Sequence Diagrams

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CMPUT 301 – Introduction to Software Engineering
Slides adapted from Dr. Hazel Campbell, Dr. Ken Wong, and Dr. Abram Hindle

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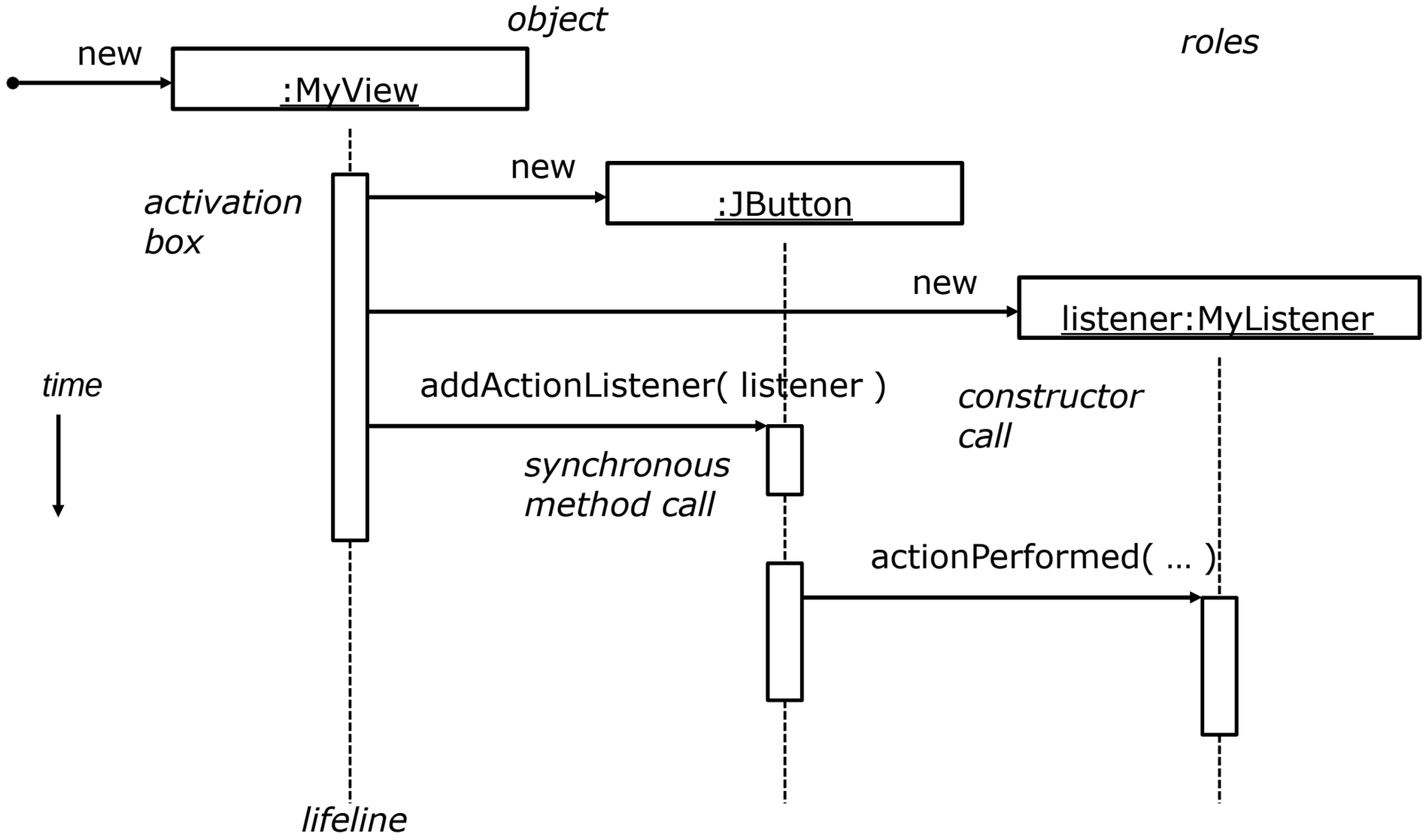
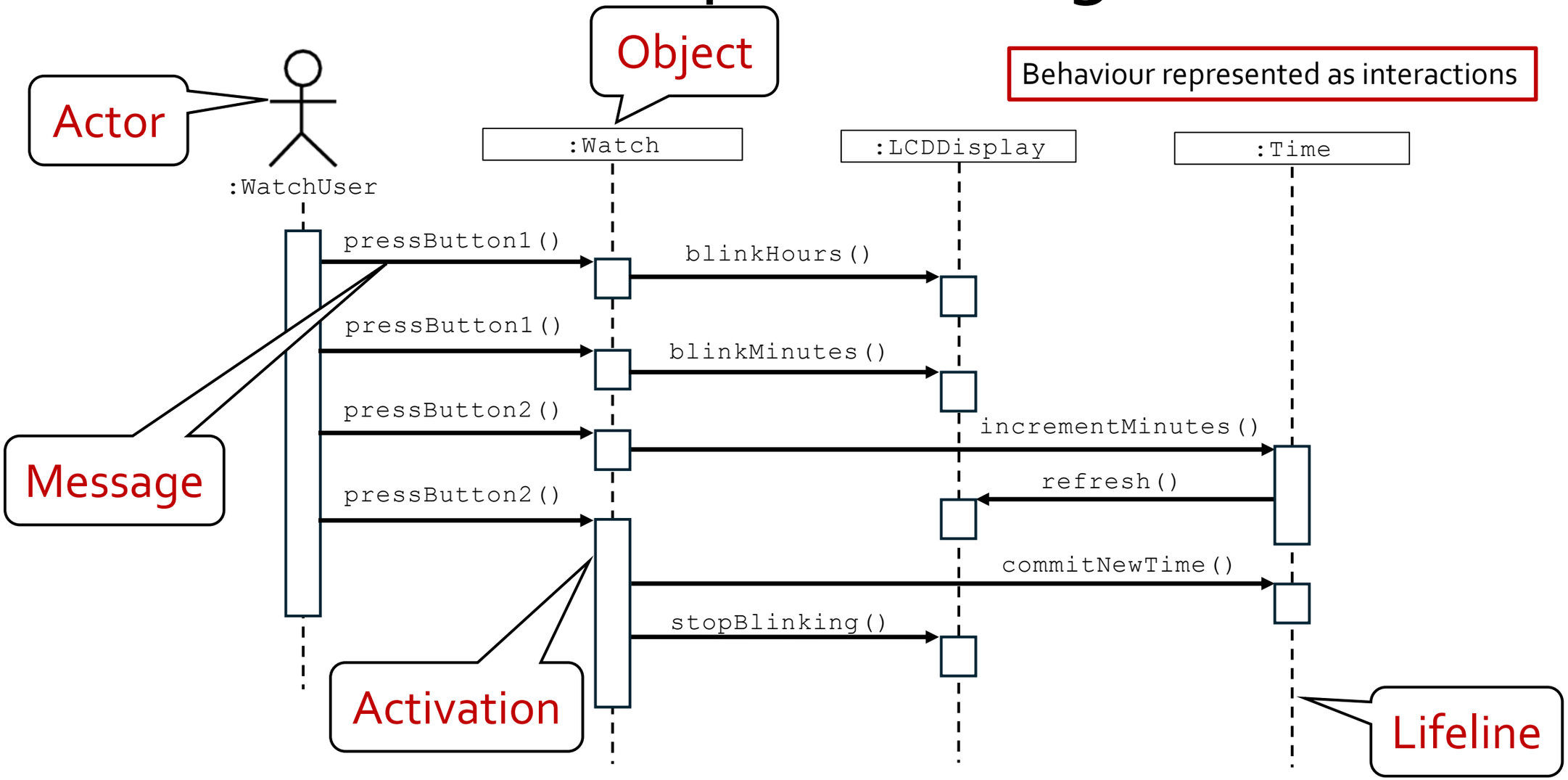
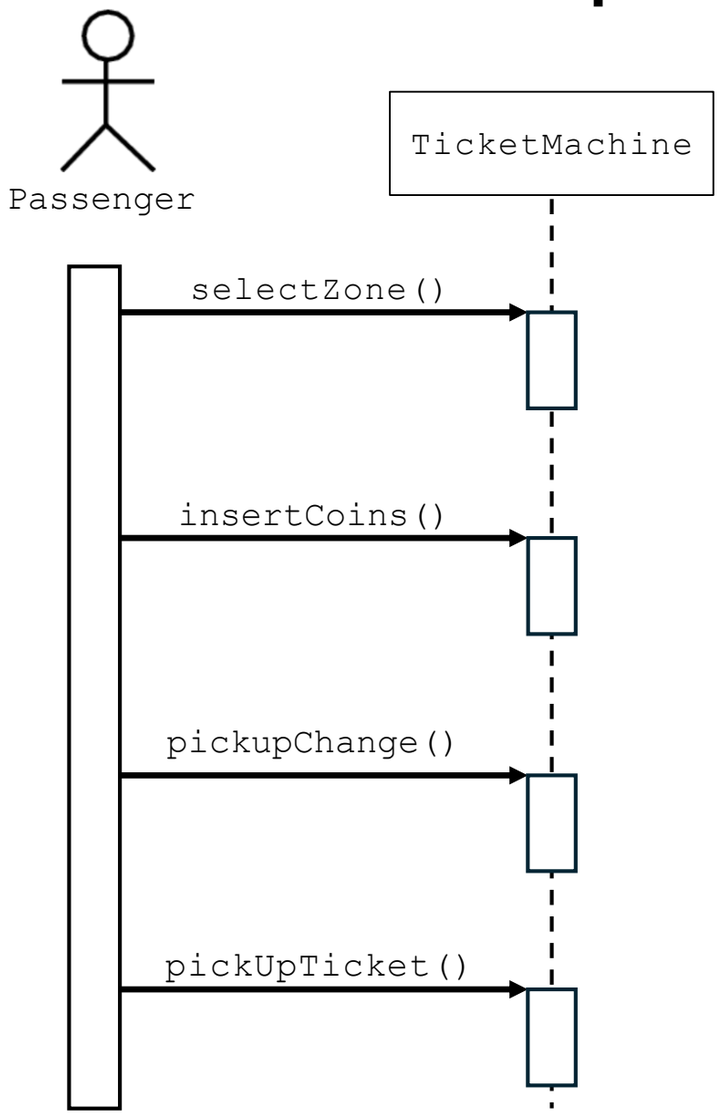
UML Sequence Diagram



