

## Unit :- I

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\* system concepts and methodology :-

\* Introduction to system:-

⇒ definition :-

system is integrated collection of components which function together according to decided plan to achieve specific goal or object.

A system is simply a set of related components which interact with each other to accomplish sum purpose or specific objective.

⇒ System is derived from greek word 'systema' which means organised relationship among functioning unit for ex: the education system consist of many components like faculty, students, administrative staff, infrastructure and management etc.

⇒ A business is also a system consist of many department like purchase, production, marketing, accounting, store etc. from the word system

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the new word is derived name as system study.

⇒ system study :-

⇒ system study may be defined as a study of the operation off a set of connected element and inter-connection between this element.

⇒ In a system study the word component may refer to a physical part for ex:- keyboard, memory, printer, mouse they all are the component of computer system.

### \* system Analysis :-

⇒ system analysis means how and where function are performed and by whom.

⇒ system analysis is the process of complete understanding the current system by gathering and interpreting facts identify the problem and using the fact to improve the current system.

=> system analysis is understanding the goal and strategies of the business.

=> defining the information requirement that supports those goal and strategies it is not about programming.

#### \* system design :-

system design is the process of planning a new system or replace of existing system.

#### \* system Analyst :-

=> A business professional who uses analysis to design to solve business problem using information technology.

=> The system Analyst is a key person analysing the business identifying opportunity for improvement and designing information system to implement this ideas.

\* what is interface?

=> An interface is a common boundary between user and the computer system application.

=> the purpose of interface is :-

- (i) tell the system what action to take.
- (ii) facility use of the system.
- (iii) Avoid user errors.

\* what do you mean by behaviour:-

=> Behaviour view is the dynamic aspects of the software system model. Processes are realization of method. Method when applied in real scenario to accomplish a particular task constitute dynamic aspects of the system.

\* need for system Analysis and design :-

System are initial for different reason, the most important reasons as below:-

## 1) Capability :-

Business activities are influenced by an organization's ability to process transaction quickly and efficiently.

⇒ information system add capability in three way :-

(i) improve processing speed :-

The inherent speed with which computers process data is one reason organization seek the development of system project's.

(ii) increase volume :-

~~provide the capacity to process a greater amount of activity, perhaps to advantages of new business opportunities.~~

(iii) Faster retrieval of information :-

locating and retrieving information from storage provide the ability to conduct complex searches.



## 2) Control :-

(i) greater accuracy and consistency:- carrying out computing steps including Arithmetic correctly and consistency.

(ii) better security:-

safe keeping sensitive and important data in a form that is accessible only authorized person.

## 3) communication :-

(i) Enhanced communication :-

speeding the flow of information and messages between remote location as well as within offices. This includes the transmission of documents within offices.

(ii) integration of Business Areas:-

coordinating business activities taking place in separate areas of an organization through capture and distribution of information.

4) cost :-

(i) monitor cost :-

Tracking the costs of labour, goods and overhead is essential to determine whether a firm is performing in line with expectations within budget.

(ii) reduce the costs :-

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

5) competitiveness :-

(i) look in customers :-

changing the relationship with services provided to customers in such way that they would not think of changing suppliers.

(ii) look out the competition :-

Reducing the chances of entering the competitions in the same market because of good information system being used.

in the organization.

(iii) Improve Arrangements with suppliers :-

changing the pricing, services or delivery arrangements or relationship between suppliers and the organization to benefits the firm.

(iv) New products development :-

Introducing new products with characteristics that use or are influenced by information technology.

\* classification of systems (Types of system) :-

(i) Physical or Abstract system.

(ii) open or close system

(iii) manual or automated

(iv) permanent or temporary system.

(v) Natural or manufactured system.

(vi) deterministic and probabilistic system.

(vii) man - made information system.

### (i) Physical or Abstract systems:-

Physical systems are tangible entities we can touch and feel them. Physical system may be static or dynamic in nature. For example, desks and chairs are the physical parts of computers center which are static. A programmed computer is a dynamic system in which programs, data and applications can change according to the user's needs.

### (ii) open or closed system:-

An open system must interact with its environment. It receives inputs from and delivers output to the outside of the system. For example, an information system which must adapt to the changing environment conditions.

⇒ A closed system does not interact with its environment. It is isolated from environmental influences. A completely closed system is rare in reality.

