SLIIT

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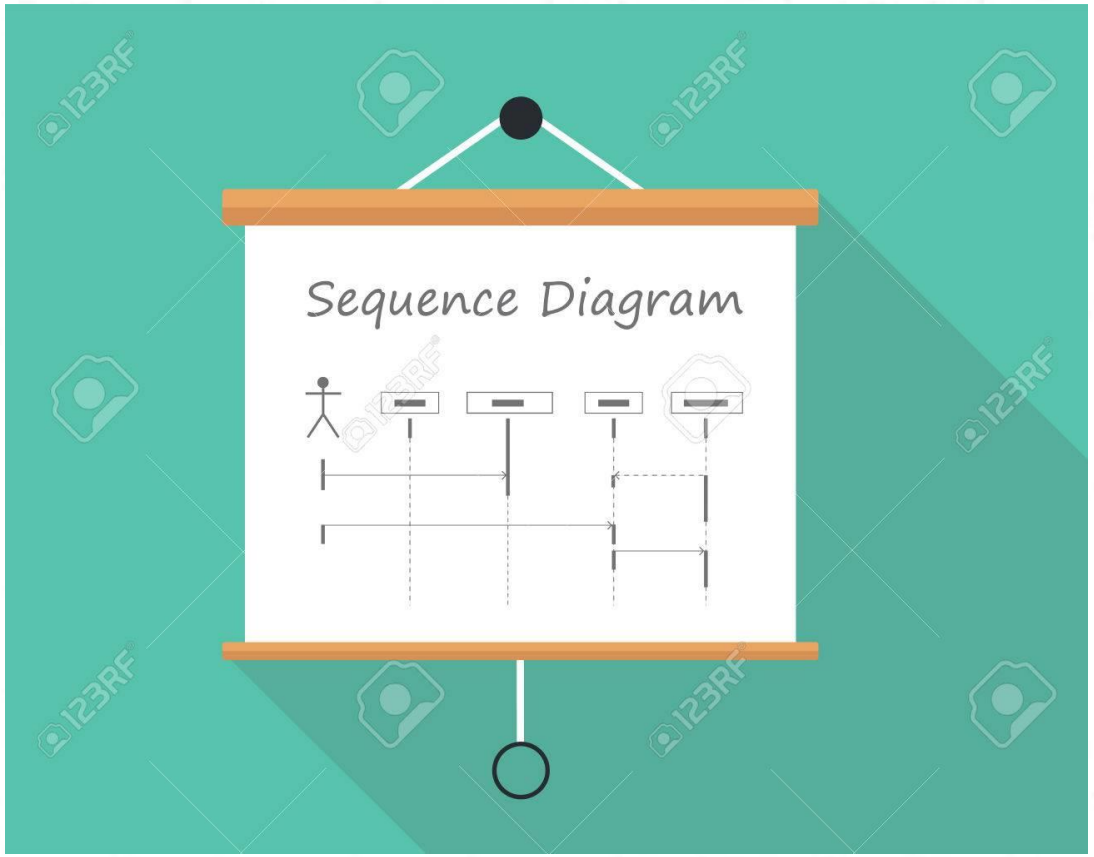
Software Engineering (IT2020)
2022

Lecture 2 - Interaction Diagrams – Part II

Interaction Diagrams



- An interaction diagram represents an interaction, which contains a set of objects and the relationships between them including the messages exchanged between the objects.

Complex Interactions with Sequence Diagrams

- Sequence diagrams may contain, essentially, sub diagrams called **interaction fragments**.
- Each interaction fragment can have an operator, such as `loop`, `opt` (“optional”), `alt` (“alternative”), `ref` (“refer ence”), `para` (“parallel”), and so on.
- These interaction fragments and operators greatly enhance the ability of sequence diagram.