UML First Pass: Sequence Diagram

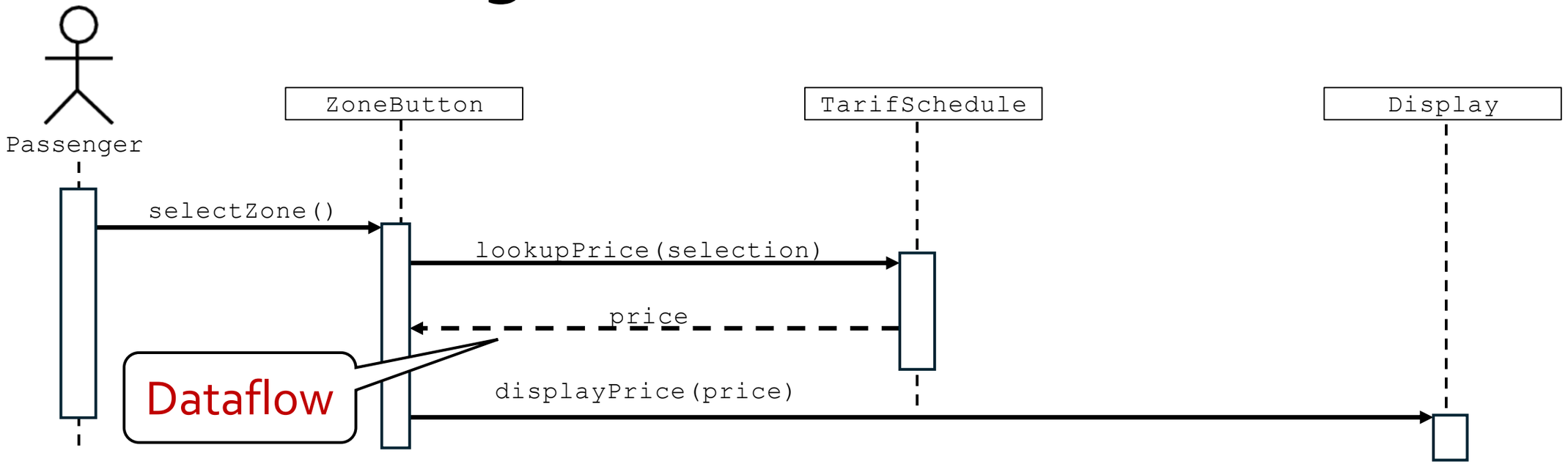


UML Sequence Diagrams



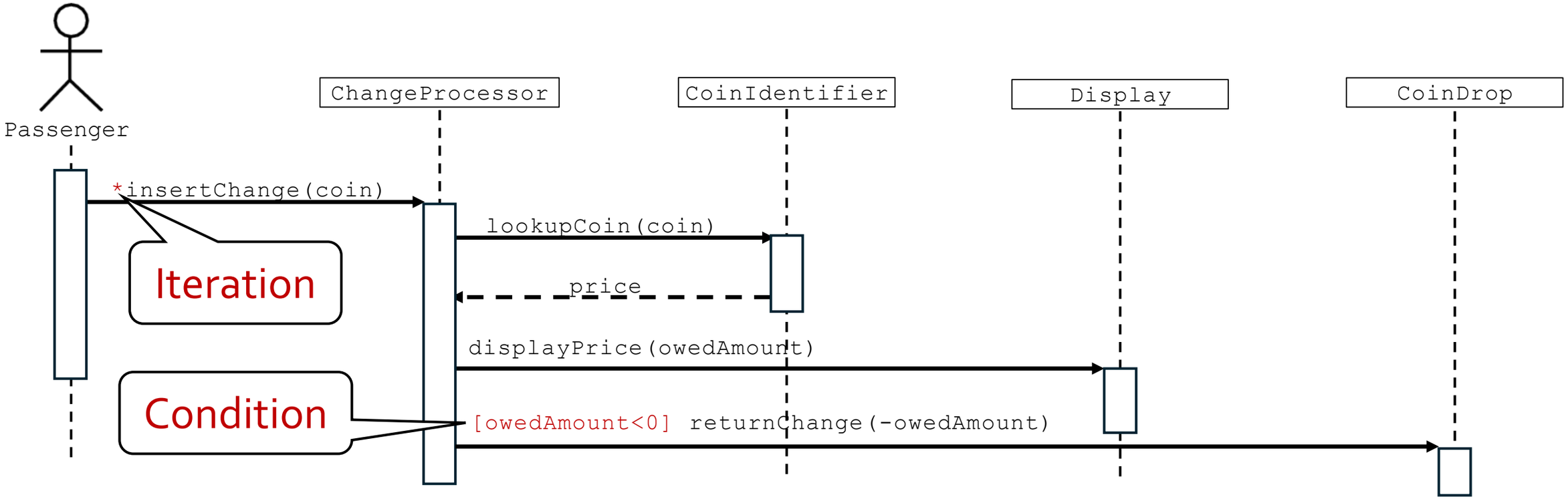
- Used during requirements analysis
  - To refine use case descriptions
  - To find additional objects ("participating objects")
- Used during system design
  - To refine subsystem interfaces
- Classes are represented by columns
- Messages are represented by arrows
- Activations are represented by narrow rectangles
- Lifelines are represented by dashed lines

Nested Messages



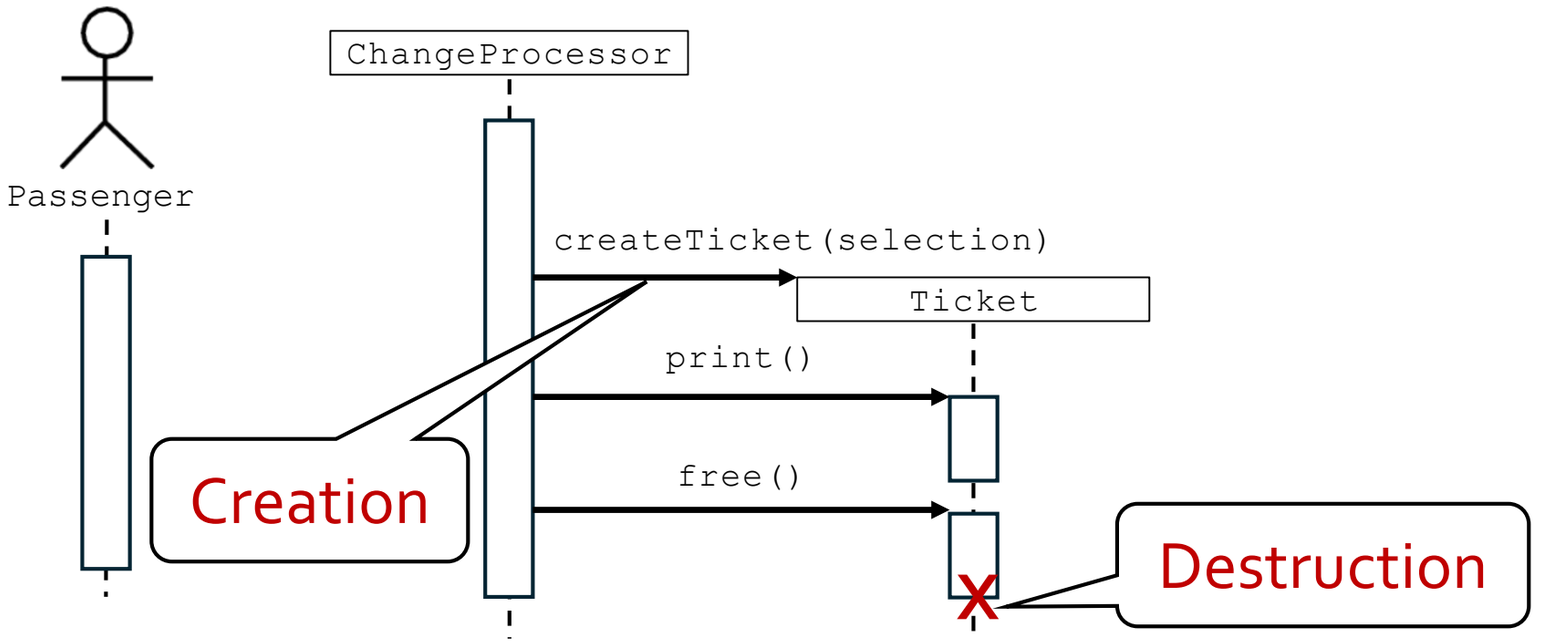
- The source of an arrow indicates the activation which sent the message
- An activation is as long as all nested activations
- Horizontal dashed arrows indicate data flow
- Vertical dashed lines indicate lifelines

Iteration and Condition



- Iteration is denoted by a * preceding the message name
- Condition is denoted by Boolean expression in [ ] before the message name

Creation and Destruction



- Creation is denoted by a message arrow to the object
- Destruction is denoted by an X mark at the end of the destruction activation
- In garbage collection environments, destruction can be used to denote the end of the useful life of an object

Sequence Diagram Summary

- UML sequence diagrams represent behaviour in terms of interactions
- Useful to find missing objects
- Time consuming to build but worth the investment
- Complements the class diagrams (which represent structure)

