CONCEPT OF INFORMATION SYSTEMS AND SOFTWARE

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Subject- COMPUTER APPLICATIONS IN PHARMACY (BP205T)

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An information system is a system that provides collection, storage and retrieval of information in an organized manner.

An information system can also be referred to as a software or system that helps us to organize data and use it in a systematic manner as and when required. It helps to convert raw data into useful information that can be analyzed at various levels in different organizations.

The information system can be of two types – general and specialized.

General Information System - These information systems are used widely for basic analysis of data in any organization. These are not specific to any department or industry. For eg. DBMS i.e. database management system (DBMS) is a type of software that is used to store and organize large amount of data for further analysis.

Specialized Information System - These systems are specifically designed to suit the requirements of a particular organization or category. For eg. GIS i.e. Geographic Information System is used to access geographical data for various regions.

INFORMATION GATHERING

Information gathering refers to collection of information from various sources and then compiling that data in the required format.

In most of the organizations, information gathering refers to collection of large amount of data from various sources. This data is further analyzed to solve a particular problem or situation. However, in specialized industries like air force, military etc., information gathering is a special skill that requires training and education of people involved. This training is based on methods and sources of gathering information.

SOURCES USED IN INFORMATION GATHERING

Existing Sources – It refers to those sources of information that can be found on internet or some other social media and thus information can be easily retrieved and used.

Natural Sources – It refers to those sources of information which exist in the market but one has to do a lot of research to compile this information. Eg. Information regarding some product, people who have already tried that product, their experiences, feedback etc

PURPOSE OF INFORMATION GATHERING -

Researchers are keen to gather information on various topics for the following reasons –

- Enhance knowledge related to a particular subject.
- Develop various skills for problem solving.

REQUIREMENTS GATHERING TECHNIQUES

o Brainstorming Technique
  - Idea generation
  - Idea reduction and voting

o Mind Mapping Technique
  - Use emphasis
  - Use association
  - Be clear
  - Layout

o Use Case Workshop Technique
  - Most popular
  - Collect requirements in step-by-step manner
  - Helps understanding the details
  - Easy to document and written in natural language

TECHNIQUES OF INFORMATION GATHERING -

- Analysis is done to understand business functions and requirements.
- Model of the existing system is created and changes are suggested as per requirements.
- Logical explanations and discussions are carried out to implement suggested changes.
- Balance is maintained between current system and required new system.
- Final design is created as per customer's requirement.

REQUIREMENT AND FEASIBILITY ANALYSIS

Requirements Analysis refers to process of analyzing various requirements of a particular user and then design a product or a software. The following points are considered for this analysis –
- Actual usage or requirement of a product
- Specifications to be met
- Expected outcomes

Requirements analysis is important for the success or failure of a particular project. These requirements are well documented and measured before initiating any project and then finally tested before launching that product in the market. This can be a long and tiring process that involves many changes before finalization. This is because, requirements of a particular user keeps on changing while the project is still in process.

Feasibility Analysis refers to a detailed analysis which is conducted prior to start of a proposed project. The major points to be considered in it are –
- Whether the project is technically feasible or not?
- Whether it can be completed within estimated cost or not?
- Whether it will be a profitable project or not?

Such analysis is conducted when large amount of investment is involved by major corporations of this world. Such organizations prefer conducting feasibility analysis before the start of any project, in order to make sure that they are going to invest in a profitable business and are availing the right opportunity.

Thus, feasibility analysis ensures that upcoming project would be a great success as it was strategically planned and executed. This kind of analysis is used to assess all the strengths and weaknesses of a proposed project and hence, one is able to bring in meaningful changes in order to achieve desired results.

