

LECTURER: JOHN DOE

# SPECIFICATION

Introduction to Software Requirements Specification (SRS)

1

Specification of User Interfaces (GUIs)

2

Specification of System Components

3

Specification of Technical System Interfaces

4

Specification of Detailed Conceptual Data Models

5

Using Structured Text in the Specification of Data Interfaces  
Specification of Quality Requirements

6

## **UNIT 4**

# **SPECIFICATION OF TECHNICAL SYSTEM INTERFACES**

## STUDY GOALS



- Explain the use of UML behavior diagrams in specifying behavior at interfaces.
- Describe the use of UML sequence diagrams.
- Specify data structures at interfaces using class diagrams.



1. The object diagram is to the class diagram as the sequence diagram is to the ...?
2. Which typical elements of a sequence diagram do you know?
3. What are the main disadvantages of a UML sequence diagram?

## MODELING WITH THE SEQUENCE DIAGRAM

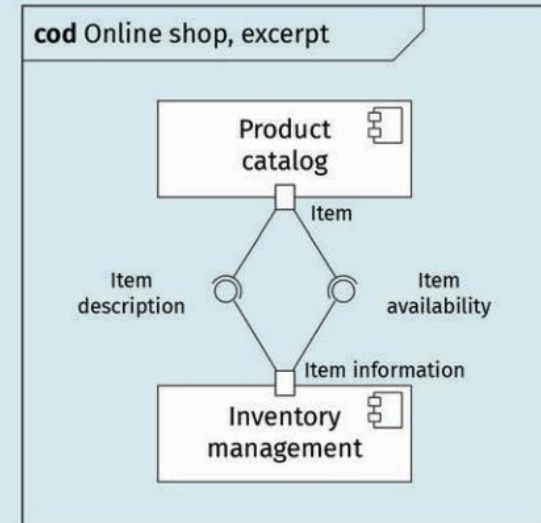
Within an online store, the **product catalog component** accesses the **inventory management component**.

Access takes place via two **interfaces**.

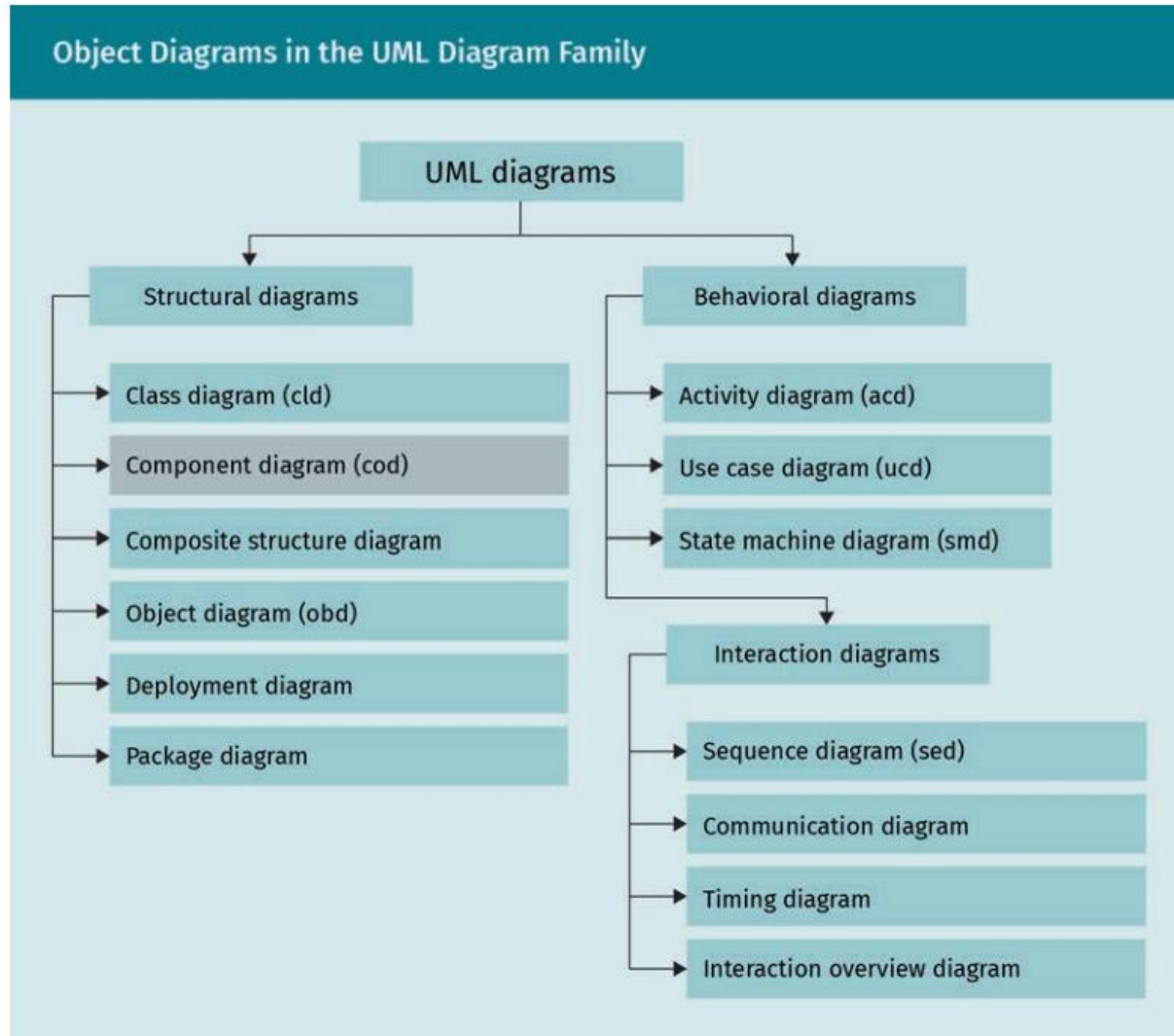
In order to implement the components, the development team needs further information. In which situation is which data exchanged via the interface?

