LESSON TITLE

Country	Cambodia
Language	■ English ■ Local Language
Course Title	Software Engineering
Lesson Title	06. Sequence Diagram
SME	Mr. TAL Tongsreng
Submission Date	November 27th, 2015
Version	1.0

Please provide the outline of course which will

☐ A : Text-based + Audio
☐ B : Text-based + Video
☐ C : Only Video

Advanced Class Diagram	
	1. Participants 2. Time 3. Events and Messages 4. Message Arrows 5. Sequence Diagram Example

Please provide the introduction / overview on this lesson

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Overview
In this chapter, you are going to learn about • Know related elements in sequence diagram • Know how to use time in sequence diagram • Know how to send and receive message in sequence diagram • Know hot to draw message arrow in sequence diagram • Drawing sequence diagram in UML drawing tool

1. Introduction > 1.2 Learning Content

Please make sure the hierarch of the content is well formed.
Please organize the lesson in 3-5 main topics and use 3-level headings.

Level 1	Level 2	Level 3
1. Participants	1.1 Definition	
	1.2. Representation in Visual Paradigm	
	1.3. Example	
2. Time	2.1. Definition	
	2.2. Usage in Visual Paradigm	
	2.3. Example	
3. Events and Messages	3.1. Messages	
	3.2. Activation Bar	
	3.3. Nested Messages	

1. Introduction > 1.2 Learning Content

Please make sure the hierarch of the content is well formed.
Please organize the lesson in 3-5 main topics and use 3-level headings.

Level 1	Level 2	Level 3
4. Message Arrows	4.1. Synchronous and Asynchronous Message	
	4.2. Return Message	
	4.3. Creation and Destruction Message	
5. Sequence Diagram Example	5.1. Use Case Diagram	
	5.2. Activity Diagram	
	5.3. Sequence Diagram	

1. Introduction > 1.4 Learning Objectives

Please provide objective of the lesson by high light keyword and follow (Audience, Behavior, Condition, Degree) to write the objective

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Objective
Upon completion of this chapter, you will be able to • Define participant in Sequence Diagram • Identify and use Time sign • Define Events and Messages • Define and use different kind of Message arrows • Understand how to draw Sequence Diagram

Please provide keywords of the lesson with explanation

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Keywords	Description
Sequence	A series of messages that executed in order.
Participant	the parts of your system that interact with each other during the sequence.
Lifeline	A dashed line indicate the lifetime of a participant during the sequence.
Message	what being sent from a participant (the message caller) to another participant (the message receiver) to do something.
Interaction	Something happened back from a participant after another participant sending a message to it.

☐ A : Fill in the blank
☐ B : Short answer question
☐ C : Multiple Choice

Feedback type
☐ A : Text-based short answer
☐ B : Text-based short answer and more information
☐ C : Video based feedback

Pre-Test

Question	Possible answers	Correct Answer	Feedback of the question
Which one is result of washing shoes?	1. Cleaned clothes 2. Dirty water 3. Wet cleaned shoes	3. Wet cleaned shoes	Cleaned clothes is the result from washing clothes Dirty water is left behind the washing process.

☐ A : Fill in the blank
☐ B : Short answer question
☐ C : Multiple Choice

Feedback type
☐ A : Text-based short answer
☐ B : Text-based short answer and more information
☐ C : Video based feedback

Pre-Test

Question	Possible answers	Correct Answer	Feedback of the question
Which one is needed before planting a seed?	1. Book 2. A pot with land 3. Watering frequently	2. A pot with land	Book is used for reading not for planting. Watering is needed after planting the seed.

☐ A : Fill in the blank
☐ B : Short answer question
☐ C : Multiple Choice

Feedback type
☐ A : Text-based short answer
☐ B : Text-based short answer and more information
☐ C : Video based feedback

Pre-Test

Question	Possible answers	Correct Answer	Feedback of the question
Suppose that you are now in a coffee shop, who can bring you coffee you want?	1. Cooker 2. Coffee maker 3. Waiter	3. Waiter	Cooker is cooking material Coffee maker, make coffee only, he don't server client

2. Learn> Topic: 1. Participants

(1) Learning Contents

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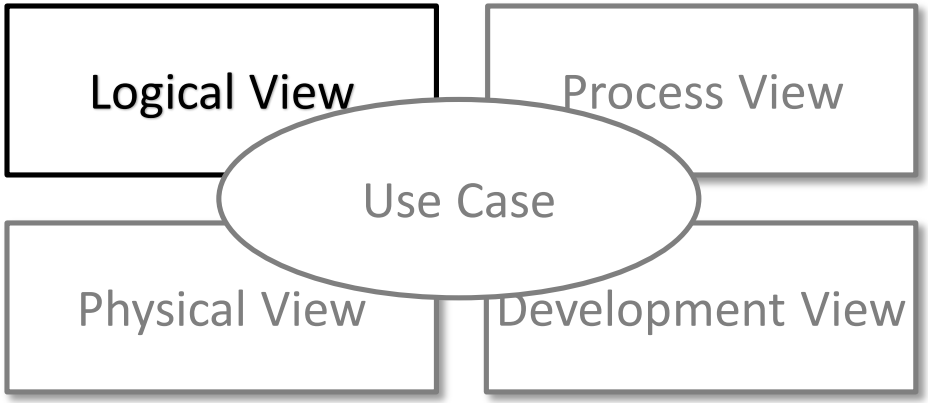
- Sequence diagram model important runtime interactions between the parts that make up your system
- It forms part of the logical view
- Sequence diagrams are all about capturing the order of interactions between par ts of your system



2. Learn> Topic: 1.1. Definition

(1) Learning Contents	☒ A : Text-based + Audio ☐ B : Text-based + Video ☐ C : Only Video
	▪ Participants: the parts of your system that interact with each other during the seq uence ▪ Participants are arranged horizontally ▪ Each participant has a corresponding lifeline running down the page

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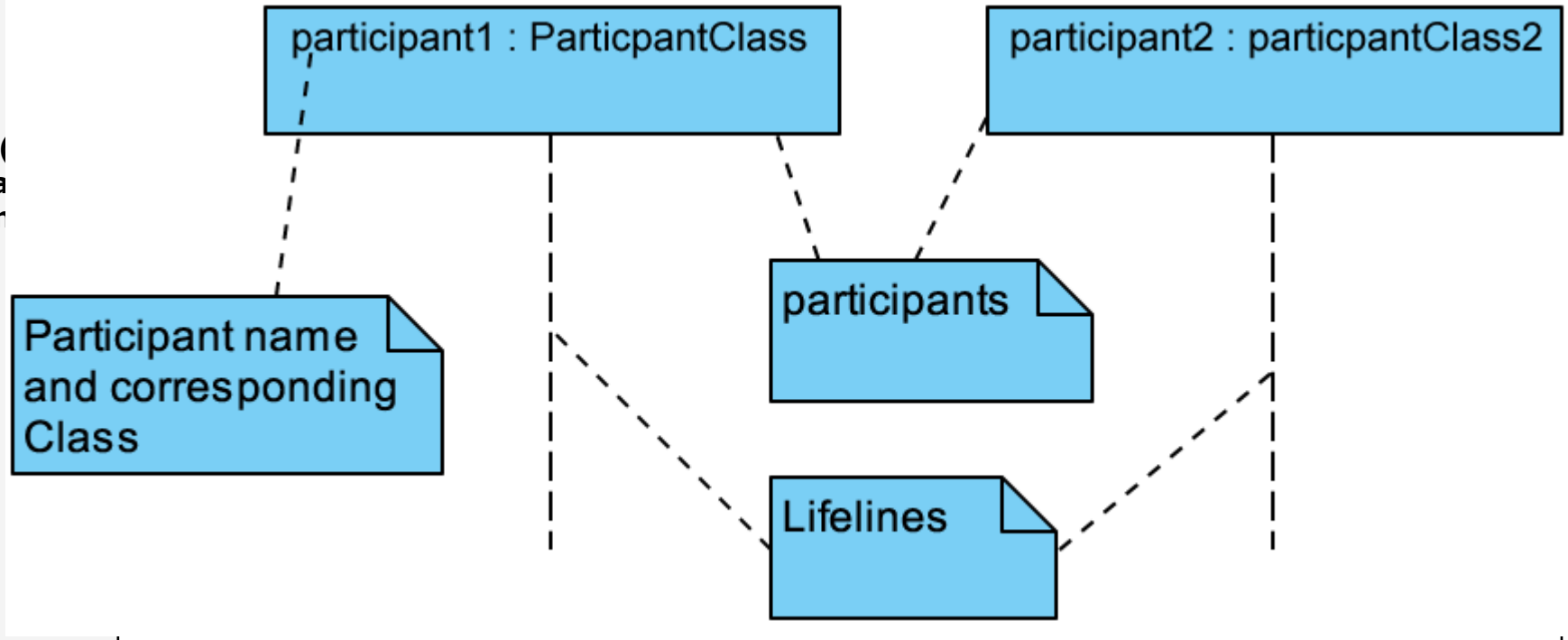
- Participant Names

```
name [selector] : class_name
```



