PXL – IT
42TIN1280 Software Analysis
System & system context – Use case diagram

Nathalie Fuchs

Luc Doumen

DE HOGESCHOOL
MET HET NETWERK

Hogeschool PXL – Elfde-Liniestraat 24 – B-3500 Hasselt
www.pxl.be - www.pxl.be/facebook

Content

- UML = Unified Modeling Language
- UML diagrams
- Why and when to use business use case models?
- Business use cases versus system use cases
- Business use case
  - What
  - Example
  - Modeling notation, rules, steps to draw up
  - Exercises
  - Questions & answers

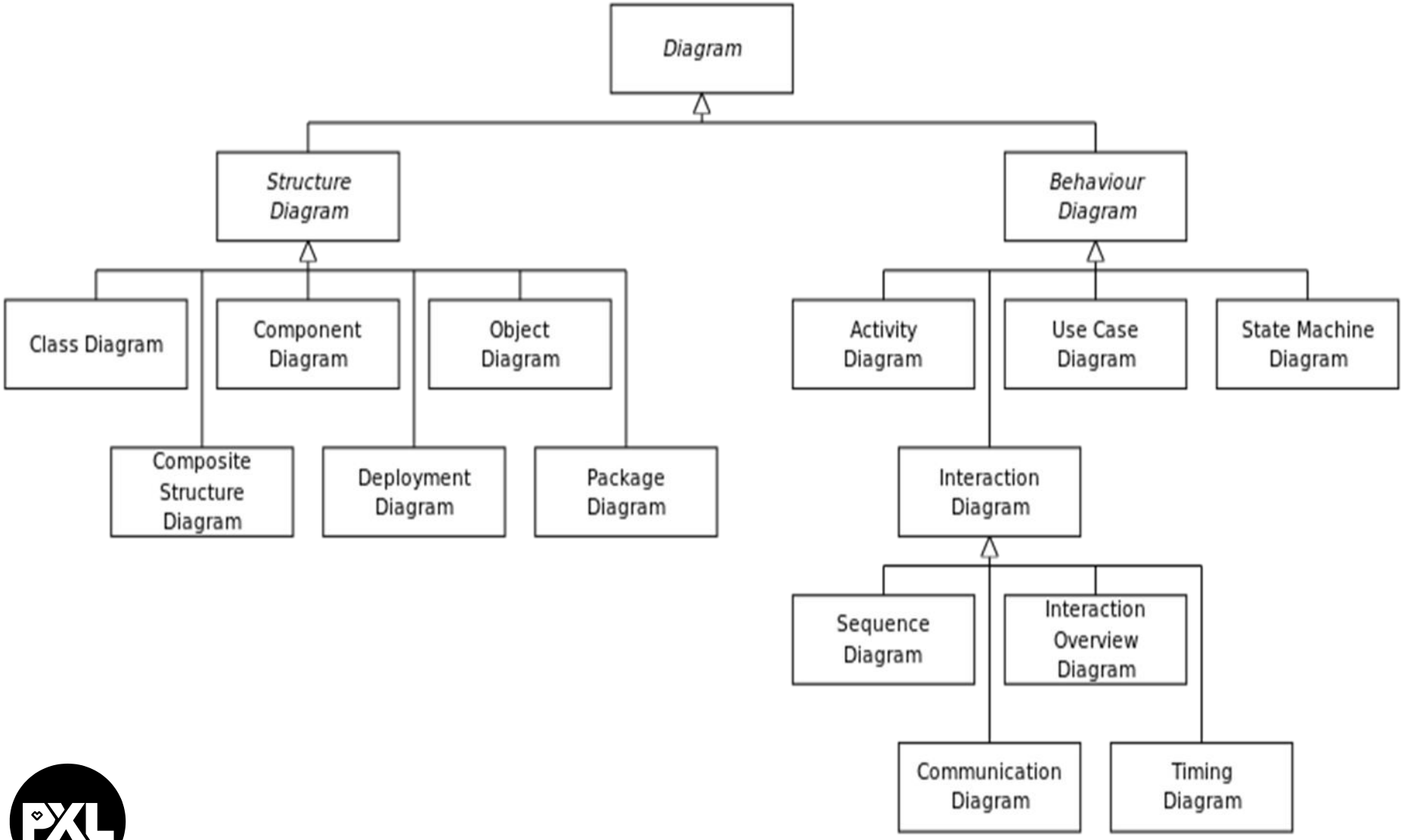
UML = Unified Modeling Language

- 

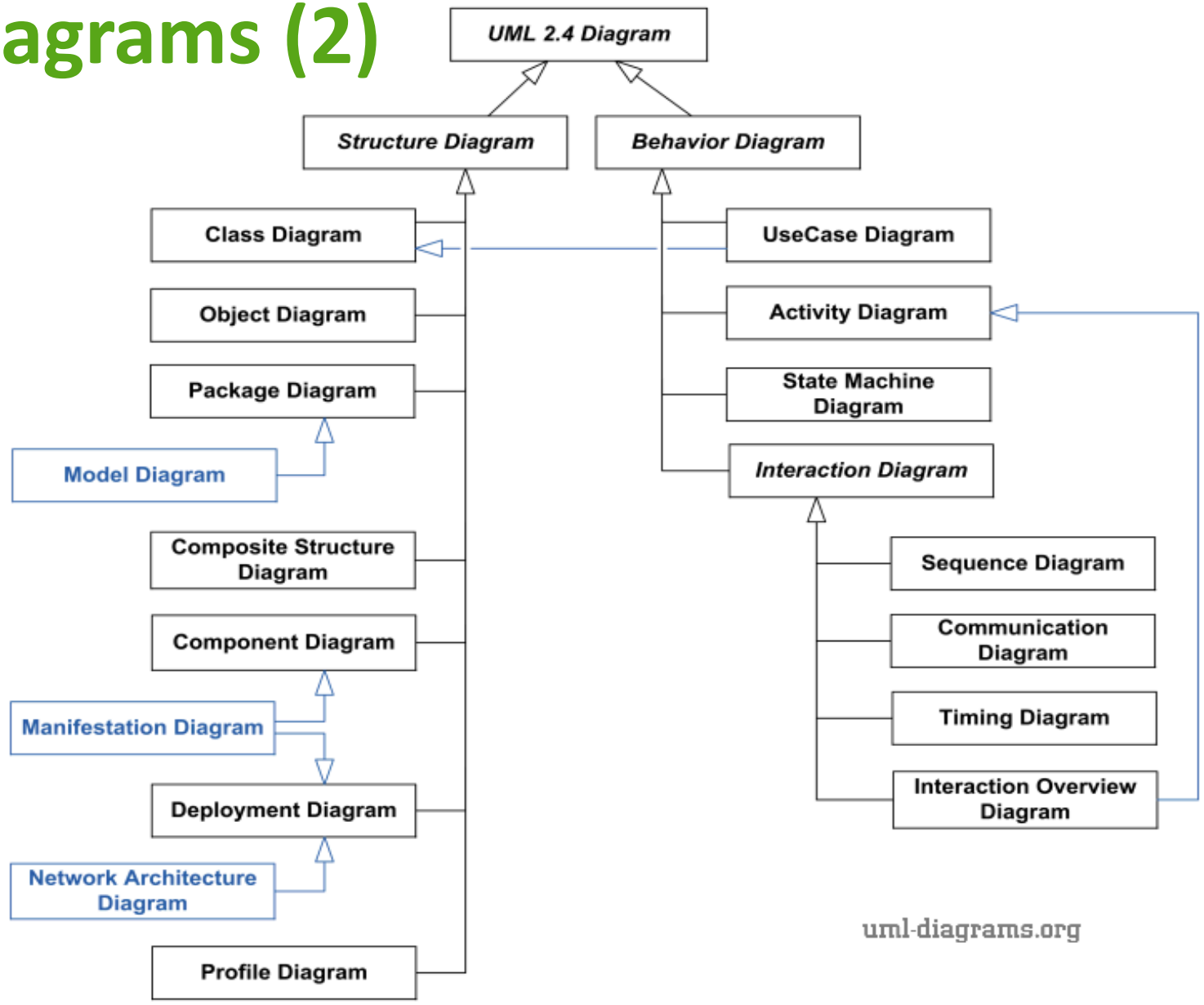
General-purpose, developmental, modeling language in the field of software engineering, that is intended to provide a standard way to visualize the design of a system

- Is NOT a methods
- Typically: UML models are graphical representations (= diagrams) of certain aspects of the information system
- https://en.wikipedia.org/wiki/Unified_Modeling_Language
  - 1997: version 1.0
  - Now: version 2.5 in progress

UML diagrams (1)



UML diagrams (2)



Why & when business use case models?

- For simple business situations
  - context diagram can be good enough to model relevant business context
- When this not sufficient, then analyst further investigate business context by using
  - business use case model or
  - business process model.

Business versus system use case

- A ***business use case*** is a way in which a customer or some other interested party can make use of the business to get the result they want whether it's to buy an item, to get a new driving license, to pay an invoice, or whatever. An important point is that a single execution of a business use-case should encompass all the activities necessary to do what the customer (or other actor) wants, and also any activities that the business needs to do before the process is complete from its point of view.

Business versus system use case

- A ***system use case*** is a way in which a user of a computer system can make use of the system to get the result they want. This will typically be something we can readily imagine as being done in a single sitting on a single PC or other device such as an ATM or a mobile/cell phone, usually with a single UI, or a small number of closely-related screens such as a wizard, and taking maybe between a couple of minutes and a half-hour at most.