DATA FLOW DIAGRAM

Data flow diagram refers to graphical representation of flow of data through an information system. It is the first step followed in order to create an overview of any information system. These diagrams are used for visualization of processing of data in various systems. Data flow diagram shows how the information will be entered into a system, how it will be processed and where it will be stored.
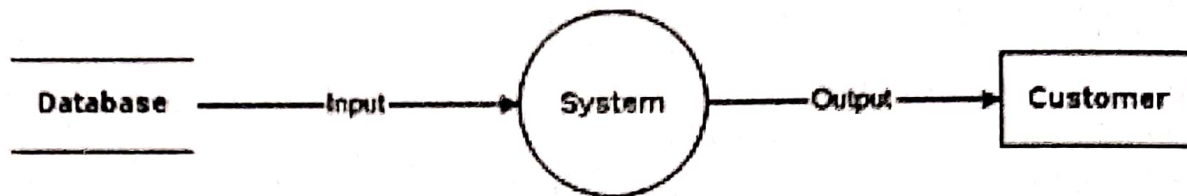
Data Flow Diagram

DATA FLOW DIAGRAMS SYMBOLS

There are two types of symbols used in DFDs.

- Yourdon & Coad – It is mainly used for system analysis and depicted as circles.
- Gane & Sarson – It is mainly used for visualizing information systems and is depicted as rounded corners.
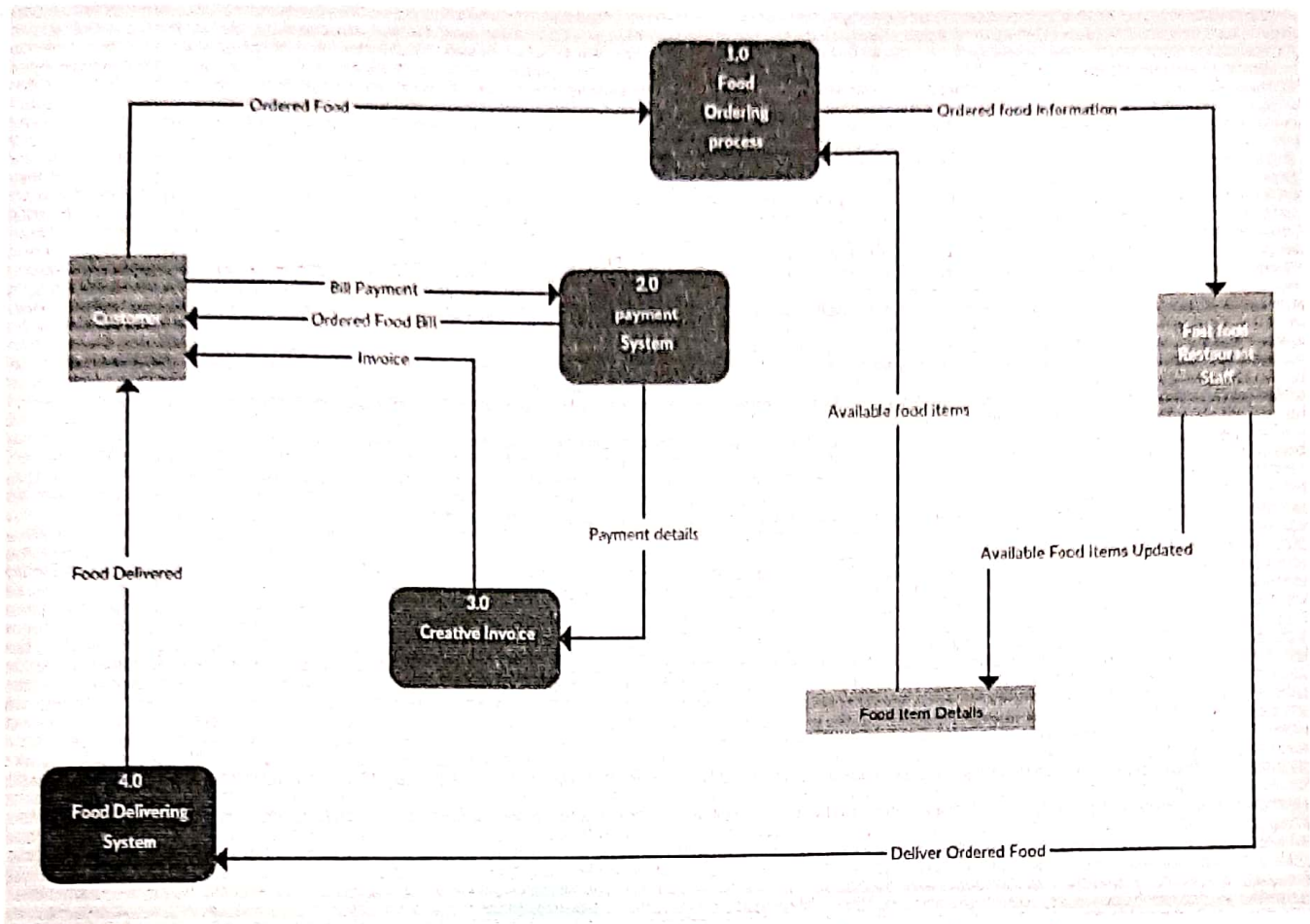
COMPONENTS OF DFD