Reading: Course Notes on Sequence Diagrams

https://ualberta-cmput301.github.io/general/1 Object-Oriented Design - Notes.pdf

Pages 73-76

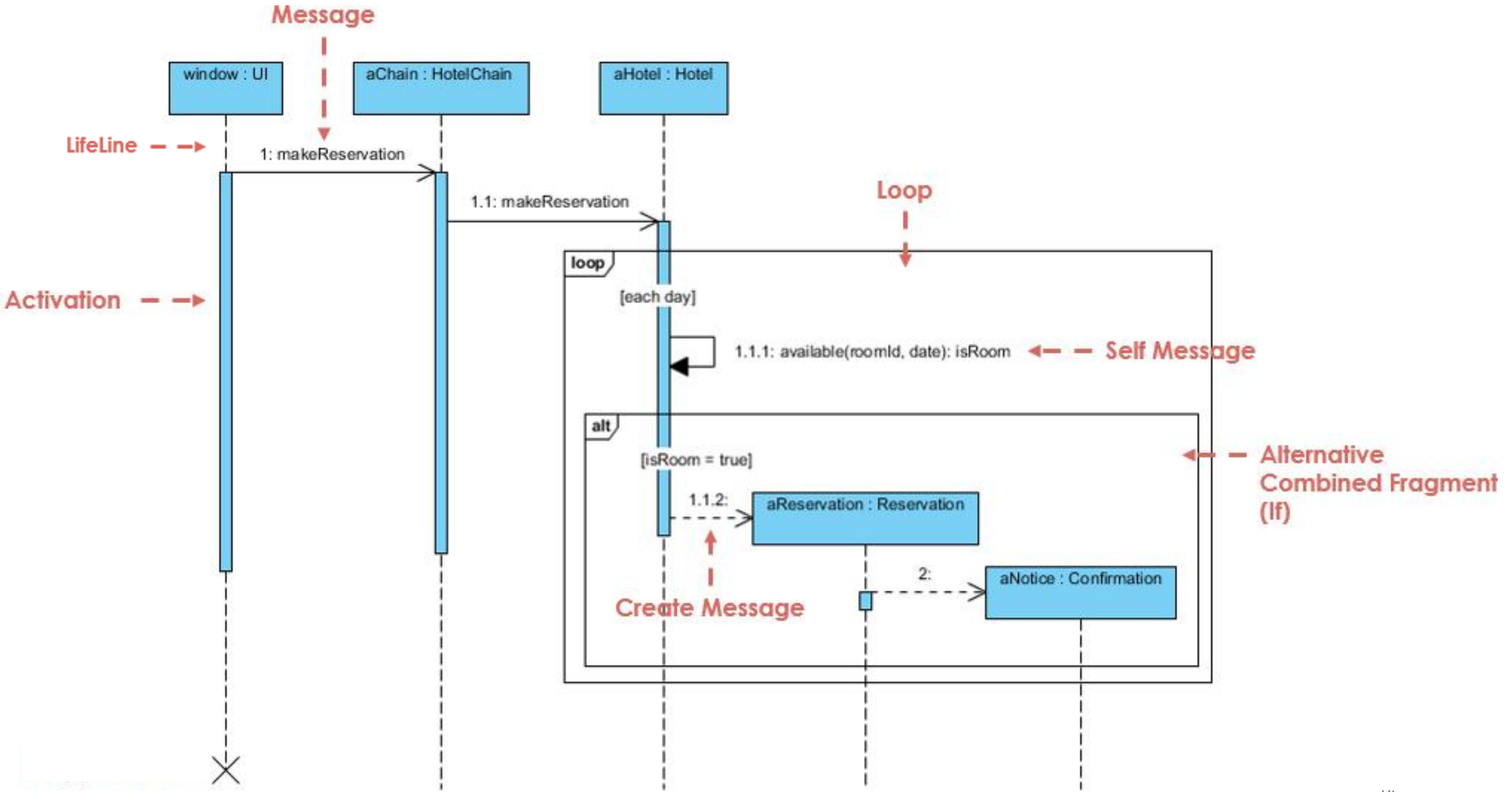
Reading: The IBM Page on Sequence Diagrams

https://developer.ibm.com/articles/the-sequence-diagram/

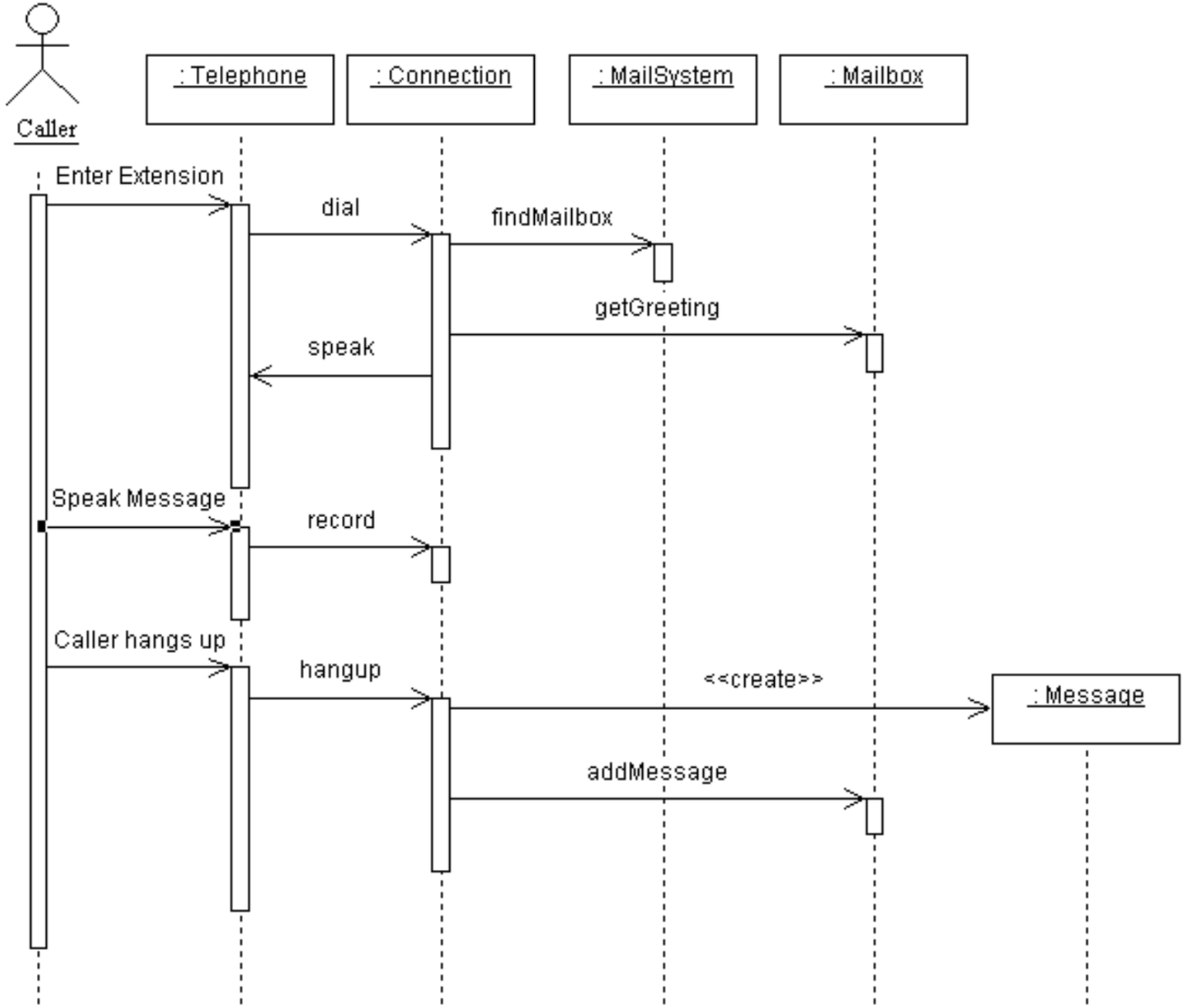
More Information

- Links:
  - UML 2 Sequence Diagrams
    - http://agilemodeling.com/artifacts/sequenceDiagram.htm
  - Wikipedia
    - https://en.wikipedia.org/wiki/Sequence_diagram
  - Other slides adapted from Larman et al.
    - http://www.cse.lehigh.edu/~glennb/oose/ppt/o6SystemSequenceDiagrams.ppt

