Object Oriented Development with Java

(CT038-3-2 and Version VC1)
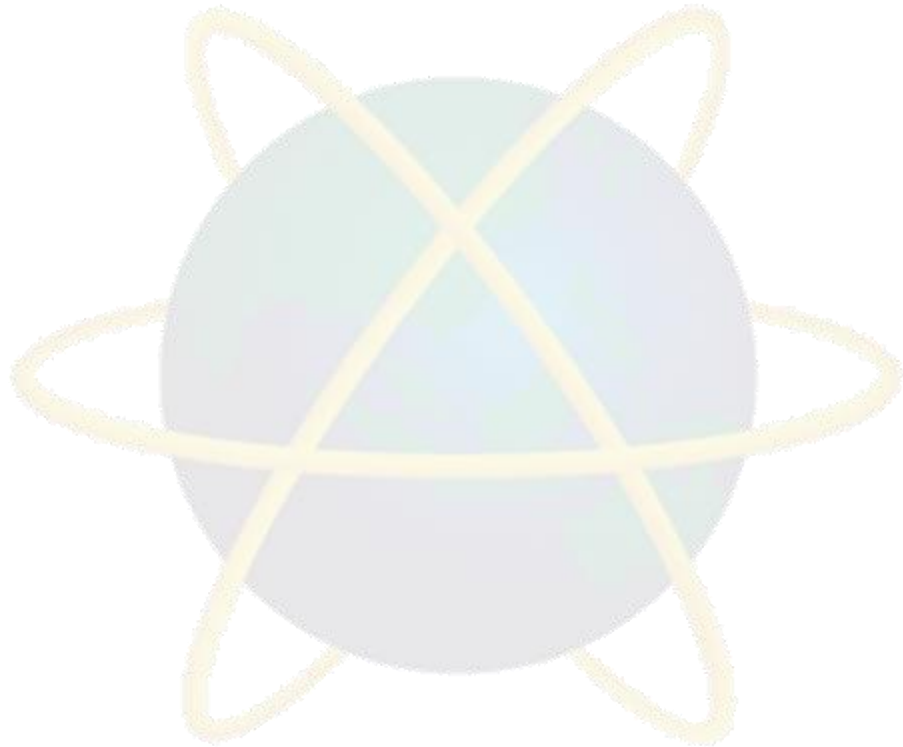
Use Case Diagram