1. Process – It is used to describe how data input will be transformed into data output.
2. Flow – It is used to describe the movement of data within any information system.
3. Store – It refers to the storehouse of data where all the data storage takes place.
4. Terminator – It refers to the final entity with which a system communicates and provides required information. It can be a person, group of persons, organization, department etc.

TYPES OF DFDS

- Physical DFD – A physical DFD represents how various functions are performed in a system.

- Logical DFD - A logical DFD is mainly related to business and its activities.

In short, we can say that, logical DFD provides "What" information on a system and physical DFD provides "How" information on a system.

1.0 Food Ordering process

Ordered Food

Ordered food Information

Customer

Bill Payment

Ordered Food Bill

Invoice

2.0 payment System

Fast food Restaurant Staff

Available food items

Payment details

Food Delivered

3.0 Creative Invoice

Available Food Items Updated

Food Item Details

4.0 Food Delivering System

Deliver Ordered Food

Data flow diagram of food ordering system in a restaurant

PROCESS SPECIFICATIONS

Process Specification refers to specifying a particular process which describes how to use input data strategically in order to transform it into required output. It shows what should be done to utilize the available information as input and generate an output.

In other words, we can say that process specification refers to a method of documenting, analyzing and explaining the process used to create an output in an information system.

Requirements of Process Specification

- Each process specification should contain detailed requirement of functionality.
- Each set of process specification must specify all the rules governing transformation of data flow within an information system.
- Each set of process specification must specify all the underlying policies governing transformation of data. However, it is not necessary to describe the method used to transform that data.

Process Specification Format Information

a. Number
- as used on the DFD

b. Name
- as used in the process symbol on the DFD

c. Description
- Description of what the process accomplishes
- Example: Determine if an item is available for sale. If it is not available, create a backordered item record. Determine the quantity available.

INPUT/OUTPUT DESIGN

Input Design is the process of converting data into a computer based system. This design is necessary to get correct interpretation of the data that has been fed into the computer.
It is a link between information and the user. It is required to convert entered data into a usable form which can be easily read and interpreted by the computer system.

Requirements of Input Design

- It should be simple and easy to use.
- It should avoid extra steps involved in analysis of data.
- It should avoid delay in interpretation of data.
- It should be error-free.
- It should keep the process simple and controlled.

Considerations of Input Design

- What kind of data needs to be entered in the computer system?
- How much data needs to be entered?
- How the data should be coded or interpreted?
- How to make it user friendly and guide the user for its appropriate use?
- Prepare proper input validations.
- Follow pre-decided steps in case of an error.

