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## Experiment No. 3

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**Aim:** Identify scenarios & develop UML Use case and Class Diagram for the project.

**Theory:**

### Use Case Diagrams:

In UML, use-case diagrams model the behavior of a system and help to capture the requirements of the system. Use-case diagrams describe the high-level functions and scope of a system. These diagrams also identify the interactions between the system and its actors. The use cases and actors in use-case diagrams describe what the system does and how the actors use it, but not how the system operates internally.

The following topics describe model elements in use-case diagrams:

- **Use-cases**

A use case describes a function that a system performs to achieve the user's goal.

- **Actors**

An actor represents a role of a user that interacts with the system that you are modeling.

- **Subsystems**

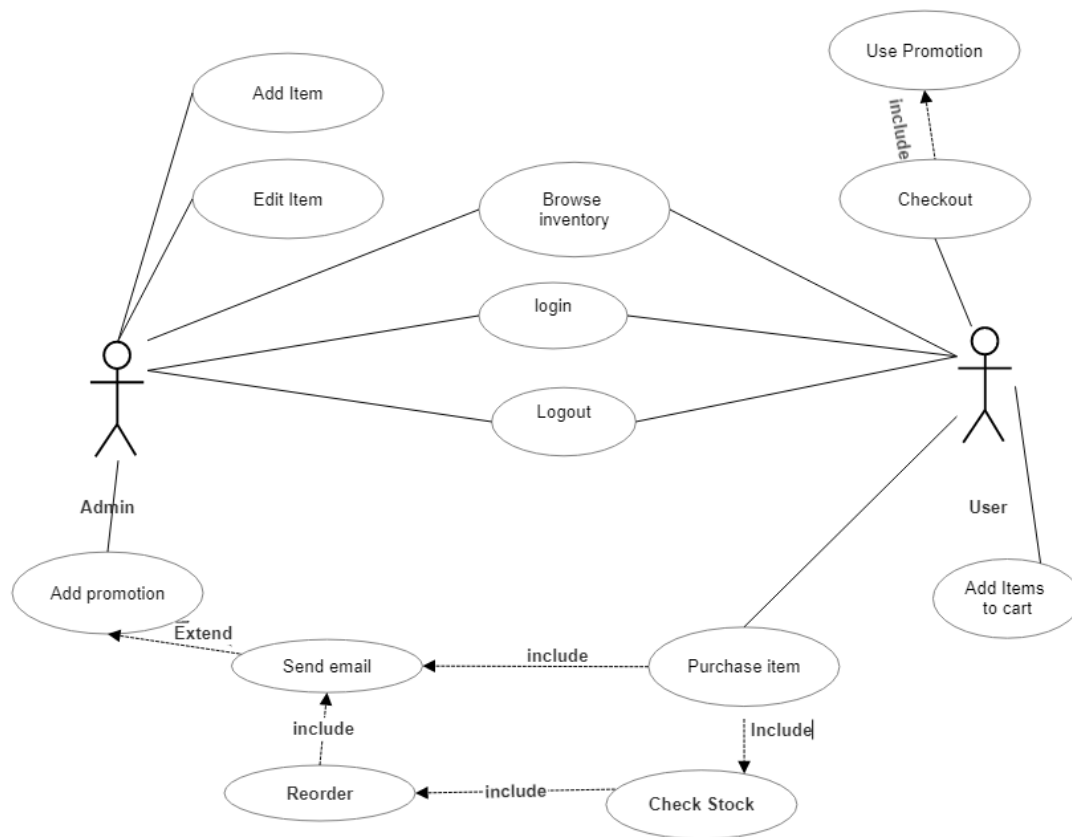
In UML models, subsystems are a type of stereotyped component that represent independent, behavioral units in a system.

- **Relationships in use-case diagrams**

In UML, a relationship is a connection between model elements. A UML

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relationship is a type of model element that adds semantics to a model by defining the structure and behavior between the model elements.



### **Users:**

The users will have specific login credentials. After login users will have access to the entire inventory and can search for their desired product, shipping details and other product details. Users can then wish to add a product to cart for instant or future buy. However, before this, there is a check if the stock is available for the desired product. If the user purchases the product a verification email is sent to the user. This email may include promotions.

### **Admin:**

The admin has a specific login ID to perform specific tasks. The admin has responsibilities as to browse the inventory to check if a product is out of stock. The admin can add, edit and delete products. On purchase the admin can send a promotion to the user related to the purchase.



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## **Class Diagram:**

In UML, class diagrams are one of six types of structural diagrams. Class diagrams are fundamental to the object modeling process and model the static structure of a system. Depending on the complexity of a system, you can use a single class diagram to model an entire system, or you can use several class diagrams to model the components of a system. Class diagrams are the blueprints of your system or subsystem. You can use class diagrams to model the objects that make up the system, to display the relationships between the objects, and to describe what those objects do and the services that they provide.