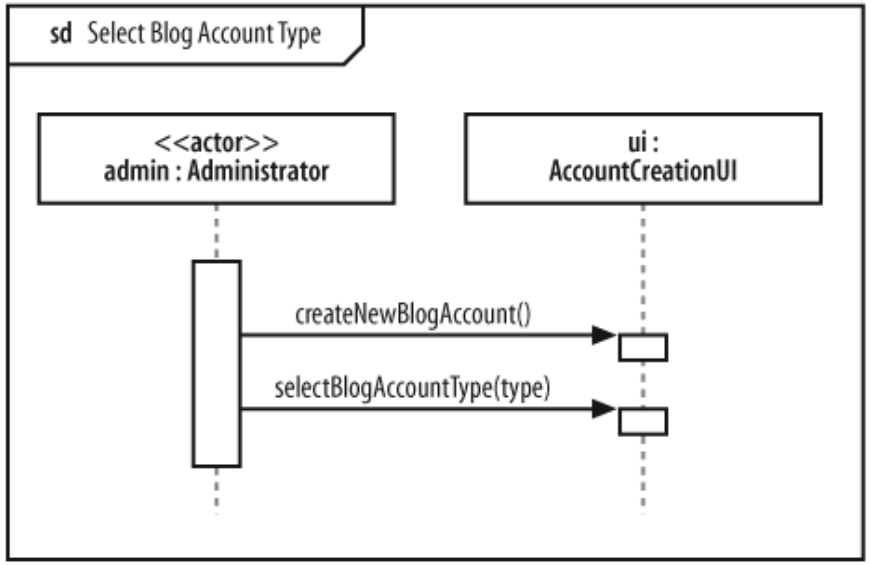
Common Interaction Fragments

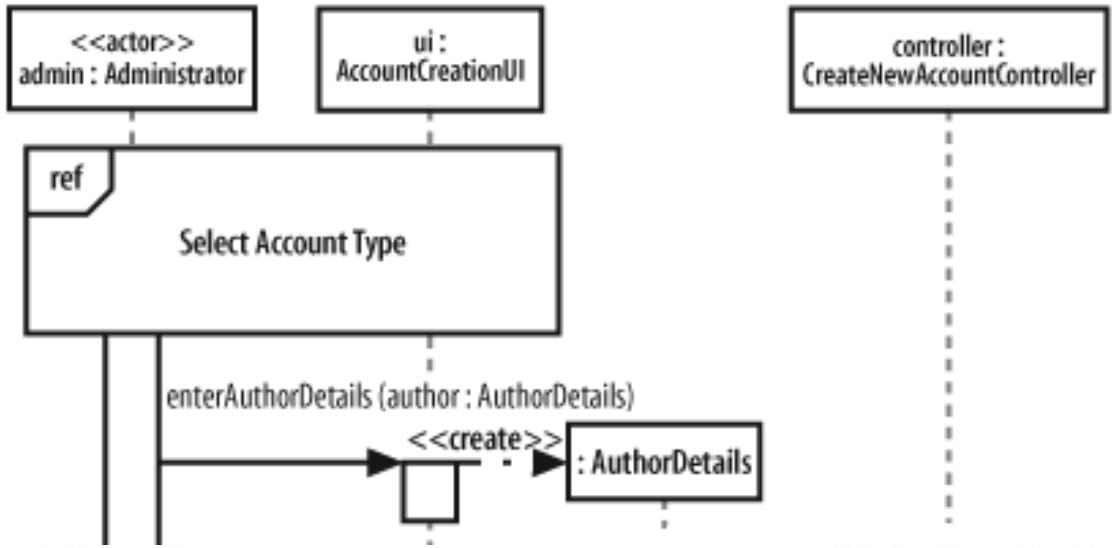
- Ref - Reference
- alt - alternatives
- opt - option
- loop - iteration
- break - break
- par - parallel

Reference Fragment - Ref Tag

- If one sequence diagram is too large or refers to another diagram, ‘ref’ tag can be used.
- Helps you to manage a large diagram by splitting, and potentially reusing, a collection of interactions.
- Reference fragment that uses or calls another interaction. It is shown in the sequence diagram as a fragment with the operator ref to indicate the reference to another interaction.