Business versus system use case

Aspect	Business Use-Case	System Use-Case
Who's the Primary actor?	Mainly a **business actor** e.g. customer; maybe other external party (regulator, shareholder) or an internal party (manager, etc)	Mainly a human user who initiates system behaviour; maybe another system, "scheduler" etc. But by definition a **system actor**
What's the use case for?	Something the actor wants to get done by using the **business / organisation**	Something the actor wants to get done by using the **system / application**
Who / what else may be involved?	May involve interaction with other **external business parties** as supporting actors	May involve interaction with **other systems** internal or external to the organisation.
What does it describe?	Describes an **interaction** involving the primary **actor**, the relevant parts of the **business**, and any supporting actor(s), in terms of their **business behaviour**	Describes an **interaction** involving the primary actor, the relevant parts of the **system**, and any supporting actor(s), in terms of their **system behaviour** . In the case of the primary actor, this means only their actions **detectable by the system,** such as making selections, supplying data etc.
How's it executed?	May involve **many organisation units**, systems (or not), technologies, manual / mental procedures etc.	Executed by **automated steps** in the system
Duration	Of **Varying duration** - May be very brief or very long-duration.	Typically quite **short duration** (Cockburn's "coffee-break" rule)

Business use case (1)

Business use case

- The business use case describes in technology free manner one business process as a sequence of (inter)actions between a business actor and a worker as a whole to fulfill a goal of the business actor. (e.g., manual payment processing, expense report approval, manage corporate real estate.)
- The business use case will describe a process that provides value to the business actor, and it describes what the process does.
- Granularity: document one business use case for every individual business event !!!!!

Business actor

- *A business actor represents a business role (customer, order intaker,...) that interacts with the business environment/process.*

Business use case (2)

Business events

- *A business event is something that happens outside the scope of the SuD or any other organizational work, to which the SuD/work responds.*
- A business event takes place outside the scope of the work/organization.
- The work/organization learns that an event took place through the arrival of some information (trigger).
- The work/organization will react to this business event following a business use case scenario.

Time-triggered business events

- Happen when a pre-arranged time is reached ...
  - a periodic occurrence (e.g. 0 a.m. every day),
  - a fixed time interval (e.g.24 hours since last occurrence)
  - a certain amount of time elapsing since another business event (30 days after sending an invoice.)

Business use case (3)

Business use case - Format (1/3)

Business Event Description

✓ A description of the business event to which the business use case responds.

Business Use Case Name

✓ Give each business use case a unique identifier and a name that communicates the functionality.
✓ The name should be an active strong verb plus + specific direct object.
✓ For example, Record Library Loan, Enroll New Student, Pay Benefit, Generate Sales Report.

Triggering business event

✓ The data or request for a service that arrives from an external source and triggers a response from the work.
✓ The trigger may be the arrival of data from an adjacent systems or from a business actor.
✓ Alternatively, the trigger may be the arrival of the temporal condition that causes the use case to activate for example, the end of the month.

Preconditions

✓ Sometimes certain conditions must be true before the use case can be executed. For example, a customer has to be registered before he can access his frequent-flyer statement.
✓ Note that another business use case usually takes care of the precondition. In the preceding example, the customer would have registered using the Register Passenger use case.

Active Stakeholders

✓ The people, organizations, and/or computer systems that take an active part in the process.
✓ Don't think about users just yet; instead, think of the real people who are involved in the work of the business use case.
✓ The people, organizations, and/or representatives of computer systems who have knowledge necessary to specify this use case or who have an interest in this use case.

Business use case (4)

Normal business Flow

✓The normal business flow should describe the normal & most used path of the business performing the process.

✓Typical flow should look like:
- Business actor X does action ...
- Business actor Y does action ...
- Business actor X does action ...
- . . . .

✓Typical step should look like: Business actor + active verb + a specific direct object.

✓Write clear, unambiguous steps that are understandable to all stakeholders related to the project.

✓Do not mention the system in the business use case.

✓Adapt a 'sunny day' strategy for elaborating business processes. Thus start with modeling the primary flow. Address branching, concurrency and exceptions as secondary considerations.

✓There are usually between three and fifteen steps.

✓Each step must make the actor move forward in fulfilling his goal.

Business use case (5)

Business use case - Format (3/3)

Alternatives

- ✓ Alternatives are acceptable variations on the normal case of processing/proceeding.
- ✓ If the alternative action is simple, you can make it part of the normal Flow:
- ✓ Step 4. Attach the frequent-flyer number to the reservation.
- ✓ Alternative 4.1 Issue a lounge invitation if the passenger holds a gold card.
- ✓ Tag each alternative to the appropriate step + define condition for alternative clearly.

Exceptions

- ✓ These are unwanted but necessary variations.
- ✓ For example, a customer may have insufficient funds for a withdrawal at an ATM. In this case, the procedure has to offer a lower amount, or offer a loan, or do whatever the stakeholders decide is appropriate.
- ✓ Tag each exception to the appropriate step + define condition for exception clearly.

Outcome

- ✓ The desired situation at the end of this use case. Think of it as the stake

Business use case (6)

Business use case example (1/3)

Business Use Case Name
- Check passenger onto flight.

Business Event description
- Passenger decides to checks in.

Triggering business event
- A passenger presents a ticket & passport to a check-in agent of BA at the airport.

Preconditions
- (The passenger must have a valid reservation.) <-- Is this correct ?

Interested Stakeholders:
- Marketeer, Baggage handler, reservation handler, immigration officer.

Active Stakeholders
- Passenger (trigger), check-in agent.