⇒ It is isolated from environment influences. It operates on factors within the system itself. It is also

defined as a system that includes a feedback loop, a control element and feedback performance standard.

(iii) natural and manufactured systems:

natural system are created by the nature. For example, solar system, seasonal system. manufactured system is the man-made system. For example, rockets, dams, trains.

(iv) deterministic or probabilistic system :-

deterministic system operates in a predictable manner and the interaction between system components is known with certainty. For example, two molecules of hydrogen and one molecule of oxygen makes water.

(v) permanent or temporary system:-

=> permanent system persists for long time. For example, business policies.

=> temporary system is made for specified time and after that are demolished. For example, A system is

set up for a program and it is disassembled after the program.

### (vii) man-made information system:-

⇒ It is an interconnected set of information resources to manage data for particular organization, under direct management control (DMC).

⇒ This system includes hardware, software, communication, data and application for producing information according to the need of an organization.

⇒ They are classified into three systems:

- 1) Formal information system.
- 2) Informal information system.
- 3) computer based information system.

#### 1) Formal information system :-

Formal information system is based on the organization represented by the organization chart. It is sponsored with pattern of authority and communication and work flow.

## 2) Informal information system :-

Informal information system is employee based system design to meet personal and vocational need to help in the solution of work related problems.

⇒ It works within the framework of business and its state policies.

## 3) Computer Based information system

system Analyst develop different types of information system to meet a variety of business needs. this class of system is known as computer based information system.

⇒ This can be further sub classified as :-

- 1) transaction processing system (TPS)
- 2) management information system (MIS)
- 3) decision support system (DSS),
- 4) office automation system (OAS).

\* what is system ? explain Role of system Analyst?

⇒ A system is simply a set of related components that interact with each other to attend specific objective.

⇒ Components of system are as follows:

- 1) input
- 2) output
- 3) control
- 4) Boundary
- 5) interface
- 6) feedback.

⇒ System Analyst is business professional who uses analysis and design techniques to solve business problem using information technology.

\* Role of system Analyst:-

(i) Defining Requirement :-

This is most difficult and primary part of software development. Business problem are difficult to understand and define problem should clearly define and that is the main duty of system analyst.

(ii) gathering data, facts and opinions

to info of users:-

⇒ system Analyst should consult with managers, users, professionals so that they can collect enough material and data to understand, define and solve problems.

⇒ data collection is very tough job as end user may have attitude, ego lack of cooperation due to reason unknown to analyst.

(iii) Analysis & Evaluation :-

⇒ Analyst responsibility is conducting system studies to know related fact about business activity.

⇒ The system analyst may then think of plan to solve the problem.

(iv) solving problems:-

system Analyst must have analytical mind and should be evaluating different possible solution before recommending best one to the management.

### (v) Drawing a specification:-

The job of system analyst also merit and user objectives and make a win situation for both of them. The specification should be non-technical so that manager from non-computer background can also understand it.

### (vi) Designing system :-

System Analyst play an important role in preparing and designing the system which matches with the user requirement.

### (vii) Evaluating system :-

⇒ The job of system Analyst does not end once implementation of the system is complete.

⇒ Evaluation also has to be done by the analyst and user satisfaction is to be monitor by the system analyst.

