UNIT - 2 Requirement Analysis and specifications

Requirement Analysis(RA): RA is a set of activities like

1. Classification
2. Organisation – Arranging in order
3. Planning — COPCNM — Prioritisation (arrange acc to priority)
4. Constraints — inputs required / data
5. Negotiation
6. Modeling

All these activities are performed in 4 types

Types of RA:

1. Structured Analysis
2. Data oriented Analysis
3. Object oriented analysis
4. Prototyping analysis

1. Structured Analysis Method: → developer / user specifies the path

- Data flow Diagram
- Data Dictionary
- Structured Analysis Method
- Pro's & Con's of Structured Analysis Method.

Software Design

- It is also called as Process Oriented (or) Data flow method
  - ↳ as process is specified.
- Data flow Diagram plays a vital role

Data Flow Diagram (DFD): It indicates the processing of flow of data from input to output.

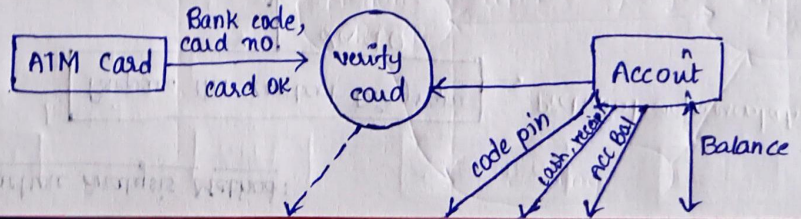
DFD (Rules)

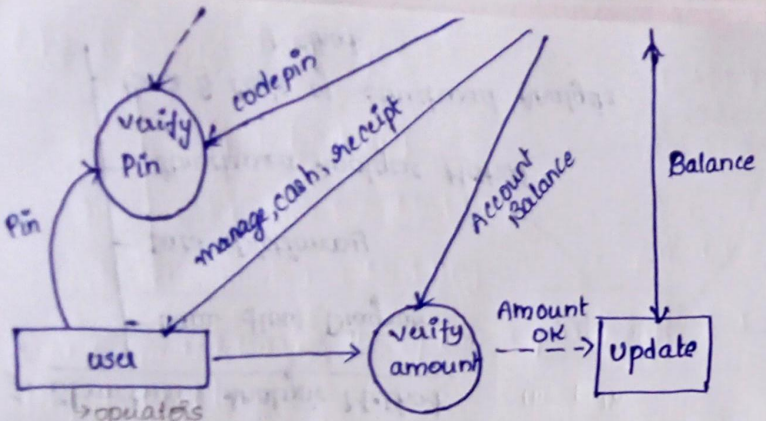
- Process — Software Process model should be specified (indicated by ○)
- Data flow
- Data store
- Actor – people who are involved in analysis / customers

Process:
Processing of data from input to output by selecting a particular process model

Data flow: Indicated by arrow marks (uni/bi). It is used for indicating the direction of the flow of data from input / output → , ⇄ , - - →

Data store: storing the data and retreiving it whenever required.





→ populates
⟷ - data isn't manipulated
- - -> - Data is manipulated through some process

