities of organization. A transaction is daily event occurring in any organization. Common possible transaction can be listed as given below.

Depositing money in Bank

Placing Orders for material

Preparing Bills for Customers

The organization must be capable of handling all such operations in timely, organized and efficient manner. The basic transaction involve following activities.

- o Calculation,
- o Storage and retrieval
- o Sorting
- o Classification
- o Summarization

The Characteristics of all the transactions are same.

1. It is always of high volume.
2. All transactions are similar
3. The procedures for operating transactions are clear and well defined.

For example the routine procedure for handling Bank-account transactions like depositing and withdrawing money, paying cash, verifying signatures etc are same. The programs are written for automating these procedures. In any bank, the bank Computerized system will respond to different customer activities as shown below.



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Customer Activity System activity

1. Enter A/C No. Verify A/C No.
2. Enter Passwords Verify Passwords
3. Enter amount to withdraw and Update Verify the balance

Thus, TCS is very much helpful in performing speedy and accurate day-to-day stereotype operation.

MIS (Management Information System):

B

There are several managerial functions like planning, controlling, co-coordinating, motivating, staffing etc. To carry out all such managerially activities the information systems can be useful to managers. The system, which is built for this purpose is known as Management Information System.

For example: cash flow, monthly financial statements etc. are maintained by M.I.S.

D.S.S (Decision Support Systems):

B

The decisions making is also one of the most important activity of top level management. It is related to taking decisions and defining policies as a part of long-range planning and long term goals of organization. This type of activities can be carried out with the help of Decision Support Systems. For example: Any manufacturing plan to install or not



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Que:5 Discuss all Stages of SDLC.

System development life cycle (SDLC):

An information system is designed and developed to meet organizational needs. The whole design and development operation is done in several different steps. The various activities under all such steps

- Feasibility
- Study
- Requirement
- Analysis &
- Specification Design
- Coding
- &
- Unit
- Testing Integration
- & System
- Testing
- Implementation
- Fig 1.1 System Development Life Cycle**
- & Maintenance**

are carried out in fixed sequence and time. Thus, the total time required for system development beginning from initial investigation to implementation is said to be the life cycle of system development. The various activities of SDLC are carried out in sequence but in real application they may overlap. The whole SDLC process is shown graphically as given above.

First step in SDLC is to find the problem. Once the problem is realized, the process of SDLS starts. The system analyst is requested to have new system for solution. The system analysts then carry out the initial investigation to collect primary information about the organization and its problem.

Information Gathering & Feasibility Analysis:

The next stage is to collect detail information about the organization and to check the feasibility. There are various methods for information gathering like asking questions, questionnaire, Interview and on-site observations. Fact -about organization can be found by using above methods.



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The feasibility analysis is for checking possibilities of completion of project. There are three different ways feasibility is checked. It may be financial, operational or technical. All the three feasibility conditions must be satisfied.

Requirement Analysis and Specification:

System analysis is to find the problematic area. It is the approaches like —Where the problem is?— it includes learning about the existing system. It is a process of knowing the need of the organizations as well as operation of, the organization. So, it is a process of.

- < Examining existing system
- < Detection of problems.
- < Specifying solution

The various tools like DFD, Decision table, Decision tree, etc are used for the system analysis.

System Design:

System design is an actual plan of the system solution. In system design processes following activities has to be performed.

- o Identifying Inputs and Outputs of system.
- o Sketching and designing forms.
- o Describing and defining data types.

- o Design of hardware components.
 - o Development of software.
 - o File and database organization.
- The step of system design is an actual blueprint of the solution.

Coding:

This phase of system development life cycle performs system coding and decides method of coding to develop application. Various methods can be used to code software like function oriented software design and object oriented design. System analyst has to decide which coding method has to be adept. As well module level testing is also perform here in this stage.

System integration and Implementation:

System integration phase integrates different module developed individually to build one application. System implementation is transferring system from development site to client site. It includes

Connecting various hardware components.

Establishing computer network

Installation of various software.

Providing training to the user.

Thus it is a process of putting the whole system into action.



System Testing:

System testing is a process of detecting errors and correcting .it in newly designed system. Under this stage the debugging programs as well as the whole system performance testing is carried out. Various methods of testing are carried out during and after system development. Broadly they call as Black Box testing and White Box testing.

System Maintenance:

System maintenance is the process to remove the defects and problems in the working of System. The system maintenance may be adaptive. It is also used to

make the system modernized by making some positive changes to it. There are three kinds of maintenance taken into consideration are,

- Corrective maintenance
- Perfective maintenance
- Adaptive maintenance



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Review Questions

Sr. No Question

Marks

- 1 List out the steps of SDLC and explain each in short. 10
- 2 Distinguish between system Analysis & Design. 5
- 3 Define the term "System" and explain what is system analysis
5
and why it is required?
- 4 What is an information system? Discuss the characteristics of
10
computer based information system.
- 5 Explain: Quality of System.
5
- 6 What is an information system? Various categories of the
10
information system.
- 7 Categorize following Businesses in to related information system.
2
Billing to customer.
B
Installation of ATM machine at bank.
B
- 8 Explain the functions of system analyst 5



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Ch:2 Managing the application development portfolio

1. Reasons for project proposal
2. Sources of project request
3. Managing project review and selection
4. The project request
5. Preliminary investigation
6. Testing project feasibility



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Que:1 Reasons for project proposal.

General objective of the project proposals can be

-

Solve a problem: An activity, process or function that does not now or may not now or may not in the future meet performance standards or expectations unless remedial actions are taken.

Example: Reduce excessive data entry errors by eliminating the manual entry of sales details.

-

Capitalize on an opportunity: A change to expand or improve business performance and competitive achievements.

Example: Capture a large base of customers by offering a new airline frequent flier program focusing on discounted airfares.

-

Respond to a directive: An order, request, or mandate originating from a legislative or management authority to provide information, perform in a certain manner, or alter either information or performance.

Example: Report annually to the U.S. Internal Revenue Service, using prescribed formats, interest earned on savings, checking, and time deposit accounts.

To achieve above objectives, firms typically undertake projects for one or more of the following reasons is called the Five C's reasons for project proposal.

-

Capability

- o

Greater processing speed:

< The inherent speed with which computers process data is one reason why organizations seek the development of systems project. Computer-based systems can help eliminate the need for many tedious calculations or comparison of items.

< Using the computer's inherent ability to calculate, sort and retrieve data and information when greater speed than that of

people doing the same tasks is desired.

o

Increased Volume:

< Since information systems are an asset to the firm, they are often a primary consideration when growth and expansion are either anticipated or are already being experienced. An inability to keep up with order processing does not necessarily mean that the existing procedures are no longer being followed. They may simply be inadequate to meet the current expanded demand.

< Providing to take advantage of new business opportunities. Often a result of growth that causes business to exceed the capacities and procedures underlying the achievements to date.

o

Faster Information Retrieval:

< Locating and retrieving information from storage. Conducting complex searches.



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Communication

o

Enhanced Communication:

Lack of communication is a common source of difficulties affecting customers and employees alike. However, well-developed information systems both enhance communication and facilitate the integration of individual business functions. Speeding the flow of information and messages between remote locations as well as within offices. Includes the transmission of documents within offices.

o

Integration of Business Areas:

In business, activities often span several areas of the organization; work done in one area overlaps that taking place in another.

Manufacturing, for instance, is dependent on materials ordered by the purchasing department. To better coordinate operations, management often distributes reports about purchasing and manufacturing to both departments. Coordinating business activities taking place in separate areas of an organization, through capture and distribution of information.

-

Competitiveness

- o

Lock in Customers: Changing the relationship with and services provided to customers in such a way that they would not choose to change suppliers.

- o

Lock out Competitors: Reducing the likelihood that competitors will be able to enter the same market because of the way the organization uses information systems.

- o

Improve Arrangements with suppliers: Changing the pricing, service, or delivery arrangements, or relationship between suppliers and the organization to benefit the firm.

- o

New Product Development: Introducing new products with characteristics that use or are influenced by information technology.

-

Control

- o

Greater accuracy and improved consistency:

Carrying out computing steps, including arithmetic, correctly and in the same way each time.

- o

Better security:

Sometimes the fact that data can be stored in machine-readable form provides security that would be difficult to achieve in a non-computer environment. Safeguarding sensitive and important data in a form that is accessible only to authorized personnel.

-

Cost

Unknown or uncontrolled costs have put many organizations out of business and severely hampered the success of countless others.



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Information systems play an important role in both monitoring and reducing operation costs.

o

Cost Monitoring:

Tracking the cost of labor, goods, and facilities to determine how actual costs compare with expectations.

o

Cost Reduction:

Using computing capability to process data at a lower cost than possible with other methods, while maintaining accuracy and performance levels.



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Que: 2 Sources of project request

There are four primary sources of project requests. The requests inside the organization are department managers, Senior Executives, Systems Analysts and Outside Groups. In addition, government agencies outside the organization may request information systems projects. Depending on the request and the reason for it, requesters may seek either completely new applications or changes in existing ones.

1. Department Managers:

Frequently, persons who deal with day-to-day business activities, whether employees or managers, are looking for assistance within their departments.

For example, a business manager in a large medical clinic supervises the preparation of patient claim forms submitted to clinic supervisors. The preparation of patient claim forms submitted to insurance companies, which reimburse the clinic for medical care. Even though the business manager knows that preparing insurance claims is necessary to aid the patient and ensure that the clinic is reimbursed, he or she may be dissatisfied with the amount of time the staff devotes to the task, especially when much insurance information is already available in the patient's records. Pointing out the duplication of work, the bookkeepers express their desire to be free of the clerical tasks involved in processing claims.

After discussing the insurance problem with administrators in other clinics, the business manager asks the clinic's management committee to approve the development of a computer-based system for preparing insurance forms and maintaining patient records about insurance payments.

2. Senior Executives:

Senior Executives, such as presidents, board chairpersons, and vice presidents, usually have information about the organization, coupled with the broader responsibilities these executives assume influences the systems project requests they make. For example, the vice president for manufacturing who knows that an additional production plant will be built in another city within 2 years may want to launch a systems project to develop a centralized production planning system---

one that will enable management to plan manufacturing at both plants at the same time. This project spans several departments at two locations and involves many other managers.

Multi-department projects are also more difficult to manage and control, however. Departmental projects, in contrast, are more likely to be successful, especially if the actual users take an active role early in the project.