2. Learn> Topic: 1.3. Example

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- Some examples:
- admin
- : ContentManagementSystem
- admin : Administrator
- eventHandlers[2] : EventHandler

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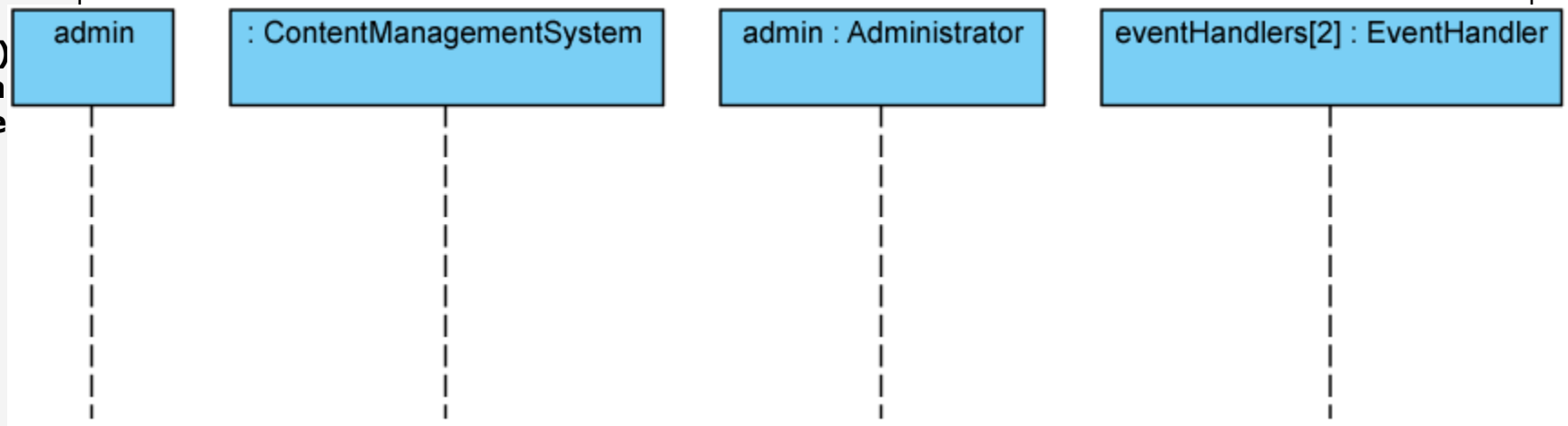

2. Learn> Topic: 2.1. Time Definition

(1) Learning Contents	☒ A : Text-based + Audio ☐ B : Text-based + Video ☐ C : Only Video
	▪ Time is an important factor in sequence diagram ▪ Time on a sequence diagram starts at the top of the page (just beneath the topm ost participant heading) and then progresses down the page ▪ The order that interactions are placed down the page on a sequence diagram ind icates the order in which those interactions will take place in time ▪ Time on a sequence diagram is all about ordering, not duration

2. Learn> Topic: 2.2. Representation in VP

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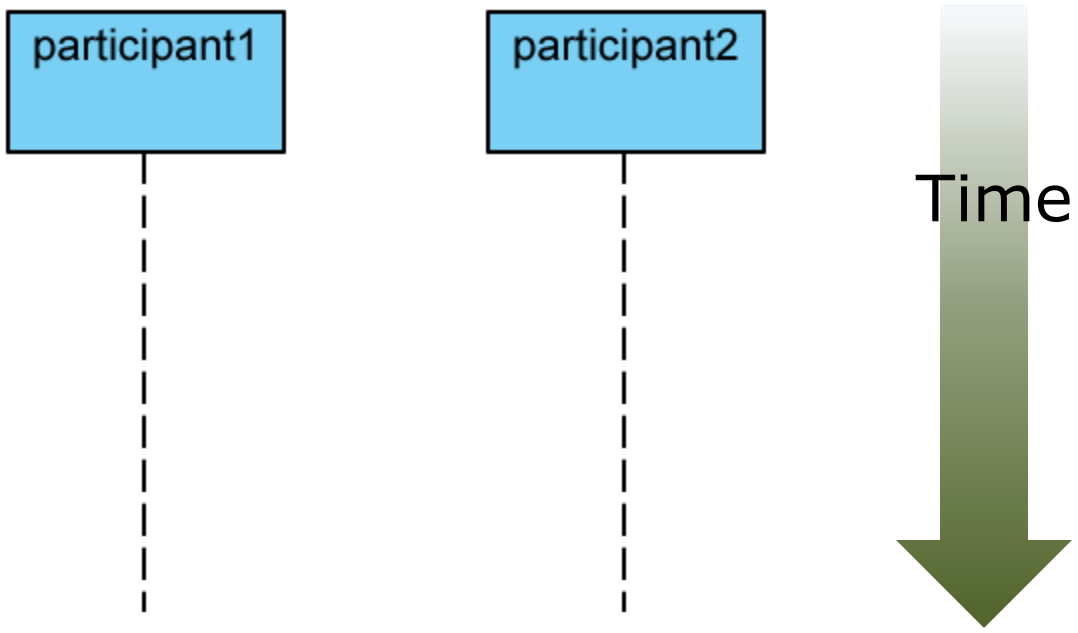

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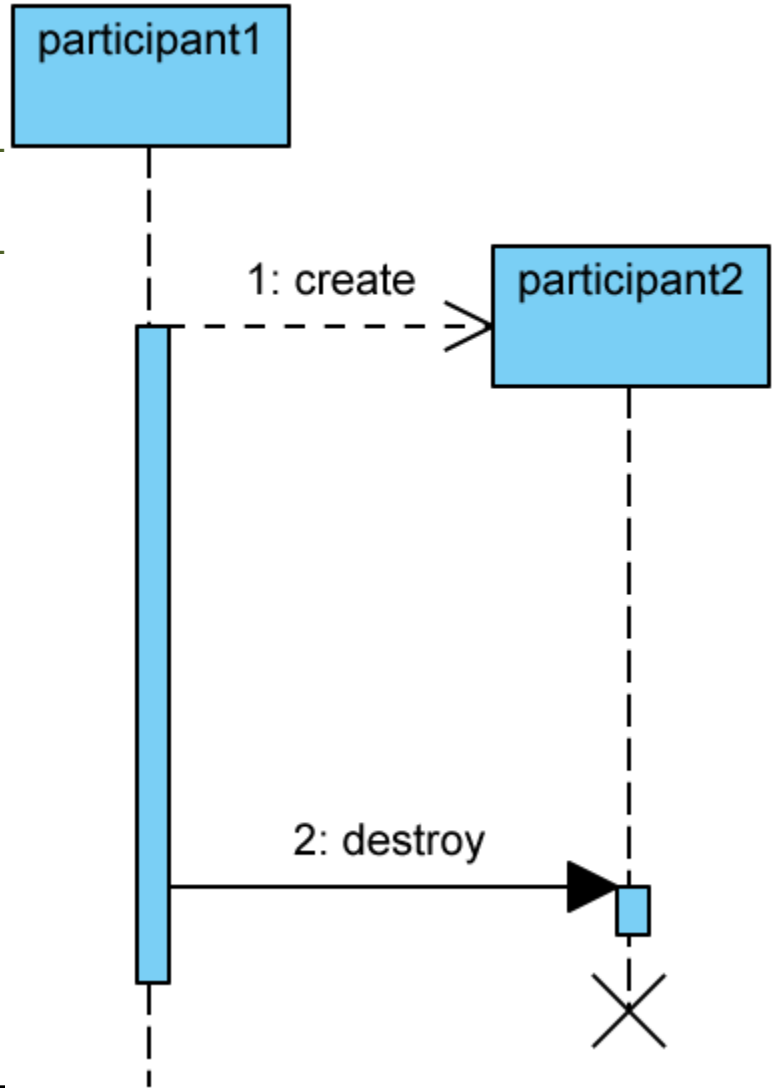
- In this example, the participant2's life time is shorter than participant1
- This example shows that participant1 creates participant2
- This example shows that participant1 also destroys participant2