1. Capture and define the structure of classes and other classifiers
2. Define relationships between classes and classifiers
3. Illustrate the structure of a model by using attributes, operations, and signals
4. Show the common classifier roles and responsibilities that define the behavior of the system
5. Show the implementation classes in a package
6. Show the structure and behavior of one or more classes
7. Show an inheritance hierarchy among classes and classifiers
8. Show the workers and entities as business object models

During the implementation phase of a software development cycle, you can use class diagrams to convert your models into code and to convert your code into models. The following topics describe model elements in class diagrams:

- **Classes**

In UML, a class represents an object or a set of objects that share a common structure and behavior. Classes, or instances of classes, are common model elements in UML diagrams.

- **Objects**

In UML models, objects are model elements that represent instances of a class or of classes.

- **Packages**

Packages group related model elements of all types, including other packages.

- **Signals**

In UML models, signals are model elements that are independent of the



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classifiers that handle them. Signals specify one-way, asynchronous communications between active objects.

- **Enumerations**

In UML models, enumerations are model elements in class diagrams that represent user-defined data types.

- **Data types**

In UML diagrams, data types are model elements that define data values.

- **Artifacts**

In UML models, artifacts are model elements that represent the physical entities in a software system.

- **Relationships in class diagrams**

In UML, a relationship is a connection between model elements. A UML relationship is a type of model element that adds semantics to a model by defining the structure and behavior between model elements.

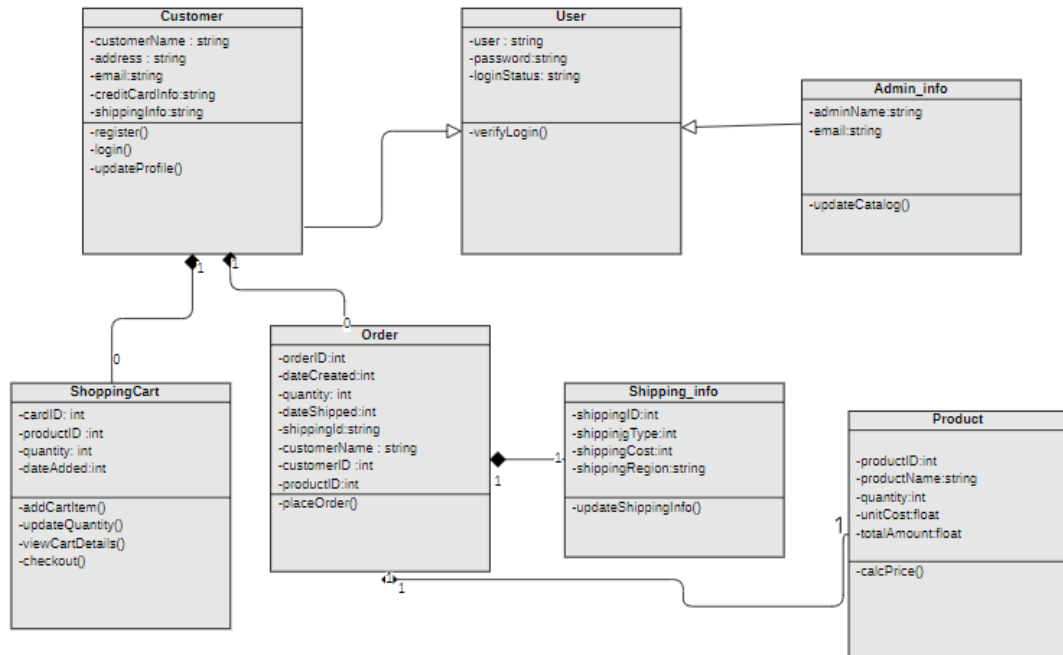
- **Qualifiers on association ends**

In UML, qualifiers are properties of binary associations and are an optional part of association ends.



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## CLASS DIAGRAM:



## CLASS DIAGRAM DESCRIPTION:

- **Class:** Customer

**Attribute:**

- customerName
- address
- email
- creditCardInfo
- shippingInfo

**Operations:**

- register()
- login()
- updateProfile()

- **Class:** User

**Attribute:**

- userId



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- password
- loginStatus

**Operations:**

- verifyLogin()

- **Class:** Admin Info

**Attribute:**

- adminName
- email

**Operations:**

- updateCatalog()

- **Class:** Shipping Info

**Attribute:**

- shippingId
- shippingType
- shippingCost
- shippingRegionId

**Operations:**

- updateShippingInfo()

- **Class:** Product

**Attribute:**

- productId
- productName
- quantity
- unitCost
- subTotal

**Operations:**

- calcPrice()

- **Class:** Orders

**Attribute:**

- orderId
- productId



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- dateCreated
- dateShipped
- customerName
- customerId
- status
- shippingId

**Operations:**

- placeOrder()

- **Class:** Shopping Cart

**Attribute:**

- cartId
- productId
- quantity
- dateAdded

**Operations:**

- addCartItem()
- updateQuantity()
- viewCartDetails()
- checkOut()

**Conclusion:** We learnt about UML Use-Case Diagrams and Class Diagrams and have created them for our e-commerce project.