Output Design is the process of getting required output from the entered data, what the system must produce to meet business requirements of its users.
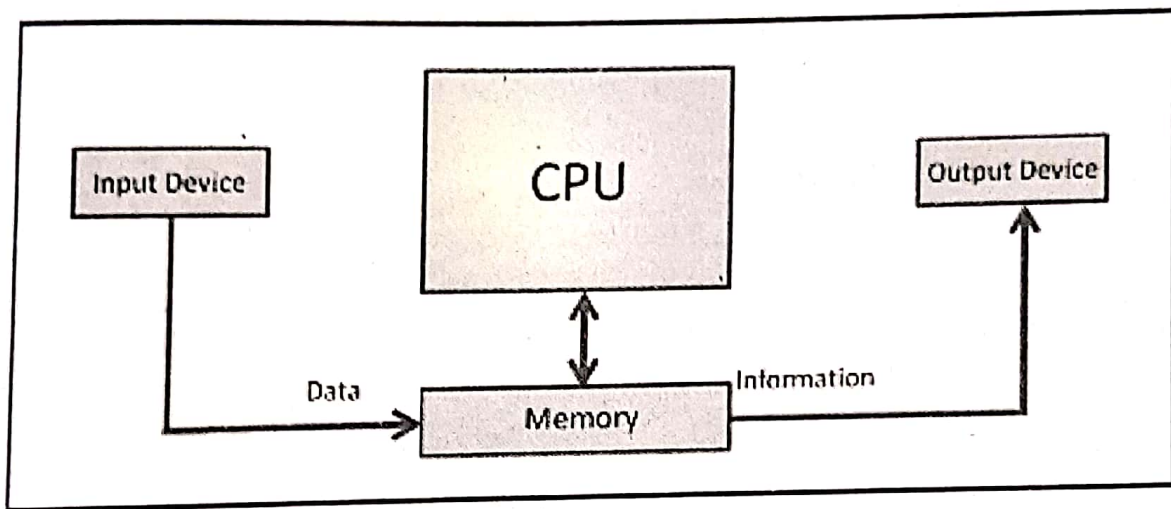
- It should serve the intended purpose of its user.
- The right amount of output should be delivered at the right time and right place.

Output Media

- Paper
- Screen
- Video/Audio Aids
- CDROM, DVD
- Other electronic media

PROCESS LIFE CYCLE

Process Lifecycle is the method of understanding initial, intermediate and final stages of growth and development in any process. It helps us to understand how a particular process fits into our system within any organization.

A process can be defined as the basic unit of work in any system and its complete cycle including model, implementation, execution, monitoring and optimization is termed as process life cycle.

Process Life Cycle includes study of all the processes involved from the start till the end of any workflow in the system.
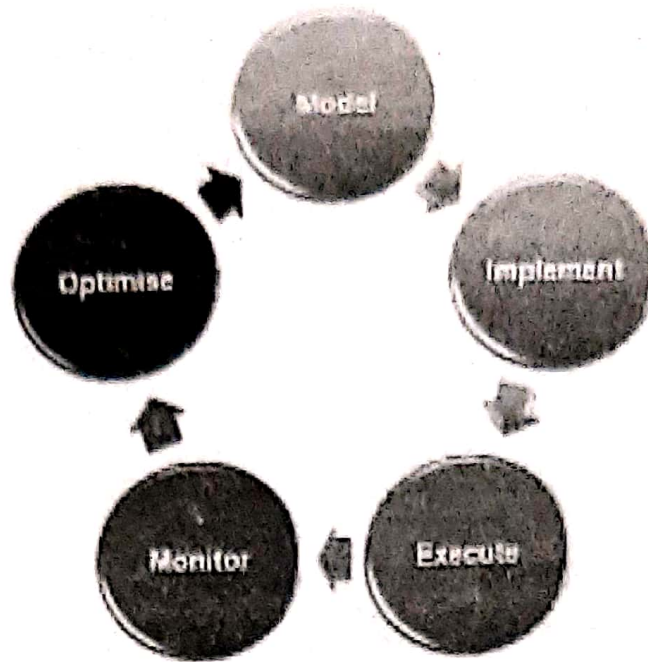
STEPS OF PROCESS LIFE CYCLE

1. Planning
2. Implementation
3. Monitoring
4. Changes or Adjustments
5. Evaluation

Planning - The initial stages of process life cycle includes modeling phase in which when we gather all the details related to that process. Eg. What does the process demands, why it is required, what will be the steps, who will participate in it, how it will be executed, from where it should begin and how will it end? With all this information in hand, a flow diagram is constructed to visualize the whole process.

Implementation & Monitoring – After planning, the process is implemented as per plan and is closely monitored for desired output or results.

Changes or Adjustments – If a given process is generating desired output, then it is allowed to continue as implemented. Otherwise, a list of changes or required adjustments is made and suggestions are taken for betterment of the process. Once the changes are finalized, these are again implemented and monitored.

Evaluation – As the name suggests, it is the last step in process life cycle where each and every step is carefully evaluated for desired results and output in order to obtain best system within an organization.