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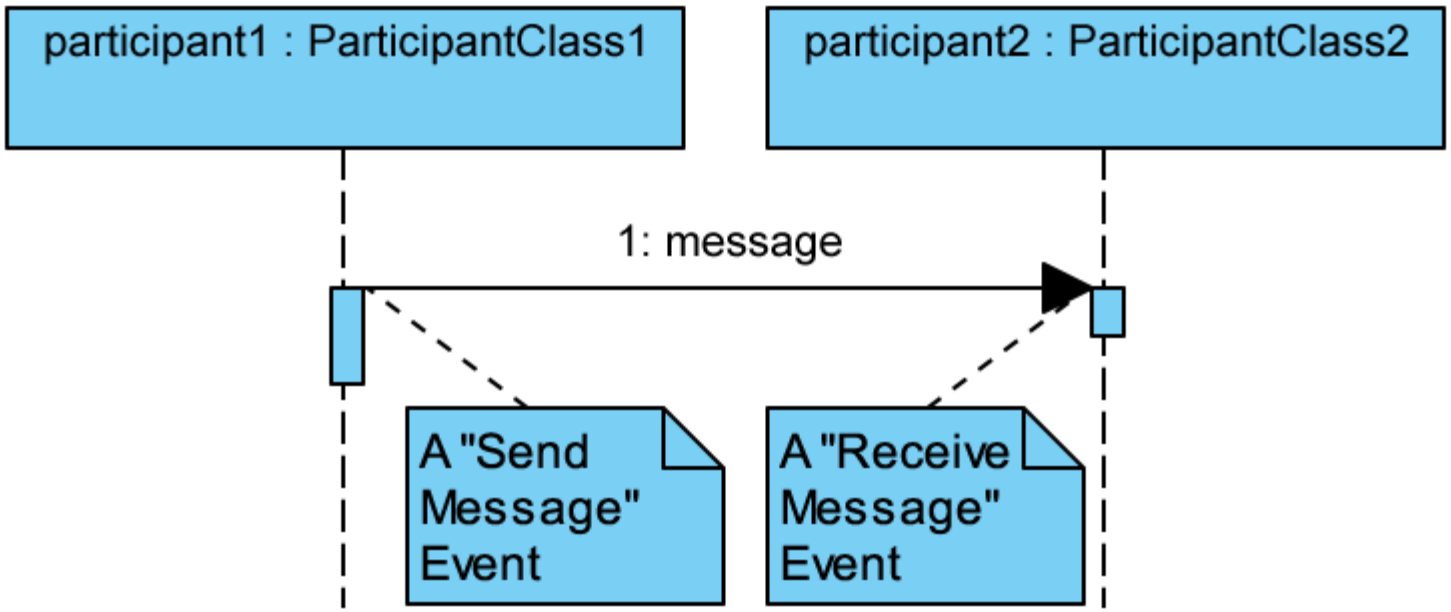
- Event: any point in an interaction where something occurs



(1) Learning Contents

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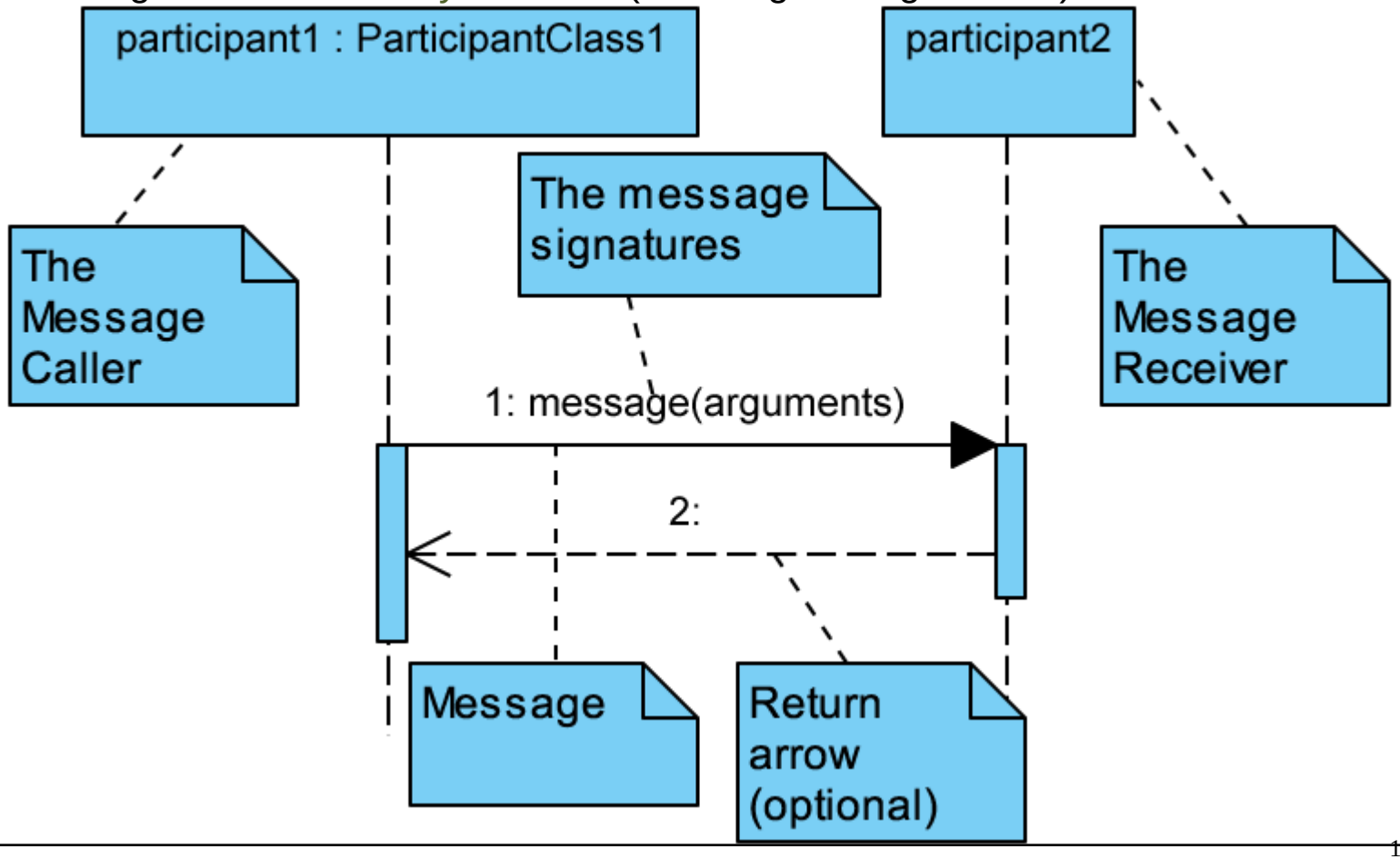
- Message: what being sent from a participant (the message caller) to another participant (the message receiver) to do something
- Messages can flow in any direction (left to right or right to left)