System Modeling

ASIA PACIFIC UNIVERSITY
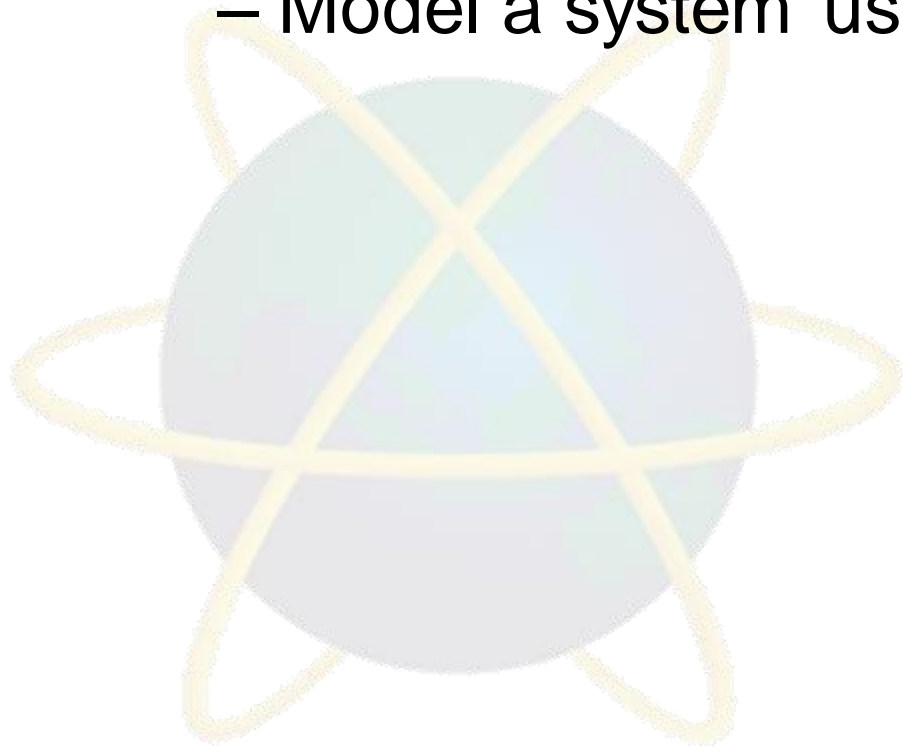OF TECHNOLOGY & INNOVATION

Topic & Structure of The Lesson
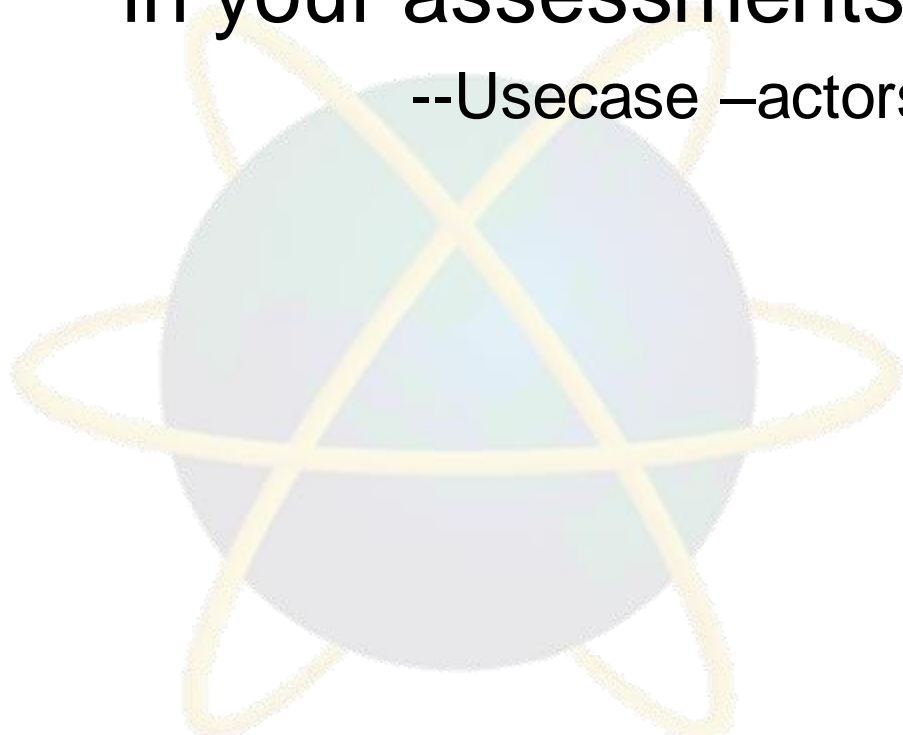
- Usecase diagram

Learning outcome

- At the end of this lesson, you will be able to:
    - Model a system using a use-case diagram

Key terms you must be able to use

If you have mastered this topic, you should be able to use the following terms correctly in your assessments:

--Usecase –actors,usecase,extend,include

Use Case Diagram

- Used for describing a set of user **scenarios** by showing the relationships between actors and use cases in a system
- used for capturing user requirements
- Works like a **contract** between the end user and software developers

Components of a Use Case Diagram

<u>Actors:</u> A role that a user plays with respect to the system, including human users and other systems. e.g.,inanimate physical objects (e.g. robot); an external system that needs some information from the current system.

<u>Use case:</u> A set of scenarios that describe an interaction between a user and a system, including alternatives. Begin with a verb. Sequence of use case shows timing of events/operations
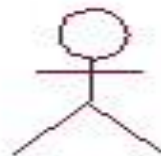

Actor

Use Case

<u>System boundary</u>: rectangle diagram representing the boundary between the actors and the system.

Components of a Use Case Diagram (core relationship)

Association: communication between an actor and a use case and is represented by a solid line.