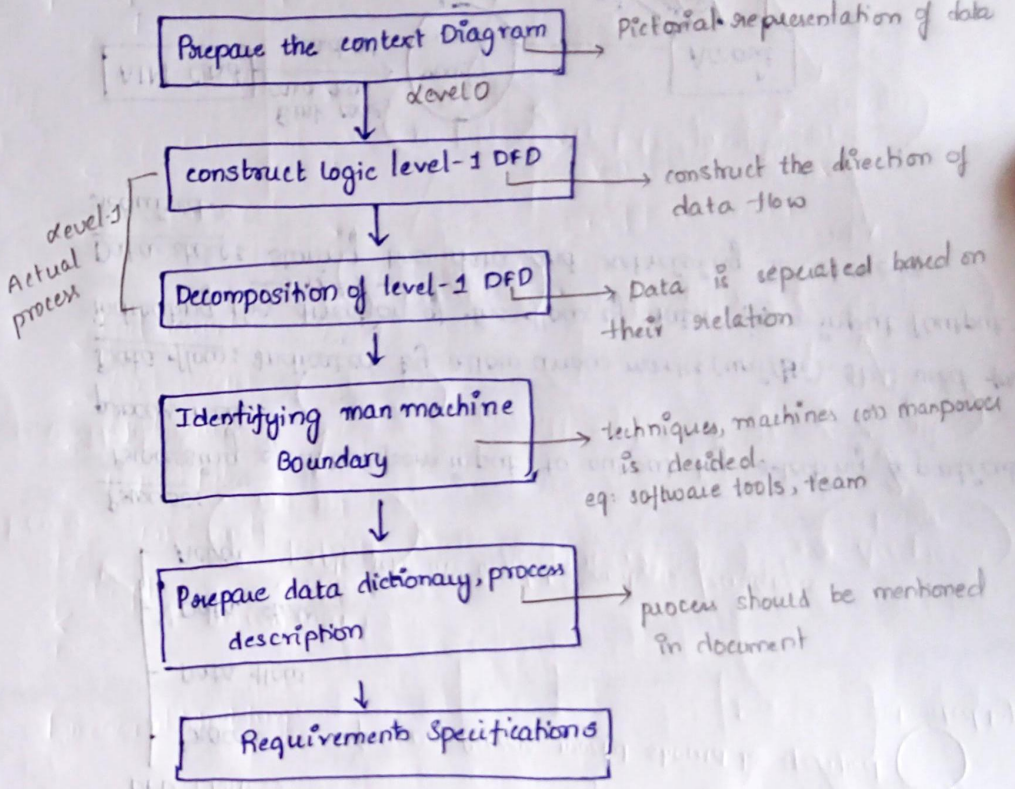
Eg: DFD: cash withdrawal

Data Dictionary (DD): DD are set of features (or) also actions performed from data to data. It is called as structured depository. It is a structured place to keep the data for process

- It has + symbols
  - + → composition (combining)
  - - → repetition of certain process
  - 1 → selection
  - [ ] → when entire set of process is repeated these are indicated in [ ]

divided into 2 levels
level 0 → indicates process is being started
level 1 → process takes place

Structure Analysis Method:



each and every part is done seperately for structured analysis

Pro's and con's:

1. Everything is represented in pictorial form - can be understood easily
2. The process will follow some structured set of actions
3. It is time consuming process
4. If any fault occurs, it is difficult to remodify it

① One - One Relationship:

2 Data Oriented Analysis:

2. Data Oriented Analysis:

- Entity Relationship Diagram
- Data oriented model

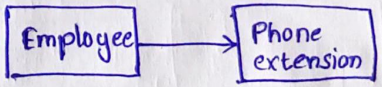
Entity Relationship Diagram: The Diagram that is drawn to show the relation blw customer and organisation is called ER Diagram.

The main key features in ER Diagram are:

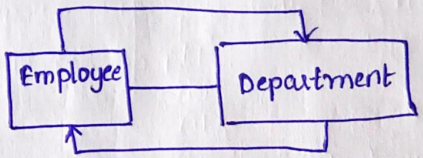
1. Entities
2. Relationship
   - Attributes
   - Aggregation
   - Specialization
   - Generalization

1. Entities: Entities can be a person/place/thing/event
2. Attributes: Attributes are mtg but knowing the details of each and every thing about an entity.
3. Relationship: based on number of entities
   - Recursive (single entity is needed)
   - Binary (2 entities are needed)
   - Ternary (3 entities are needed)
   - n-ary (n entities/more than 3)

① One-One Relationship:



② One-many Relationship:



③ Many-Many Relationship:

posts ⟶ tag.

Data Oriented ~~Analysis~~ → Model:

(i) Identification of Entity & Relationship
(ii) Add key attributes to the ER Diagram.
(iii) Add non-key attributes to the ER Diagram.
(iv) Apply hairarichal relations
(v) Process of normalisation
(vi) Identification of Integrity rules

3 Object Oriented Analysis:

- Object Modeling
- ~~Jan~~ Dynamic Modeling
- Functional Modeling.

Used to find/determine the system requirements

Object Modeling:

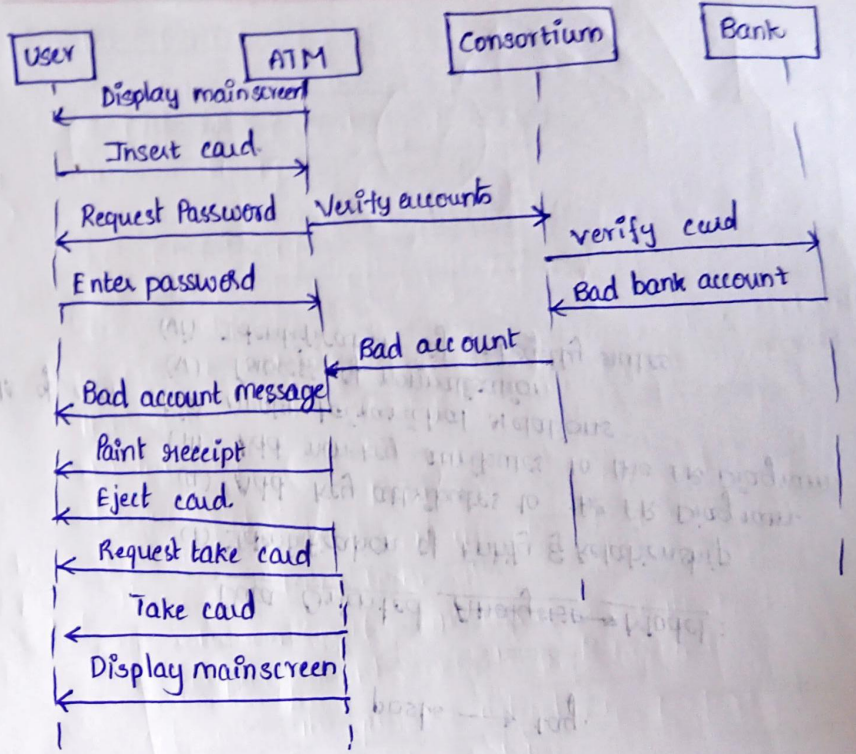
(i) Identify classes and object.
(ii) Preparing data dictionary
(iii) Identifying the relationship
(iv) Finding out the attributes
(v) Designing the heirarchial relationship
(vi) Grouping of classes into specific modules

completely focused on product (objects) final output project.

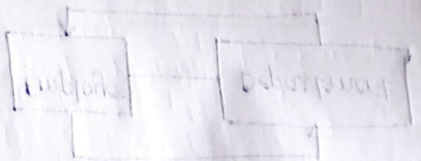
No testing, No updation of product

Dynamic Modeling:

Sequential flow of process



Functional Modeling:

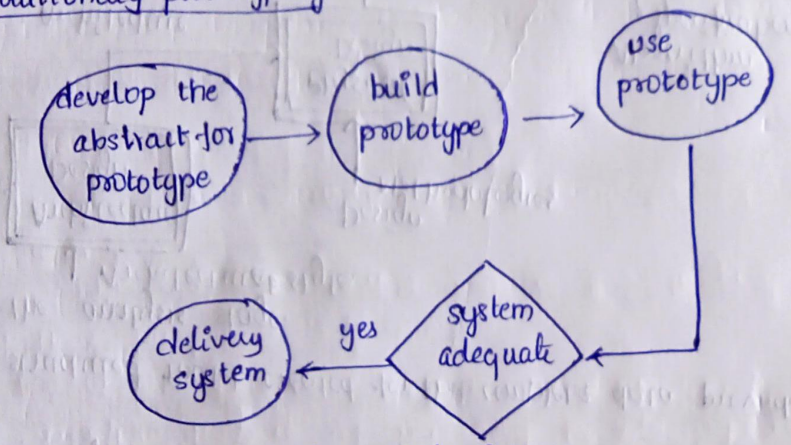


Prototyping Model:

It is of two types

(i) Throwaway prototyping
(ii) Evolutionary prototyping

Evolutionary prototyping:



Hardware product needs prototyping

○ → structure □ → process ◇ → condition.

Software Requirement specification:-

SRS is abbreviated as software requirement specification

It is an documentary part which is used to store all the data which is collected in analysis stage.

Characteristics of SRS:

(i) It is used for future references
(ii) Easy to modify (SRS document)
(iii) Availability

(iv) Component of SRS

Functional requirements:

It is used to describe the behaviour of the system

Operating requirements:

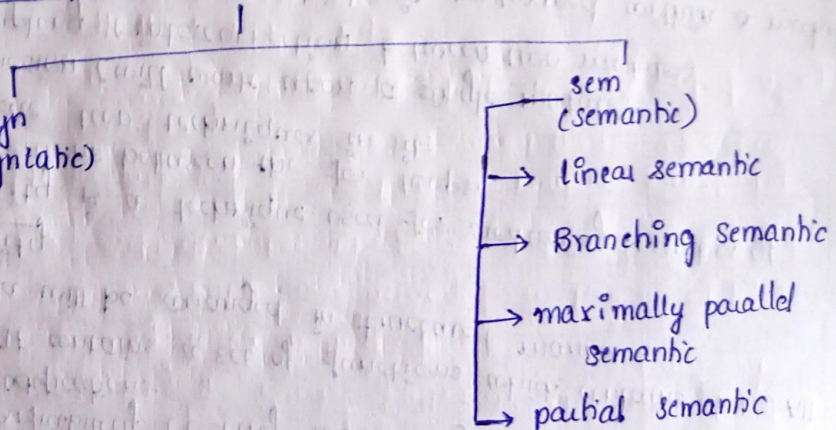
It is used for finding operational characteristics of system like response of the system, nature of system, evolution of the system.

