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SOFTWARE ENGINEERING
Experiment -7

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Experiment-7

Designing the module using Object Oriented approach including Use Case Diagram with scenarios, Class Diagram and State Diagram, Collaboration Diagram, Sequence Diagram and Activity Diagram.

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Aim: Designing the module using Object Oriented approach

Objectives: visually representing a system

Apparatus/Components: VISIO Software

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LIST OF DIAGRAMS

- Use Case Diagram with scenarios
- Class Diagram
- State Diagram,
- Collaboration Diagram,
- Sequence Diagram
- Activity Diagram

Use Case Diagram with scenarios

- use case diagram is the primary form of system/software requirements for a new software program underdeveloped. Use cases specify the expected behavior (what), and not the exact method of making it happen (how).
- Use cases once specified can be denoted both textual and visual representation (i.e. use case diagram).
- A key concept of use case modeling is that it helps us design a system from the end user's perspective.
- It is an effective technique for communicating system behavior in the user's terms by specifying all externally visible system behavior.

Example

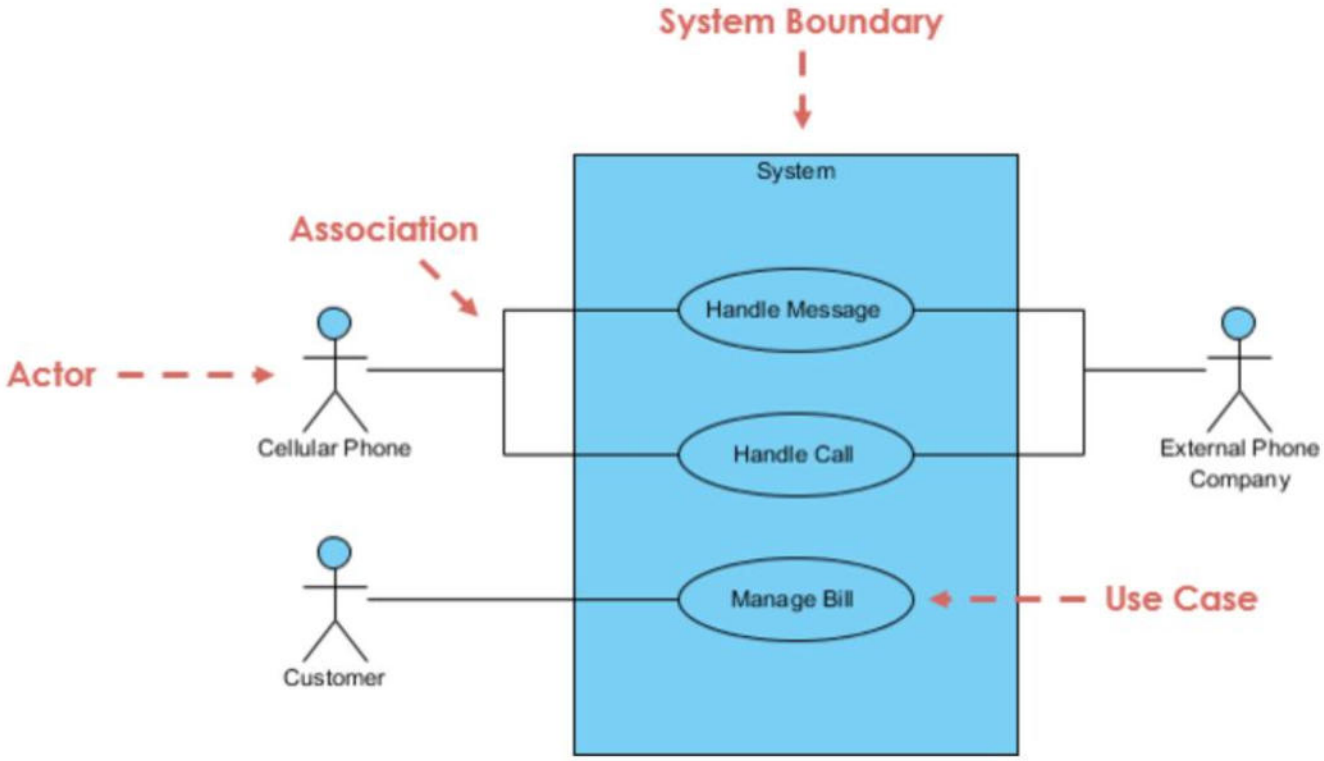

Fig-1 use case

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CLASS DIARAM

- Class Diagram examples that show you how to model the structure of system with a UML Class Diagram.
- A UML Class Diagram is a blueprint of the classes (code level) required to build a software system.
- Programmers implement a software system with the help of both the Class Diagram and the class specification.

CLASS DIAGRAM (EXAMPLE)

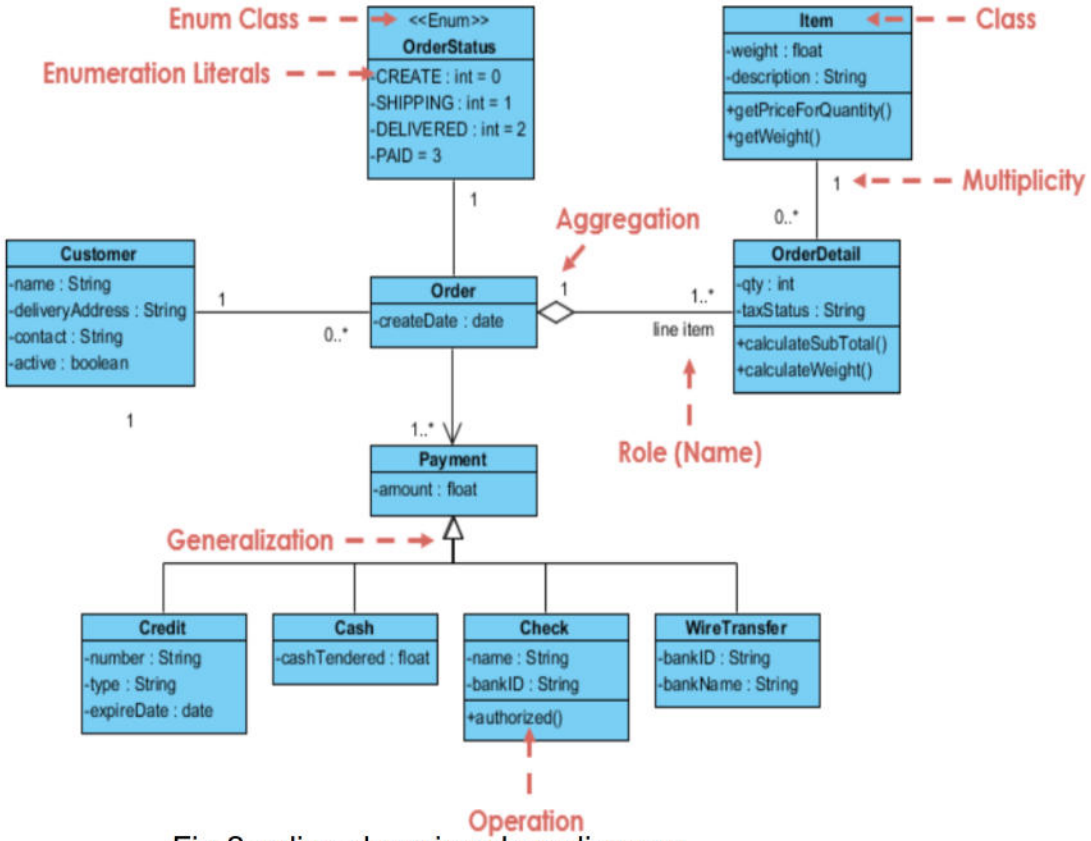


Fig-2 online shopping class diagram

association -- a relationship between instances of the two classes.

aggregation -- an association in which one class belongs to a collection. It has a diamond end pointing to the part containing the whole.

generalization -- an inheritance link indicating one class is a superclass of the other. A generalization has a triangle pointing to the superclass.