Modelling the Process and Life Cycle

Software development usually involves the following stages:

- Requirements analysis and definition
- System design
- Program design
- Program implementation (writing the program)
- Unit testing
- Integration testing
- System testing
- System delivery
- Maintenance

PLANNING AND MANAGING THE PROJECT

Planning and Managing the Project involves various methodologies that are required for proper implementation and successful running of any project. The various steps involved in planning and management of a project are as follows –
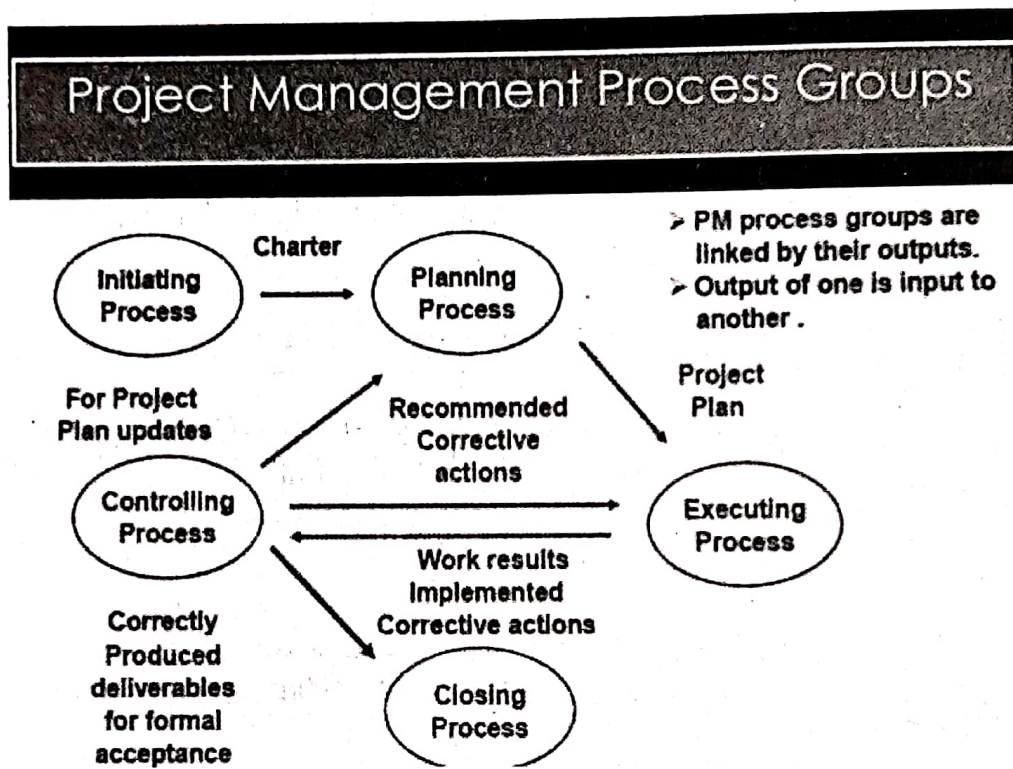
Planning the Project

- In order to plan the project, it should be divided into manageable components so that each component can be deeply analyzed and managed.
- After breaking them into variable components, we should identify their dependent entities like the factors responsible for successful running of the project.
- Next step is to provide an estimated time line for completion of project so that every component and factor can be taken care of properly.
- Before implantation, we should carefully analyze the resource requirement in detail in order to minimize the chances of alterations during later stages.
- The risk factors involved in a project should also be considered well in advance so that they can be avoided in final stages of development.

Tracking and Managing the Project

Tracking project's progress is essential in order to fulfill the time line that has been estimated in initial stages of planning. It helps to monitor progress at each step as per planned process. Project tracking is also important to keep a check on emerging problems that can arise anytime during the implementation of a project. If such problems are diagnosed in initial stages, it becomes easier to deal with them before they become big issues and put a hold to any process.

Project Management Metrics

- Schedule – It involves providing an estimated time period to be taken to complete any given project.
- Cost – It calculates the estimated budget for a particular project.
- Resource – It defines how much resource and how many persons are required to complete a given project in given time period.
- Scope - It shows the upcoming scope for a given project and its success rate as per provided projections.

In the end, we can say that the process of planning, directing, controlling and implementing a project from start to an end is known as project management. It is necessary to provide desired results to the end customers.