3. Systems Analysts:

Sometimes systems analysts see areas where projects should be developed and either write a systems proposal themselves or encourage a manager to allow the writing of a proposal on their behalf. For instance, an analyst who sees that a university's course-registration procedure is slow, error-prone, and generally inefficient may prepare project proposal for a new registration system. The



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request prescribes the development of a system that takes advantage of new easy-to-use data entry terminals to speed registration.

Normally, proposals for operating systems, such as those for course registration, are prepared by department managers. However, in this case, the analyst has information about new equipment and technology that makes a more efficient registration system possible.

Don't forget that systems analysts and developers can also be users themselves.

Project management systems, file monitoring packages, or programming library projects are typical of the application projects that systems personnel might request.

4. Outside Groups:

Developments outside the organization also lead to project requests. For example, government contractors are required to use special cost accounting systems with government-stipulated features. The internal revenue service requires organizations to keep careful payroll records and to account for employee income tax withheld. The internal revenue service also specifies the format for many of the tax documents that must be prepared; the employer has no choice in the matter.

Quite often, new demands from external groups bring about project requests,

either for new systems or changes in current ones. Projects originating from this source are just as important as those from within the organization.



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Que:3 Managing project review and selection

- a. Steering committee method
- b. Information system committee method
- c. User- group committee method

The decision to accept or reject request can be made in a number of different ways and by various members of the organization. The system analysts are not the final authority. One of the more common methods of reviewing and selecting projects for development is by committee.

Steering committee method

Steering committee is also called operating committee, operating councils or project selection board. The steering committee typically consists of key managers from various departments of the organization, as well as members of the information systems group. However, systems specialists do not dominate the committee. A typical seven- to ten-person committee would consist of the following membership:

1. Upper-management members:
 - a. Executive vice president
 - b. Vice president for manufacturing
2. Departmental management:
 - a. Manager or retail marketing
 - b. Credit manager
3. Technical Managers:
 - a. Manager of research and development
 - b. Quality control coordinator
4. Information systems group:
 - a. Data processing manager
 - b. Senior systems analyst

The committee receives proposals and evaluates them. The major responsibility of the committee is to make a decision, which often requires more information than the

proposal provides. This method brings high respectability and visibility to the review of project proposals. This method is often favored because systems projects are business investments. Management selects projects for development. Decisions are made on the basis of the cost of the project, its benefit to the organization, and the feasibility of accomplishing the development within the limits of information systems technology in the organization.

Information Systems committee method

In some organizations, the responsibility for reviewing project requests is assigned to a committee of managers and analysts in the information systems department. Under this method, all requests for service and development are submitted directly to a review committee within the information systems department. The information systems committee approves or disapproves projects and sets priorities, indicating which projects are most important and should receive immediate attention.

This method can be used when many requests are for routine services or maintenance on existing applications. System developers can have access



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to information about where the firm is moving overall- an important consideration for effective project selection.

User-Group Committee Method

Some organizations, hire their own analysts and designers, who handle project selection and carry out development. That means, departments form their own selection committees—user-group committees controlling what is developed and when it is implemented.

It has disadvantages for the users. For example, a number of small departments working independently toward the same goal could unknowingly waste resources and miss the opportunity to coordinate planning of a shared and integrated information system that could benefit the entire firm. A company's computer facilities can be unduly strained if the systems development team is not made aware of the future demands on the facilities that are being planned throughout the firm. Some user groups may find themselves with defective or poorly designed systems that require additional time and effort to undo any damage caused by the misinformation that such systems could generate.

Other Methods

Other approaches are also tried from time to time, although usually with much less success than the other methods. Some organizations have management planning committees that propose new projects, which are in turn evaluated by the systems department staff members. This method suffers from lack of user involvement, as well as limited insight into technology.

In still other cases, department managers are able to bypass the organizations' information systems departments to contract with independent systems companies, which handle all analysis and design work for projects. A disadvantage of this approach is the possibility that a department can sponsor the development of a system while the information systems group or upper management is completely unaware that a project is in the making.



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Que:4 The project request

In the proposal, the requester identifies where assistance is needed and gives details. A statement describing the significance of the problem or situation is also useful to the committee members, who want to know why the requester thinks the project is important.

What is the problem?

Details of problem

How significant is the problem?

What does user feel is the solution?

How information systems will help

Who else knows about this and could be contacted?

The following is the example of system project request.

What is the problem?

Inventory records are frequently inaccurate, causing shortages at manufacturing time and variances in cost of goods sold.

Details of problem

Quantity on hand and actual physical count records do not always match—no pattern appears evident. Sometimes quantity on record is high and other times it is low. The quantity should always agree if material requisitions are posted properly. The two

buyers usually ensure that enough material has been ordered and delivered on time.

How significant is the problem?

The shortage causes major problems. Sometimes we even have to shut down lines until emergency reorders are filled. Controller objects when costs become excessive at end of month. Inventory manager complains when books are out of agreement with her on-hand actual.

What does user feel is the solution?

We need to automate receiving, withdrawal, inventory records, and posting to eliminate arithmetic errors.

How information systems will help?

Cut down on arithmetic errors; also provide quicker information.

Who else knows about this and could be contacted?

Controller, Buyers, Manager of inventory.

Signed by Mfg. Manager



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Que:5 Preliminary investigation

A request to receive assistance from information systems can be made for many reasons, but in each case someone initiates the request. When that request is made, the first systems activity, the preliminary investigation begins.

This is advisable for all proposals to be submitted to the selection committee for evaluation to identify those projects that are most beneficial to the organization.

Scope of Study:

The purpose of the preliminary investigation is to evaluate project requests. It is not a design study, nor does it include the collection of details to completely describe the business system. Rather, it is the collecting of information that permits committee members to evaluate the merits of the project request and make an informed judgment about the feasibility of the proposed project.

Analysts working on the preliminary investigation should accomplish the following objectives.

1. Clarify and understand the project request.

What is being done? What is required? Why? Is there an underlying reason different from the one the requester identifies?

Example: the user justifies a request for developing an accounts receivable system on the basis of wanting faster processing. Lost checks, not speed of processing, are the real problems, but the requester has not described this specific need clearly.

2. Determine the size of the project:

Example: Does a request for a course-registration project call for new development or for modification of the existing system? The investigation to answer this question will also gather the details useful in estimating the amount of time and number of people required to develop the project.

3. Assess costs and benefits of alternative approaches:

Example: What are the estimated costs for developing a patient information system, as requested by the hospital's chief of staff? What expenses will be incurred to train medical and nursing personnel and install the system? Will the proposed system reduce operating costs? Is it likely that the cost of errors will decrease?

4. Determine technical and operational feasibility of alternative approaches:

Example: Does the necessary technology to link office word acquired? How workable is the request to enable administrative assistants to retrieve sales information from the main system and insert it directly into typewritten reports prepared on a word processor?

5. Report the findings to management, with recommendations outlining the acceptance or rejection of the proposal:



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Example: A proposal for the installation of an order entry system should be modified to allow all salespersons to submit their orders through ordinary telephone connections directly into the computer. The modification will improve the usefulness of the system and increase the financial benefits to the organization.

Conducting the investigation:

The data that the analysts collect during preliminary investigations are gathered through two primary methods: reviewing organization documents and interviewing selected company personnel.

< Reviewing Organization Documents:

The analysts conducting the investigation first learn about the organization involved in, or affected by, the project. Analysts can usually learn these

details by examining organization charts and studying written operating procedures. The procedures describe how the inventory process should operate and identify the most important steps involved in receiving, managing, and dispensing stock.

< Conducting Interviews:

To learn the complete details, analysts use interviews. Interviews allow analysts to learn more about the nature of the project request and the reason for submitting it. To accomplish the purpose of the interviews, analysts must be sure to emphasize the request and the problem it addresses. Interviews should provide details that further explain the project and show whether assistance is merited economically, operationally, and technically. Preliminary investigation interviews involve only management and supervisory personnel.



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Que:6 Write short note on feasibility study.

Preliminary investigations examine project feasibility; the likelihood the system will be useful to the organization. Three tests of feasibility are available.

1. Operational feasibility
2. Technical feasibility
3. Financial feasibility

•

Operational feasibility:

This test of feasibility asks if the system will work when it is developed and installed. Here are questions that will help test the operational feasibility of a project:

o

Is there sufficient support for the project from management? From users?

o

Are current business methods acceptable to the users?

o

Have the users been involved in the planning and development of the

project?

o

Will the proposed system cause harm? Will it produce poorer results in any respect or area? Will loss of control result in any area? Will accessibility of information be lost? Will individual performance be poorer after implementation than before? Will the system slow performance in any areas?

Issues that appear to be relatively minor in the beginning have ways of growing into major problems after implementation. Therefore, all operational aspects must be considered carefully.

•

Technical feasibility:

The technical issues usually raised during the feasibility stage of the investigation include these:

o

Does the necessary technology exist to do what is suggested?

o

Does the proposed equipment have the technical capacity to hold the data required to use the new system?

o

Will the proposed system provide adequate responses to inquiries, regardless of the number or location of users?

o

Can the system be expanded if developed?

o

Are there technical guarantees of accuracy, reliability, ease of access, and data security?

•

Financial feasibility:

The financial and economic questions raised by analysts during the preliminary investigation are for the purpose of estimating the following:

o

The cost to conduct a full systems investigation.



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o

The cost of hardware and software for the class of application being considered.

o

The benefits in the form of reduced cost or fewer costly errors.

o

The cost if nothing changes (i.e., the proposal system is not developed).

To be judged feasible, a project proposal must pass all these tests. Otherwise, it is not a feasible project.

Handling infeasible projects:

Not all projects submitted for evaluation and review are judged acceptable. Requests that fail to pass feasibility tests are not pursued further, unless they are reworked and resubmitted as new proposals. In some cases, only part of a project is actually unworkable, and the selection committee may decide to combine the workable part of the project with another feasible proposal.



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Review Questions

Sr. No Question

Marks

- 1 Write short note on feasibility study. 5
- 2 Explain various project review and selection committee method. 6
- 3 Define: Feasibility study
2
- 4 Project Request
2
- 5 What is preliminary investigation? Write in a brief. 10
- 6 What do you mean by Project Review and selection? List the
10
different methods of project selection. Explain any one of them.



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Ch:3 Tools for Determining systems requirements

1. Activities in requirement determination
2. Fact finding techniques
3. Tools for documenting procedures and decisions



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Q:1 Explain Activities in requirement determinations.