Normal business flow
- 1. A passenger presents a ticket & passport to a check-in agent of BA at the airport.
- 2 . The check-in agent retrieves the passenger's reservation information based on the presented ticket & passport and & validates that reservation is valid.
- 3. The check-in agent validates that the passport is valid and belongs to the passenger.
- 4. The check-in agent validates whether the procedure guidelines EU175 is followed.
- 5. The check-in agent attaches the frequent-flyer number to the reservation.

Business use case (7)

Business use case example (2/3)

Normal business flow

- ….
- 6. The check-in agent allocates a seat.
- 7. The check-in agent asks the security questions.
- 8.The passenger answers the security questions.
- 9. The check-in agent checks the baggage onto the flight.
- 10. The check-in agent prints and conveys to the passenger the boarding pass and bag tags.
- 11. The check-in agent wishes the passenger a pleasant flight
- Alternate business flow
- 11a. If the passenger is a gold cardholder, then
- 11a1. The check-in agent invites the passenger to the lounge while waiting to board.

Exception business flow

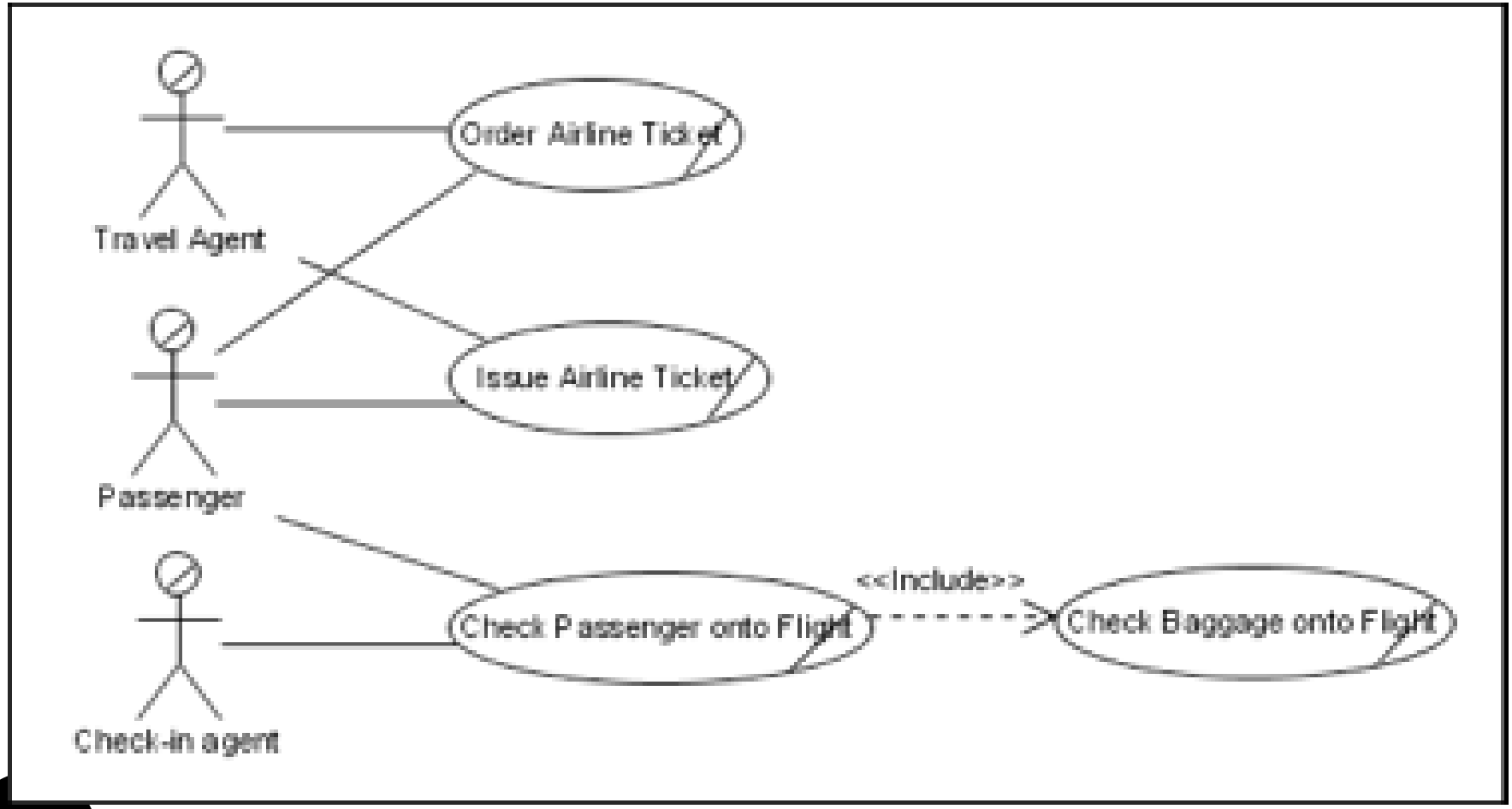
- 2a. If the passenger has no valid reservation for the ticket, then
- 2a1. The check-in agent communicates the passenger ticket reservation is not valid. The passenger is given the possibility to book a new flight
- 2a2. The check-in agent offers the passenger to book a new flight reservation, offering a reduction of maxim 50 % of the reservation fee.