Generalization: relationship between one general use case and a special use case (used for defining special alternatives)
Represented by a line with a triangular arrow head toward the parent use case.
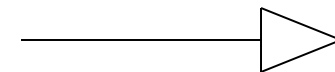
# Components of a Use Case Diagram (core relationship)

Include: a dotted line labeled <<include>> which begins at the base use case and ends with an arrows pointing to the include use case. The include relationship occurs when a chunk of behavior is similar across more than one use case. Use "include" in stead of copying the description of that behavior.

<<include>>

- - - - - - - - - - - - - ->

Extend: a dotted line labeled <<extend>> with an arrow toward the base case. The extending use case may add behavior to the base use case. The base class declares "extension points".

<<extend>>

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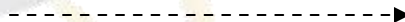
Basic Use Case Diagram Symbols and Notations

1. System
2. Use-Case / Operation
3. Actors
   1. Primary Actors
   2. Secondary Actors
4. Relationships
   1. Association
   2. Includes
   3. Extends

System_Name

Case_1

<<Extend>>

Case_2

<<Include>>

Case_3
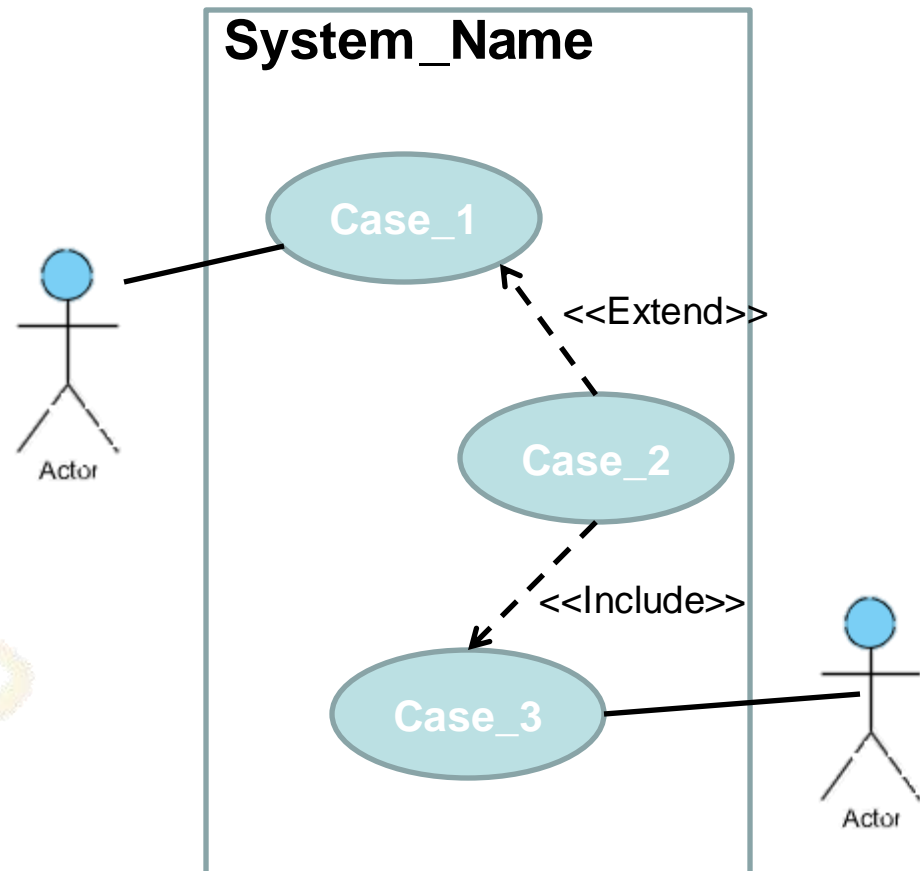
Actor

Actor

Use Case Diagram: Smart Phone

Use Case Diagram: ATM

ATM Machine

Withdraw Cash

Pay Bills

Transfer Funds

Print Receipt

Restock Paper

Customer

Maintenance Man

<<Extends>>

<<Includes>>
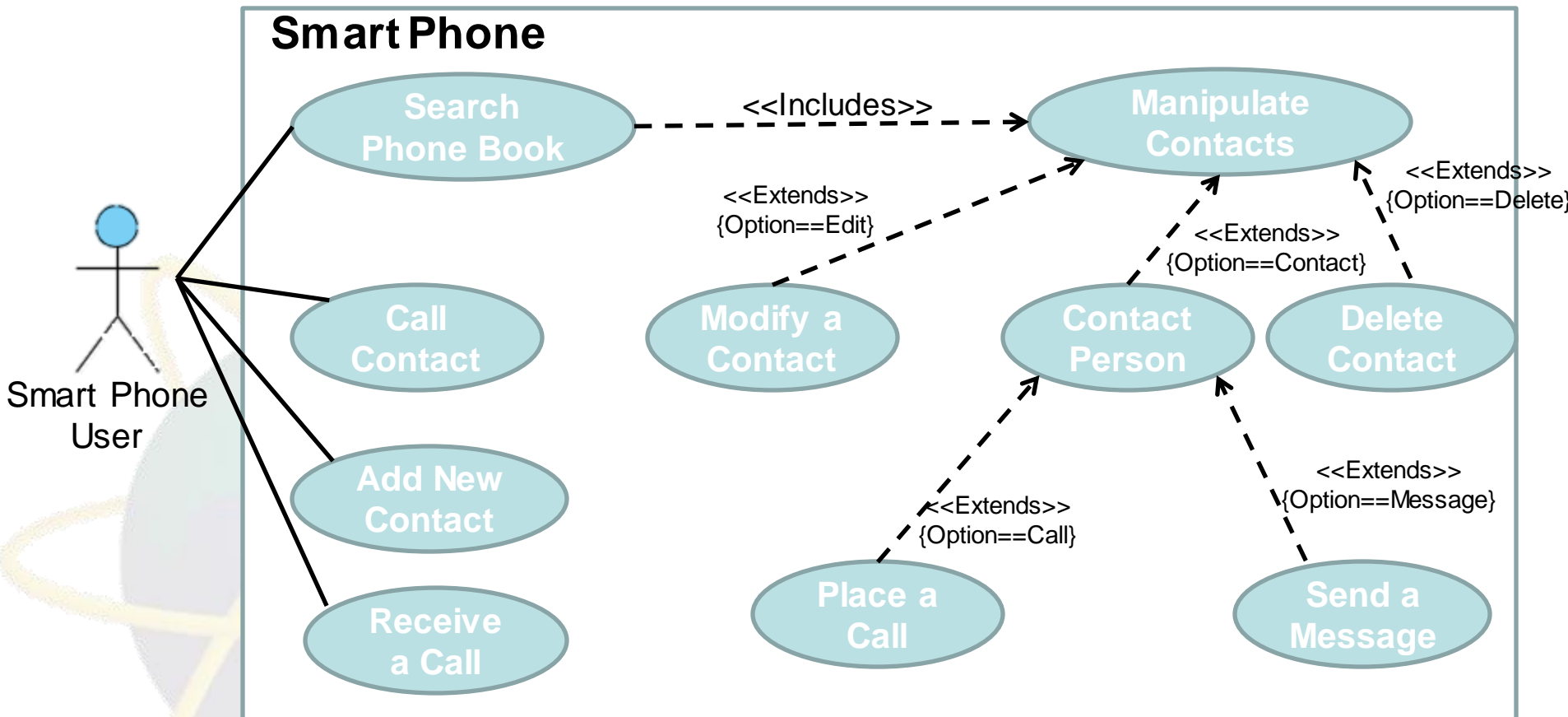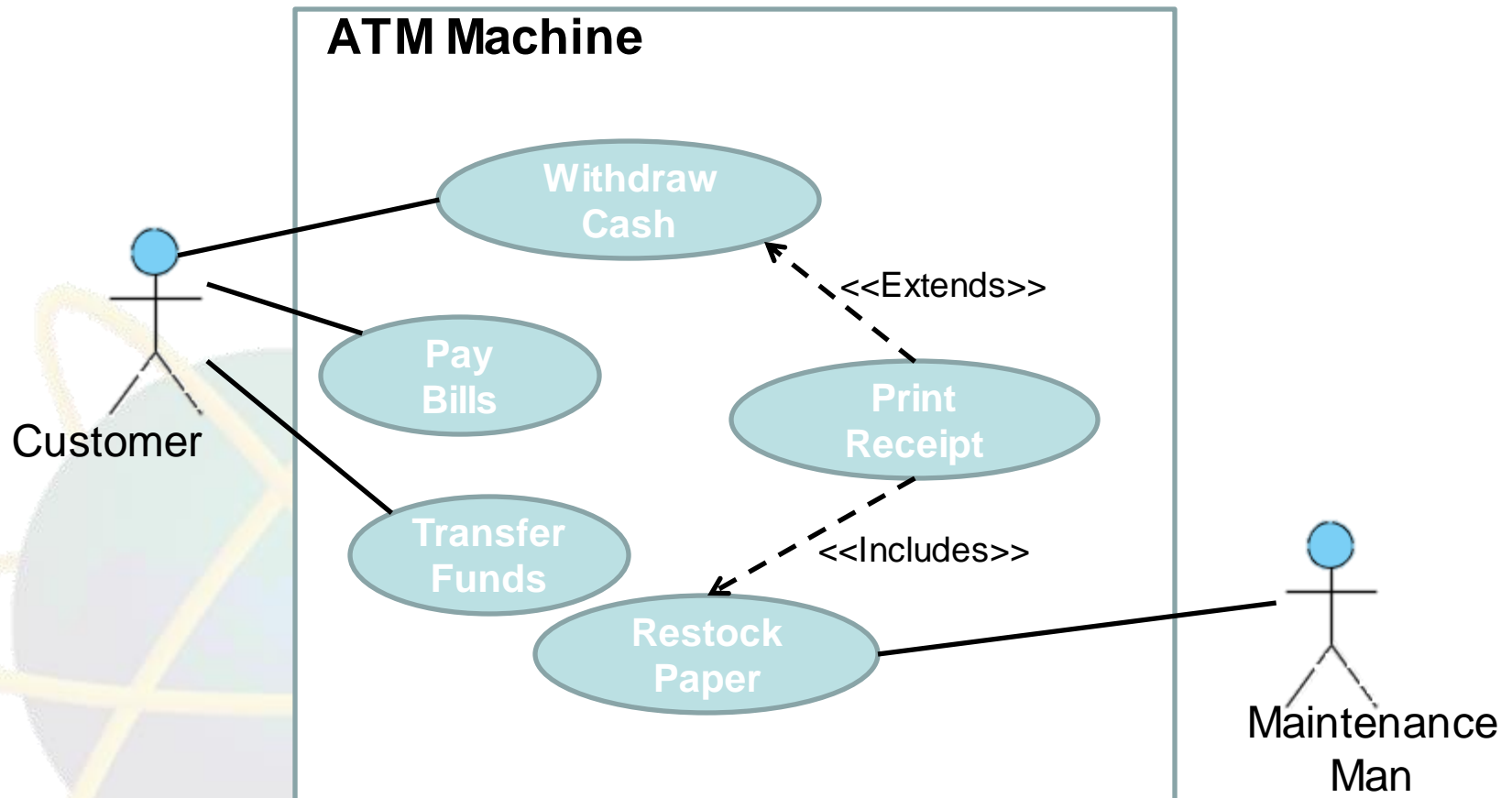
Use Case: Case Descriptions