Ans: Requirements Determination involves studying the current business system to find out how it works and where improvements should be made. A requirement includes a way of capturing or processing data, producing information, controlling a business activity, or supporting management.

ACTIVITIES IN REQUIREMENT DETERMINATION:

1. Requirements anticipation:

Forecasting systems characteristics based on previous experience. May cause the analyst to investigate areas and issues that could otherwise be overlooked. May also introduce bias. Experience from previous studies can lead to investigation of areas that would otherwise go unnoticed by an inexperienced analyst. We will point out guidelines for structuring an investigation around basic questions to avoid the undesirable consequences of requirements anticipation.

2. Requirements Investigation:

This activity is at the heart of systems analysis. Using a variety of tools and skills (like fact-finding techniques, data flow analysis, and decision analysis) analysts study the current system and document its features for further analysis.

3. Requirements Specification:

This is the description of features for a new system. Analysis of data describing the system to determine how well it is performing, what requirements must be met, and strategies for fulfilling them. This activity has three interrelated parts....

a). Analysis of Factual Data: The data collected to determine how well the system is performing and whether it will meet the organization's demands.

b). Identification of Essential Requirements: Features that must be included in a new system, ranging from operational details to performance criteria, are specified.

c). Selection of Requirements Fulfillment Strategies: The methods that will be used to achieve the stated requirements are selected. These form the basis for systems design, which follows requirements specification.



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Q:2 Explain Fact-Finding Techniques.

The methods used by analysts for collecting data about requirements are called Fact-Finding techniques. There are 4 techniques.

1. Interview
2. Questionnaire
3. Record review
4. Observation

Analysts usually employ more than one of these techniques to help ensure an accurate and comprehensive investigation.

1. INTERVIEW :

This is used to collect information from individuals or from groups. The respondents (may be Managers or Employees) are generally current users of the existing system or potential users of the proposed system. These interviews provide analysts with opportunities for gathering information from respondents who have been chosen for their knowledge of the system under study. This method is the best source of qualitative information (opinions, policies, and subjective descriptions of activities and problems). But this method is time consuming process. Other fact-finding methods are likely to be more useful for collecting quantitative information. Interviews allow analysts to discover areas of misunderstanding, unrealistic expectations, and even indications of resistance to the proposed system.

Interviews can be either structured or unstructured.

The following table can describes the advantages and disadvantages of structured and unstructured interviews.

Structured Interview	Unstructured Interview
Advantages	1. Ensure uniform wording of

1. Interviewer has greater flexibility in wording questions to suit respondent.
2. Easy to administer and evaluate.

2. Interviewer can pursue areas
 3. More objective evaluation of that arise spontaneously during both respondents and answers interview.
 - to questions.
 3. May produce information about
 4. Results in shorter areas that were overlooked or interviews.
 - not thought to be important.
- Disadvantages 1. Cost of preparation is high.
1. May be inefficient use of both respondent and interviewer time.
 2. Respondents may not accept high level of structure
 2. Interviewers may introduce and mechanical posing of their biases in questions or questions.
 - reporting results.
 3. High level of structure may
 3. Extraneous information may not be suitable for all be gathered.
 - situations.
 4. Analysis may be lengthy.
 5. Takes extra time to collect essential facts.



2. QUESTIONNAIRE:

The use of Questionnaires allows analysts to collect information about various

aspects of a system from a large number of persons. The uses of standardized question formats can yield more reliable data than other fact-finding techniques, and the wide distribution ensures gather anonymity for respondents, which can lead to more honest responses. However, this method does not allow analysts to observe the expressions or reactions of respondents. Response may be limited, since completing questionnaires may not have high priority among the respondents.

There are two types of questionnaire forms. The first one is Open-ended (open-response) questionnaires to learn about feelings, opinions, and general experiences or to explore a process or problem. This is to obtain information about critical design features for employees. And the other one is Closed-response questionnaires to control the frame of reference by presenting respondents with specific responses from which to choose. This is to obtain insight into system likes and dislikes. As with interviewers, recipients of questionnaires should be selected from the information they can provide. The analyst should ensure that the respondents' background and experiences qualify them to answer the questions.

3. RECORD REVIEW :

Record and reports can provide analysts with valuable information about organizations and operations. Analysts examine information that has been recorded about the system and users. Record inspection can be performed at the beginning of the study, as an introduction, or later in the study, as a basis for comparing actual operations with what the records indicate should be happening.

4. OBSERVATION:

Observation allows analysts to gain information they cannot obtain by any other fact-finding method. Through observation, analysts can obtain firsthand information about how activities are carried out (see the following table). This method is most useful when analysts need to actually observe how documents are handled, how processes are carried out, and whether specified steps are actually followed.

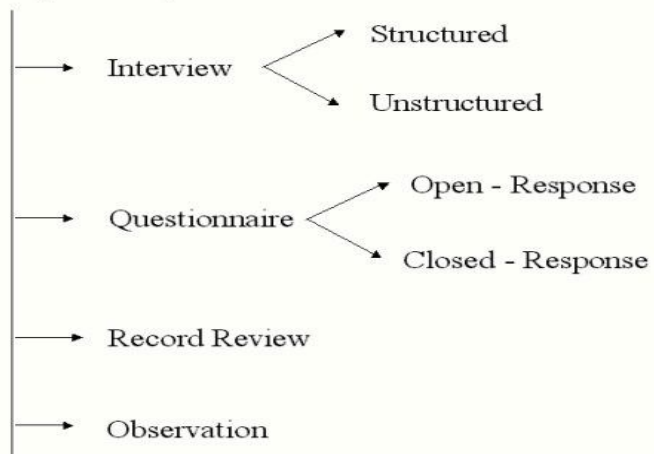
Observation shows the analyst

What should happen? What actually occurs?

1. Standard operating procedures.
1. Delay in doing work.
2. Controls and check for accuracy
2. Information recalled from
and completeness.
memory (incorrectly)
3. Properly completed documents.
3. Skipped steps.
4. Efficient and timely, completion of
work.
4. New controls needed.
5. Documents not completed as
required.



Fact – Finding Techniques





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Q:3 Describe tools for documenting procedures and decisions

Ans: Documenting procedures and decisions are important to system analysts when they are within the business system under investigation. These tools are used for organizing the details collected and determining where information is incomplete or inconsistent. These are for studying operational procedures and decision-making steps, and the means of documenting them for study. A tool is any device, object, or operation used to accomplish a specific task.

Decision Concepts:

When analyzing procedures and decisions, the analysts must start by identifying conditions and actions- concepts common to all activities. The condition is the possible states of an entity (person, place, thing, or event). For example GOOD and BAD are two specific alternative conditions that can be applied to each of the above entities.

When all possible conditions are known, the analyst next determines what to do when certain conditions occur. Actions are alternatives—the steps, activities, or procedures that an individual may decide to take when confronted with a set of conditions.

Condition Actions

Possible states of events % lead to selection of % Alternatives, steps, activities, or procedures that can be taken when a specific decision is made.

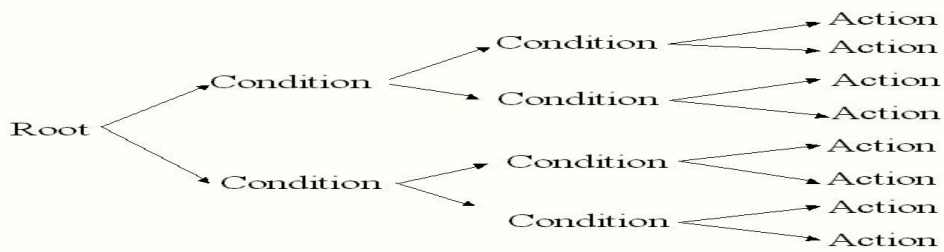
In many procedures, analysts must consider combinations of conditions and actions. To assist them in understanding and matching combinations, they use 3 tools. Those are Decision Trees, Decision Tables, and Structured English.

Decision Trees:

A Decision tree is a diagram that presents conditions and actions sequentially and thus shows which conditions to consider first, which second, and so on. It is also a method of showing the relationship of each condition and its permissible actions.

Decision trees showing the relationship of each condition and its permissible actions.

It shows the sequential nature of many business decisions. Developing decision trees is needed to describe conditions and actions forces analysts to formally identify the actual decisions that must be made. Decision trees also force analysts to consider the sequence of decisions. Decision trees are effective when describing business problems of more than one dimension or condition. Analysts need to describe and define all data used in decision-making, so that the system can be designed to produce data properly.



Conditions	Decision Rules
Condition statements	Condition entries
Action statements	Action entries



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Disadvantage of Decision-Trees:

Decision trees may not always be the best tools for decision analysis. A decision tree for a complex system with many sequences of steps and combinations of conditions will be unwieldy. A large number of branches with many paths through them will cloud rather than aid analysis. The analyst may not be able to determine which business policies or practices guide the formulation of specific decisions. Where these problems arise, decision tables should be considered.

2. Decision Tables:

A Decision table is a matrix of rows and columns, rather than a tree that shows conditions and actions. Decision rules, included in a decision table, state what procedure to follow when certain conditions exist. Using decision-tables analysts can produce complete and accurate analysis. It has 4 sections.

1. Condition Statements. - Identifies the relevant condition.
2. Condition Entries. æ Tell which value applies for a particular condition.
3. Action Statements æ List the set of all steps that can be taken when selected conditions occurs.
4. Action Entries æ Shows what specific actions in the set of take when selected. Conditions or combination of conditions are true.



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Building Decision tables:

To build decision tables, analysts should use the following 6 steps.

1. Identify the conditions.
2. Identify actions (activities) under varying conditions.
3. Study the combinations of conditions that are possible.
4. Fill in the table with decision rules.
5. Make action entries with 'X' to signal action(s) to take.
6. Examine the table for redundant rules or for contradictions within rules.

Checking Decision Tables:

After constructing a table, analysts verify it for correctness and completeness to ensure that the table includes all the conditions, along with the decision rules that relate them to the actions. Analysts should also examine the table for redundancy and contradictions.

Eliminating Redundancy: Removing redundant entries can help manage table size. Redundancy occurs when both of the following are true: (1) two decision rules are identical except for one condition row, and (2) the actions for the two rules are identical.

Removing Contradictions: Contradictions mean either that the analyst's information is incorrect or that there is an error in the construction as a result of the analyst's receiving discrepant information from different individuals about how they make decisions.