\* system Analyst approach to problem solving :-

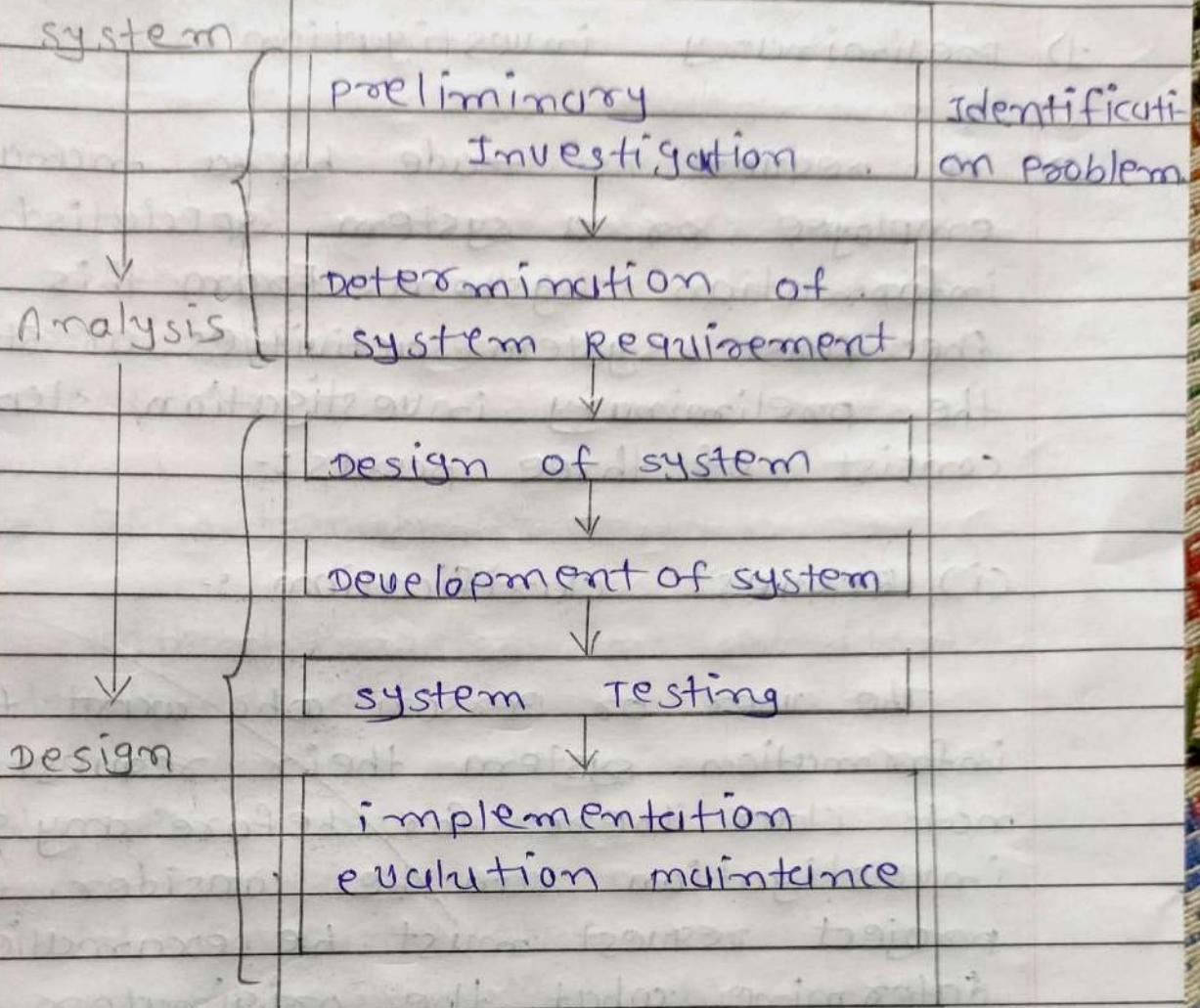
- (i) Research and understand problem
- (ii) Verify benefit of solving problem and out weightage the cost.
- (iii) define the requirement for solving the problem develop a set of possible solution.
- (iv) decide which solution is best.
- (v) define chosen situation.
- (vi) implement solution.
- (vii) monitor to ensure desire result.

\* what is SDLC and explain each activity of SDLC in detail.

⇒ SDLC stand for system development life cycle.

⇒ The sequence and implemented known as SDLC. the SDLC is a collection of process which are followed to develop a software.

⇒ SDLC is a classically through of set of activities that analyst, designers and user carry out to develop and implement an information system.



⇒ SDLC consist of the following six activities or stage :-

- 1) Preliminary investigation.
- 2) determination of system requirement.
- 3) Design of system.
- 4) development of system.
- 5) system testing.
- 6) implementation, evalution and maintenance.

## 1) Preliminary investigation :-

⇒ A request is made by a manager or employee or a system specialist for information system. From this point the first system activities or stage the preliminary investigation starts. It consists of three parts :-

### (i) Request classification :-

The user or person who want the information system their request are not clear these far before any system investigation can be consider, the project request must be examined to determine what the originator want.

### (ii) Feasibility study :-

whenever any user request is clarified then it is very much important to determine whether the system request is feasible or not. There are three aspects in the feasibility study :-

#### ⇒ Technical feasibility :-

can the work for project be done

with current equipment existing software technology and available personnel?

