Object Oriented Modeling and Design

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## Assignment 1

Q1] What is OO development

⟹ - Development means the use of software life cycle such as analysis, design and implementation.
- The object oriented development focuses on identifying and organizing the application concept instead of the implementation of the software.

The OO development and modeling is performed by focusing on-

A) Modeling concept and not implementation
B) Use of OO methodology
C) Use of three models.

(A) Modelling concept

- In OO development approach, the developer has to think in terms of application and therefore the data structures and functions are addressed effectively.
- In OO development the fundamental way to thinking is represented and the focus is not on the programming techniques.
- Using the modelling techniques the system that is to be built can be very well explained to specifiers, developers & the customers.

(B) OO Methodology

- The OO development along with the graphical

notations is used to represent the OO concept.
- In this process the model of an application is built first and then the details are added to this model during the design.
- The same notations are used throughout the lifecycle of software development process from analysis to design and from design to implementation. Due to this approach the important information need not be lost from one stage to another.

Stages of OO methodology

① System conception:
The system are specified by the business analysts or the users who want to use the system.

② Analysis:
- During depending on the requirements of software developer constructs a model to analyze the inadequacy in the model.
- The analysis model is comprised of two parts that are domain model and application model.

③ System Design.
- This phase include the implementation of system.
- The architecture, models, components and their interfaces are designed at

this stage.

④ class Design.
- The class designers add details to the analysis model using system design strategies.
- The focus of class design is on data structure and algorithm.

⑤ Implementation -
This is the phase in which the classes and relationships are transformed into the particular programming language databases and so on.

⑥ Three Models
- There are three types of model the class model, ~~an~~ state model and interaction model.

1) class Model
The class diagram is a graphical representation in which nodes represent the classes and arc represents the relationships among classes.

2) state model
- The object changes its state over the time this can represent using this model.

3) Interaction model
The interaction model represents how the object interact with each other in order to perform same task.
Use case diagram, sequence diagram & activity diagram helps in elaborating the interaction model.

Q.2. Explain the three Models.
⟹ There are three types of model.
1) Class Model
2) State Model
3) Interaction Model

1) Class Model
The basic static structure of the objects and their relationship described in this model.

2) State Model
The Object change its state over the time
This can represent using This model.

3) Interaction model
The interaction model represent how the object interact with each other in order to perform same task.
Use case diagram, sequence diagram & activity diagram helps in elaborating the interaction model.

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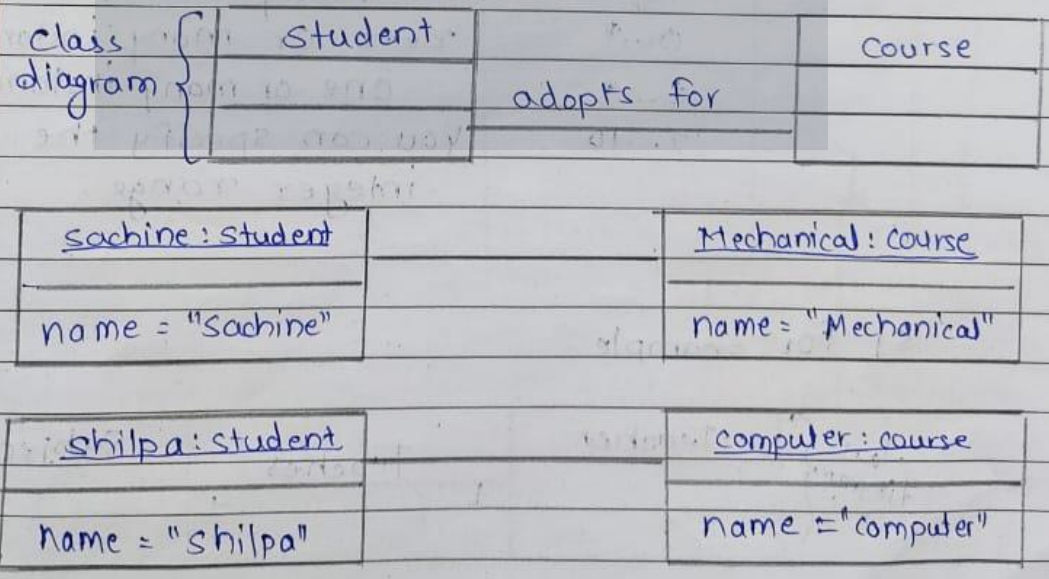
Q.3 Explain the Links and Association concept.

