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## 2 Marks:

① Define the term requirement elicitation & analysis

- • sometimes also called as requirement elicitation & requirement discovery.
- involves a technical staff working with customers to find out about application domain, the services that system should provide and the system's operational constraints
- May involve end-users, managers, domain experts etc.

② Define a term stakeholders mention the different categories of stakeholders

- The term stakeholders is used to refer to any person or group who will be affected by the system directly or indirectly.

Categories of stakeholders.

- Investors • employees • customers • trade unions
- engineers involved in maintenance

③ What is Behavioural model? Mention the types

- • Behavioural models are used to describe the overall behaviour of a system
- Two types of behavioural models are:
- Data processing models that show how data is processed as it moves through

the system

→ state machine models that show the systems response to events

② what is data flow model? List the notations used in data flow model.

→ Data flow models are one intuitive way of showing how data is processed by system  
• tracking & documenting how the data associated with a process is helpful to develop an overall understanding of the system.

Notations are:  
• functional processing (rounded rectangles)  
• data stores (rectangles)  
• data movements (flow functions) (labelled arrows)

③ Define the term requirement discovery & requirement documentation

→ Requirement discovery: It is the process of interacting with stakeholders in the system to collect their requirements. Domain requirements are also discovered at this stage.

Requirement documentation: Requirements are documented & input to the next round of iteration.

④ Differentiate validity check & consistency checks

→ • Validity checks: A user may think that a system is needed to perform certain functions. However further thought & analysis may identify additional or different function that are required.

• Consistency: Checks requirement. In the documentation should not conflict. That is there should be no contradictory constraints or descriptions of the same system functions.

⑤ what is data dictionary? Mention the advantages of using data dictionary

→ Data dictionaries are lists of all the names used in the system models. Description of the entities, relationships & attributes are also included.

Advantages:

• support name management & avoid duplication  
• store of organisational knowledge linking analysis, design & implementation.

⑥ what is object model?

→ Object models describe the system in terms of classes & their associations

• An object class is an abstraction over a set of objects with common attributes & the services provided by each object.

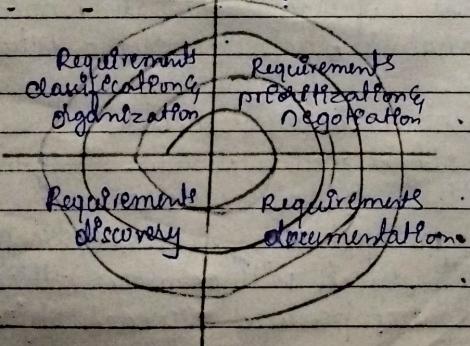
## Long Answers

Date

Date

① Describe the term requirements elicitation & analysis. Explain the reason which cause difficulty in understanding stakeholders requirements?

- Sometimes called requirements elicitation & requirements discovery.
- Involves technical staff working with customers to find out about the application domain, the services that the system should provide & the system's operational constraints.
- May involve end users, managers, engineers involved in maintenance, domain experts, trade unions etc. These are called stakeholders.
- The term stakeholders is used to refer person or group who will be affected by the system directly or indirectly.



Reasons which cause difficulty in understanding stakeholders requirements:

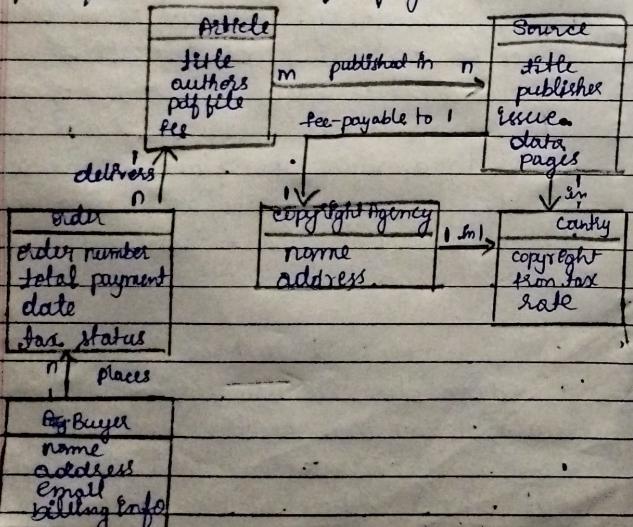
- Stakeholders don't know what they really want from the computer system except in most general terms.
- Stakeholders express requirements in their own term & with implicit knowledge of their own work.
- Different stakeholders have different requirements. Hence to consider all potential sources of requirement & discover commonalities & conflicts.
- Political factors may influence the requirements of the system for eg: manager may demand specific system requirements that will increase their influence in the organization.
- The economic & business environment in which the analysis takes place is dynamic. It inevitably changes during the analysis process. Hence the importance of particular requirements may change.

② Write a note on Data Model.

- Used to describe the logical structure of data processed by the system.
- An entity - relation - attribute models sets out the entities in the system, the

the relationships b/w these entities & their attributes.