⇒ Economic feasibility :-

Are there sufficient benefits in creating the system to make the cost acceptable?

⇒ Operational feasibility :-

Will the system be used if it is developed and implemented?

⇒ The feasible study is carried out by a small group of people who familiar with information system technique as well as routine and detailed activity of the organization.

(iii) Request approval :-

All requested project are not desirable or feasible however those project that are both feasible and desirable should be put into a schedule if the system developer are free then the development process will be immediately started otherwise the proposal will put into repository.

queue depending upon their importance.

## 2) Determination of system requirements:-

⇒ detail understanding of all important fact of business area under investigation is the key point or heart of system analysis.

⇒ The analyst must study the business process so that the question related to study can be answered.

⇒ For this system analyst has to work with variety of person to gather detail about the business process.

⇒ The details are gathered the analyst study the requirement data to identify features the new system should have.

## 3) Design of system :-

⇒ The design of information system produce the detail that state how a system will meet the requirement identify during system analysis. sometimes this stages called logical design in contrast to the process of developing program software which is refer

to as physical design.

=> system analyst begins the design process by identifying reports and other output, usually designer sketch it to appear when the system is complete. this may be done on paper.

=> The system design also describe the data to be input calculated or stored. Individual data item and calculation procedure are written in detail.

=> The detail design information is passed on to the programmer with complete and clearly outline software specification as programmer start designer are available to answer questions clarify difficult areas and handle problems that comfort the programmer when using the design specification.

#### 4) Development of System :-

=> software developer may install purchase software they may write new custom design program. The choice depend on the cost of each option. the time available to write software and availability

of programmers.

⇒ Programmers are also responsible for documenting the program providing and explanation of how and why certain procedures are coded in specific way.

### 5) System Testing :-

⇒ In testing the system is used experience to ensure that the software does not fail, for example; that it will run according to its specification and in the way user expect. Special test data are imputed for processing and the result examined. A limited number of user may be allowed to use the system so analyst can see whether they try to use it in unusual ways.

⇒ In many organization testing is performed by person other than those who wrote the original programme to ensure more complete unbiased testing and more reliable software.

## ⑥ Implementation, evaluation and maintenance:

=> Implementation is the process of having system personnel check out and put new equipment into use, train user, install new application and construct any files of data needed to use it.

=> Evaluation of this system is performing to identify its strength and weakness. The evaluation process can be categorised in following Three ways :-

### (i) operational Evaluation :-

In this it will determine how system is functioning. It also includes ease of use, response time, suitability of information format, overall reliability and level of utilization.

### (ii) organizational impact :-

Identification and measurement of benefit to the organization in such area is financial concern (cost, revenue and profit), operational.

### (iii) user management assessment :-

Evaluation of the attitude of seniors and user managers within the organization as well as end users.

⇒ development performance :- It major overall development and efforts conform to budget and other standard project management criteria include assessment of development method and tools.

\* Difference between system analysis and system design :-

#### System analysis

#### system design

- |  |   |
|--|---|
| 1. System analysis is the examination of the problem.            | System design is creation of information system which is solution of problem.                   |
| 2. It is concerned with identify all the contains and influence. | It is concerned with coordination of the activities job and procedure in order to achieve goal. |
| 3. The deals with data collection and detailed                   | It deal with generation of new design   |

Evaluation of current specification. It also deal with testing and maintenance of system.

4. It shows the components. It shows the way of organize components.
5. It describe by logical model of system such as DFD and flowchart. It provide technical specification and reports.

\* The components of structured analyst  
or  
Need of structured analysis and design:-

=> structure analyst consist of following components :-

1) graphic symbols :-

=> This include icons and data follow diagram instead of words structure analyst uses symbol or icons to create a graphic model of the system.

=> icon is graphical represent of entities described by the data.

⇒ data flow diagram is important graphical tool to used described and analysed the movement of data through a system.

2) data dictionary :-

⇒ The data dictionary store details and description of all data used in a system. it is organized listing of all the data element that are introduce of the system.

3) procedure and process description:-

⇒ The process description allows the system analysis to describe the business policy representation by bottom level bubble in bottom level DFD. This can be return in a variety of forms such as structured english, decision tree, description table etc.

4) rules :-

⇒ These are the standard for describing and documenting the system correctly and completely good documentation provide an explanation of how system operate.