Let’s Practice Reading Sequence Diagrams



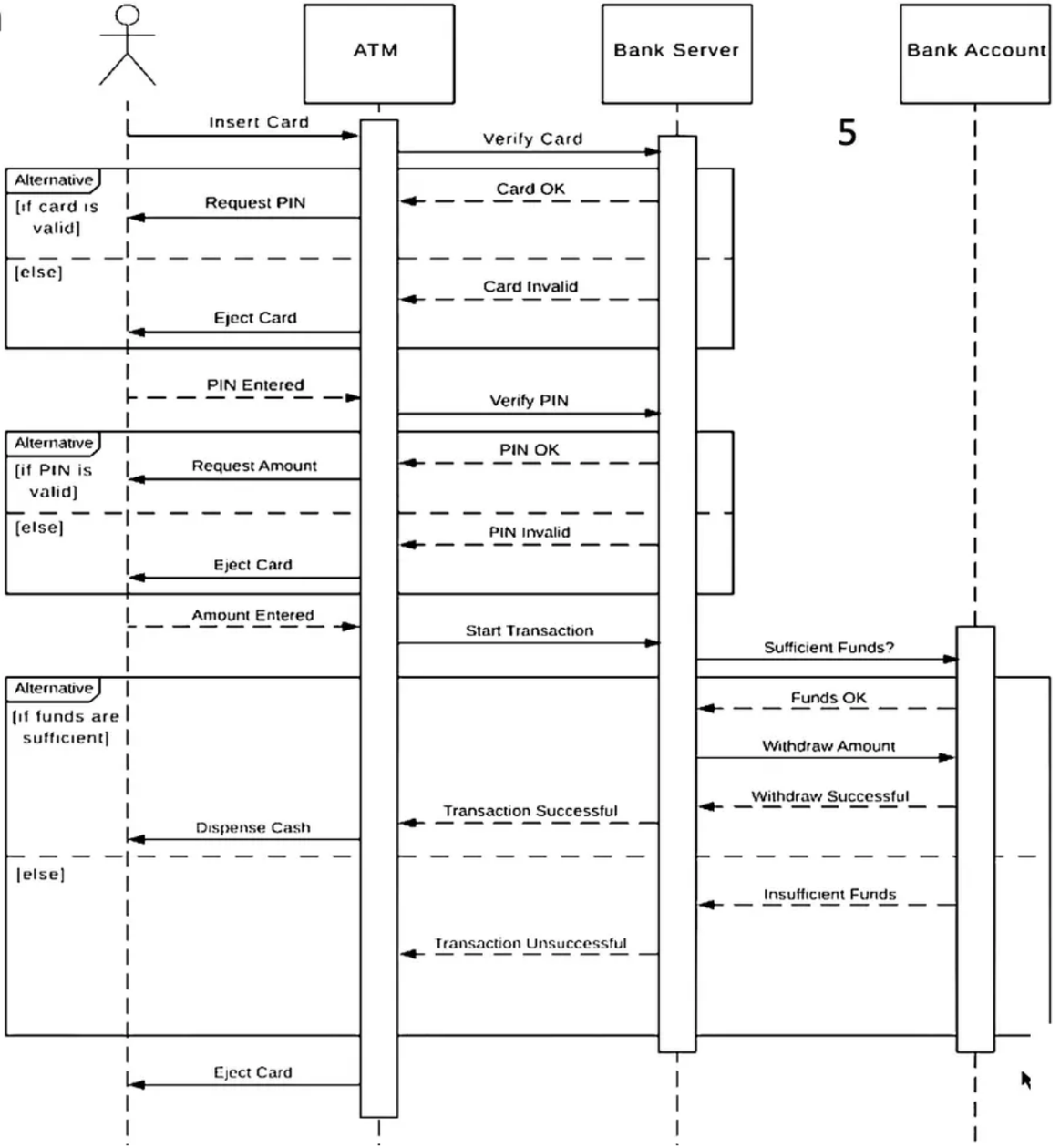
https://www.visual-paradigm.com/guide/uml-unified-modeling-language/what-is-sequence-diagram/



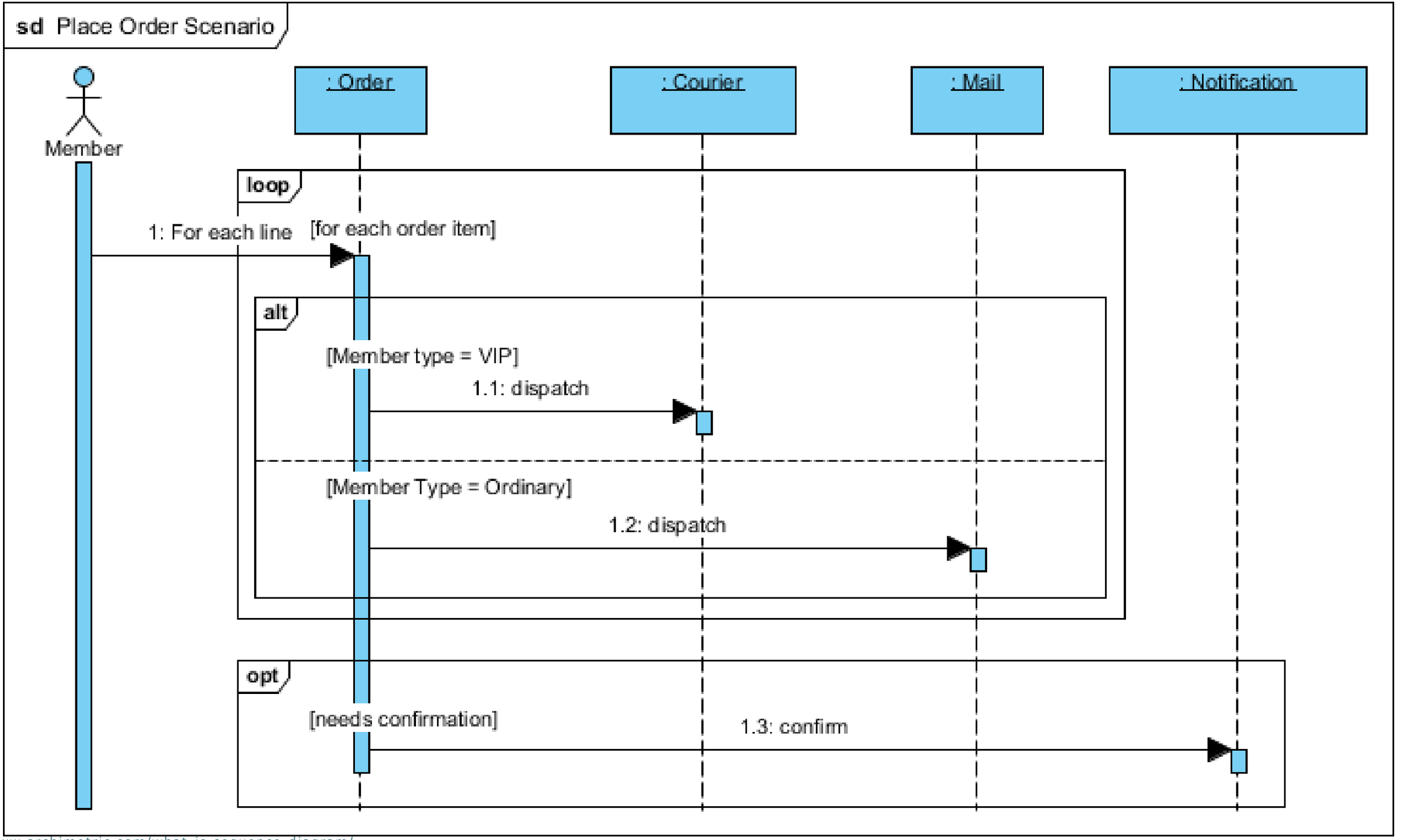
https://www.cs.fsu.edu/~myers/cop3331/notes/dynamicmodel.html