3. Structured English:

Structured English is an additional method to overcome problems of ambiguous language in stating conditions and actions in decisions and procedures. This method does not use trees and tables, but rather narrative statements, to describe a procedure. It does not show decision rules; it states them. This method allows analysts to list steps in the order in which they must be taken. Entire procedures can be stated quickly, since only English-like statements are used.

Structured English uses 3 basic types of statements to describe a process: Sequence Structures, Decision Structures, and Iterative Structures.

a) Sequence Structures:

A Sequence Structure is a single step or action included in a process. It does not depend on the existence of any condition, and, when encountered, it is always taken. Typically, several sequence instructions are used together to describe a process.

b) Decision Structures:

Structured English is another way of showing decision analysis. Therefore, the action sequences described are often included within decision structures that identify conditions. Decision structures thus occur when two or more actions can be taken,



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depending on the value for a specific condition. One must assess the condition and then make the decision to take the stated actions or sets of actions for that condition.

The following is the syntax for IF-THEN-ELSE.

IF (condition)

Statements...

ELSE

IF (condition)

Statements...

ELSE

Statements...

Statements...

End IF.

By this convention the extra clarity gained even more helpful when dealing with large or complicated decision situations. Decision structures are not limited to two condition-action combinations. There can be many conditions.

c) Iteration Structures:

In routine operating activities, it is common to find that certain activities are repeated while a certain condition exists or until a condition occurs. Iteration instructions permit analysts to describe these cases.

The following is the syntax for DO-WHILE and DO-UNTIL.

DO WHILE (condition)

Statements...

END DO.

DO UNTIL (condition)

Statements...

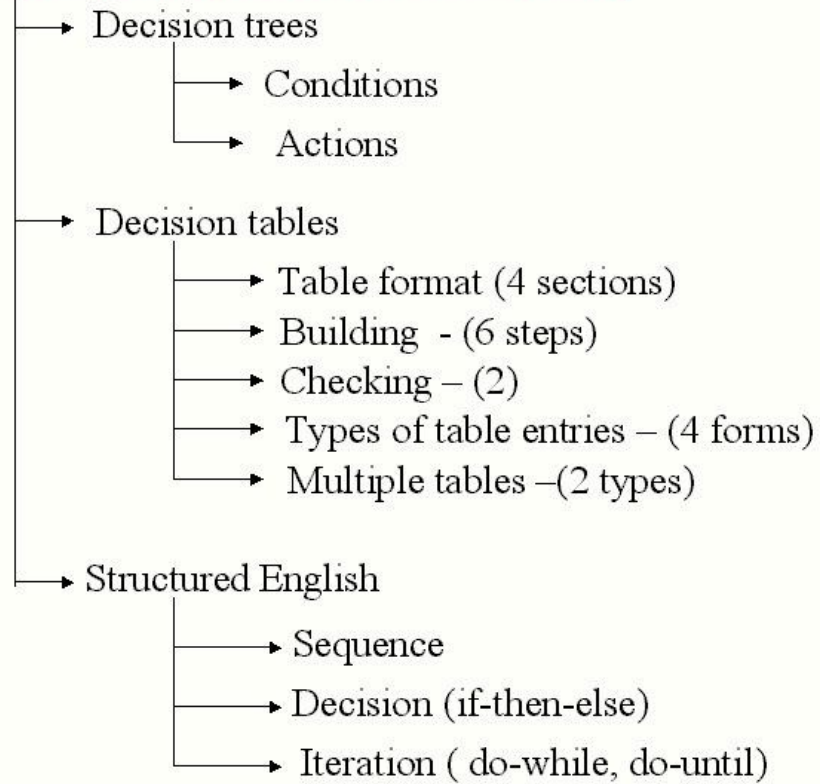
END DO.

Advantages of Structured English:

1. To state decision conditions and actions clearly.
2. It can be reviewed by other person quite easily.
3. It is also effective in systems design.



Tools for documenting procedures and decisions





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Review Questions

Sr. No Question

Marks

- 1 Explain activities in requirement determination. 10
- 2 Explain different fact finding techniques. 5
- 3 Describe tools for documenting procedures. 5
- 4 Discuss the strategies adopted in the progress of requirement analysis. 10
- 5 Explain various requirement determination techniques. 10
- 6 Differentiate between: Structured interview V/s Unstructured Interview. 10



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Ch:4 Structured analysis development strategy

1. What is structured analysis?
2. Features of Data flow strategy
3. Data flow tools
4. Data Dictionary
- 5.

Developing data flow diagrams



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Q:1 What is structure analysis?

Structured analysis is a development method for the analysis of existing manual or automated systems, leading to the development of specifications for a new or modified system. When systems analysts approach an unfamiliar situation, there is always a question of where to begin the analysis. Structured analysis allows the analyst to learn about a system or process (activity) in a manageable and logical way while providing a basis for ensuring that pertinent details do not get overlooked.

The underlying objective in structured analysis is to organize the tasks associated with requirements determination to provide an accurate and complete understanding of a current situation. From that, requirements are determined that will become the basis for a new or modified system.

The word structure in structure analysis means:

- (1) The method attempts to structure the requirements determination process, beginning with documentation of the existing system.
- (2) The process is organized in such a way that it attempts to include all relevant details that describe the current system.
- (3) It is easy to verify when relevant details have been omitted.
- (4) The identification of requirements will be similar among individual analysts and will include the best solutions and strategies for systems development opportunities.
- (5) The working papers produced to document the existing and proposed systems are effective communication devices.

Components of Structured Analysis

Structured analysis uses the following components:

1. Graphic Symbols

Icons and conventions for identifying and describing the components of a system and the relationships among these components.

2. Data Dictionary

Descriptions of all data used in the system. Can be manual or automated (may be included in a larger project dictionary that also contains descriptions of processes making up the system).

3. Procedures and Process Description

Formal statements using techniques and languages that enable analysts to describe important activities that make up the system.

4. Rules

Standards for describing and documenting the system correctly and completely rules have to be defined.



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Q:2 What are the features of Data Flow strategies (or) Analysis?

Data flow analysis studies the use of data in each activity. It documents these findings in data flow diagrams, which graphically show the relation between processes and data, and in data dictionaries, which formally describe the systems data and where they are used.

FEATURES OF DATA FLOW STRATEGY:

Data flow analysis examines the use of data to carry out specific business processes within the scope of a systems investigation.

The components of data flow strategy span both requirements determination and systems design. A prescribed notation facilitates the documentation of the current system and its analysis by all participants in the process of determining system requirements.

Tools of Data Flow Strategy:

Data flow strategy shows the use of data in the system pictorially. It can be difficult to fully understand a business process through a verbal description alone. Data flow tools help by illustrating the essential components of a system and their interactions.

Data flow analysis makes use of the following tools:

1. Data Flow Diagram

A graphic tool used to describe and analyze the movement of data through a system—manual or automated—including the processes, stores of data, and delays in the system. Data flow diagrams are the central tool and the basis from which other components are developed. The transformation of data from input to output, through processes, may be described logically and independently of the physical components (for example, computers, file cabinets, disk units, and word processors)



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Que:3 Explain Data Dictionary in brief.

—It is a structured and organized storage about the explanation of data.“

It is a document in which various data elements are clarified. It includes:

1. The relationship among data elements
2. Their data type
3. Their storage type
4. Its Data structure
5. The Variable name

For example If we consider any DATA as

The var Name : Stu_name

The Sub Elements : First Name (F-Name)

Middle Name

Last Name

The Type : Character

Storage Type : Random Access

The User : Scott

Characteristics : Must be alphabets

Thus all such above mentioned information are about data, which is explained in nicely indexed Document, which is nothing but Data Dictionary.

The Use and Advantages of Data Dictionary:

1. It is very useful for the future modifications in the program.
2. It helps System analyst in Information Gathering.
3. Useful at the time of Software Debugging.



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Review Questions

Sr. No Question

Marks

- 1 Distinguish between Logical & Physical DFD. 5
- 2 What is Data Dictionary? How it clarifies the data? 5
- 3 Write short-note on data flow diagram. 5
- 4 Explain: Data Dictionary is a structured repository of data. 10
- 5 Explain the utility of Decision Table & Data Flow Diagrams
10
(DFDs)
- 6 Explain: Logical and Physical Design. 5
- 7 Differentiate: Decision Tree V/s Decision table. 5
- 8 Draw a DFD into first level data flow diagram of system of your
10
choice.
- 9 Explain DFD notation. With example. 5



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Ch:5 Design of computer output

1. Output objectives
2. Types of output
3. How to represent information
4. Designing Printed Output



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Que:1 Explain various output methods.

The output applies to any information produced by an information system, whether printed or displayed. When analysts design computer output they first identify specific output needs of the system user. So methods of output vary across system. For some, such as an inventory report of the quantity of sale, the computer system, under program control, simply retrieves the data on hand from storage and assembles them into a presentable form. This type of output may be retrieved on printed form as per customer requirement, as stated above. Whether the output is a formatted report of a simple listing of the contents of a file, a computer process will produce the output.

System output may be,

1. A report
2. A document
3. A message

Depending on the circumstances and the contents, the output may be displayed or printed.

Output contents originate from these sources:

1. Retrieval from a data store
2. Transmission from a process or system activity
3. Directly from an input source

Method of output suite to client flavor can be decided from asking few questions to the user of the system. Analyst can retrieve information on asking, who will receive the output? Answer of this question derives type of information and method of information. Analyst further checks for method of output by asking, by what method output is required? Should the output be printed or displayed? And rest depends on the user of the system for system method of output.



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Que:2 Explain the considerations of output design.

The term —OUTPUT“ means the processed information produced by the information system. Output may be printed or displayed. In output design process one has to first

- 1) Identify specific output need
- 2) Select Method for presenting output
- 3) Create document in any fixed format.

There are various possible types of output like.

V A Report

V A Document

V A Message

There are three different sources of output. It may be the result of process or it may come from file or it may be direct input. The output presentation design basically concentrates on presenting more using less space.

There are various different formats to present the output data.

1. Tabular Format
2. Graphical Format
3. Use of Icons
4. Colored Presentation

The direct source of information for user is computer output. Effective, efficient and well-organized output can be more meaningful for user to operate information system. Below list of consideration has to be taken in any system output...

- (1) Always give proper title to output
- (2) Specify various fields with boundaries or highlighted areas.
- (3) If possible, make your output interactive.

Provide facility for online editing in output.



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Que : 3 State the utility of output. List the different types of information.

