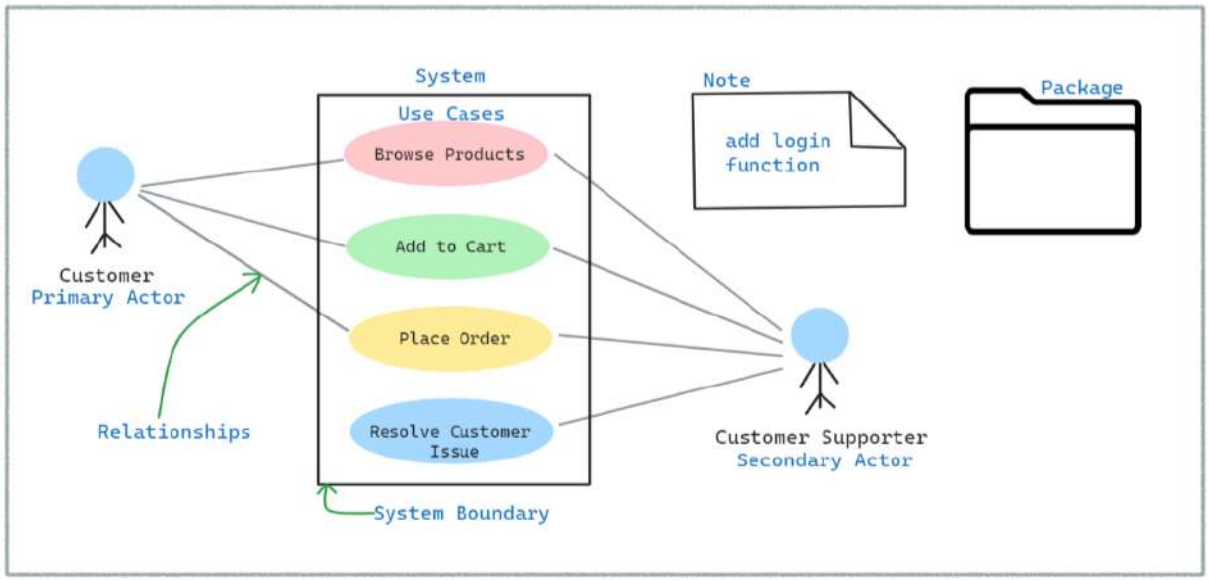
Use-case Diagram

Use case diagram describes the specification of users and their possible interactions with the system.
These possible interactions are called use cases.

Components of a use-case diagram:

- **Actor:** they interact with systems
- **Primary actor:** responsible for initiating use case
- **Secondary actor:** responsible for assisting the primary actors
- **Use case:** a single function
- **Package:** group of different elements
- **Note:** used to add additional information



Relationships in use-case diagrams:

*In UML use-case diagrams, various relationships are used to depict the interactions and dependencies between different **use cases** and **actors**.*

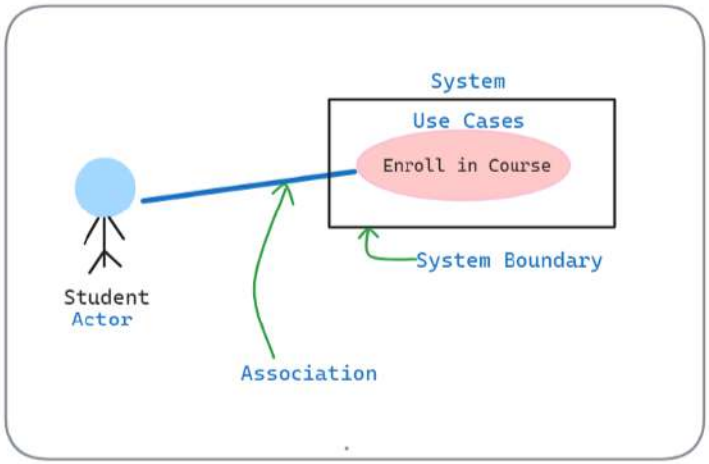
- ***Association*** *(Solid Relation)* ——
- ***Generalization*** *(Inheritance IS-A Relation)* ——▷
- ***Include*** *(Mandatory Relation)* ***<<include>>*** - - ->
- ***Extends*** *(Not Mandatory Relation)* ***<<extends>>*** <- - -