STATE DIAGRAM

- A **state diagram** is used to represent the condition of the system or part of the system at finite instances of time. It's a **behavioral** diagram and it represents the behavior using finite state transitions. State diagrams are also referred to as **State machines** and **State-chart Diagrams**

STATE DIAGRAM (EXAMPLE)

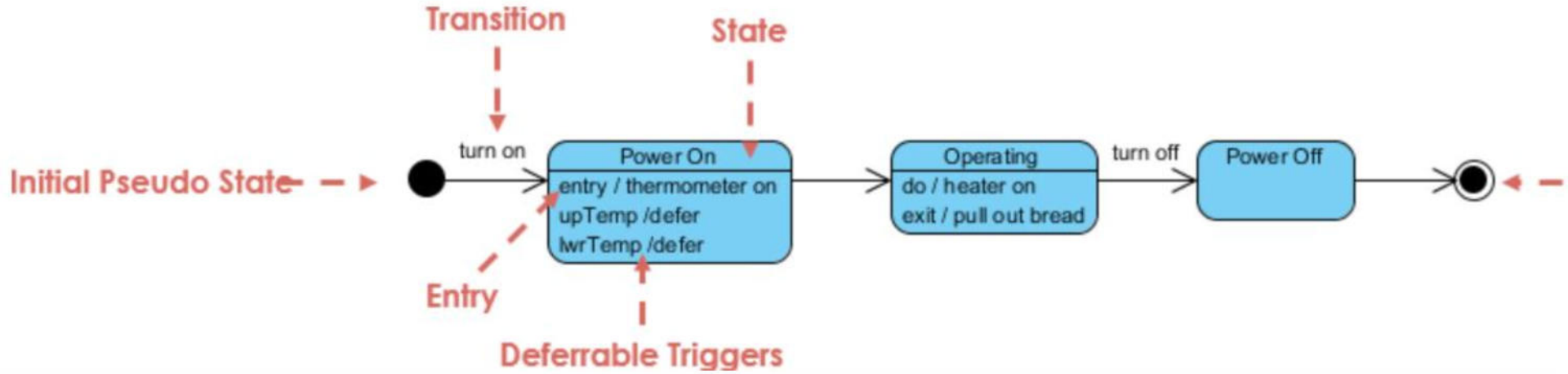


Fig-3 state diagram of toaster

What are the steps of making a toast? First of all we must turn on the toaster, put in the bread and wait for several minutes to bake it. The initial state diagram is shown here.

Collaboration Diagram

- Collaboration between objects in runtime can be modeled in the UML tool, with a UML Communication Diagram.
- The Communication Diagram examples show you how to model the lifelines (objects) and their inter-relationships in presenting the need of communication during the execution of an interaction

Collaboration Diagram (example)