(1) Learning Contents

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- Message Signatures
  - The format for a message signature is

```
attribute = signal_or_message_name (arguments) : return_type
```

  - The format of an argument is

```
<name>:<class>
```

- Some examples:
  - doSomething()
  - doSomething(arg1 : Class1, arg2 : Class2)
  - doSomething() : Class3
  - myVar = doSomething() : Class3

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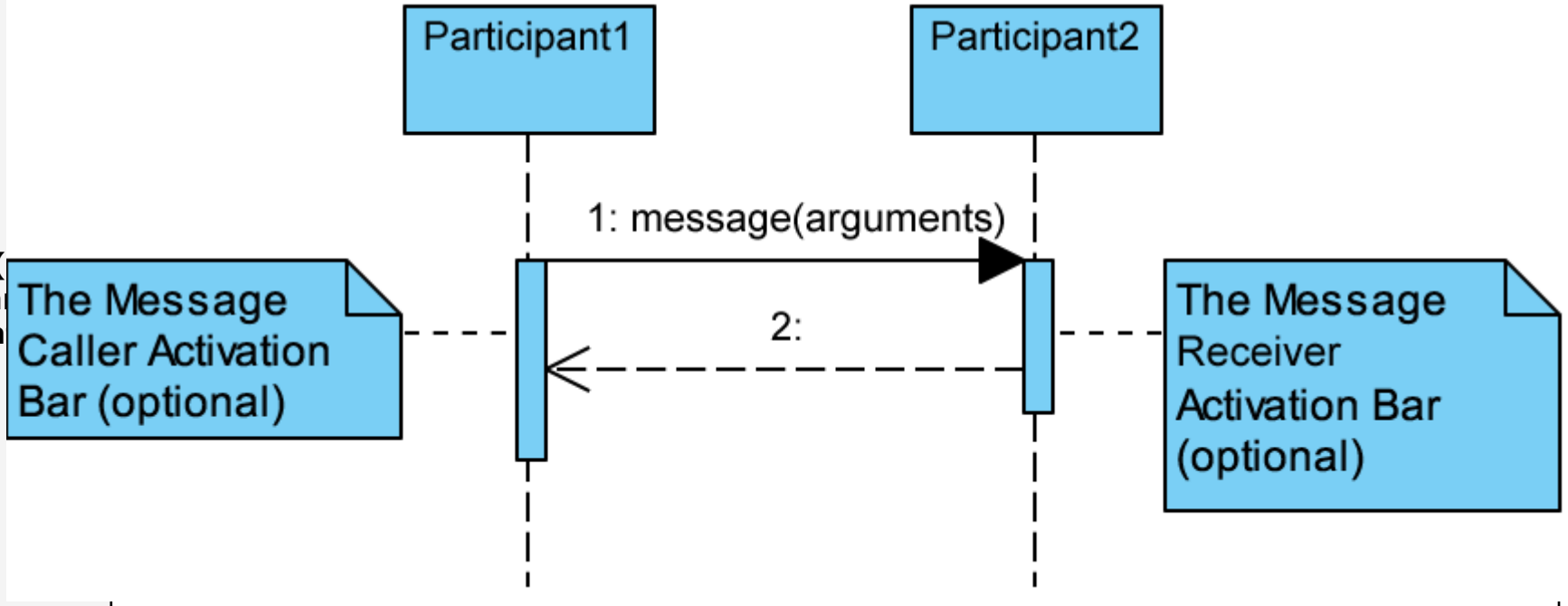
- Activation Bar: is used to show that a participant is active



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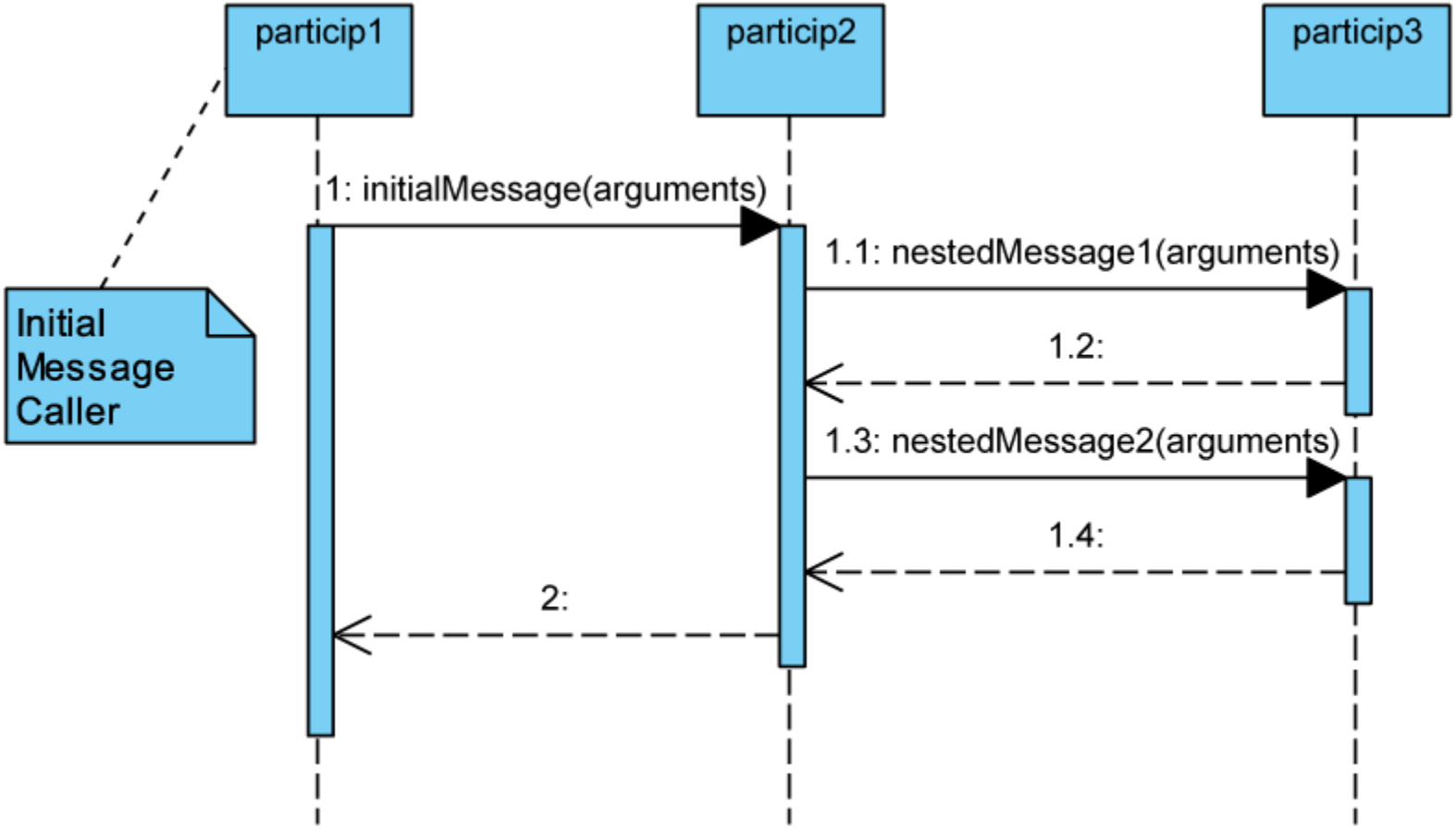
▪ when a message from one participant results in one or more messages being sent by the receiving participant