Output design focuses on what the users need to know. User may need information about past or current activities or about projections for the future; they may need to be notified of events, opportunities or problems; they may need verification that certain actions were or were not taken. User may expect about an items that will trigger an action.

The real issue in designing computer output is not how much can be provided, but how little is needed to make important information available. Anyone can fill a page or screen with information, but there is no guarantee that the right information will be communicated to the users. To represent information in attractive and informative way on can work on guidelines. Possible ways to represent information in perfect manner are:

- Tabular format
- Graphic information
- Use of Icons
- Ways to utilize color

Way of information representation depends on needs of customer and data. Above mentioned ways of representation are explained here with.

TABULAR FORMAT:

The financial reports, the accounting details etc. are generally presented in tabular format. Here one table is prepared showing various items row and column wise. The column shows the various categories of data. The data can be easily added in this Tabular Format. Sometime data can also be sorted in table to get important data at the top.

Thus, the Tabular Format enhances the readability of the data and more detail can be included in small space. Again at the end of table summaries and total gives

extra understanding of output.

For example,

RollNO Name M1 M2 TOTAL

1 Jay 75 80 155

2 Vijay 45 60 105



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GRAPHICAL FORMAT:

Now a day graphical technology has been improved. Thus it is very easy to present output in interactive and graphical way. High quality charts and diagrams can be easily created based on some data. For more understanding animation can also be used. There are various types of business graphics which are used now a days like Pie chart, Line-chart, bar chart, column-chart, map etc. as drawn below.

90

80

70

60

50

East

West

40

North

30

20

10

0

1st Qtr 2nd Qtr 3rd Qtr 4th Qtr

USE OF ICONS:

Icon is a symbol used to describe about the data. For example picture of person can be used to report the no. Of student passed every year in BIT examination as given

below.

FIGURE:

2000		
1500	1600	
1000	1450	
500	900	
0		
1998	1999	2000



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Thus, one can easily say that the no. of student passed in 1999 is 1600 which is maximum.

COLORED PRESENTATION:

Sometime for more clarification of data and graph different colors are used to identify them easily. For highlighting some part of data again colors are used.

The direct source of information for user is computer output. Effective, efficient and well-organized output can be more meaningful for user to operate information system.

The major form of output type is printout (flare-copy). The various types of printers are from cheap to costly. The other important output media is CRT monitor. The following media devices are capable of giving computer-based output.

- (1) MISR Recorder
- (2) Dot Matrix printer
- (3) Inkjet, laser printer
- (4) Computer output micro-film
- (5) CRT Screen Display
- (6) Graph plotters
- (7) Audio Response

Some time various different types of O/P forms are combined for proper and good combination. Some skill is required.

- (4) Always give proper title to output
- (5) Specify various fields with boundaries or highlighted areas.
- (6) If possible make your output interactive.

(7) Provide facility for online editing in output.



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Review Questions

Sr. No Question

Marks

1 Explain various output method.

7

2 Explain the considerations of output design. 5

3 State the utility of output. List the different types of presenting

10

information. Explain any one of them.



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Ch:6 Design of input and control

1. Objective of input design
2. Data capture guidelines
3. Design of source document
4. Input Validation



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Que:1 Explain the considerations of input design.

The input design is the link that with information system and user. There are general input concerns that all analyst should have. Input design consists of procedures for data preparation as well data entry. Here data procedures means by those steps necessary to put transaction data into a usable form for processing. And data entry mean by activity of putting the data into computer for processing. Data entry can be achieved by computer to read data from a written or printed document, or by having data directly into the system.

There are several way to guide the design of input are,

Controlling amount of input: Because data entry operations are dependent of people, if possible less data entry leads low cost. Second as data input is high leads much time consumption for processing.

Avoiding Delay: This means by, how analyst can design input of the system so that time delay can be reduced for input.

Avoiding Errors in Data: The rate of errors directly depends on data input. The analyst can also affect the error rates of an operation through input design by the way data be entered.

Avoiding extra steps: When the volume of transactions can not be reduced, the analyst must be sure the process is as efficient as possible. Perfect analyst will also avoid input designs that cause extra steps. This will save time as well less data entry.

Keeping the process simple: the users always accept Simple input design. It is advisable to avoid complexity when there are simple alternatives for complex systems.



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Que:2 Explain Data capturing guidelines.

For various categories of information systems, the data to be inputted varies. So it is important to collect information related to input data and categories of data. Here we have general guidelines for analyst to formulate an input design. The analyst should start by capturing only those items that must be input when processing transactions.

There are two types of data that must be input when processing transaction:

- a) Variable data: Those data items that change for each transaction. For example withdraw amount from account varies on each transaction. On other hand account number does not vary with time. So amount should be entered in variable as well account no should be maintained in data files.
- b) Identification data: The data items which are identical to the system should be identified first. That results in low data entry as well generates proper results. What not to enter is equally important in the system. Input process should not require entry of the following cases:
 - 1) Constant data: Data that are the same for every entry. For example value of pie is 3.14 and is constant for each transaction. So the user should not enter this type of values.
 - 2) Details that the system can retrieve: This means by stored data available on data file anywhere should not enter by the user again.
 - 3) Details that the system can calculate: This means derivative of existing values in the data file. For example, withdrawal amount of today can be calculated by doing sum of every transaction and that should not be stored anywhere in data file.



Indiana Technologies

Personal Details

Roll No	<input type="text" value="1"/>	<input type="button" value="ADD"/>
Name	<input type="text" value="Jignesh Dhol"/>	<input type="button" value="UPDATE"/>
Course	<input type="text" value="BScIT"/>	<input type="button" value="DELETE"/>
Gender	<input type="radio"/> F <input checked="" type="radio"/> M	<input type="button" value="EXIT"/>
Birth Date	<input type="text" value="DD/MM/YYYY"/>	

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Que:3 Explain: Caption and Data capture of input design.

Captions are static information available on the input design. Which guides user for data entry. Captions tell the user what data to provide and where they should be entered. For better and user friendly layout one should avoid using abbreviations for caption. Caption should be proper informative for respected data entry. For example, to insert date value in birth-date field one has to

mention format of input data, like "dd-Mon-yy", "DD/MM/YY", or "MM/DD/YYYY". Figure shows student data entry screen with respected fields and captions. Fields are mentioned with boxes and rest are captions.

A well-designed source document is easily completed and allows rapid data entry. Captions can be mentioned with variety of ways like before line, After line, Above Line, Below line, inside box, below box, ballot box. These varies with requirement and display available on screen. Many a times due to space allocate for input these requirements may vary. Data capture facility is always attached with captions.



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Que:4 List the different coding techniques in input design. Explain any two of them.

Information system projects are always based on time limit, cost conscious and teamwork. Looking to these requirements system analyst has to design project guideline in a way that reduce development time, cost and employee. For these types of settlements system analyst can look forward to coding methods that fulfills above-mentioned goals. A code can be brief number, title or symbol instead of lengthier or describe coding techniques. With code, fewer details are necessary in input, but no loss of information results. Various coding methods are adopted for these are:

- Classification codes
- Function codes
- Sequence codes
- Significant digit
- Mnemonic codes

CLASSIFICATION CODES:

Classification codes place separate entities, such as events, people or objects into

distinct groups called classes. A code is used to distinguish one class from another. The code is recorded on the source document by the user or, in an online system. The user classifies the event into one of several possible categories and records the code.

For example, College management system can be classified by students, faculty or course. In this system, to maintain library information system can be classified using books issue or author to check book of interest.

FUNCTION CODES:

Function codes state the activities or work to be performed without spelling out all of the details in narrative statements. User use this type of coding method to process the data. The particular function code may determine the contents of the input record whether data in the code are keyed or scanned. For example to process today's total withdrawal amount in a bank analyst can design function, which accepts today's transaction with complete details of the transaction and data. A derived function can evaluate amount using input data. Another function can be derived to delete account information with different input values. For deletion of account, identical account number has to pass and rest function can be performed by function code.

SEQUENCE CODES:

Sequence codes are either numbers or letters assigned in series. For example roll no is a sequence in a class. Another example, a banking system must be able to keep track of the order of transactions so that it is clear which transaction to process first, which second and so on. Therefore, a sequence number should be specified in the design to order the transactions.

Sequence codes are also used for identification purpose but are assigned in the order in which customers enter the system.



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SIGNIFICANT-DIGIT SUBSET CODES:

Suppose item number will be assigned to the different materials and products a firm stocks or sells. One way to accomplish this is to assign number in sequence. Starting with the first and going through to the last. Or a prefix can be added to the identification numbers to further describe the type of item: steel has an S-prefix,

plastic a P and so on.

The codes can be divided into subset or subcodes, characters that are part of the identification number and that have special meaning. The subcodes give the user additional information about the item.

MNEMONIC CODES:

Mnemonic does use letters and symbols from the product to describe it in a way that communicates visually. For example, to describe a 21-inch color television set, a useful code is TV-CL-21 (black and white is TV-BW-21). Universities frequently use mnemonic to code information: BIT (Bachelor of Information Technology)

In general data and transaction coding reduces the volume of data for input and simplifies the process. Code selection depends on the nature of data and objectives of the analyst.



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Que:5 What is verification and validation?

Input designs are aimed at reducing the chance of mistakes or errors during the data entry. However, an analyst must always assume the error will occur. The general term given to methods aimed at detecting errors in input is input validation. Three main categories of methods are checking the transaction, checking the transaction data and changing the transaction data.

CHECKING THE TRANSACTIONS:

It is essential to identify any transactions that are not valid, that is, not acceptable. Transaction can be invalid because they are incomplete, unauthorized or even out of order.

Batch Controls:

Batch processing means delaying processing by accumulating the transaction into batches or groups of records. When transactions are accumulated and not processed as they are occurring, there is a good chance that some will be misplaced, forgotten, or simply overlooked. Whether large or small, a lost transaction should always be a concern to the analyst. One method of batch control uses fixed batch size.

Transactions are accumulated into groups of say 50. These transactions may be in temporary in memory then at any instance they can be stored in data files.

Transaction Validation:

Inexperienced analysts sometimes assume that users submit only valid transactions for processing, that is, only those that are acceptable to the system and that can be properly processed. Unfortunately, users often attempt to process data in unexpected ways, either accidentally or intentionally. It is the responsibility of the analyst to specify validation procedures that test the acceptability of a transaction. The transaction itself must be acceptable to the system before it can be processed. The steps the system takes to ensure that the transaction is acceptable are called transaction validation. For example, a typical inventory system is designed to expect inventory transactions to add items to inventory, delete item, or change the quantity on hand through withdrawal of stock. However, it is not acceptable to add a new item when there is already an item with the same name and identifying stock number.