Association:

Definition: *Association represents a relationship between two or more elements, such as between* ***actors*** *and* ***use cases.***

Notation:	*A* ***solid line*** *connecting the involved elements with an optional arrow indicating the direction of the association.*

Example: *An association between an actor* ***"Student"*** *and a use case* ***"Enroll in Course"*** *signifies that the student can perform the enrollment action.*

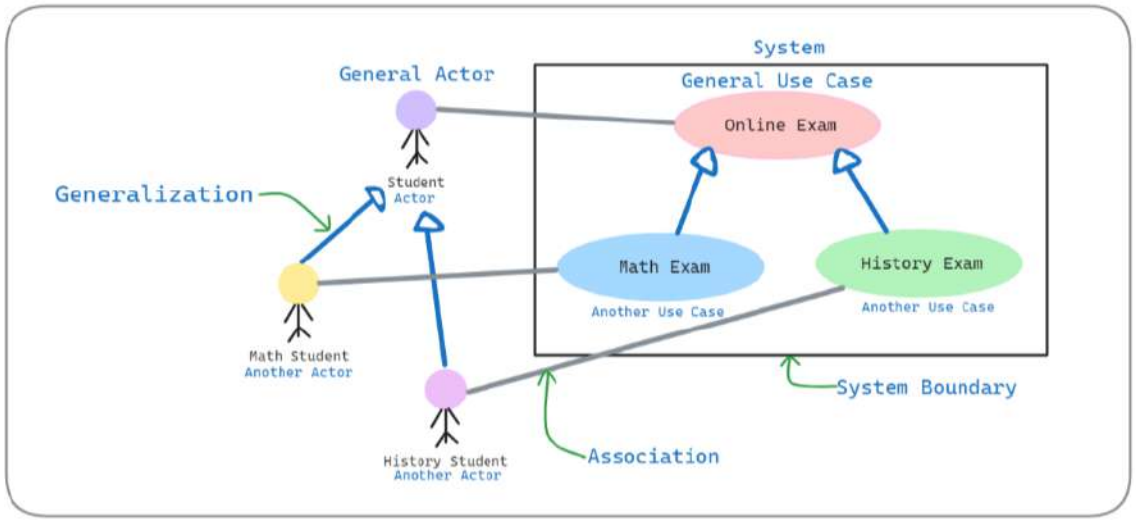


Generalization:

Definition: *Generalization represents an* ***"is-a"*** *relationship, indicating that one use case or actor is a specialized version of another.*

Notation: 	*Shown as a* ***solid line with a hollow triangle*** *pointing to the more general element (base use case or actor).*

Example: *If* ***"Online Exam"*** *is a general use case, and* ***"Math Exam"*** *and* ***"History Exam"*** *are specific, a generalization arrow points from* ***"Math Exam"*** *and* ***"History Exam"*** *to* ***"Online Exam."***