\* what is structure analysis?

→ structure analysis is a development method for the analysis of existing manual or automated system.

⇒ leading to the development of specification for a new or modify system.

⇒ structure analysis allow the analyst to learn about a system or a process in a managerial or logical way the objective in structure analysis are to completely understand system from which requirement are determine which become the bases for new or modify the system.

⇒ fully understanding of large complex system may be difficult but structure analysis development method is aimed at overcoming this difficulty through its components which are described in the next session.

⇒ structure analysis come above during the late 1970s as a method of communicating more effectively with user during the entire system development lifecycle.

\* what is SSADM?

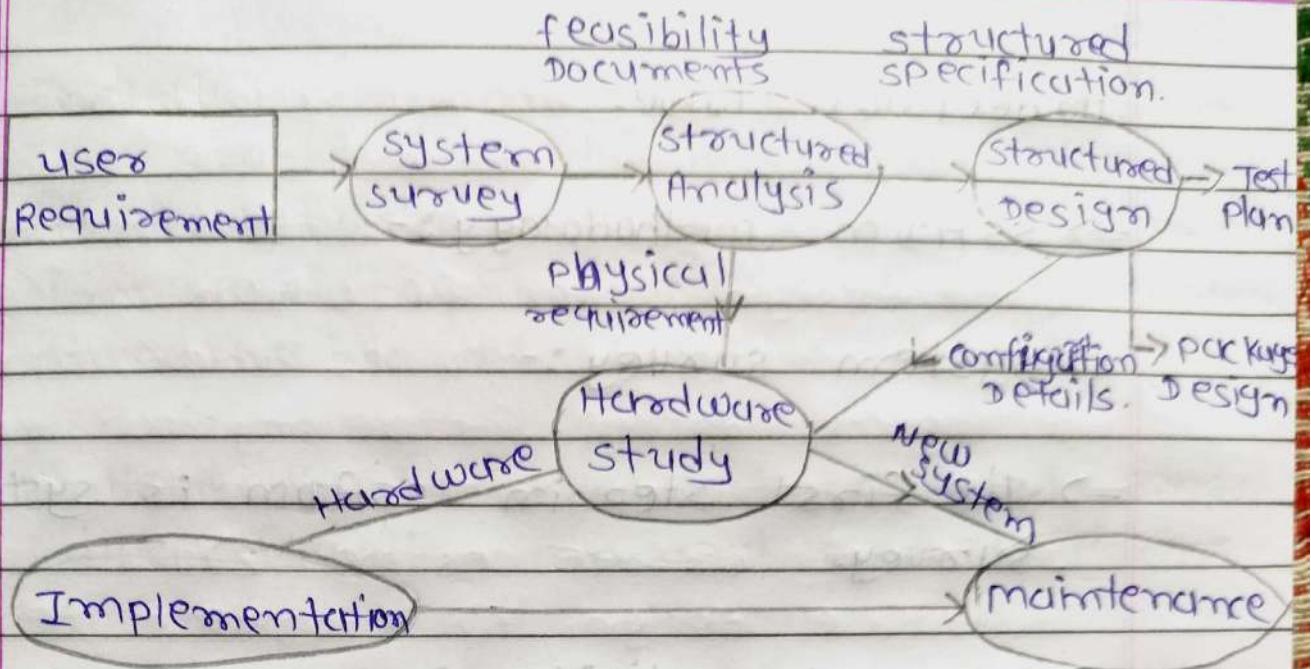
⇒ SSADM stand for system structured analysis and design method.

⇒ Structured system analysis and design is a well define approach in the form of methodology. It is not a new.

⇒ SSADM is a further modify form of SDLC hence we can also call SSADM as a SDLC using structure technique.

⇒ SSADM is consist of :-

- 1) system survey.
- 2) structure analysis.
- 3) structured design
- 4) Hardware study
- 5) Implementation
- 6) maintenance.



⇒ structured analysis using symbol instead of negative description and create a graphic mode of the system.

⇒ The SSADM involves data flow movement of data diagram (DFD) method of showing the movement of data through a system. The DFD are free of unnecessary detail and are therefore very useful in providing overview of the system.

⇒ The structure analysis uses other tools like :-

- 1) data dictionary
- 2) structure english
- 3) decision tree

1) decision table.