Sequence Test:

In some systems, the order of transactions is important. When processing bank checking deposits and withdrawals, it is important to ensure that each is processed in the order in which it arrived.

CHECKING THE TRANSACTION DATA:

Even valid transactions can contain invalid data. Therefore, analysts should be sure to specify methods for validating the data when developing input procedures. There are four data validation methods.



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Existence Test:

Some data fields in transactions are designed to not be left empty or blank. Existence tests examine these essential fields to determine that they contain data. For example, in processing inventory, it is incorrect to accept orders that do not specify the quantity of an item ordered.

Limit and Range Tests:

Limit tests validate either the minimum or maximum amount acceptable for an item. In most banks, tellers must notify a bank officer before completing a cash transaction in excess of Rs 1 lakh is the limit they are authorized to handle without approval when actual cash changes hands.

Combination Test:

Combination tests validate that several data items jointly have acceptable values; that is, the value for one element of data determines whether other data values are correct. For example, a systems design for this industry should note that a customer order for an automobile with factory air conditioning must also specify other options; heavy-duty battery, heavy-duty shock absorbers, and an oversize radiator. All must be ordered in combination with each other.

MODIFYING THE TRANSACTION DATA:

A third way of validating data involves modifying the data themselves.

Automatic Correction:

This method simply requires the program to detect an error and make the correction automatically. For example, data entry personnel keying data into, say, a six-digit numeric field can enter only three digits.

Check Digits:

Transcription errors occur if data are accidentally copied incorrectly by the data entry person. For example, a customer number of 24589 is transcribed incorrectly if it is entered as 24587.



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Que:6 Explain methods of data capture.

The method in which the data are captured for transactions are called methods of data capture. Variety of methods are adopted in this concern. Those methods are Source data capture with keypunching, key-to-storage, with scanner and with intelligent terminals. Let us take look to individuals:

SOURCE DATA CAPTURE WITH KEYPUNCHING:

Best known and most widely used data entry method is key punching. Logical code are transcribed in punching cards. This verification and correction can be done using computer. A card reader provides a final validation check to ensure against missing data and other errors during preparation and entry. The use of punch cards has largely given way to key-to-storage devices.

Best example of this system is employee attendance punch card system. This tracks employee attendance on certain time frame.

SOURCE DATA CAPTURE WITH KEY-TO-STORAGE:

When punch card system fails and times when user require data to be entered like

text, one has only alternate like key-to-storage data capture method. Key are alphanumeric values as well special signs inputted from key board. Contents are always stored on storage devices. Storage devices can be temporary or permanent, primary or secondary. Generally data are entered through a workstation, which includes a typewriter-like keyboard for keying the data and a visual display.

Sequences of this procedure are:

Writing data on source document

If required code data from source document to form acceptable for processing

Process data on tape or disk

Validate the data as they processed

Store data permanently

SOURCE DATA CAPTURE WITH SCANNER:

Optical Character processing is possible with scanner machines. A source document that can be directly used as an input document for scanning by the optical character reader (OCR). When transaction occur, the data are written or marked on the scannable form, sometimes with hand-printed letters and numbers and in other cases by marking special symbols or boxes or represent data. Variety of scanner are available in the market which provides OCR facility. This sort of instruments are useful in huge data entry job works.

DIRECT ENTRY THROUGH INTELLIGENT TERMINALS:

Intelligent terminals are special machines which have connection with computers.

These terminals receives data from user and passes to computer. This have very sophistication on work and advance technology has to be used to have these facilities. For example, pen scanner can be used to scan bar code of any product which has information of product like rate, qty etc. Ophthalmic doctors use machine to have eye number of patient, output of the same can generate on computer.

Future tends to this emerging technology.



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Review Questions

Sr. No Question

Marks

1 Explain various output method.

7

- 2 Explain the considerations of output design. 5
- 3 State the utility of output. List the different types of presenting
10 information. Explain any one of them.



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Ch:7 Design of Files

1. Basic File terminology
2. Types of Files
3. Methods of file Organization



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Top:1 Basic File terminology

Information systems in business are file and database-oriented. Data are accumulated into files that are processed or maintained by the system. Here file concepts and concern concepts are reviewed.

DATA ITEM

Individual elements of data are called data items. It is also known as fields or simply items. For example, student register consists of the following data items: RollNo, Name, Birth Date, Address, City, Blood Group, Contact Nos. etc.

Each data item is identified by name and has a specific value associated with it. Respected values are shown in the example below:

Date item name Value

RollNo 1

Name Jignesh Dhol

Birth Date 26/6/1975

Address Jawahar Road

City Rajkot

Blood Group B +ve

Contact Nos. 123456

The association of a value with a field creates one instance of the data item. Data items can have subitems or subfields. For example, one person can have many addresses to contact or many contact nos.

RECORD

The complete set of related data for all the fields is a record. For single student all related information creates one record. Each field has a predefined length and type (data type). For example, a record description of the student contains the following data:

Date item name Type

Length

RollNo N 2

Name C 75

Birth Date D -

Address C 255
City C 50
Blood Group C 5
Contact Nos. N 10

When the number and size of data item in a record are constant for every record, the record is called fixed-length record. The advantage of fixed-length records is that they are always the same size. Variable-length records are widely used in most business applications than fixed-length designs. Record size may vary because the individual data items vary in length.



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RECORD KEY

To differentiate one specific record from another record, systems analysts select one data item in the record that is likely to be unique in all records of a file and use it for identification purposes. This item is called the record key, key attribute and is part of record itself.

Common examples of record keys are the roll no of student data, part number in the inventory record, and the chart number in a patient medical record or serial number in manufactured product. Each of these record keys has variety of other uses.

ENTITY

An entity is any person, place, thing or event of interest to the organization and about which data are captured, stored or processed. Patients and tests are entities of interest in hospitals.

FILE

A file is a collection of related records. Each record in a file is included because it contains to the same entity. A file of student information consists of student related information. Attendance and library issues are not included in that file. The number of records in the file determines the file size. If each record is fixed-length and uses 250 characters of storage, the file uses 6 times 250 characters of storage.

DATABASES

A database is an integrated collection of data stored in different types of records, and in a way that makes them accessible for multiple applications. The logical or physical relationship establish low storage in data files. Records for different entities are

typically stored in a database. In college database, for example, records of students, course and faculty.



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Top:2 Types of Files.

Business and organizations, whether computerized or not, make extensive use of master, transaction, table and report files to collect and maintain many types of records. There are various types of file that can be managed are:

1. Master File
2. Transaction File
3. Table File
4. Report File
5. Other File

All kinds of file has their own benefits and usage. All kinds of files have been explained in greater detail here.

MASTER FILE

A master file is a collection of records about an important aspect of an organization's activities. For example, in educational institution master file can be a student record system or faculty master database. Any bank database can have account holder information as a master database.

A second type of master file reflects the history of events affecting a particular entity. For example, the sales history for commercial business is reflected in a master file containing a record of each sale made to a customer over a specified period. Each record in the file shows the date and amount of the sale. In many applications, there are benefits to having both types of information available.

Master files are useful only so long as they are kept accurate and up to date. Master files are kept up to date through the use of transaction files.

TRANSACTION FILE

A transaction file is a temporary file with two purposes: accumulating data about events as they occur and updating master files to reflect the results of current transaction. Examples of common transaction in organizations are making purchase, paying for purchase, paying employees. Data important to the organization are collected about each event and accumulated into the transaction file.

TABLE FILE

A special type of master file is included in many systems to meet special processing requirements involving data that must be referenced repeatedly. Table files contain reference data used in processing transaction, updating master files, or producing output.

Analyst some time generate table file to store values of option given in application program. For example, in a computerized payroll processing system, the percentage amount of state and federal tax to be taken from each employee can be stored in table file.

REPORT FILE



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The report files are temporary files used when printing time is not available for all the reports produced. i.e. output that can not be printed when it is produced is pooled into a report file. Later, in a few minutes or hours, depending upon the volume of work and speed of the printers, the system will be instructed to read the report file and print the output.

Report files can be used with many other output devices, such as graphic plotters, microfilm units or commercial typesetting systems.

OTHER FILES

Other kinds of files, as well as special uses of the file types previously discussed, play a role in information systems. For example, a back up file is a copy of a master, transaction or table file made to ensure that a duplicate is available. If anything happens to the original these other file can be replaced.



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Top:3 Methods of file organization.

Records are stored in files. The organization of file specifies how records are stored, located and retrieved. Here we are discussing three ways of records storing. Among them two are sequential and direct are available in most of the computer where index method is possible with special type of software.

SEQUENTIAL ORGANIZATION:

Sequential organization is the simplest way to store and retrieve records in a file. In a sequential file, records are stored one after the other. The first record stored is placed at the beginning of the file. The second is stored right after the first, the third after the second, and so on. This order never changes in sequential file organization.

To read a sequential file, the system always starts at the beginning of the file and reads one record at a time. System starts retrieving until last record is reached. It cannot go directly to any particular record without passing through earlier records.

Searching for any particular record cannot be done by jumping through records, because of sequential files do not use physical record keys. Records are accessed in order of their appearance in the file.

Example of this type of file organization is handling text editor. In text editors file store data line by line. As well it retrieves data line by line.

DIRECT-ACCESS ORGANIZATION:

When sequential file fails for a proposed system, an alternative is direct-access organization. This method requires the program to tell the system where a record is stored before it can access the record. In contrast to sequential organization, processing a direct-access file does not require the system to start at the first record in the file. This file are keyed files. They associate a record with a specific key value and a particular storage location. All records are stored by key at addresses rather than by position.

Using the record key as the storage address is called direct addressing. This method is more useful with data base storage which is given record key. With direct access records can be retrieved randomly. Reason behind random selection of record is record key and address information of particular record.

Example of this file organization is database file which stores information in row and

column manner. Because database file is mean for random record retrieval.

INDEXED ORGANIZATION:

A third way of accessing records is through an index. The basic form of index includes a record key and the storage address for a record. To find a record when the storage address is unknown, it is necessary to scan the records. However, the search will be faster if an index is used, since it takes less time to search an index than an entire file of data.

An index is a separate file from the master file. Each record in the index contains only two items of data; a record key and a storage address. A record key is unique



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for all the records like storage address. To find a specific record when the file is stored under an indexed organization, the index is first searched to find the key of the record wanted. When it is found, the corresponding storage address is noted and then the program accesses the record directly.