Object Dimension

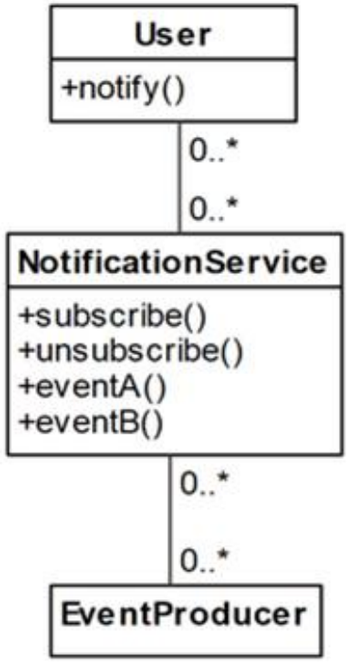
Time Dimension

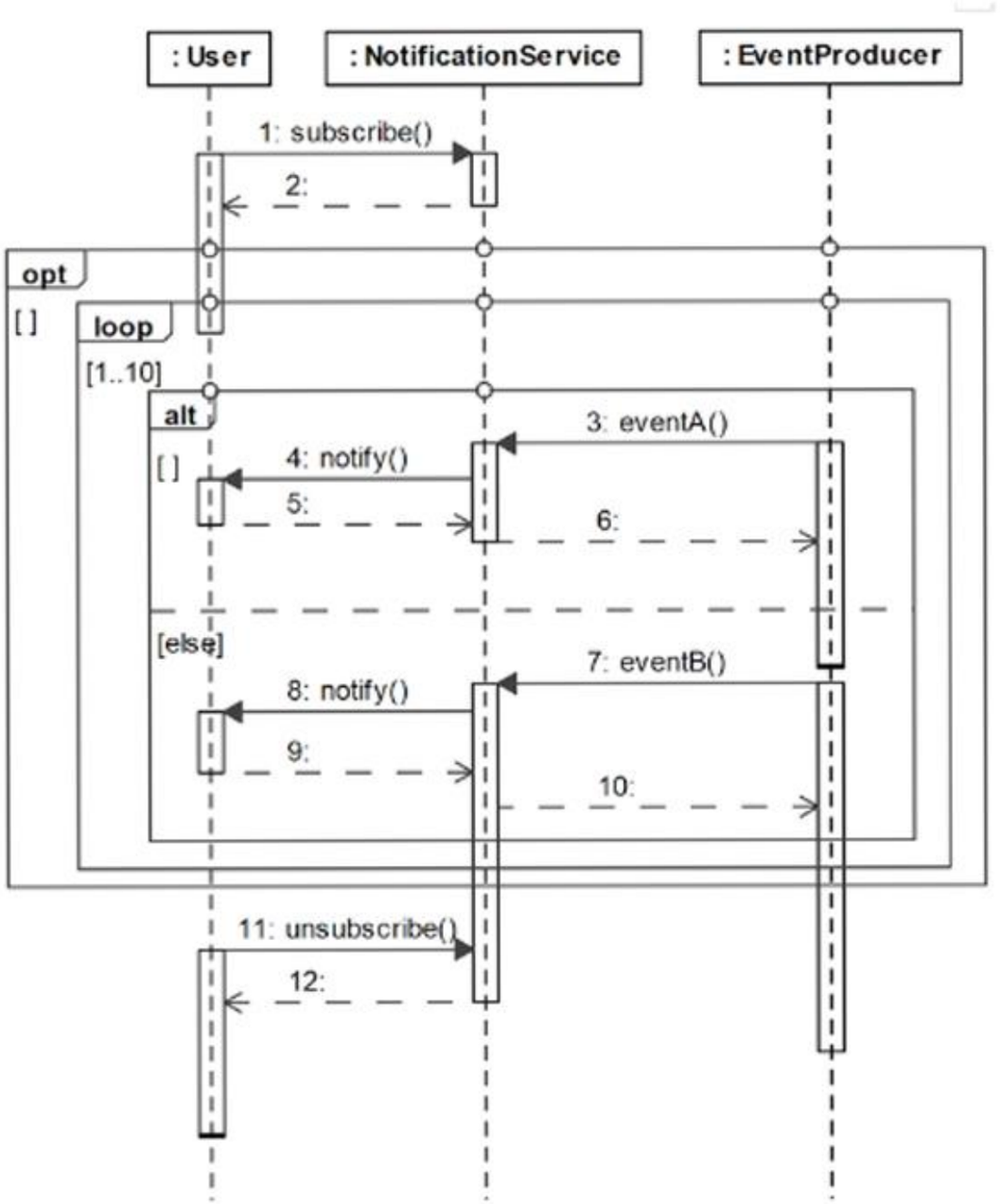


https://thebadoc.com/ba-techniques/f/sequence-diagrams-made-simple

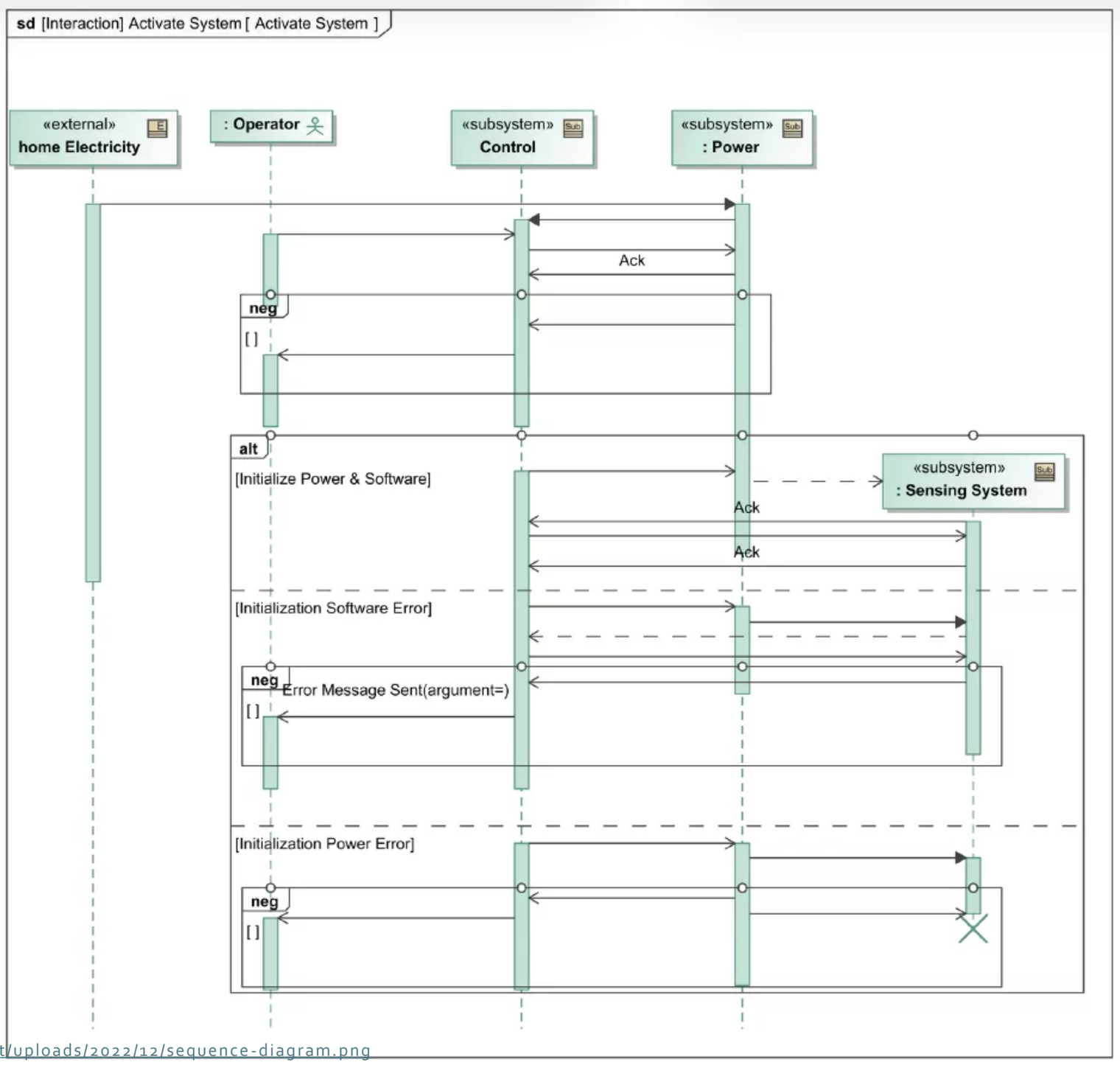


https://www.archimetric.com/what-is-sequence-diagram/





https://modeling-languages.com/wp-content/uploads/2020/06/03Fig.jpg