Design constraints:

The specifications required for designing a particular model.

eg: size of the system, features of the system etc.

Formal Specification language:



syntatic: The alphabetical parts used in the code

semantic: The special characters of special features will fall under this category

Linear Semantic: It is used when sequence of events occurs

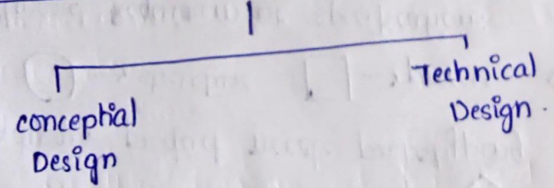
Branching Semantic:

- the graph structure variables but used here
- It is used where same process repeated. (maximally parallel semantic)

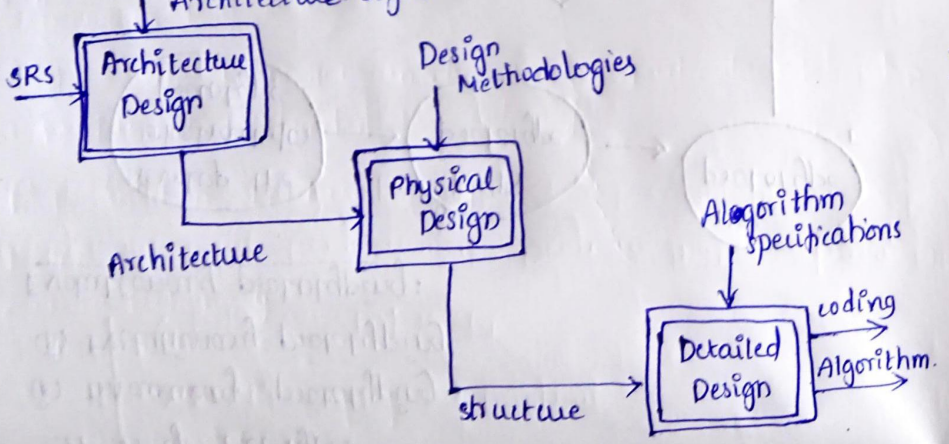
Partially semantic:

- It is used where conditional statement exist

Software Design: (final stage)



- The structured model created for the complete data provided in the analysis stage.



Characteristics of Software design:

(i) Correctness (checking requirements)
(ii) Efficient (working perfectly or not)
(iii) reusability
(iv) completeness (no modifications are required)
(v) Modularity.
(vi) Verifiability (testing or checking components)
(vii) Modifications.

→ **Module:** It contains a set of functions which contains data. All those data will be arranged in structured manner

→ **Modularity:**

Modularity is a technique used for reducing number of interconnections between the for loops.
There are two techniques in it.
(i) cohesion (will work upon a single module)
(ii) coupling (interconnection between two modules)

Cohesion: The process which is performed within a module
It is called as intramodule.

Types of Cohesion:

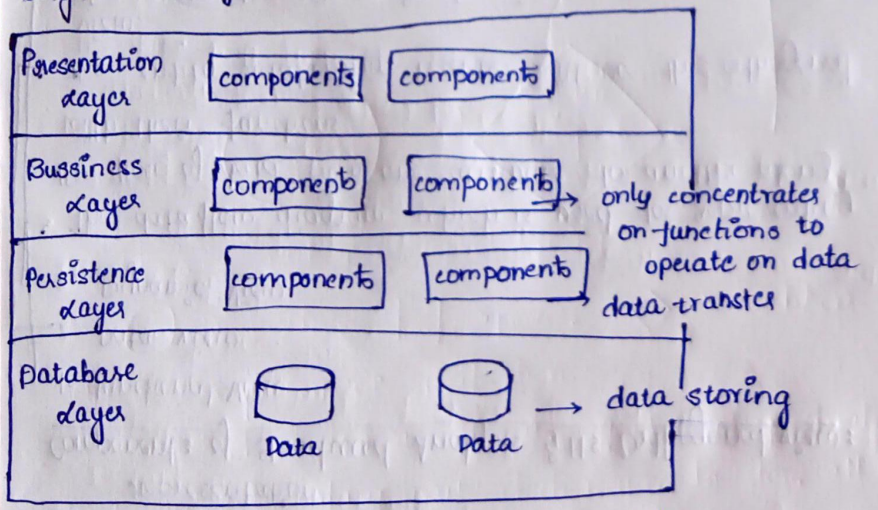
(i) Functional cohesion
(ii) Sequential cohesion. (doing in stepwise manner)
(iii) communication cohesion
(iv) Procedural cohesion (works simultaneously at a time)
(v) Temporal cohesion (keeping data for temporary use)
(vi) Logical cohesion
(vii) coincidental cohesion