Outcome (post condition)

- The passenger is registered as checked onto the flight, the bags are assigned to the flight, a seat is allocated, and the passenger is in possession of a boarding pass

Business use case (8)

Business use case example (3/3)



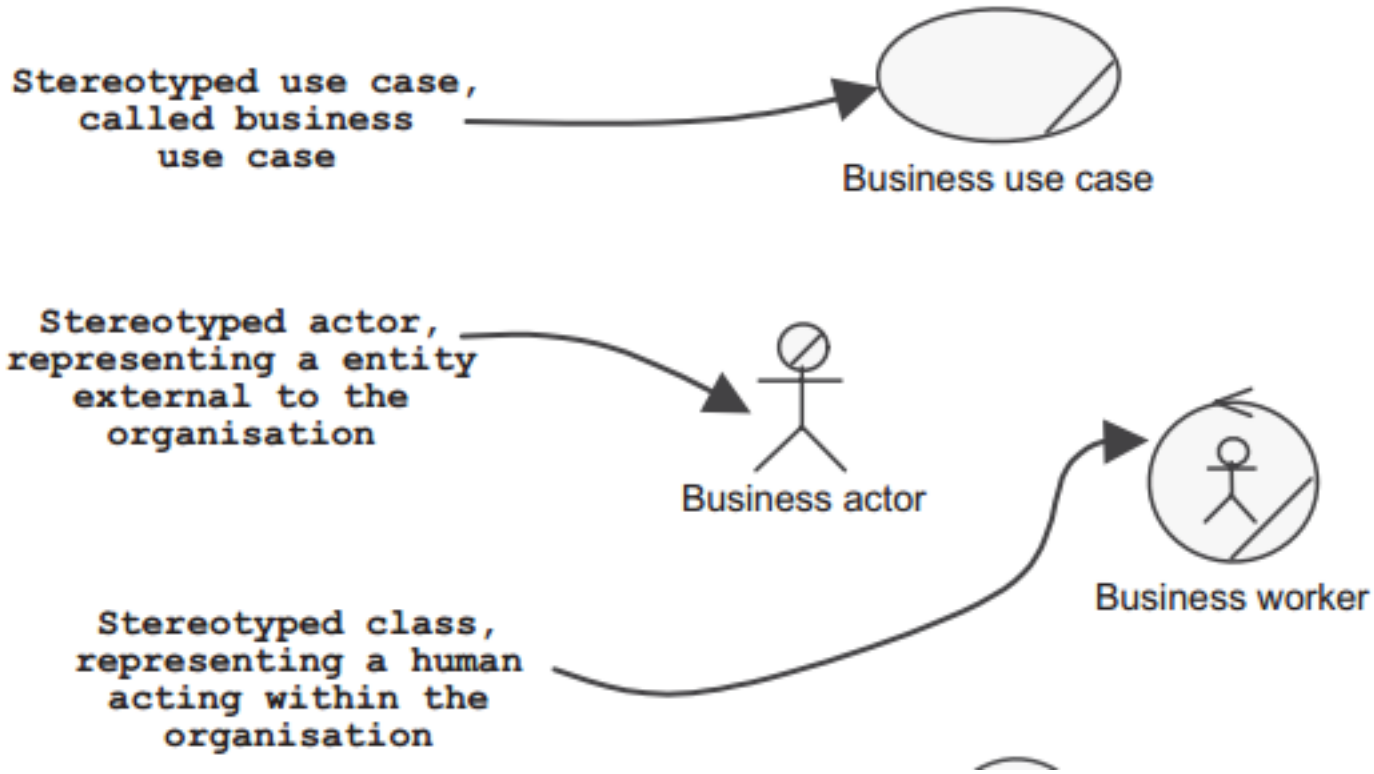
Business use case – modeling steps (1)