For example, Bank account master table can be indexed to retrieve account information fastest possible.



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Review Questions

Sr. No Question

Marks

- 1 Explain Indexed-Sequential file-format.
- 2 Explain types of files
- 3 Explain terms : Entity, File and Database



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Ch:8 System Engg. And Quality Assurance

1. Design of software
2. Software Design and Documentation Tools
3. Managing Quality Assurance



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Top:1 Design of software:

Design of software can be classified in two different way, they can be Object-oriented design as well function oriented design. To learn about design of software let us consider software distributed in different modules and modules in sub modules up to leaf level module. Design of software has consideration for software strategies. Different principles guide software designs are modularity and partitioning, coupling, cohesion, Span of control, size and shared use.

Each of these principles will be examined in more detail, with examples to demonstrate how they are applied.

TOP-DOWN STRUCTURE OF MODULES (MODULARITY AND PARTITIONING):

Top-down methods are used throughout the analysis and design process. In this method, modularization happens in top to down approach. This method is widely used in system engineering and software design. Each function the system will perform is first identified and then developed in greater detail.

For example, an accounting system consists of many separate modules top to down approach. This methods is widely used in system engineering and software design. Each function the system will perform is first identified and then developed in greater detail.

For example, an accounting system consists of many separate modules that are invoked one at a time as users indicate the particular function they wish to perform.

COUPLING:

It is degree of functional interdependence or interaction between the two modules of software. Coupling of two different modules are common matter in object-oriented design approach. Low coupled modules are called best software design. Variety of coupling methods are here explained...

< Data Coupling: In general two modules are coupled via a parameter that can be of any primitive data type like integer, float or character.

< Stamp Coupling: Two modules communicate via composite data item like structure or say private data type.

< Control Coupling: One module give direction to another module to be executed is called control coupling.

< Common Coupling: If two module share common data then it is called common coupling.
< Content Coupling: If two module share common data code then it is called content coupling.
COHESION:
< It is a measure of functional strength of a module. This means as no of function increases design of software gets better.
< Coincidental Cohesion: performs tasks that are related to each other very loosely.
< Logical Cohesion: If all elements of module perform similar operations like error handling, printing, data input and output is called logical cohesive module.



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< Temporal Cohesion: Module contains tasks that are related by the fact that all tasks must be executed in the same time span. That means data start up, shutting down and initialize procedure are similar operation.
< Procedural Cohesion: A set of function of module are part of a procedure is called procedural cohesive module.
< Communicational Cohesion: All function of module refer to or update same data structure is called communicational Cohesive module.
< Sequential Cohesion: One function refer another in same module is called sequential cohesive module.

There are variety of cohesive module as mentioned above and are tightly bound with a good software design.

SPAN OF CONTROL:

Span of control refers to the number of subordinate modules controlled by a calling module. In general, we should seek to have no more than five to seven subordinate modules.

On the other hand, excessive span of control, meaning a high number of subordinate modules.

MODULE SIZE:

Some organization has defined rules to manage module size. A common one is that

no module should contain more than 50 instructions. For example, If the module cannot be coded in 50 instructions, create a second module that is called by the first. Again module should be highly cohesive and loosely coupled. The size of the module depends on the language used.

For example, 50 statements in COBOL may be require more lines of code in fourth generation language.

SHARED MODULES:

Object oriented design works with code reusability. Specific size of code can be shared between different modules. Sharing modules reduces size of software design. Second benefit is, it minimizes the number of changes that must be made during system maintenance.

For example rate of product can be shared with sales as well marketing division of the company.



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Top:2 Software design and documentation.

For well design software have modular design. Such designs are more likely to complete the application. Two methods of structured designing as Structured flowcharts and HIPO diagrams are explained here,

1) STRUCTURED FLOW CHARTS:

Structured flowcharts also called Nassi charts, are graphic tools that force the designer to structure software that is both modular and top-down. They provide a structure that can be followed by programmers who develop the application software. In some organizations, analysts are responsible for developing module logic, while in others that responsibility is delegated to the programmer. In either case, the programmer should be well prepared in the use of structured flowcharts.

Basic Elements:

B

Three basic elements are process, decision and iteration for designing of structured flowcharts.

Process: Simple process or steps in a program are represented by a rectangular box, the process symbol. This symbol represents initialization of values, input and output activities.

Decision: The decision symbol represents alternative conditions that can occur and that the program must have a manner of handling. Decision is structure of IF-THEN-ELSE type. The decision symbol may show actions for more than two alternatives at the same time.

Iteration: The iteration symbol represents looping and repetition of operations while a certain condition exists or until a condition exists. The form of the iteration symbol clearly shows the scope of the iteration, including all processes and decisions that are contained within the loop. The left-hand portion of the symbol shows the path of repetition to follow until the conditions are satisfied for iteration.

Using Structured Flowcharts:

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When designing structured flowcharts analyst specifies the logic in a top-down fashion. An important use of structured flowcharts for the designer is to verify systems specification. Logic of system can be explained via flowcharts. Complex logic can be explained in easiest manner. The structure chart is easy to read will enable the analyst to determine whether the debit adjustment transaction, sales transaction or what so transaction done and affected data file.

2) HIPO

HIPO is commonly used method for developing systems software. This method was developed by IBM for its large, complex operating systems.



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Purpose: HIPO diagrams are graphic, rather than narrative description of the system. They assist the analyst in answering three guiding questions:

1. What does the system or module do? (Asked when designing the system.)
2. What does it do it? (Asked when reviewing the code for testing or maintenance.)
3. What are the inputs and outputs? (Asked when reviewing the code for testing or maintenance.)

A HIPO description for a system consists of the visual table of contents and the functional diagrams.

Visual table of contents:

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The visual table of contents (VTOC) shows the relation between each of the

documents making up a HIPO package. It consists of hierarchy chart that identifies the modules in a system and relation to each other and gives a brief description of each module.

Functional Diagram s:

β

There is one diagram for each box in the VTOC. Each diagram shows input and output, major processes, movement of data and control points.

HIPO diagrams are effective for documenting a system. HIPO diagrams are not as easy to use for communication purposes as many people would like. And, of course, they do not guarantee error-free system. Hence, their greatest strength is the documentation of a system.



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Top:3 Managing Quality Assurance.

To develop properly designed software and low-failure chances system analyst has to look forward to quality standards. Quality assurance is the review of software products and related documentation for completeness, correctness, reliability and maintenance. It must include assurance that the system meets the specifications and the requirements for its intended use and performance.

LEVELS OF ASSURANCE

Analyst use four levels of quality assurance: testing, verification, validation and certification.

Testing:

Testing is most important part of system development. Testing takes 50 percent of the budget for program development. Testing purpose is to make program error free. That means testing purpose is to make program fail. The tester, who may be an analyst, programmer or specialist trained in software testing is actually trying to make the program fail. A successful test, then, is one that finds an error.

Verification and Validation:

Verification is also intended to find errors. When commercial systems are developed with the explicit intention of distributing them to dealers for sale or marketing them through company-owned field offices, they first go through verification, some times called alpha testing.

The feedback from the validation phase generally produces changes in the software to deal with errors and failures that are uncovered. Then a set of users sites is selected that puts the system into use on a live basis. These beta test sites use the system in day-to-day activities; they process live transaction and produce normal system output. The system is live every sense of the word, except that the users are aware they are using a system that can fail. But the transactions that are entered and the persons using the system are real.

Validation may continue for several months. During the course of validation the system, failure may occur and the software will be changed. Continued use may produce additional failures and the need for still more changes.

Certification:

Software certification is an most important factor in software market. At any time end user can claim for software facilities, which were not satisfied. In such time third party consultants can certify software product on basis of study of software documentation and actual use of system. Such consultants then certify about product.

Testing Strategies:

Testing strategies use practical data input on real system. It generates respected output of the system. Practical data can be generated manually and end user can implement on the software. This is the proper way of checking system performance



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and completeness. This may vary and depends on system outline. At the end manual data and test result can be compared to certify product.

Code Testing:

The code-testing strategy examines the logic of the program. To follow this testing method, the analyst develops test cases that result in executing every instruction in the program or module. This means any application can be distributed in module, sub module and leaf level modules which can be checked individually is called unit testing or code testing. Code testing seems to be an ideal method of testing software.

Specification Testing:

To perform specification testing, the analyst examines the specifications starting

what the program should do and how it should perform under various conditions. Then test cases are developed for each condition or combination of conditions and submitted for processing. By examining results, the analyst can determine whether the program performs accordingly to its specified requirements.



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Review Questions

Sr. No Question

Marks

- 1 Write short-note on Quality- Assurance. 5
- 2 Write short-note on User-Manual.
5
- 3 Write Short note on Cohesion and Coupling 5
- 4 What is structured analysis. Discuss the various tools of structured analysis.
- 5 Explain: Form and Form design
- 6 Explain various output method.
- 7 Explain data capturing guidelines.
- 8 State the utility of output: List the different type of presenting information. Explain any one of theme.



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Ch:9 MIS (Management Information System)

1. Organizational impact of MIS
2. Understanding MIS
3. Design of MIS



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Que:1 Organizational Impact of MIS:

It is a method to see how management Information system affects or change the organization. The new MIS is implemented to get increased speed, less errors and better integration of organizational activities. The main purpose of MIS is to get more benefits and less cost.

The implementation of MIS may change the functioning and working style of organization. It may improve the performance of organization. Thus it is necessary to study the impact of MIS on Organization.

Due to recent revolution, the concept of global village is developed. The advance method of control, monitoring and evaluation has dominated the old traditional methods of management. The Airline Reservation system of America called —SABRE“ is a classic example of MIS. Even in Indian context the railway reservation system has simplified the operations and provided the facilities to the users. The MIS has brought the dynamism in the global management scenario.

The MIS provides the Accuracy of operations. Due to fast and accurate operations the organization can perform well and ultimately can have more financial benefits and faster business growth.

The MIS may affect the organization using it in following areas like

- V Accuracy
- V Timeliness
- V Relevance
- V Structure
- V Human Behavior
- V Organizational Culture
- V Organizational Policies
- V Long term Benefits
- V Working Style

Due to In-time availability of data the organization can take decision at right time. With the MIS future data forecasting is also possible which may help in decision making.

The MIS is capable of maintaining and capturing useful and relevant data. It discards redundant set of data provides up-to-date latest information.