Types of coupling:

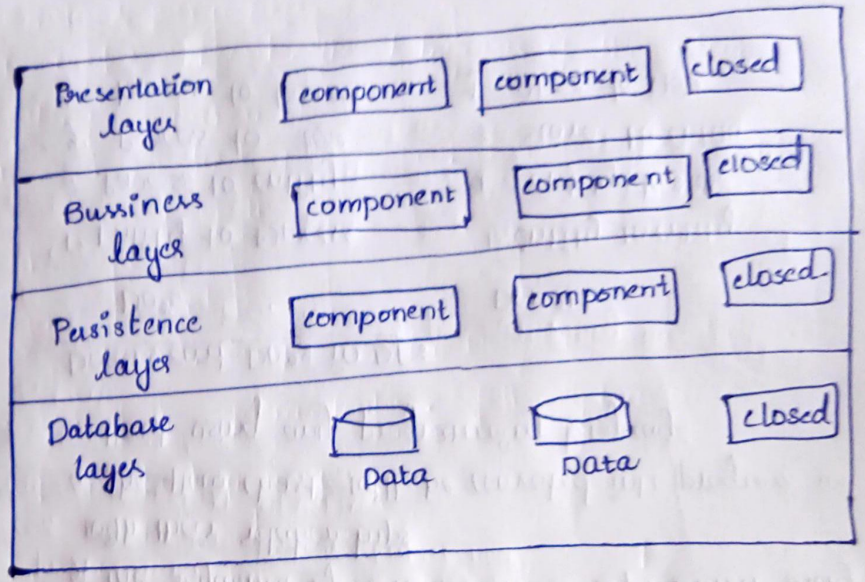
(i) Message coupling (data transfer from one to other modu

(iii) Data coupling. (data can be modified)
(iii) Stamp coupling (grouping & clubbing together)
(iv) Control coupling.
(v) External coupling (sending entire data from one module to another module)
(vi) Common coupling.
(vii) Content coupling.

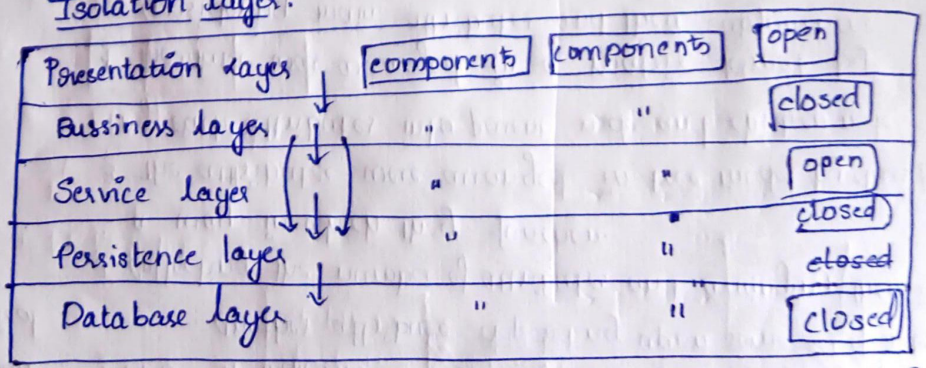
Layered Arrangement Architecture: (n-tier layered model)



Presentation Model:
- It is an n-tier model
- The presentation layer is only used for exhibiting / displaying the output whereas bussiness layer is used for aggregation of data
- Pasistence layer is responsible for transformation of data whereas database layer is used for storing



Isolation layer:



- It is an layered pattern technique used for introducing a new layer into the existing layer architecture so as to make the layers to jump from one layer to any other layer.