2. Learn> Topic: 4. Message Arrows

(1) Learning Contents

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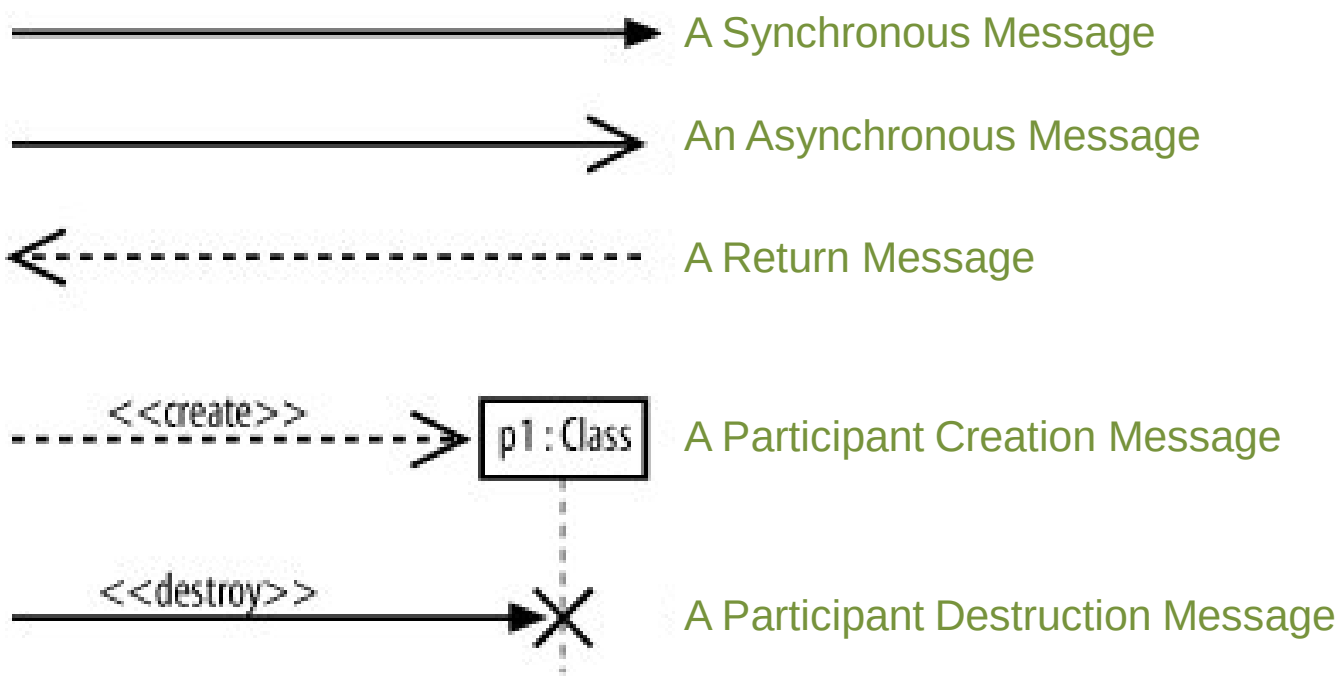
- There are 5 main types of message arrow



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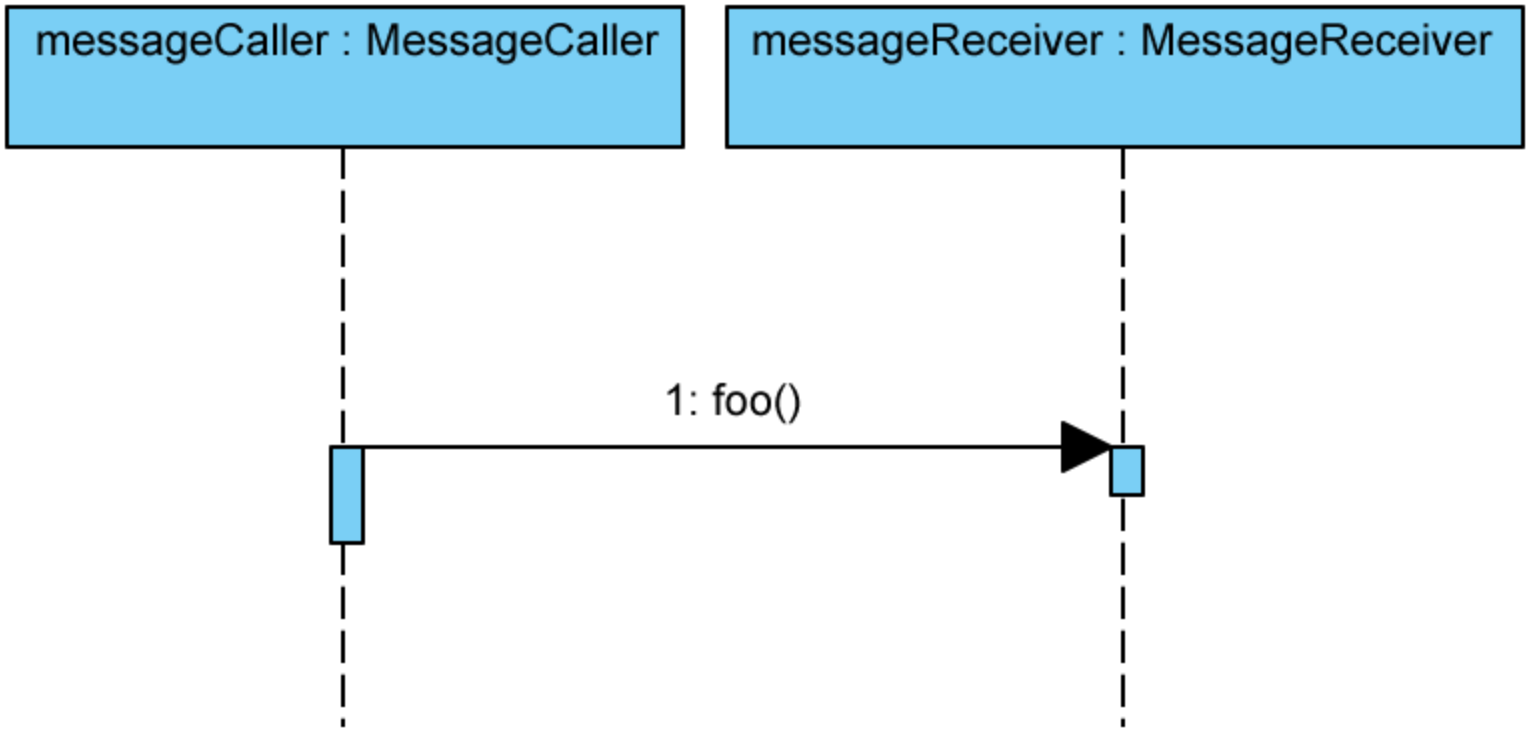
▪ Synchronous Message: this type of message is invoked when the Message Caller waits for the Message Receiver to return from the message invocation