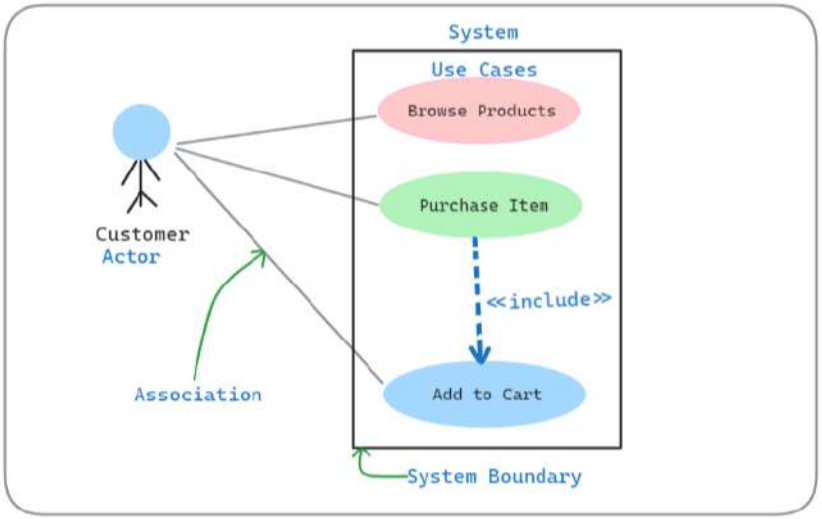
Include:

Definition: *Include represents a relationship where one use case includes another as part of its behavior.* ***It is used to break down a complex use case into smaller, manageable components.***

Notation: ---->	*Shown as* ***a dashed line with an arrow*** *pointing from the including use case to the included use case.*

Example: *The use case* ***"Purchase Item"*** *might include the use case* ***"Add to Cart"*** *as part of its behavior.*

We have to add to cart the item first.
if we want to purchase them.



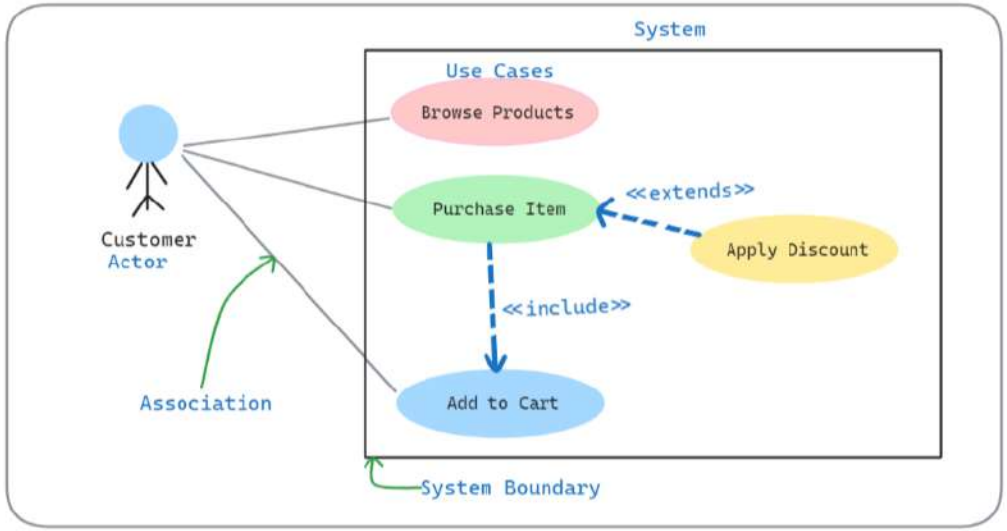
Extends:

Definition: *Extends represents a relationship where one use case can extend the behavior of another use case under certain conditions.* ***It allows for optional or exceptional behavior.***

Notation: 	*Shown as* ***a dashed line with an arrow*** *pointing from the extending use case to the extended use case.*

Example: *The use case* ***"Apply Discount"*** *might extend the use case* ***"Purchase Item"*** *if a discount is applicable.*

We may or may not Apply the Discount coupon while purchasing the Item.



Benefits of use-case diagrams:

- It shows what each part of the system does and what it aims to achieve.
- It makes it easy to grasp what the system is supposed to do at a basic level.
- It outlines what the system requires and its setting.
- It describes how the system works from the viewpoint of someone using it.
- It outlines what the system includes and its limits.

Home Work:

- Design a Parking Lot System
- Design an Elevator System
- Design a Car Rental System
- Design Library Management System
- Design Hotel Management System
- Design ATM
- Design Stack Overflow
- Design LinkedIn