UML activity diagram and the **UML sequence diagram** are suitable forms of documentation.

### Example of Components and Interfaces



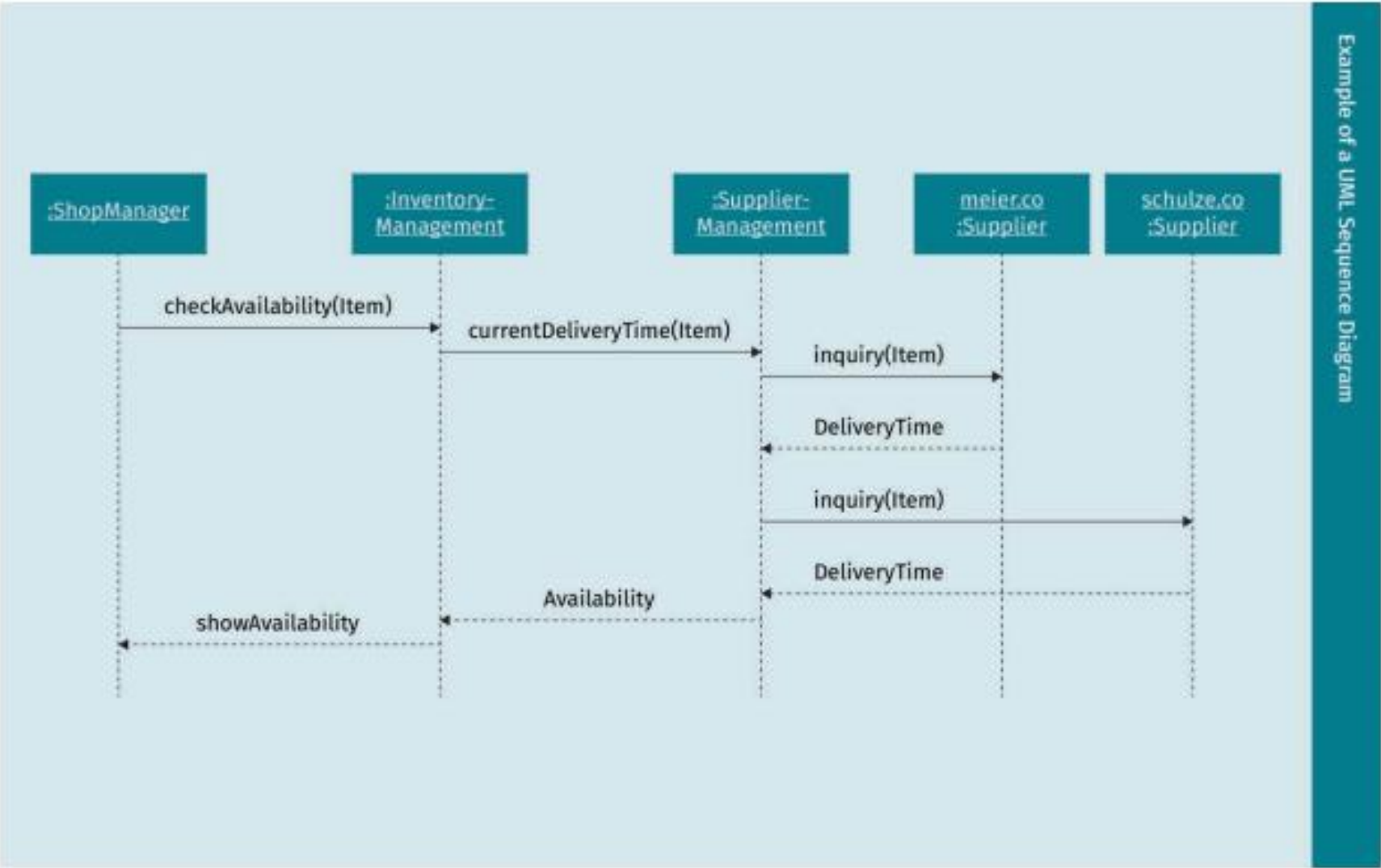
## MODELING WITH THE SEQUENCE DIAGRAM



The **UML sequence diagram** is type of **behavior diagram**. Concrete examples can be used to show and specify the system behavior.