Reference Fragment - Ref Tag cont…





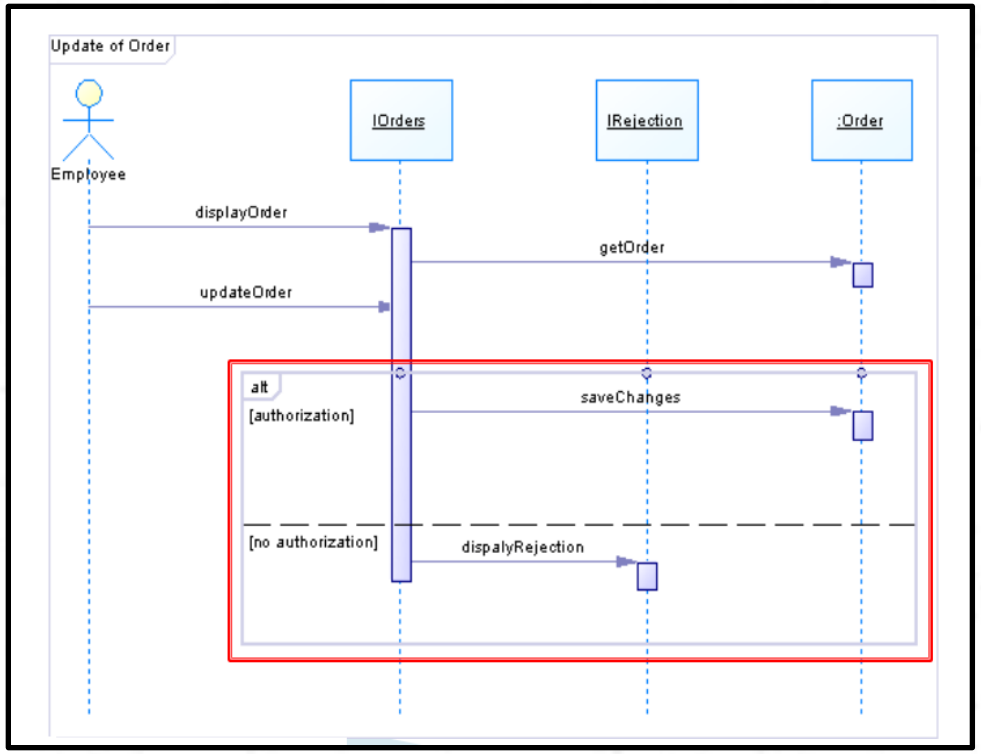
Activity 01

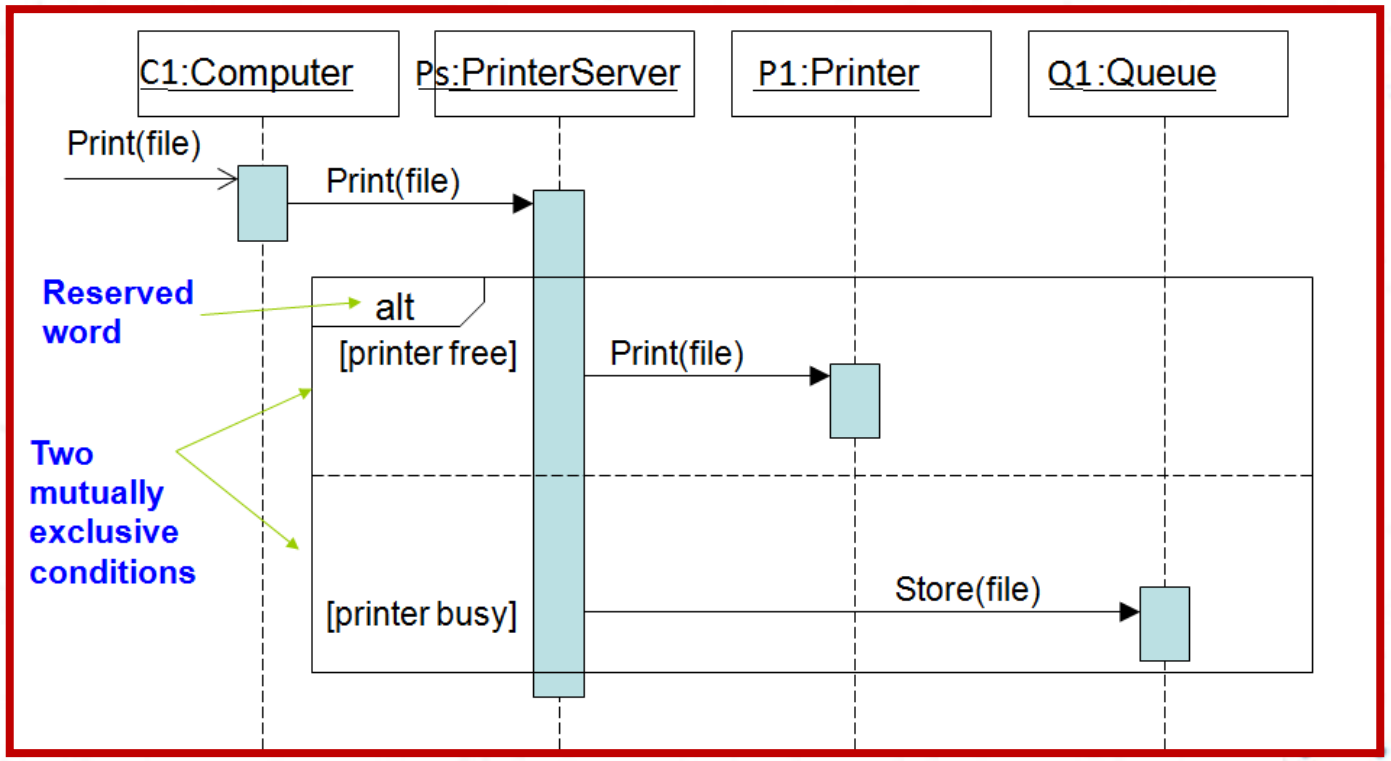
- Customer needs to logging to the system to purchase an e-ticket for cinema.
- After the login, customers request movie details via MovieUI and the request will pass to the MovieManeger.
- Then MovieManager request the details from the MovieDB and pass to the customer.
- Then customer can request to book with MovieID and MovieManager generate the ticket and send to the customer. Then MovieManager update the seat count via the SeatInfo class.
- Assume that the logging process already designed and you have to use it in your diagram.

Alternative Fragment – Alt tag

- **Alt** : Alt can have number of guard conditions known as alternatives.
- At one time one of the alternatives will be true and the messages related to that condition will execute.
- There can be an else clause, which will execute whenever none of the other options are selected.
- Alt tag can have **two or more** alternatives.