⇒ ssADM methodology :-

1) system survey :-

⇒ the first step in ssADM is system survey.

⇒ the sub activity in survey are :-

- (i) identify the scope of current system.
- (ii) identify and list deficiency in the current system by taking into consider the user requirement.
- (iii) Establish new system goal and identify the constraint.
- (iv) prepare a document consistency of goal and objectives, customise project lifecycle, constraint regarding technical and procedure aspect, cost benefit analysis.

⇒ This phases is similar to feasible study in SDLC.

2) structured analysis :-

⇒ The second stage is ssADM is structure analysis. which is most important part.

⇒ Structured analysis is set of techniques or graphical tools they allow the analyst to develop a new kind of the system in specification that are easily understandable to the user.

⇒ Here the analyst uses graphic symbol data flow diagram and data dictionary to represent the system.

⇒ Structure analysis consists :-  
1) To study current system  
2) To derive logical equivalent DFD.  
3) Develop logical model of new system.  
4) Establish men machine interface  
5) Identify cost and benefits  
6) Select the best options.  
7) Package specification.

### 3) Structured design :-

⇒ Structure design is the data flow methodology. The input for structure design is structure specification which is the output of structure analysis.

⇒ It also receive input from the hardware study.

=> what we do in the system design process is to convert the logical design process specification into technical design specification in short system design involves transforming a logical design into physical design here the important activities are :-  
1) input output design 2) Files and database design. 3) program design  
4) control design.

=> Activities that run parallel to this detail design steps of software package are :- 1) Equipment specification. 2) Test specification 3) user interface specification.

4) Hardware study :-

=> This step considers the physical requirement of the purpose system.

=> It is based on the new physical DFD and data dictionary of step 2 here we should specify detail of the configuration to be used in implementation stage.

⇒ This configuration detail go as input for equipment specification process in step 3 the cost involve and the present work of the benefits to the occur are consider here for hardware specification.

5) constructing the system and implementation :-

⇒ The implementation process begins after the management has accepted the new system.

⇒ System implementation consist of five components:-  
1) system Acquisition  
2) Programming  
3) Testing  
4) conversion  
5) documentation.

1) system Acquisition :-

It involves the purchase of hardware, packaged software and software services. here the system analyst and designer work together to determine best place to make this outside purchase another important part of the system acquisition is actual purchase of goods and services.

## 2) Programming :-

It is the writing of instruction to be read and executed by a computer.

=> Programming is performed by computer programmer or analyst rather than by system analyst or designer.

=> Normally team of programmers work under the direction of lead programmer typically a system designer.

=> Task in programming include writing coded instruction, testing each segment of the code and testing the entire computer program once it is completed.

## 3) Testing :-

=> It consists of putting together the various coded pieces of design, testing them and correcting the part of the code or the design that are not correct.

=> At this stage some errors are introduced purposely to test whether they will be spotted by the program.

#### 4) conversion :-

⇒ once the system has been tested successfully then the part which remain is that of putting them into the operation.

⇒ The conversion team must manage the smooth change over from the old system to new system. this requires:-  
(i) training of personal. (ii) modifying part of the old system. (iii) running parallel system or dual system until everything goes as plan.

#### 5) documentation :-

⇒ documentation means putting it in the writing form above how system is designed or function.

⇒ The documentation include :-

##### 1) design documentation :-

It describe the overall system design and include system flowchart, all input output formats, file description, control requirement and report specification.

### 2) Program documentation :-

It consists of programming specification like program logic, graphics, input-output formats etc.

### 3) Training documentation :-

It includes user training manual and material to be used in the conversion and the installation of the new system.

### 4) Operation documentation :-

It contains instruction for normal operation as well as direction for handling problems and breakdowns.

### 5) User reference documentation :-

It comes on after training is over and the system is installed it should provide quick and clear answer like a dictionary.

## 6) maintenance :-

=> This is the last step in the system life-cycle. However it takes the longest duration. Maintenance may be corrective, adaptive, perfective.

=> In corrective maintenance errors or bugs rectify.

=> In adaptive maintenance the user requirement if any are still consider and the necessary changes are made.

~~=> In perfective maintenance effort will be constantly going on to perfectly system in term of response time and resource requirement.~~

=> Advantage of SSADM :-

=> good documentation :-

In the structure methodology well define documentation take place hence it is easy for the analyst user and programmer to understand and use.