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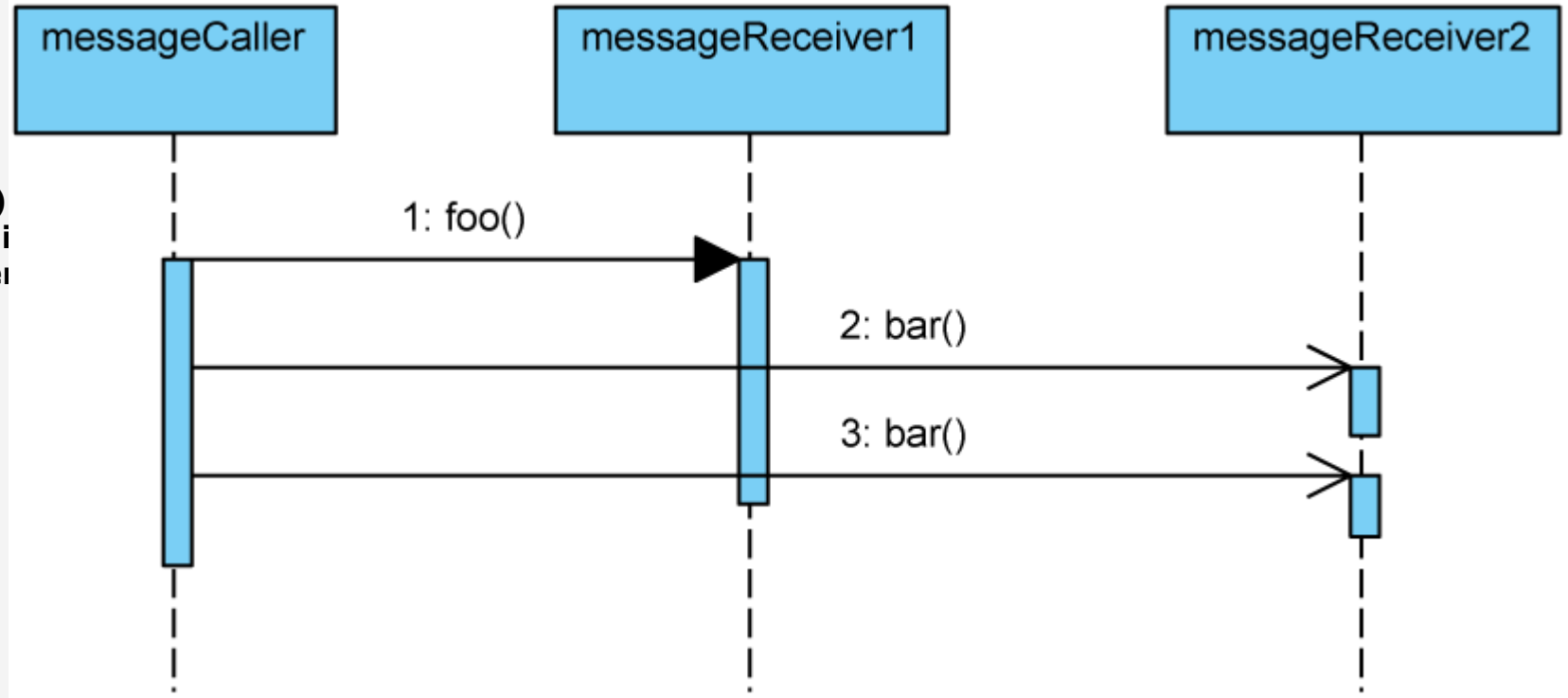
▪ Asynchronous Message: this type of message is invoked by a Message Caller on a Message Receiver, but the Message Caller does not wait for the message invoc ation to return before carrying on with the rest of the interaction's steps.



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2. Learn> Topic: 4.2. Return Message

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	▪ Return Message: optional piece of notation that you can use at the end of an activation bar to show that the control flow of the activation returns to the participant that passed the original message ▪ A return arrow is similar to reaching the end of a method or explicitly calling a `return` statement ▪ A return arrow is optional

(1) Learning Contents

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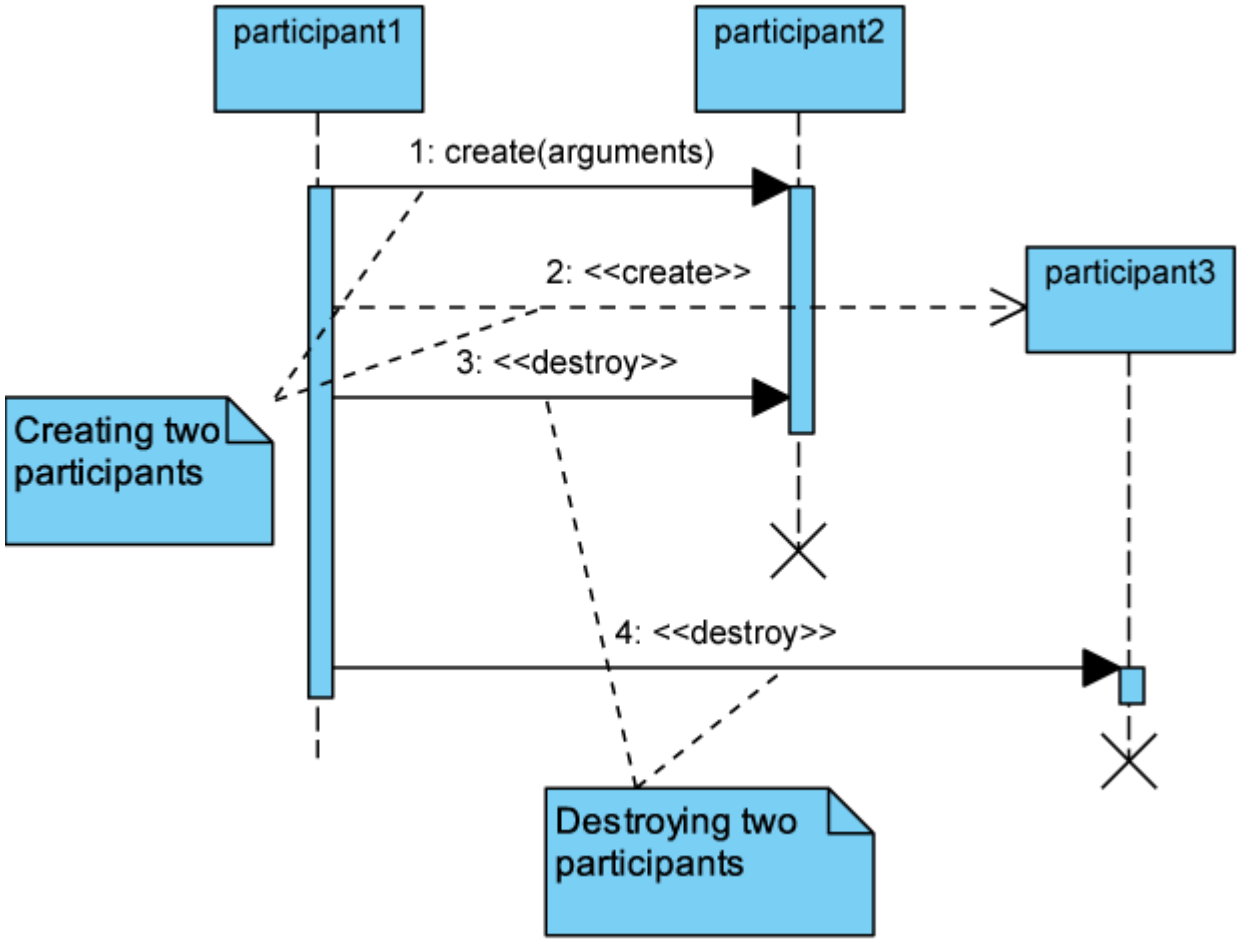
▪ Participant Creation and Destruction Messages are used when messages are passed in order to create or to destroy a participant



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- Requirements below are part of ATM system requirements:

R1. Customer uses bank ATM to do transactions such as

1. check balances of his/her bank accounts
2. deposit funds
3. withdraw cash
4. transfer funds

R2. The customer needed to be authenticated by inserting a plastic ATM card and entering a personal identification number (PIN) before doing any transaction.

R3. If needed, customers may ask ATM for help during their transacti on.

R4. In case of defect, ATM Technician maintains Bank ATM.
ATM maintenance includes

1. replenishing ATM with cash, ink or printer paper
2. upgrades of hardware, firmware or software

The ATM requires remote or on-site diagnostics before repairing.