⟹ 1] Links is a connection between the objects. It represents a simple association of one object with another.

2] An association is a group of links that have common structure and common semantics.

3] The links and association often appear as verbs in the problem statement. The links is between two object & association is between the two classes.

4] For example - Following is part of online course management system. The upper part represents the part of a class diagram and the bottom part represents the partial object diagram of the system. The * indicates the multiplicity.




Links and Associations

Q.4. What is Multiplicity? Explain with Example.

⟹ Multiplicity

1] Multiple objects can be related to some objects. The multiplicity represents "how many" objects are connected.

2] The multiplicity can be written as expression. It describes "one" or "many" objects associated with other object.

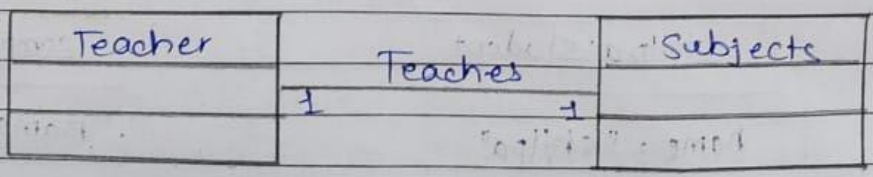
3] The multiplicity is specified at the end of the association link.

4] following are the notation that can be used to denote the multiplicity of associations.

| Notations | Description |
|---|---|
| 1 | only one instance |
| 0..1 | zero or one instance |
| * | Many instance |
| 0...* | zero or many instances |
| 1...* | one or many instances |
| 2...10 | You can specify the integer range. |