→ Better communication :-

since structure methodology is graphic it provides easy to understand presentation of the application. The DFD for example :- present a better picture than any other computerized tool.

→ standardization :-

before the emergence of the structure method the system analyst used to have their own method of designing computerised system. but structure methodology offers very little scope for individual approach.

→ modularization :-

The process is a partition so that we have clear picture of the smaller modules which is essential to understand the system thoroughly.

→ logical design :-

The SSADM is more logical and then physical. The element of the system do not depend on the hardware.

⇒ User orientated :-

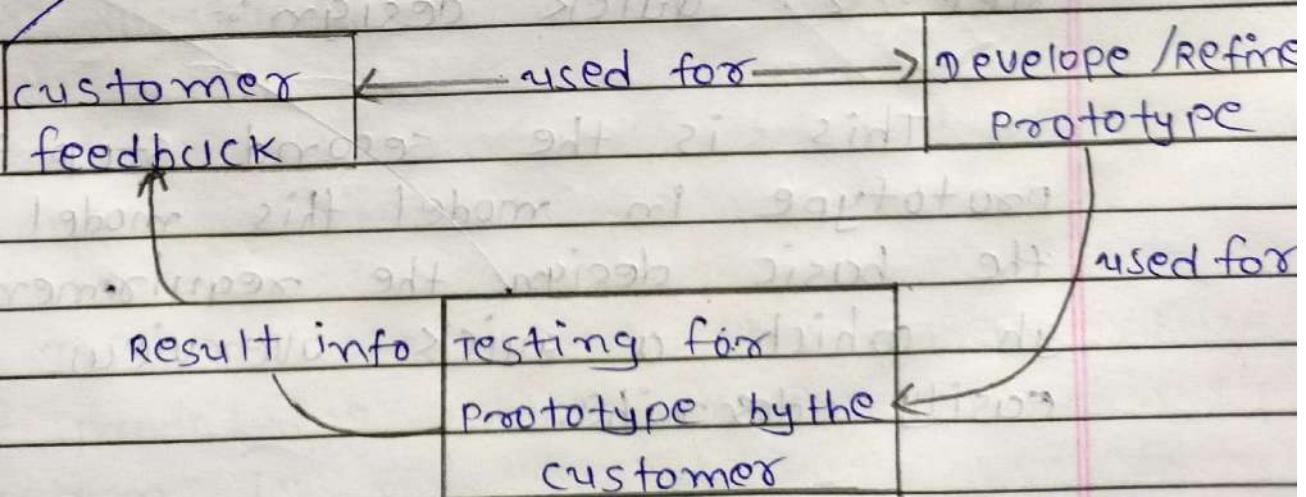
The SSADM is consult user at every stage of development thereby leaving no scope for rejection. After the system is implemented.

⇒ maintainability :-

The need for maintenance arise due to error, modified user requirements and enhancement. The structure methodology take into account hence maintenance become cheaper.

\* SPM :-

⇒ SPM stand for system prototype method.



- ⇒ In this process model the system is implemented before or during analysis thereby allowing the customer to see the product early in the lifecycle.
- ⇒ The process starts by interviewing the customer and developing incomplete high-level papermodel.
- ⇒ The step of prototyping model:-

Step :- 1 :- requirement gathering and analysis:-

This is the initial step in designing a prototype model in this phase users are asked about what they expect or what they want from the system.

Step :- 2 :- quick design:-

This is the second step in the prototype model this model covers the basic design the requirement through which a quick overview can be easily describe.

Step :- 3 :- Build a prototype :-

This step helps building an actual prototype from knowledge gained from the prototype design.

Step :- 4 :- Initial user evaluation:-

This step describe the preliminary testing where the investigation of the performance model occurs. As the customer will tell the strength and weakness of the design which was send to the developer.

Step :- 5 :- Refining prototype :-

If any feedback is given by the user then improving the clients response to feedback and suggestion the final system is approved.

Step :- 6 :- Implement product and maintain:-

This is the final step in the phase of prototyping model where the final system is tested and distributed to production here the program is run regularly to prevent failures.

requirement gathering and analysis

↓  
quick design

↓  
build a prototype

↓  
initial user evaluation

↓  
refining prototype

↓  
implement product  
maintain.

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