Input business use case

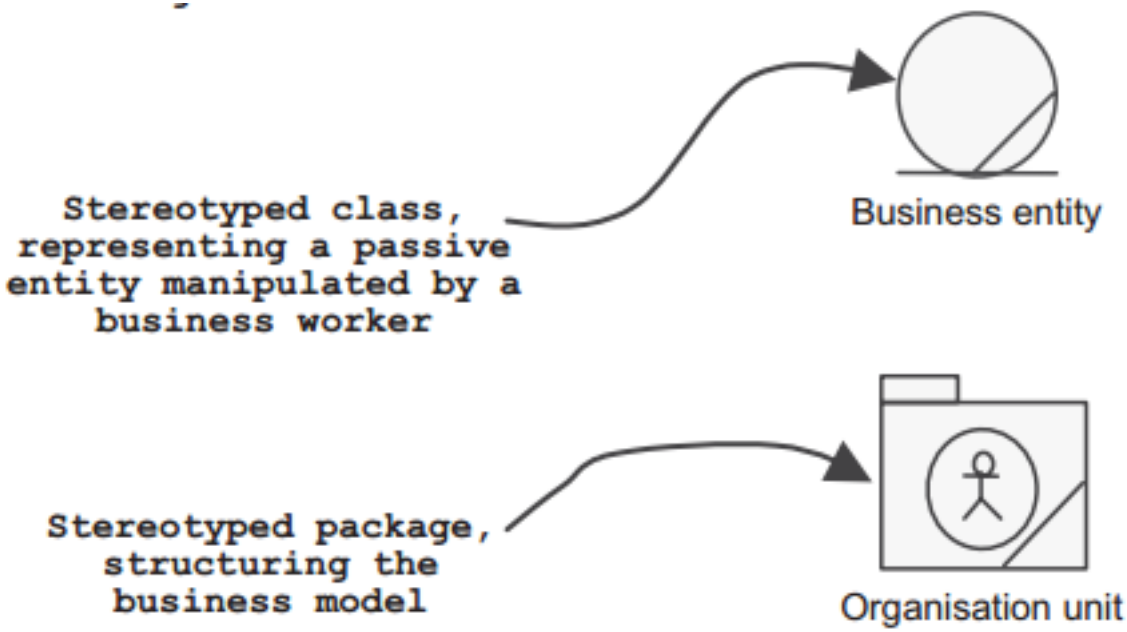
- Context diagram
- Project kick off documents
- Other relevant documentation concerning the business area Process

Business use case – modeling steps (2)

1. Begin by modelling the business and processes of the organization. This analysis will allow to establish more easily the specifications of the information system that will support these processes.
2. Stereotypes for business mondeling



Business use case – modeling steps (3)



Note: in many CASE tools you can change an Actor or Use Case symbol to a Business Actor or Business Use Case symbol by an option in the properties panel of the symbol)

Business use case – modeling steps (4)

- !!! Note: in a Business Use Case diagram there is no system involved
- The System Use Case diagram will come into the picture later on, when (and if) the Business Use Case diagram is refined into a System Use Case diagram.

Business use case – another example (1)

- An organization wants to improve its information system and, first of all, wishes to model the training process of its employees so that some of their tasks may be computerized.
  1. The training process is initialized when the training manager receives a training request on behalf of an employee. This request is acknowledged by the person in charge who qualifies it and then forwards his or her agreement or disagreement to the person who is interested.
  2. In the case of agreement, the person in charge looks in the catalogue of registered courses for a training course, which corresponds to the request. He or she informs the employee of the course content and suggests a list of subsequent sessions to him or her. When the employee has reached a decision, the training manager enrolls the entrant in the session with the relevant training body.

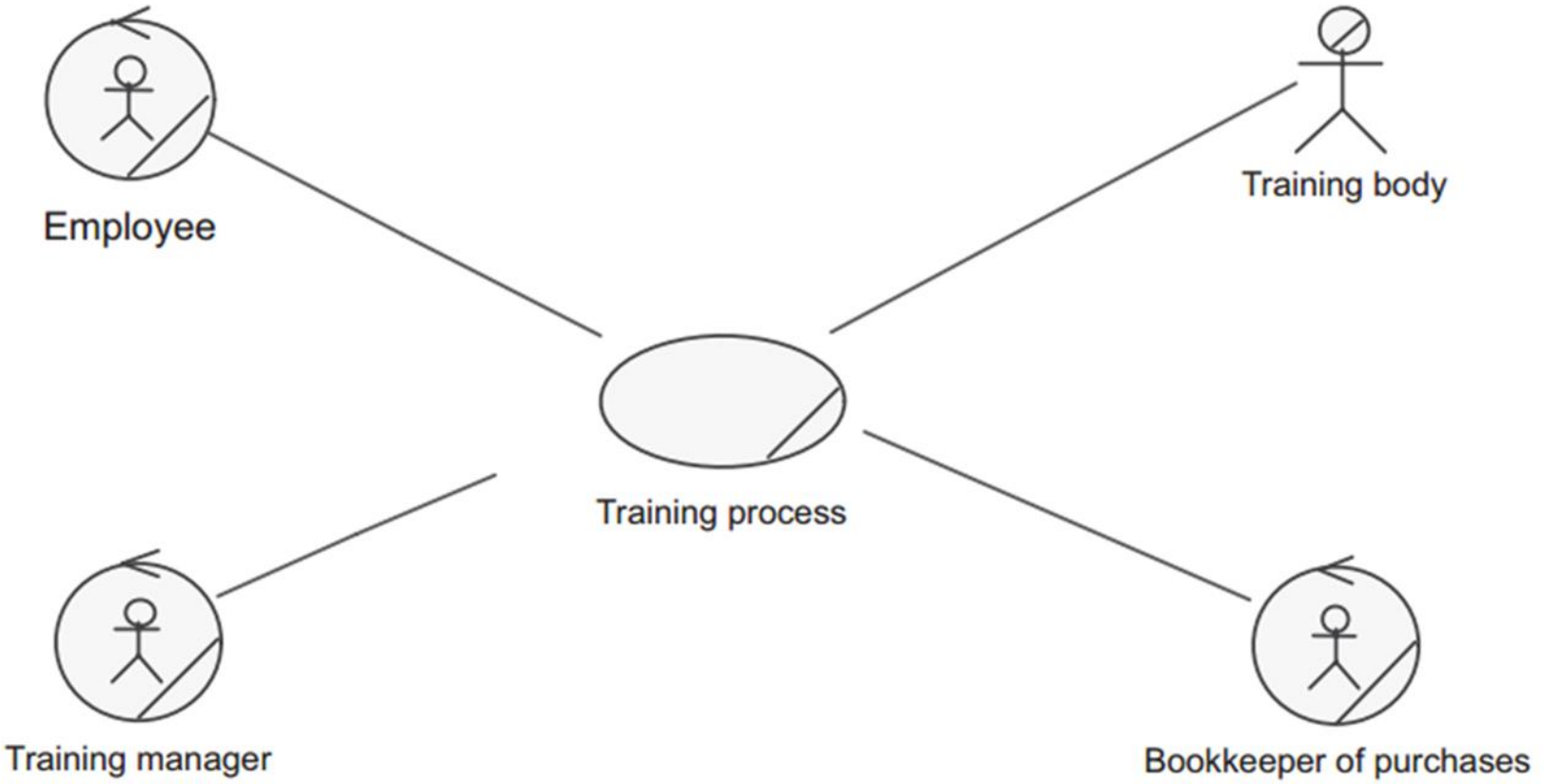
Business use case – another example (2)