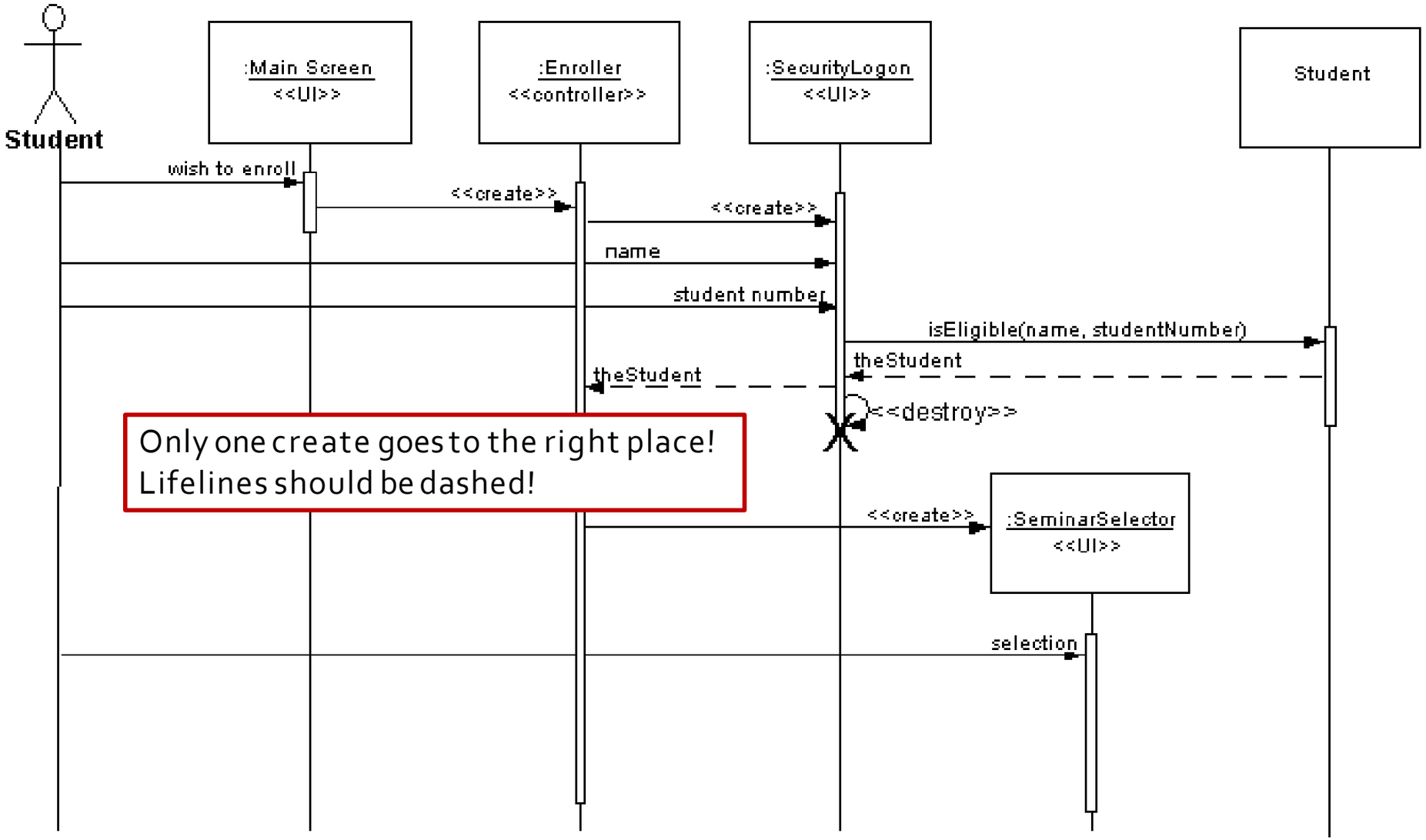
https://www.beyondmbse.com/wp-content/uploads/2022/12/sequence-diagram.png

Spot the Mistakes

What's Wrong with This One?

Enroll In Seminar
Basic Course of Action

1. Student indicates wish to enroll
2. Student inputs name and number
3. System verifies student
4. System displays seminar list
5. Students picks seminar
...