The organizational structure may change due to introduction of MIS in the organization. For Example there may be the requirement of the post like Manager (MIS). Again the work & distribution among employees may change. Due to extensive possible communication between the people of organization, there is more understanding and less confusion. This may improve the organizational culture. The organizational goal and target may change. In short due to launching of MIS the organization will be capable of performing faster, accurate, effective and better performance. The firm as well as the employees will get the benefits so that they will be less resistive to change.



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Que:2 Understanding MIS:

The invention of Computer has simplified the processing of large amount of data with enough speed and accuracy. In day-to-day management operation lot of data gets generated which is required to be processed to get the results. The various departments have then realized the advantages of computer in improving and simplifying managerial operations. The Concept of MIS is now grown up. It is very popular among the users now are days.

The term MIS means —Management Information System“. It is basically a computer based Information system, which is designed for the managers of Government sector, private and public sector. The MIS is used at various levels of the organization. The Requirement of information and the type of information may vary from level to level. There are three levels of management as shown in the below given diagram.

The concept of MIS differs from the ordinary Electronic Data processing system. It is specially designed to help the managers for their special activities. The MIS is basically used for....

- V Bringing full integration in organization
 - V Smoothening decision- making process
 - V Short-term and long term planning
- | | | |
|-----------------------|------------------------|-----------------|
| Strategic Information | Very | Top |
| Less | | |
| Tactical Information | Like | Moderate Middle |
| Planning & Control | | |
| Operational Info. | Big set of information | Lower |

There are many managerial operations taking place in any organization everyday like,

1. Accounting
2. Planning
3. Supervising
4. Analysis and Control
5. Financing
6. Social welfare
7. Staffing etc.....

To perform above operations effectively one can use MIS. Thus MIS can be defined as...

—A Computer based Information system which is designed to improve the organizational operations like organizing, planning, decision-making etc...“



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MIS is developed by keeping in view all the levels of managers. The information generated at top level is less but very important and crucial where as the information generated at lower level is huge but not very sensitive and less important.

Thus it can be said that MIS is the way by which organization can feed the managers requirement to show their better performance.



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Que:3 DESIGN OF MIS.

Different organizations have different functions and different goals and need.

The purpose of MIS Design is to cater the above needs.

Data gets generated at various levels of management, irrespective of type of organization.

MIS transforms such raw-data into information and helps on taking actions based on real information.

Following steps are followed in MIS Design.

First step in MIS design is to identify problem to be solved and to make it clear.

For example objective of Automation System for any government organization may make millions of records to computerize.

FIGURE:

Internal

constraints

Determine

Determine

Problem

Set

Identify

information

information

definition

objection

constraints

needs

sources

External

constraints Develop
alternative
design
Main Frame
Cost &
Mini computer
facilities
Micro computer
Design &
Implementation
Evaluation



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The basic questions that are asked while listing objectives are...

- (1) What is the purpose of system?
- (2) Why it is needed?
- (3) What is expected to do?
- (4) Who are the users and what are their objectives?

=> The system constraints should be identified.

The constraints are called problem boundaries or restrictions.

The internal constraints are organization policy, personal need, economic threat etc.

The external constraints are mainly concern with customer.

=> Determining information needs.

It is necessary to identify all such crucial information, which are very much helpful to management process.

=> Developing information sources and designing.

It is required to identify the various sources of information. Develop ways to collect such information. Computerize it and make the system implemented as per requirement.



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Review Questions

Sr. No Question

Marks

- 1 What is MIS? Explain with diagram. 5
- 2 Write down objectives of MIS.
5
- 3 Write short note on MIS diagram.
5
- 4 Explain Role of computer in MIS.
5



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Ch:10 Extra Questions

1. Types of Maintenance
2. System Testing
3. Question Bank
4. Fill in the Blanks
5. True - False



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Que:1 Explain System maintenance.

System maintenance is the very important process of system development. Once the system testing is carried out next stage is to remove the errors, which are detected.

Thus, —System maintenance is process of recovering a system to its original.“ If any hardware problem is there it is require correcting. If any software bug is there, it is require debugging. Software never wears or tears out. Thus, major maintenance activity in S/W is debugging and modification to modernize it.

There are 3 different way maintenance is carried out.

- 1) Corrective Maintenance
- 2) Adoptive Maintenance
- 3) Perceptive Maintenance

1) Correcting Maintenance:-

If system fails in working, it is required to correct it. Thus, it is a method of maintenance to work against processing failures. It also includes repairing of the hardware components to remove problem.

2) Adaptive Maintenance:-

The organizational need may vary from time to time. Thus to meet these changing needs, the software is also maintenance is carried out to add some facilities into the S/W and to make it more suitable to organization. Thus, it is a process of making advancement in the system software.

3) Perfective Maintenance:-

To get the system performance best one has to make changes in H/W and S/W to enhance the system performance, the positive changes are brought. The aim of this process is to get the system performance perfect and to make perfect system. The system maintenance process starts where system testing ends up. The system manuals as well as operational manuals are very helpful in system maintenance process. Various different software debugging and utility programs are used to maintain the software.



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Que:2 Explain system testing in brief.

Any newly developed system can never be perfect. There might be some error in the program. Thus, system testing is a process of detecting errors in the software.

The error in S/W may occur due to short time period of development, unskilled men power, Lack of communication between user and programmer and many more things that can be considered.

All the errors are detected in system testing. Thus, it is a method to test the system against pre-defined performance.

Basically there are two strategies for system testing.

-

Code testing

-

Specification testing

CODE TESTING:

Under this method code (program) logic and instructions are tested to find if any bug is there. Here the program execution is carried out step by step to find the logical error.

SPECIFICATION TESTING:

The programmer examines the specifications and checks the program performance. It should be as per the specifications. Program should accept input as per specification and it should provide output as per specification. The system testing carried out at two different levels.

-

Unit testing

-

System testing

UNIT-TESTING:

Under this test the modules alone are tested. Whether they provide service as per requirement or not? All modules are tested one by one unit-by-unit. This type of testing is often called White Box testing. This testing is carried out by analyst, programmer or specialized trained testing person.

For example, any one module calculates square root then it is given some value and tested

whether it returns square root of the number or not? Thus, unit test concentrates on modules only.

Storage Test:

The data storage capacity of system is tested. The maximum possible data is loaded in system and tested it should work properly. If it works, it is successful in storage test.



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Recovery Test:

Some time due to malfunctioning or due to virus data may get corrupted. In this situation, there is provision to recover data. But this provision must work. Recovery Test is used for this type of testing.

Performance & Time Test:

For all the operations to do system takes some specific time. Some operations are required to be done faster. These operations are actually carried out and time & testing is done.

Whether they are completed within pre-defined time or not?



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DETAIL QUESTIONS

1. List out the steps of SDLC and explain each in short.
2. Explain various methods of information gathering.
3. Give various types of feasibility and explain each.
4. Distinguish between system Analysis & Design.
5. Write short note on Project-selection method.
6. Give list of various categories of information systems and explain any one of them.
7. Define the term "System" and explain what is system analysis and why it is required?
8. Write short-note on data flow diagram.
9. What is Data Dictionary? How it clarifies the data?
10. Distinguish between Logical & Physical DFD.
11. Explain why codes are used? Give various types of codes with example.
12. What is form? Why it is required? What care must be taken at the time of designing form.
13. Explain various methods of Data Validation & Error correction.
14. Explain various methods for on-line interactive data input.
15. Explain sequential file organization.
16. What is system testing? Why it is required? Explain it.
17. Write short-note on Quality- Assurance.
18. What is system maintenance? Give 3-types of it.
19. Write short-note on User-Manual.
20. What is structured analysis? Give various components (tools) of structured analysis.
21. Draw one prototype o/p report. List various important components of report with example.
22. Explain Indexed-Sequential file-format.
23. What is MIS? Explain with diagram.
24. Write down objectives of MIS.
25. Write short note on MIS diagram.
26. Explain Role of computer in MIS.
27. Why does one need computerized information System.?

28. Distinguish between on-line and off-line data entry.
29. Distinguish between technical, operational and financial feasibility.



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FILL IN THE BLANKS

1. The _____ phase follows system analysis phase.
2. Strategic information can help _____ level management.
3. _____ technique reduces redundancy in data designing.
4. The intensity of coupling between modules is known as _____.
5. In DFD open rectangle represents a _____.
6. In DFD a circle represents a _____.
7. Context-diagram of system is referred as a level _____ DFD.
8. A decision tree can be represented in a tabular form called _____.
9. _____ file organization does not require record keys.
10. A record contains _____.
11. Records in a file on magnetic tape can be accessed only in _____ manner.
12. Transaction files have _____ life than master file.
13. A file containing multiple indexes to data is called _____ file.
14. Data is arranged in some fixed order in _____ file format.
15. A top-down hierarchical design methodology is known as _____ Design.
16. Sequence numbering method where each data is given a number is a method to _____ data.
17. A process to identify and correct errors in source file is known as _____.
18. Maintenance begins where _____ and up.
19. _____ testing provides final certification that system is ready to indent.
20. The relation between two entities is represented as _____ diagram.



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TRUE OR FALSE

1. Information needs vary across different levels of organization.
2. When there is only one possible solution, system study is not required.
3. If a solution is only technically feasible, it is practical.
4. System study is a waste of time.
5. System study requires the skill of a programmer.
6. System study involves cost-benefit analysis to decide whether to proceed or not.
7. All problems of organization can be solved by computerized information systems.
8. The analyst learns the system, and decides on solution without discussion with users.
9. To understand a system first physical aspect is identified to prepare logical model from that.
10. All data has to be entered one by one from first.
11. The various steps of SDLC must be carried on strictly one by one and in sequence.
12. Increasing cohesion increases coupling.
13. High cohesion is a sign of good design.
14. Normalization reduces redundancy of data.
15. Decision tree is only meant to depict processing logic.
16. A decision table contains at least two possible actions.
17. DFD contains decision tree.
18. Data element contains data stores which contain data structures.
19. A system flow-chart is not a part of program documentation.
20. Indexed sequential files will be faster than sequential in situation.
21. Indexed file can have more than one key fields.
22. Key fields are used for finding other data of that record.
23. Preparation for change over can start after acceptance testing.
24. Parallel run is always a secured means of change over.
25. Direct change over is very risky.
26. Most systems can work well regardless of whether users are trained or not.
27. In online input methods forms are first filled up and then data is entered from form to system.