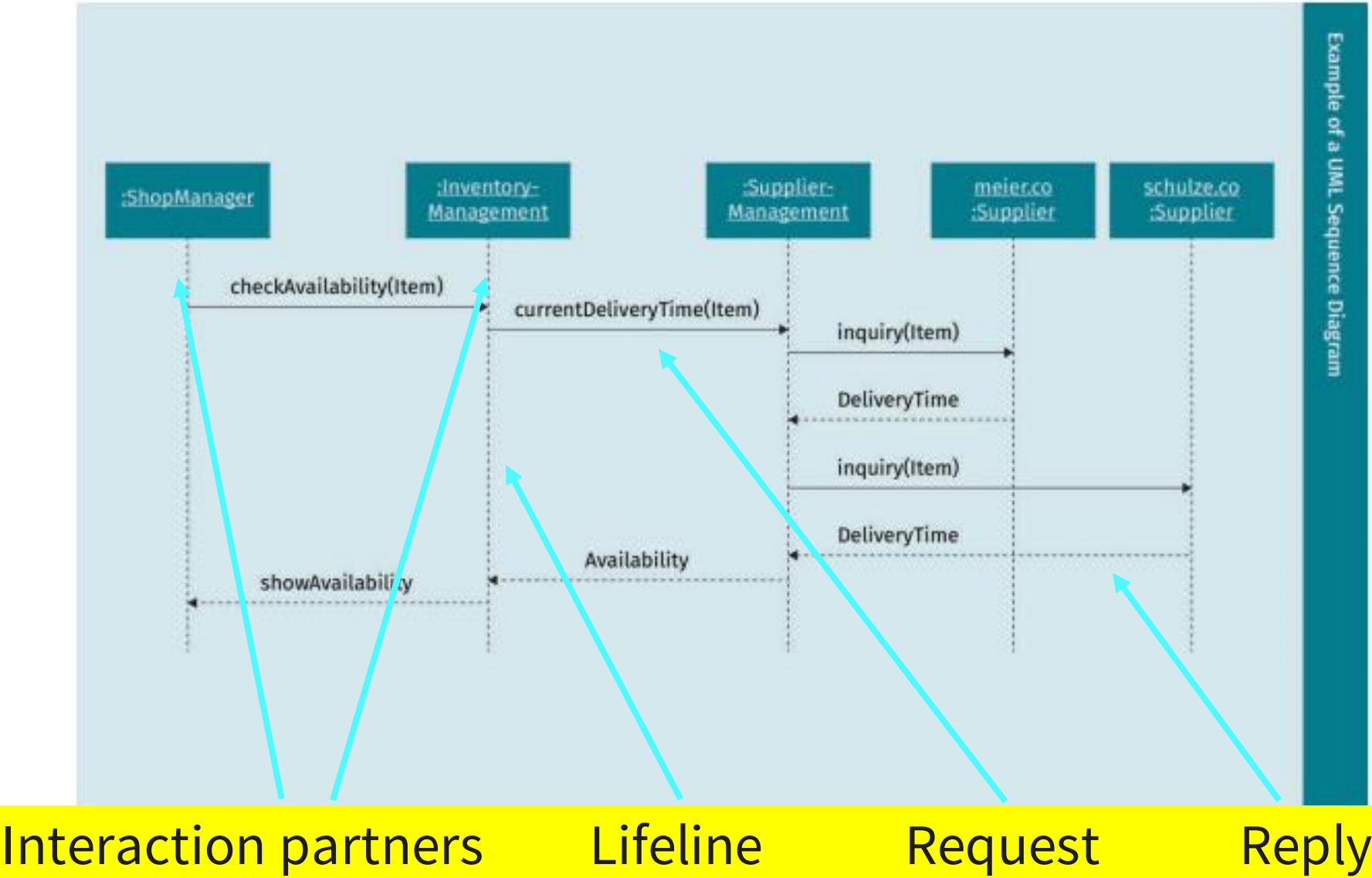
The sequence diagram is to the activity diagram, as the object diagram is to the class diagram: The **sequence diagram** shows a **concrete process**, while the **activity diagram** specifies the **set of all possible processes**.