3. If something crops up, the employee must inform the training manager as soon as possible in order to cancel the enrolment or application.
4. At the end of the employee's training, he or she must submit an assessment to the training manager on the training course that he or she completed, as well as a document proving his or her attendance.
5. The training manager then checks the invoice that the training body has sent him or her before forwarding it to the bookkeeper of purchases.

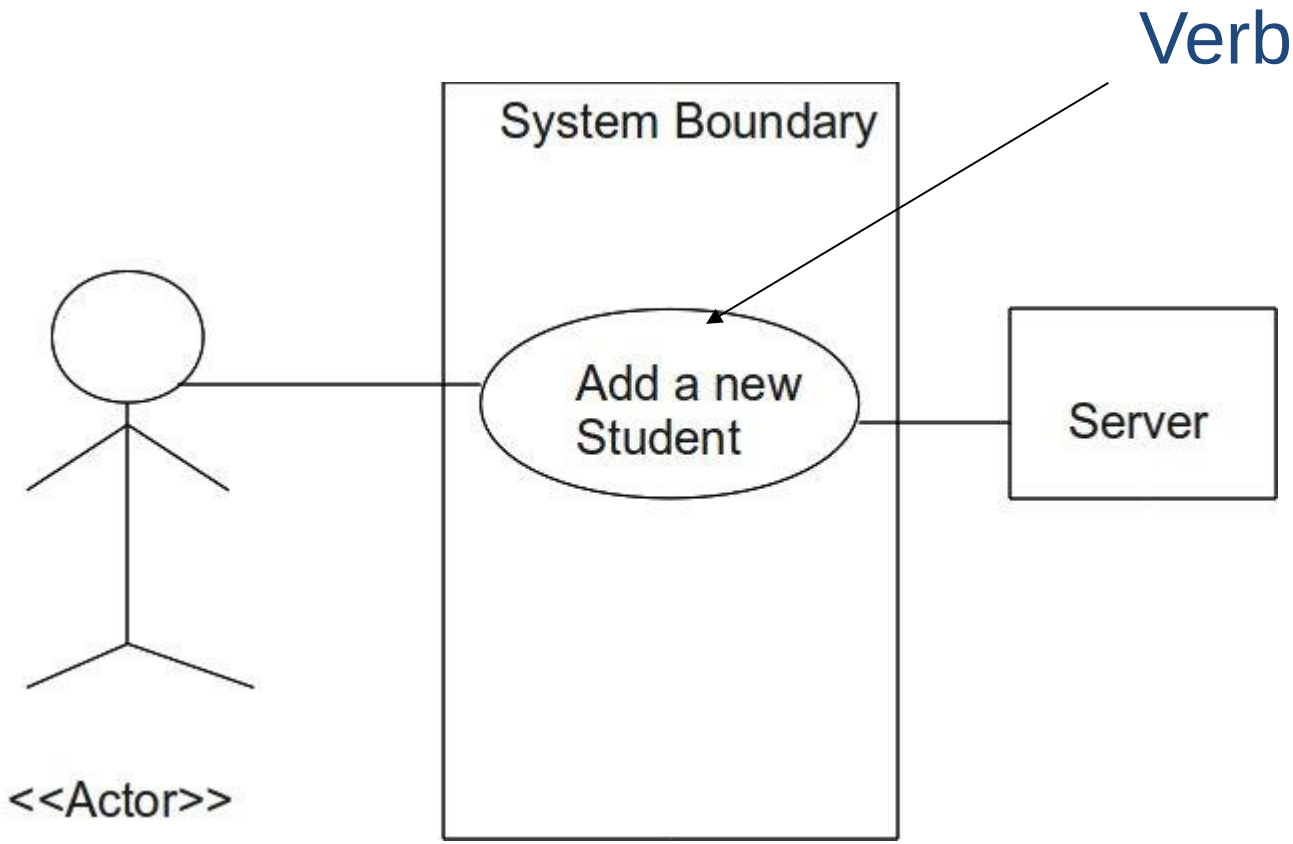
Business use case – another example (3)