Alternative Fragment – Examples





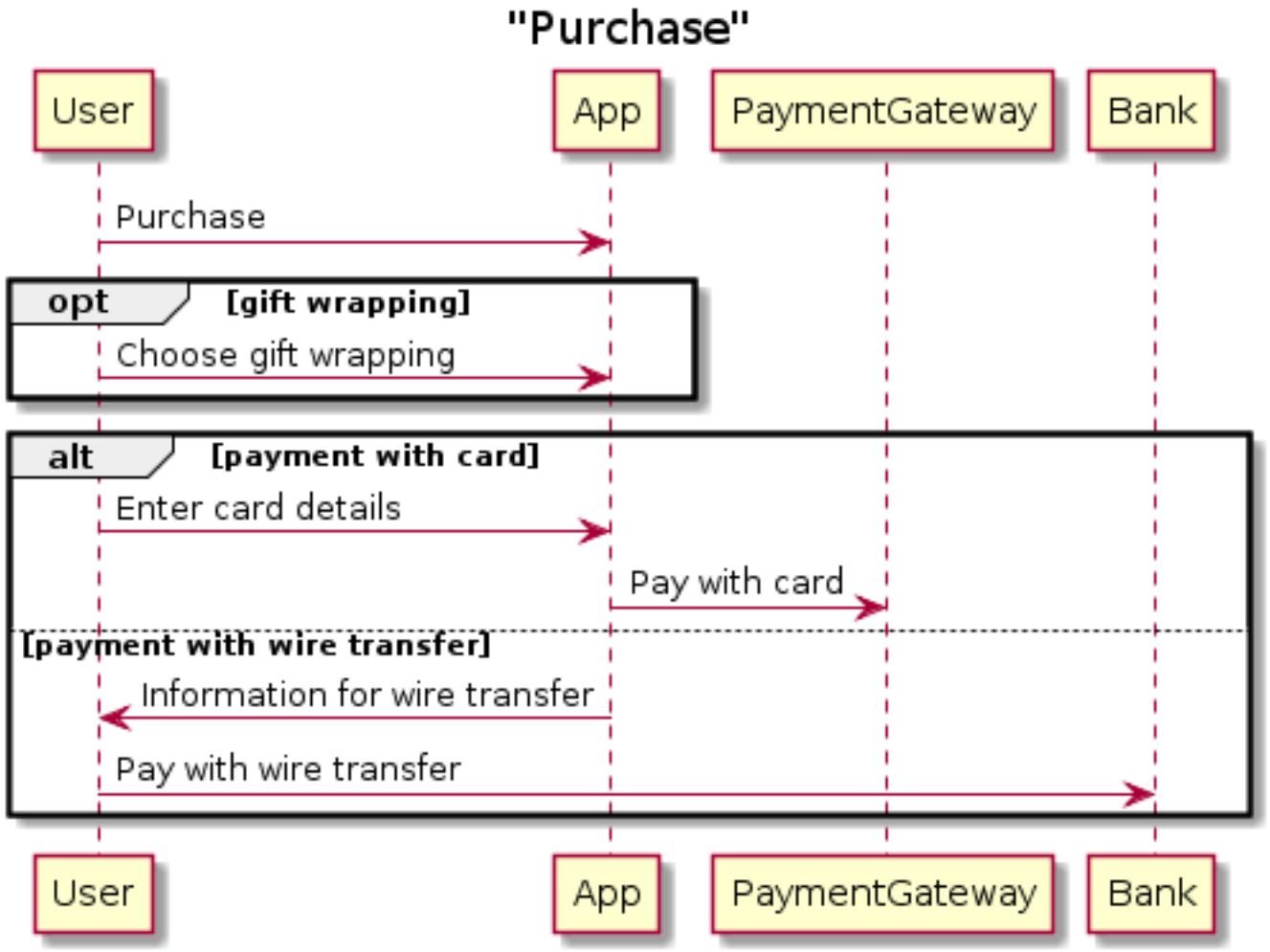
Activity 02

- Draw a sequence diagram for a login process of an online ordering system.
- Note: You may use suitable boundary, control and entity classes.
  - Customer login using his/her username and password.
  - System request user details from the user DB and validates the username and password by comparing entered data with the user details in the user DB.
  - If he/she is a valid user, the system will display a success message and else ask to relogging.

Optional Fragment – Opt Tag

- The opt (optional) interaction operator use to handle a single condition situation.
- The model for an opt combined fragment looks like an alt that offers only one interaction.
- To be used, the guard condition must be satisfied.
- If the guard condition fails, the behavior is simply skipped.