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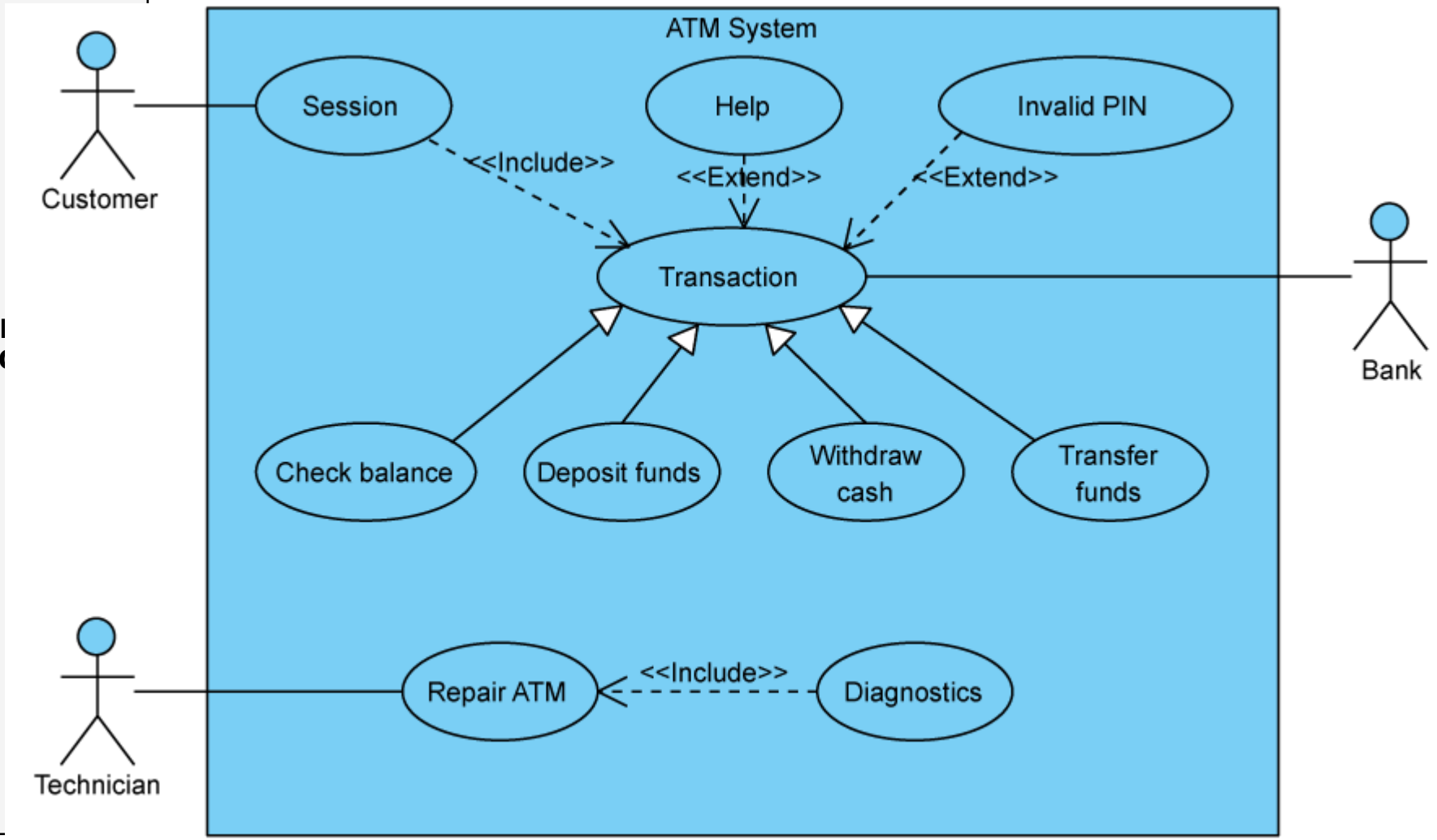
Use Case Diagram of ATM System



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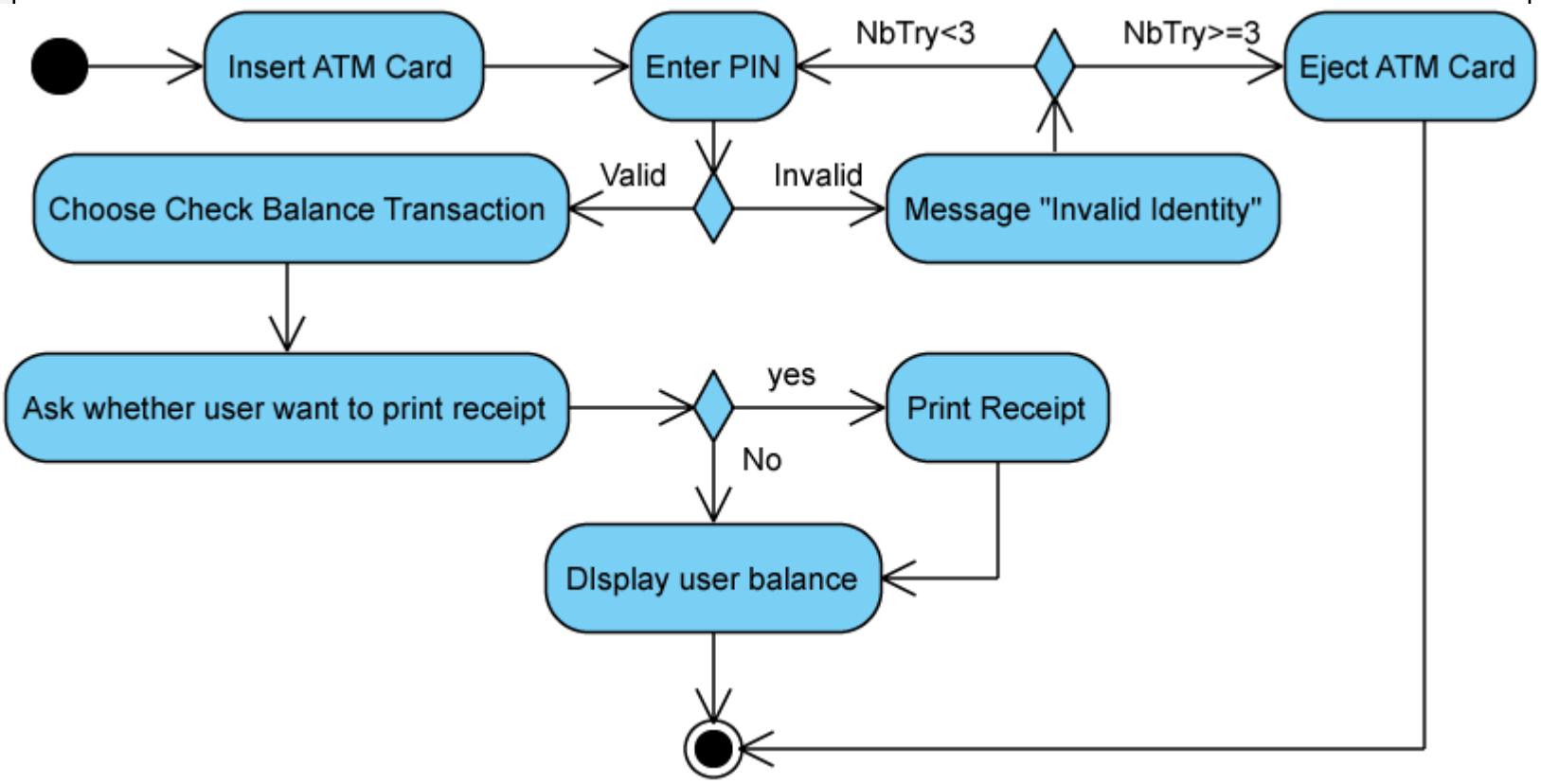
- Activity Diagram of Use Case “Check Balance”
  - For security, If user Enter invalid PIN 3 times (`NbTry`), it will eject the Plas tic ATM card
  - To include real practice, user can also print receipt