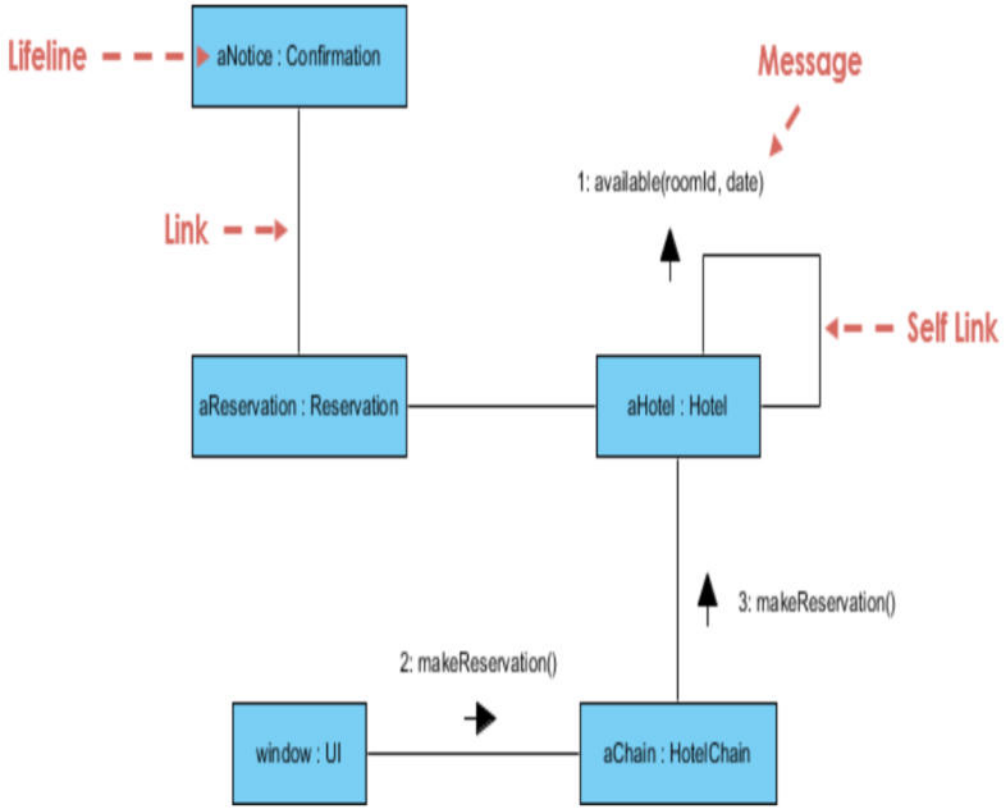
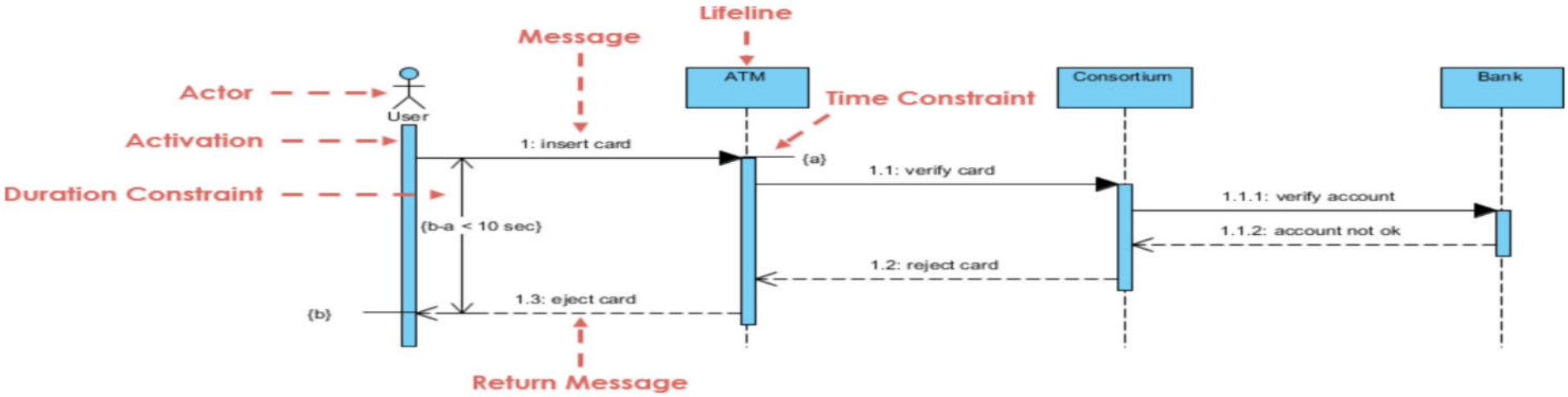


Fig-4 hotel reservation collaboration diagram

- The object-role rectangles are labelled with either class or object names (or both). Class names are preceded by colons (:). Each message in a collaboration diagram has a **sequence number**.
- The top-level message is numbered 1. Messages at the same level (sent during the same call) have the same decimal prefix but suffixes of 1, 2, etc. according to when they occur

Sequence Diagram

- Sequence Diagrams visualize the interactions between users, systems and sub-systems over time through message passing between objects or roles.