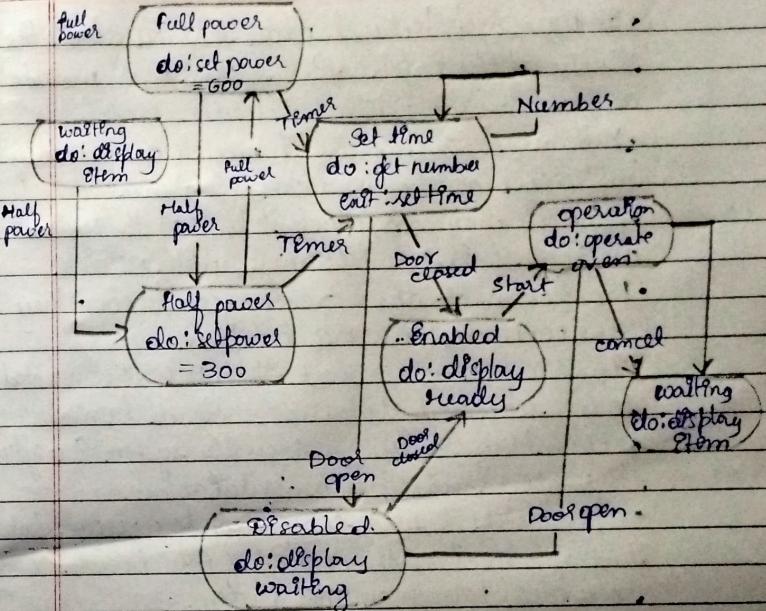
- Widely used in database design, can readily be implemented using relational databases.
- No specific notation provided in the UML but objects & associations can be used.
- Following is the eg of a data model that is part of library system LIBSYS.
- If has an article has attributes reflecting the title, the authors, the name of the PDF file of the article & fee payable.



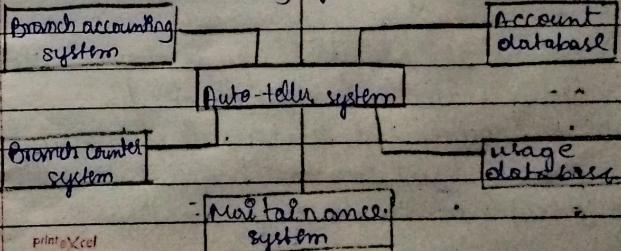
### ③ Write a note on object model

- Object models describe the system in terms of object classes & their associations.
- An object class is an abstraction over a set of objects with common attributes & the services provided by each object.
- Various object models maybe produced
  - Inheritance models & Aggregation models
  - Interaction models
- Natural ways of reflecting the real-world entities manipulate by the system
- More abstract entities are more difficult to model using this approach
- Object class identification is recognized as difficult process requiring a deep understanding of the application domain
- Object classes reflecting domain entities are reasonable across system.
- Inheritance model:
  - Organize the domain object classes into a hierarchy.
  - Classes at the top of hierarchy reflect the common features of all classes.
- Object aggregation:
  - An object is an aggregate of a set of other objects
  - The classes representing these object may be modelled using an object aggregation model

- ④ Write a note on state machine model
- A state machine model describes how a system responds to internal or external events.
- The state machine model shows system states & events that cause transition from one state to another.
  - It does not show the flow of data within the system.
  - This type of model is often used for modelling realtime systems because these systems are often driven by stimuli from the system's environment.
  - State machine models show system states as nodes & events as arcs b/w these nodes when event occurs, the system moves from one state to another.
  - State charts are an integral part of the UML & are used to represent state machine models.
- State machine model of a simple microwave oven



- ⑤ Explain the concept of an ATM system with the diagram



• It is an architectural model that illustrates the structure of the information system that includes a bank - auto - teller network.

• High level architectural models are usually expressed as simple block diagram.

• In these diagrams, different parts of the system are represented as rectangles with names.

• Lines connect these rectangles to show they are connected & work together.

• In this figure see that each ATM is connected to an account database, a local branch accounting system, a security system & a system to support machine maintenance.

• The system is also connected to a usage database that monitors how the network of ATM is used & to a local branch counter system.

• This counter system provides services such as back-up & printing.

• Architectural models help describe the surrounding environment of a system.

⑥ Explain the concept of requirement review along with the review checks.

→ A requirement review is a manual process that involves people from both client & contractor organization

• They check the requirements document for anomalies & omissions.

• The review process may be managed in the same way as program inspection.

• Alternatively, it may be organized as a broader activity with different people checking different parts of the document.

• Requirement reviews can be informal or formal.

• Informal reviews involve contractors discussing requirement with as many system stakeholders as possible.

• In formal requirements reviews the development team should work the client through system requirements, explaining the implications of each requirement.

Review checks:

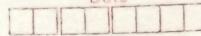
① Verifiability : Is the requirement as stated realistically testable?

② Comprehensibility : Do the procurers & end-users of the system properly understand this requirement?

③ Traceability : Is the origin of the requirement clearly stated? you may have to go back to source of the requirement to assess the impact of change. → It's impact of change on the rest of the system to be assessed.

④ Adaptability is the requirement adaptable?

Data	Data	Data



that is, can the requirement be changed without large scale effects on other system requirements

⑦ Explain the general process model of the elicitation & analysis process with diagram.

→ ① Requirement discovery: This is the process of interacting with stakeholders in the system to collect their requirements. Domain requirements from stakeholders & documentation are also discovered during this activity.

② Requirement classification & organization: This activity takes the unstructured collection of requirements groups related requirements & organizes them into coherent clusters.

③ Requirement prioritisation & negotiation:  
Inherently, where multiple stakeholders are involved, requirements will conflict. This activity is concerned with prioritizing requirements & finding & resolving requirements conflicts through negotiation.

④ Requirements documentation:  
The requirements are documented & input into the next round of spiral formal or informal requirements documents may be produced.

Requirement classification & organization

Requirement prioritisation & negotiation

Requirements discovery

Requirements documentation