- A use case is often accompanied by *use case description* and *actor descriptions*

Name	The Use Case name. Typically the name is of the format <action> + <object>.
ID	An identifier that is unique to each Use Case.
Description	A brief sentence that states what the user wants to be able to do and what benefit he will derive.
Actors	The type of user who interacts with the system to accomplish the task. Actors are identified by role name.
Organizational Benefits	The value the organization expects to receive from having the functionality described. Ideally this is a link directly to a Business Objective.
Frequency of Use	How often the Use Case is executed.
Triggers	Concrete actions made by the user within the system to start the Use Case.
Preconditions	Any states that the system must be in or conditions that must be met before the Use Case is started.
Postconditions	Any states that the system must be in or conditions that must be met after the Use Case is completed successfully. These will be met if the Main Course or any Alternate Courses are followed. Some Exceptions may result in failure to meet the Postconditions.

Use-Case Description For: ATM

Use Case Description: Restock Paper	
Name	Restock Paper
ID	N/A
Description	Refill the ATM Machine with paper rolls to print receipt
Actor(s)	Maintenance Man
Organizational Benefits	N/A
Frequency of Use	N/A
Triggers	N/A or Maintenance Man
Precondition	ATM Machine CANNOT print receipts
Post-condition	ATM Machine CAN print receipts

Use-Case Description For: ATM

Use Case Description: Pay Bills	
Name	Pay Bills
ID	N/A
Description	Allows the user to pay the house bills
Actor(s)	Customer
Organizational Benefits	N/A
Frequency of Use	N/A
Triggers	N/A or Customer
Precondition	N/A
Post-condition	N/A

Use-Case Description For: ATM

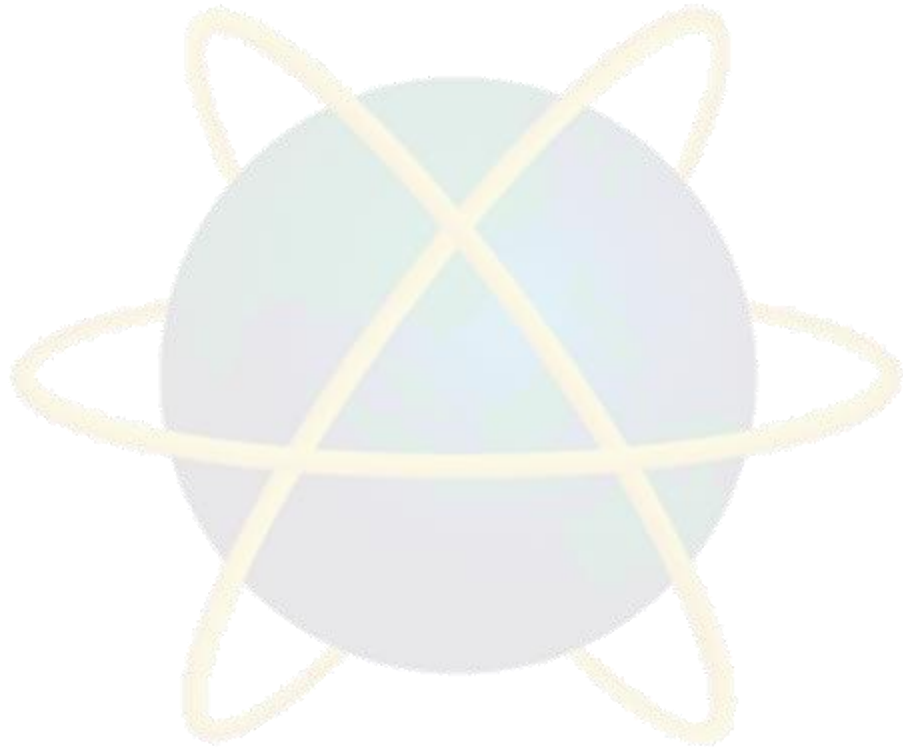| Use Case Description: Withdraw Cash	
Name	Withdraw Cash
ID	N/A
Description	Allows the user to withdraw money (RM1, RM10, and RM50)
Actor(s)	Customer
Organizational Benefits	N/A
Frequency of Use	N/A
Triggers	N/A or Customer
Precondition	The ATM Machine has sufficient Money
Post-condition	The ATM Machine has less Amount of Money

Quick Review Questions

- What is a use case diagram?

- What are the components of a use case diagram?