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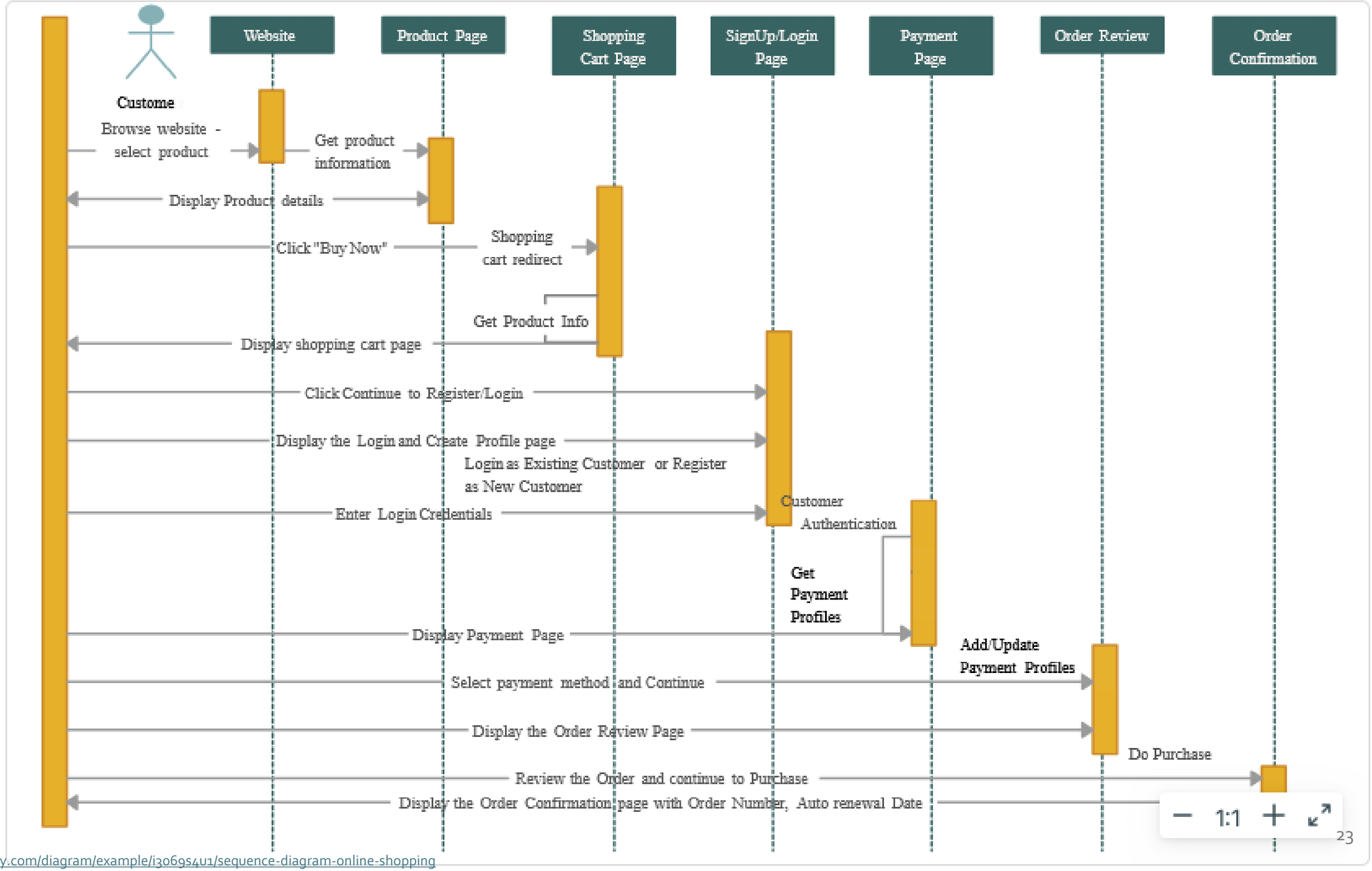
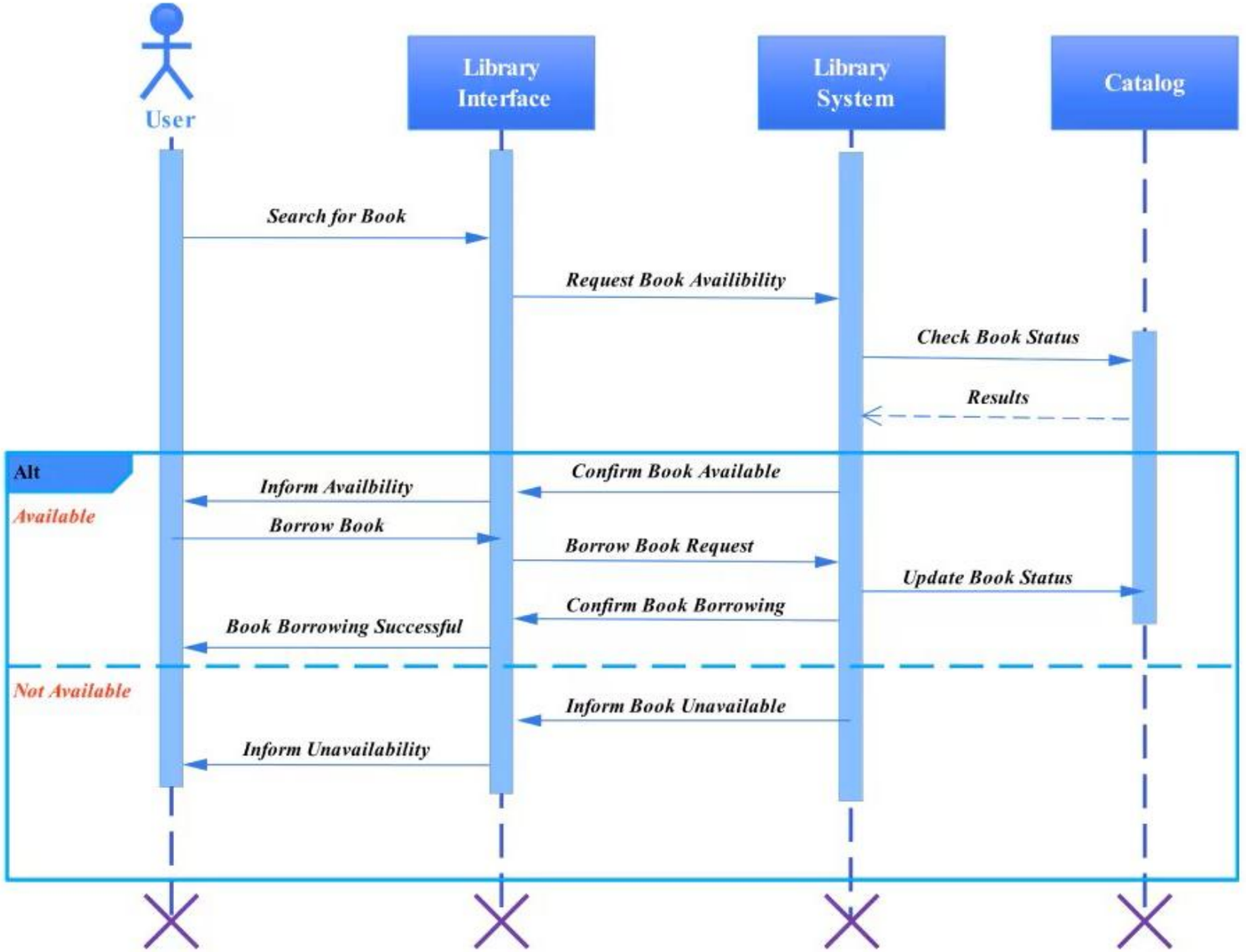
https://agiledata.org/essays/objectorientation101.html



https://creately.com/diagram/example/i3069s4u1/sequence-diagram-online-shopping



https://edrawmax.wondershare.com/templates/sequence-diagram-for-library-management-system.html