5] For example -

class diagram



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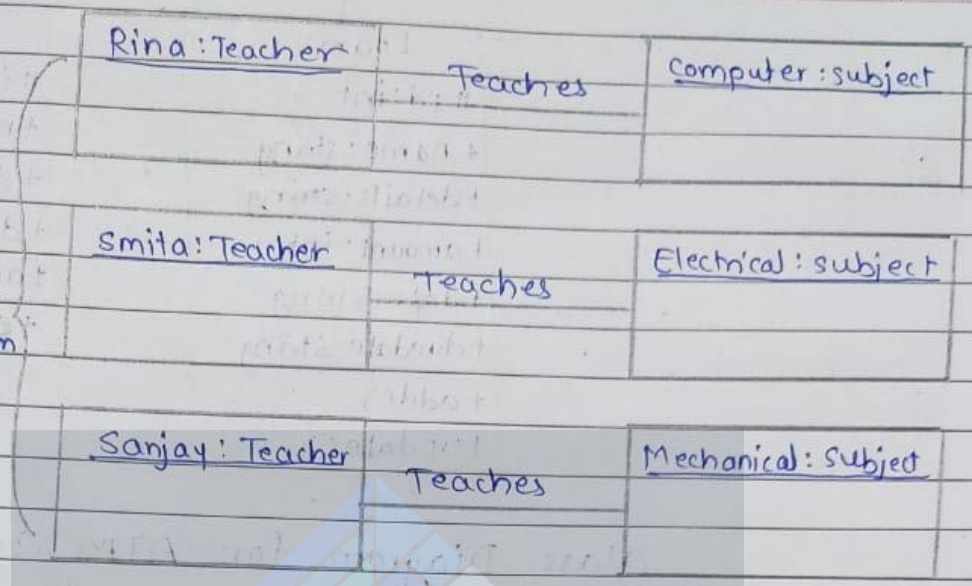
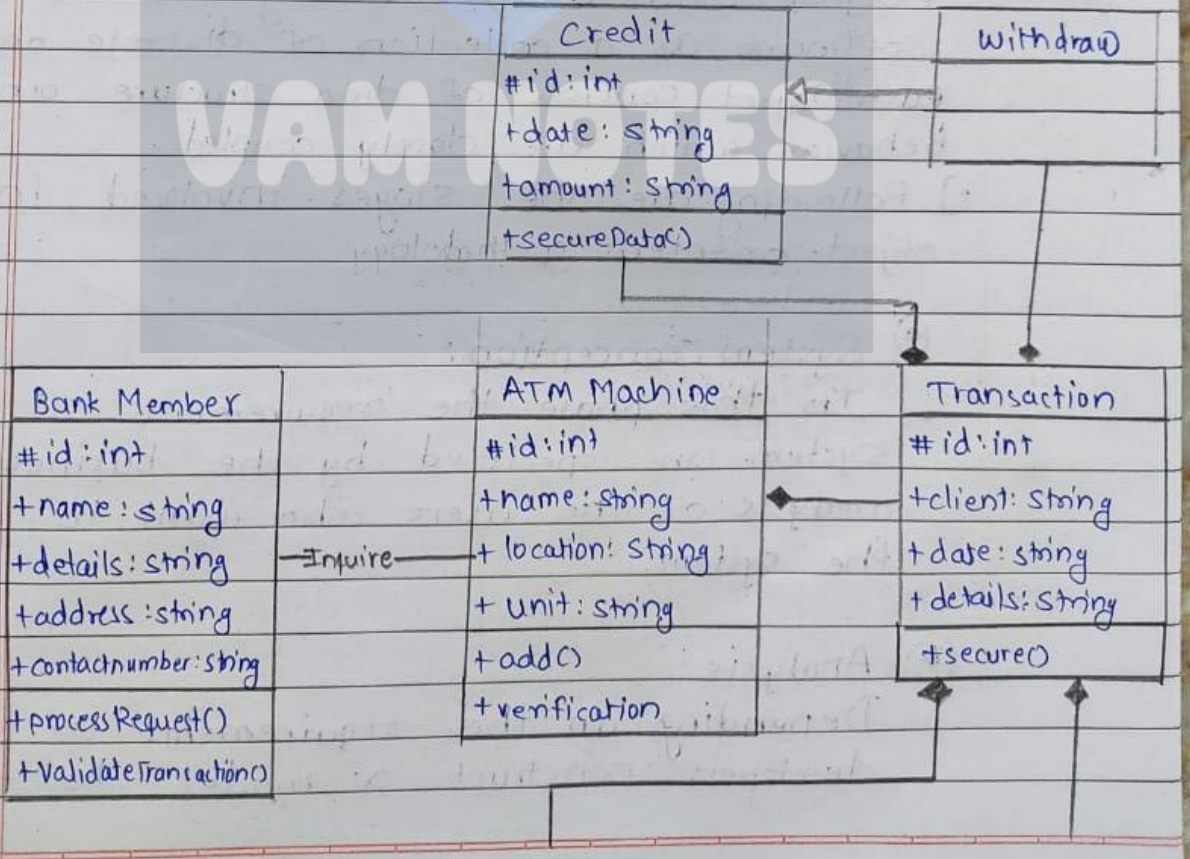
object diagram




Q.5] Class Diagram for ATM system.



| Loan |
| --- |
| # id: int |
| + name: string |
| + details: string |
| + amount: int. |
| + date: string |
| + duedate: string |
| + add() |
| + update() |

| Savings |
| --- |
| # id: int |
| + name: string |
| + details: string |
| + date: string |
| + amount: int |
| + add() |

Class Diagram for ATM System.

Q.6 What is object oriented? Explain the stages involved in object-oriented methodology.

⟹ 1] Object oriented means organization of software as a collection of discrete objects each object consists of data structure and behavior which are closely coupled.

2] Following are the stages involved in object-oriented methodology.

(a) System conception:
In this phase the requirements of the system are specified by the business analysts or the users who want to use the system.

(b) Analysis:
Depending on the requirements of software developers construct a model to analyze

the inadequacy in the model.
- The analysis model is comprised of two parts that are domain model and application model

(c) System Design.
- This phase include the implementation of system.
- The architecture, models, components and their interfaces are designed at this stage.

(d) class Design.
- The class designers add details to the analysis model using system design strategies
- The focus of class diagram/design is on data structure and algorithm.

(e) Implementation
- This is the phase in which the clauses and relationships are transformed into the particular programming language databases and so on.