- Draw the use case diagram for borrowing a book from the library
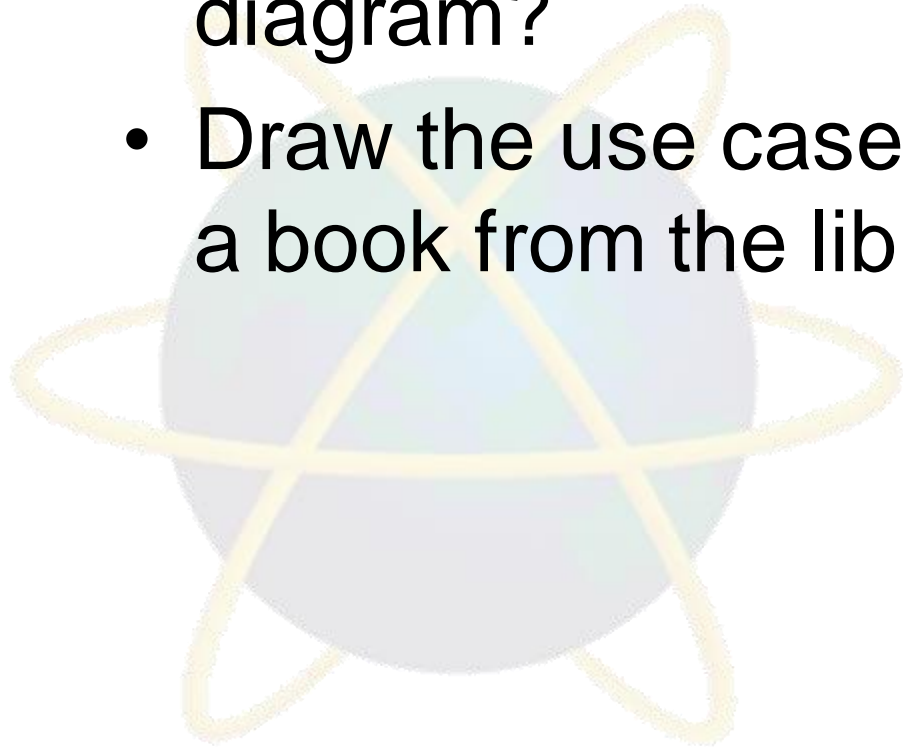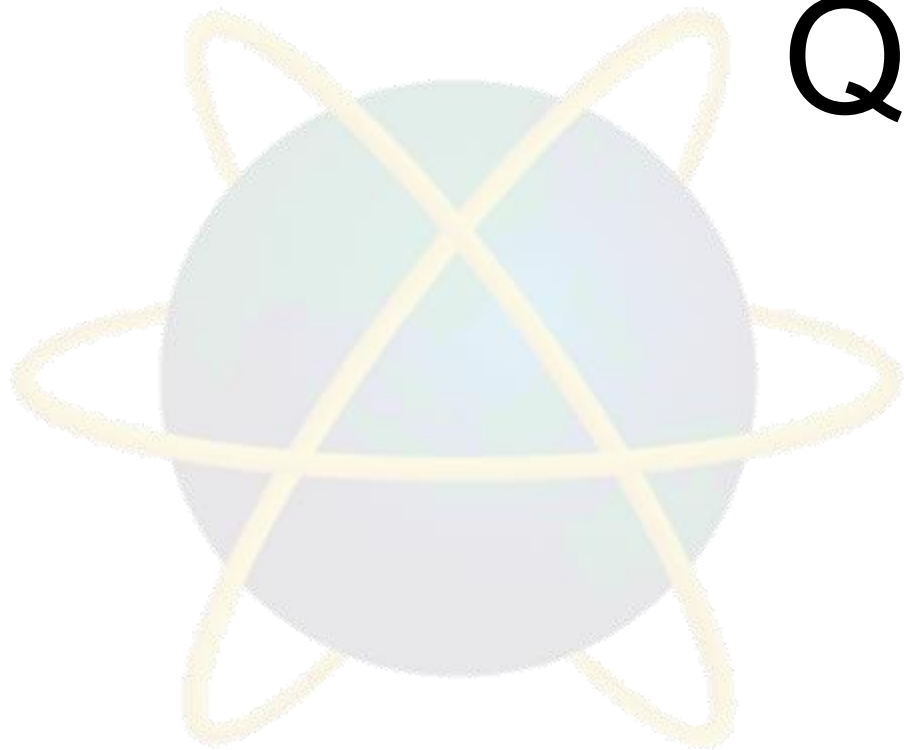
Summary of Main Teaching Points

-Usecase diagrams and components

Q & A

Next Session

-class diagram