Optional Fragment – Example



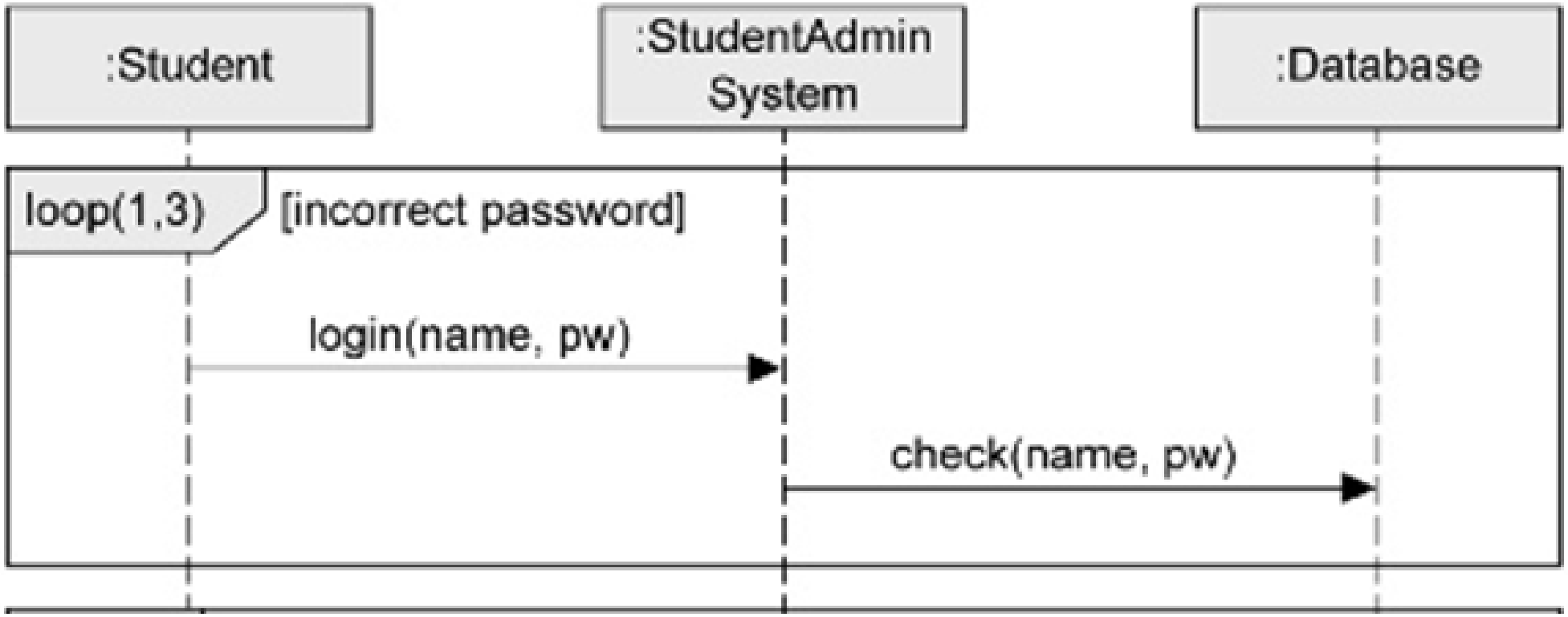
Activity 03

- “ABC” cinema has a eTicket booking system. Customer can request a particular movie details via MovieUI and the request will pass to the MovieManeger.
- Then MovieManager request the details from the MovieDB and pass the results to the customer.
- Only if the requested movie is available, the customer can request to book with MovieID and MovieManager generate the ticket and send to the customer.

Loop Fragment – Loop Tag

- Loop fragment is used to represent a repetitive sequence.
- Place the words ‘loop’ in the name box and the guard condition near the top left corner of the frame.
- The guard condition in a loop fragment can have two other special conditions tested against. These are minimum iterations (min int) and maximum iterations (max int).
- When the guard condition become false, the loop ends.