This sequence diagram example shows a simple scenario for the use of an automatic teller machine. In this scenario, the system rejects the card. For the customer this transaction is simple: he inserts the card and the card is rejected. For the system, several actions are necessary. A constraint specifies 10 seconds as the maximum acceptable time interval for the transaction.

Activity Diagram

- Activity Diagram examples that show you the use of UML Activity Diagram, the flowchart-based diagram to model the flow of control.

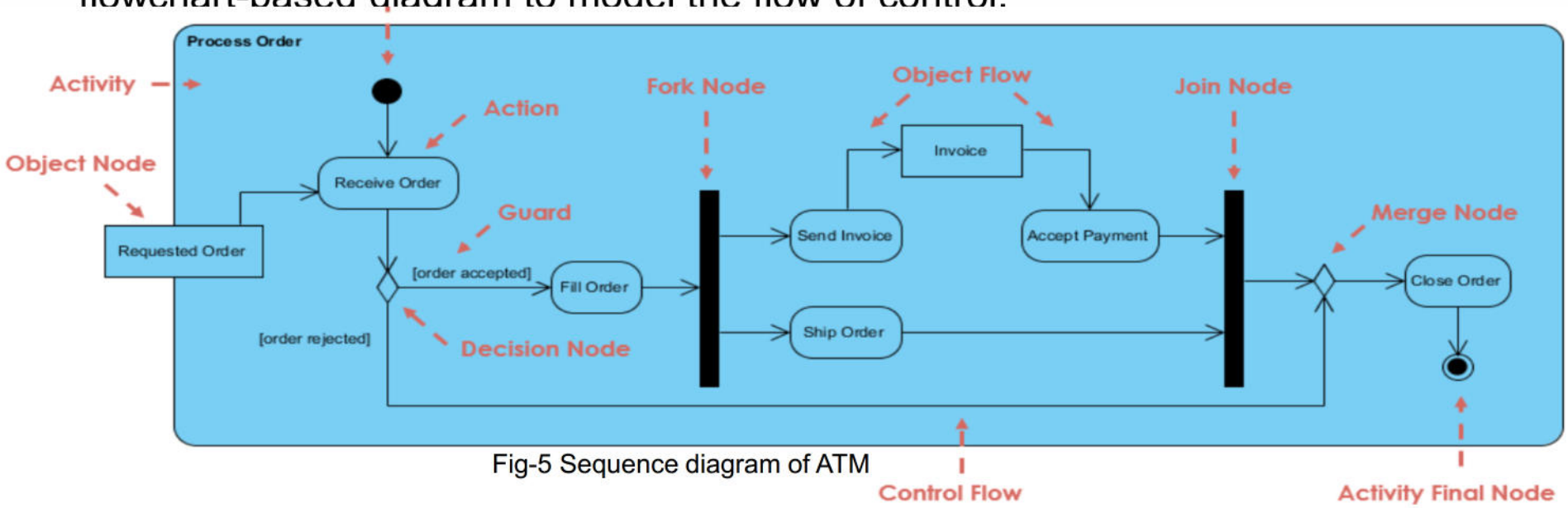


Fig-5 Sequence diagram of ATM

This activity diagram example describes a business flow activity of order processing. In this figure, the requested order is input parameter of the activity. After order is accepted and all required information is filled in, payment is accepted and order is shipped.

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Thank you