- The training process is represented by a stereotyped use case.
- The actors required are (in order of the exposition):
  - the employee,
  - the training manager,
  - the training body,
  - bookkeeper of purchases.
- The training body is the only entity external to the organization

Business use case – another example (4)

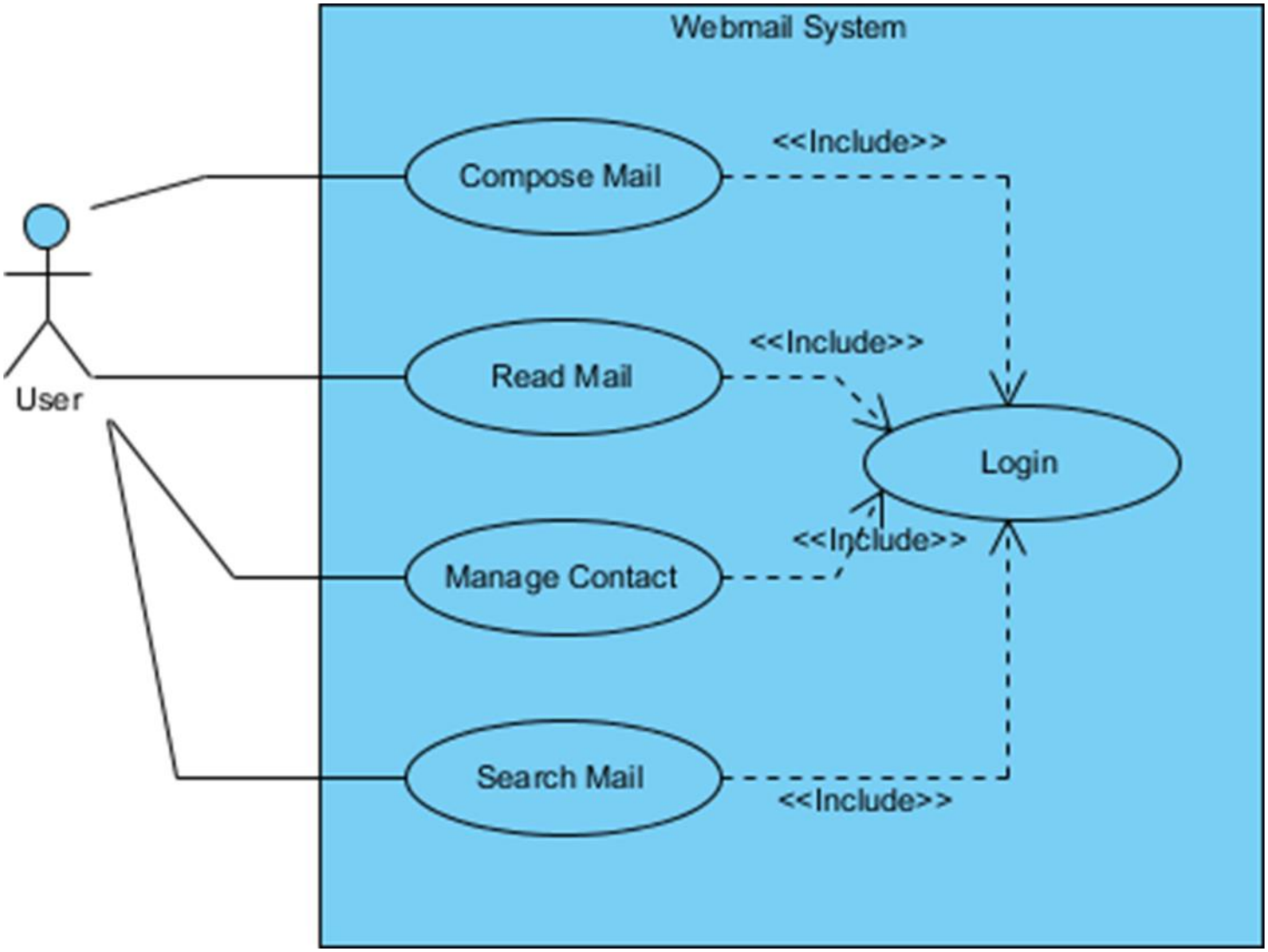


!!! System use case – notation



: in case the actor is another system

!!! System use case – example



Use case diagram – document

Cf. files

- WK04 - 11 - System and System Context SW-Analysis-1516 - 03 UseCase-Bibliotheek
- WK04 - 11 - System and System Context SW-Analysis-1516 - 03 UseCase-Exercises02

- Create business use case diagrams and business use case description (if possible)

Questions & answers