Loop Fragment – Example

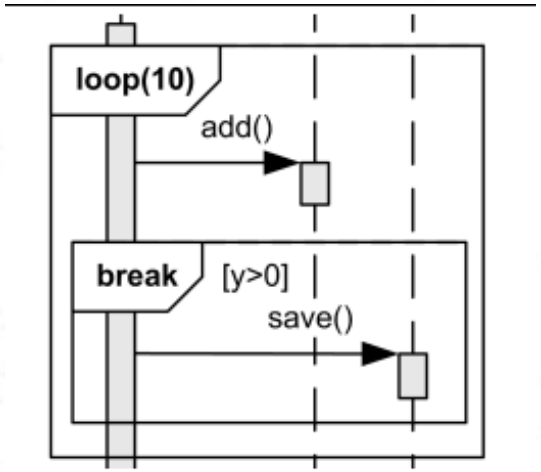


Activity 04

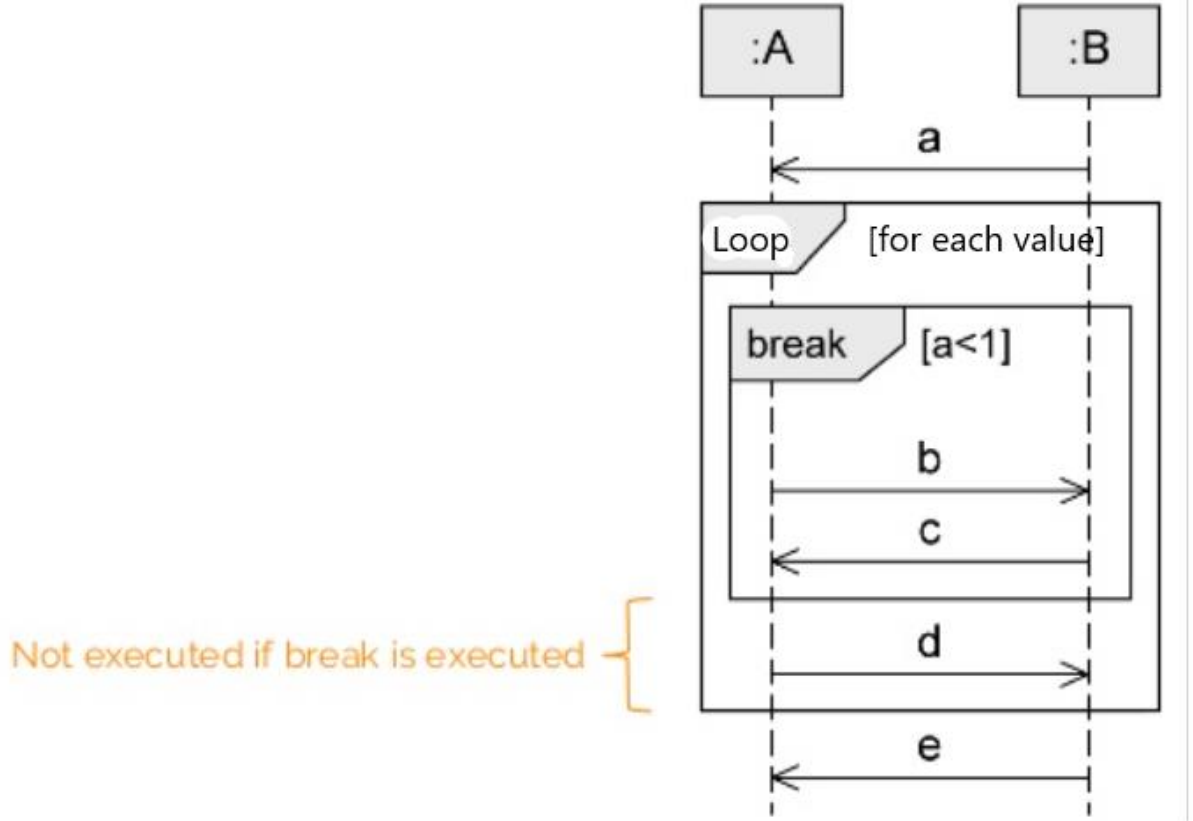
- “ABC” cinema has a eTicket booking system. Customer can request a particular movie details via MovieUI and the request will pass to the MovieManeger.
- Then MovieManager request the details from the MovieDB and pass the results to the customer.
- Only if the requested movie is available, the customer can request to book with MovieID and MovieManager generate the ticket and send to the customer.
- In the same way, customer can make any number of requests for eTickets for different movies.

Break Fragment – Break Tag

- If Break fragment is executed, the rest of the sequence is abandoned.
- You can use the guard to indicate the condition in which the break will occur.
- The break interaction operator provides a mechanism similar to the break syntax in many programming languages.
- Breaks are most commonly used to model exception handling.