MODELING WITH THE SEQUENCE DIAGRAM





MODELING WITH THE SEQUENCE DIAGRAM



MODELING WITH THE SEQUENCE DIAGRAM

Strengths and weaknesses of UML diagrams for behavior specification:

Strengths and Weaknesses of UML Diagrams When Specifying Technical Interfaces between Components		
	Strengths when specifying interfaces	Weaknesses when specifying interfaces
UML use case diagram	<ul style="list-style-type: none"><li>• Denotes at the highest level that interfaces exist</li><li>• Strengths when specifying interfaces</li></ul>	<ul style="list-style-type: none"><li>• No conceptual or technical details</li><li>• Weaknesses when specifying interfaces</li></ul>

	Strengths when specifying interfaces	Weaknesses when specifying interfaces
UML activity diagram	<ul style="list-style-type: none"><li>• Links conceptual operations with exchanged data structures</li><li>• Overview of required messages</li><li>• Denotes the purely conceptual level</li></ul>	<ul style="list-style-type: none"><li>• No technical details of the interface</li><li>• No details of the message content</li></ul>
UML sequence diagram	<ul style="list-style-type: none"><li>• Depicts complex interactions and technical interaction cascades in their precise sequence</li><li>• Links operation and data structure</li></ul>	<ul style="list-style-type: none"><li>• Focus on specific operations</li><li>• Operation isolated from the conceptual use case</li><li>• Can soon become highly complex and technical</li><li>• Only readable by those with advanced knowledge of UML</li></ul>

## REVIEW STUDY GOALS



- Explain the use of UML behavior diagrams in specifying behavior at interfaces.
- Describe the use of UML sequence diagrams.
- Specify data structures at interfaces using class diagrams.

**SESSION 4**

# **TRANSFER TASK**

## TRANSFER TASKS

In the Unit 3 transfer task, you depicted the Deutsche Bahn booking system as a UML activity diagram. Build on this and:

1. Represent the booking system as a sequence diagram.
2. Research the topic of interfaces in more detail and explain in which form and with which parameters interfaces can be described.

TRANSFER TASK  
PRESENTATION OF THE RESULTS

Please present your  
results.

The results will be  
discussed in plenary.





1. The UML sequence diagram ...
  - a) ... relates to the activity diagram in the same way as the class diagram relates to the object diagram.
  - b) ... is used to illustrate examples of particular operations.
  - c) ... primarily denotes the precise processing time for an inquiry.
  - d) ... is a UML structural diagram for the detailed technical representation of exchanged messages between actors.



## 2. The lifelines in a sequence diagram ...

- a) ... may include an activation bar to indicate that an actor is active in relation to the current operation.
- b) ... reflects the precise duration of processing via its length.
- c) ... can be assigned only to one or two actors
- d) ... represent the start and end points of interaction partners.





3. In order to identify component interfaces that require detailed specification, ...
- a) ... the component diagram may be used.
  - b) ... the activity diagram may be used but not if it contains partitions.
  - c) ... the sequence diagram does not provide any useful information.
  - d) ... the use case diagram may be used but only if it contains at least one human actor.

**LIST OF SOURCES**

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