(1) Learning Contents

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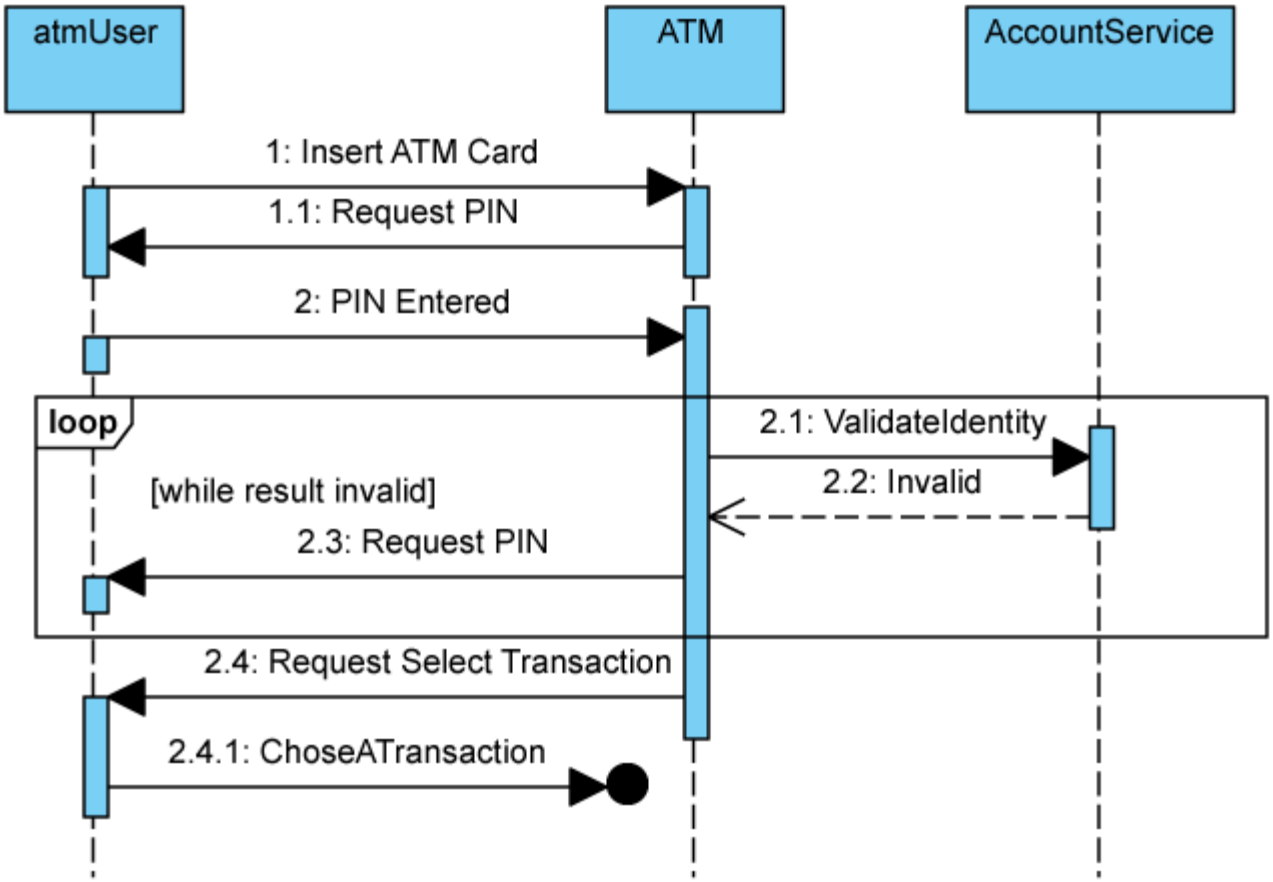
▪ In Sequence diagram, we will separate into 2 parts such as account validation an d doing an operation.



(1) Learning Contents

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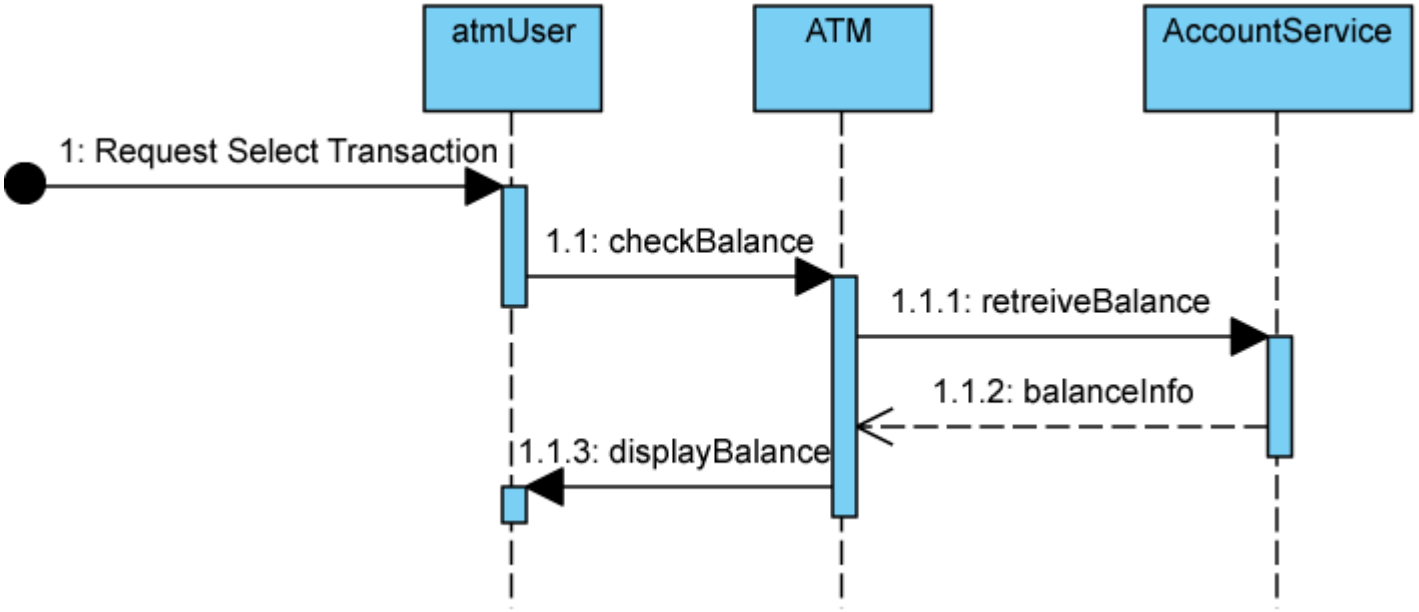
▪ Second part is doing an operation, here we choose checking balance as an exa mple



3. Test

Question	Possible answers	Correct Answer
1. Participants are:	a) The parts of your system that interact with each other during the sequence b) The parts of the system that is called classes that build the system c) The parts of the system that combine together to build a system	a) The parts of your system that interact with each other during the sequence
2. Completing blank field:	……starts at the top of the page (just beneath the topmost participant heading) and then progresses down the page	Time
3. Choose a name that is not mentioned in this lesson:	a) Participant b) Event c) Message d) Aggregation e) Time	e) Aggregation
4. Message arrows are:	a) Participant creation message b) Return message c) physical message	a) Participant creation message b) Return message d) Asynchronous message

4. Practice

☐ A : Fill in the blank
☐ B : Short answer question
☐ C : Multiple Choice

Feedback type
☐ A : Text-based short answer
☐ B : Text-based short answer and more information
☐ C : Video based feedback

Practice

No.	Exercise	Solution
1.	Draw Sequence diagram of ATM system (see det ail in Moodle)	
2,	Draw Sequence diagram of Insurance System	
3,	Draw Sequence diagram of Check-in-system	

5. Outro > 5.1 Summarize

Please give a lesson summary.
Each topic can be summarized into a sentence, diagram, or even a word.

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Summarize

- Sequence diagram show the logical relation structure of the system.
- Participants are the parts of your system that interact with each other during the sequence.
- Time is an important factor in sequence diagram.
- Synchronous message wait for message receiver to return but asynchronous message does not.
- Creation message is used for creating life of participant but destruction message for terminate or stop life.

Provide references if you think the students need.

Reference

- Miles, R. (2006). Learning UML 2.0. O'Reilly
- Chonoles, M. & Schardt, J. (2003). UML 2 for Dummies. Wiley Publishing
- http://www.visual-paradigm.com/features/
- http://staruml.io/support
- http://staruml.sourceforge.net/v1/documentations.php
- http://www.math-cs.gordon.edu/courses/cs211/ATMExample/UseCases.html

5. Outro > 5.3 Next Lesson

This is the end of the lesson.
Ending message and introduction to next lesson including lesson title and topics should be given.

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☐ C : Only Video

Next Lesson Title	**Concept Object** 1. What is Object? 2. Object examples 3. Encapsulation concept 4. What is Classes? 5. Example using Classes and Objects