Break Fragment - Example

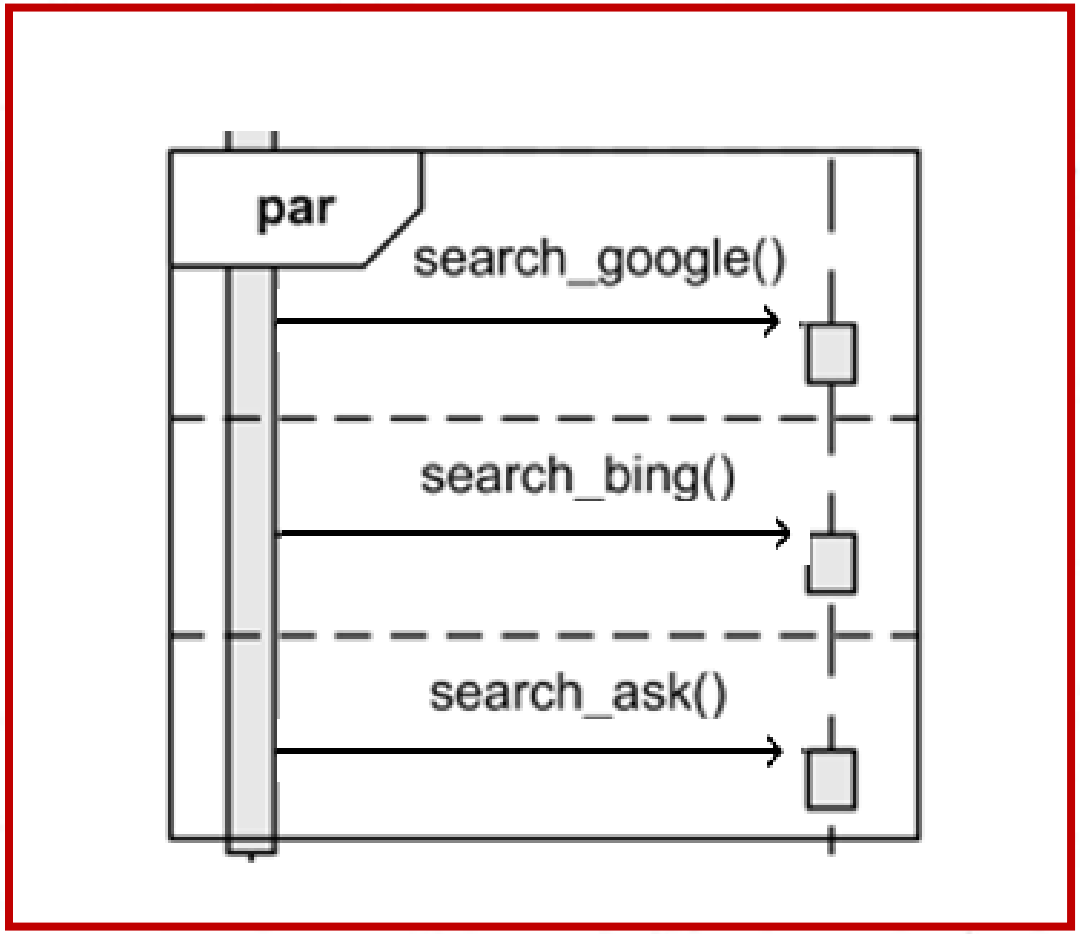


Source: https://www.slideshare.net/iivanoo/modeling-objects-interaction-via-uml-sequence-diagrams-software-modeling-computer-science-vrije-universiteit-amsterdam-20162017

Parallel Fragment – Par Tag

- When the processing time required to complete portions of a complex task is longer than desired, some systems handle parts of the processing in parallel.
- The interaction operator ”par” defines parallel execution of behaviors.
- Different operands can be interleaved in any way as long as the ordering imposed by each operand is preserved.

Parallel Fragment - Example



Search Google, Bing and Ask in any order, possibly parallel.

References

- UML 2 Bible
  Chapters 8 & 9
- Learning UML 2.0 by Kim Hamilton, Russ Miles
- Applying UML and Patterns by Craig Larman
- Chapter 15UML 2 Bible
  Chapters 8 & 9
- TheElementsofUML2Style
  Chapter 7