UML Tutorial

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Model

Model

A model in science is a physical, mathematical, or logical representation of a system of entities, phenomena, or processes. **A model is a simplified abstract view of the complex reality.** It may focus on particular views, enforcing the "divide and conquer" principle for a compound problem. Formally a model is an interpretation which deals with empirical entities, phenomena, and physical processes in a mathematical, or logical way. For the scientist, a model is also a way in which the human thought processes can be amplified. Models that are rendered in software allow scientists to leverage computational power to simulate, visualize, manipulate and gain intuition about the entity, phenomenon or process being represented.

--Wikipedia

Modelling language

Modelling language

A modelling language is any artificial language that can be used to **express information or knowledge or systems in a structure that is defined by a consistent set of rules**. The rules are used for interpretation of the meaning of components in the structure.
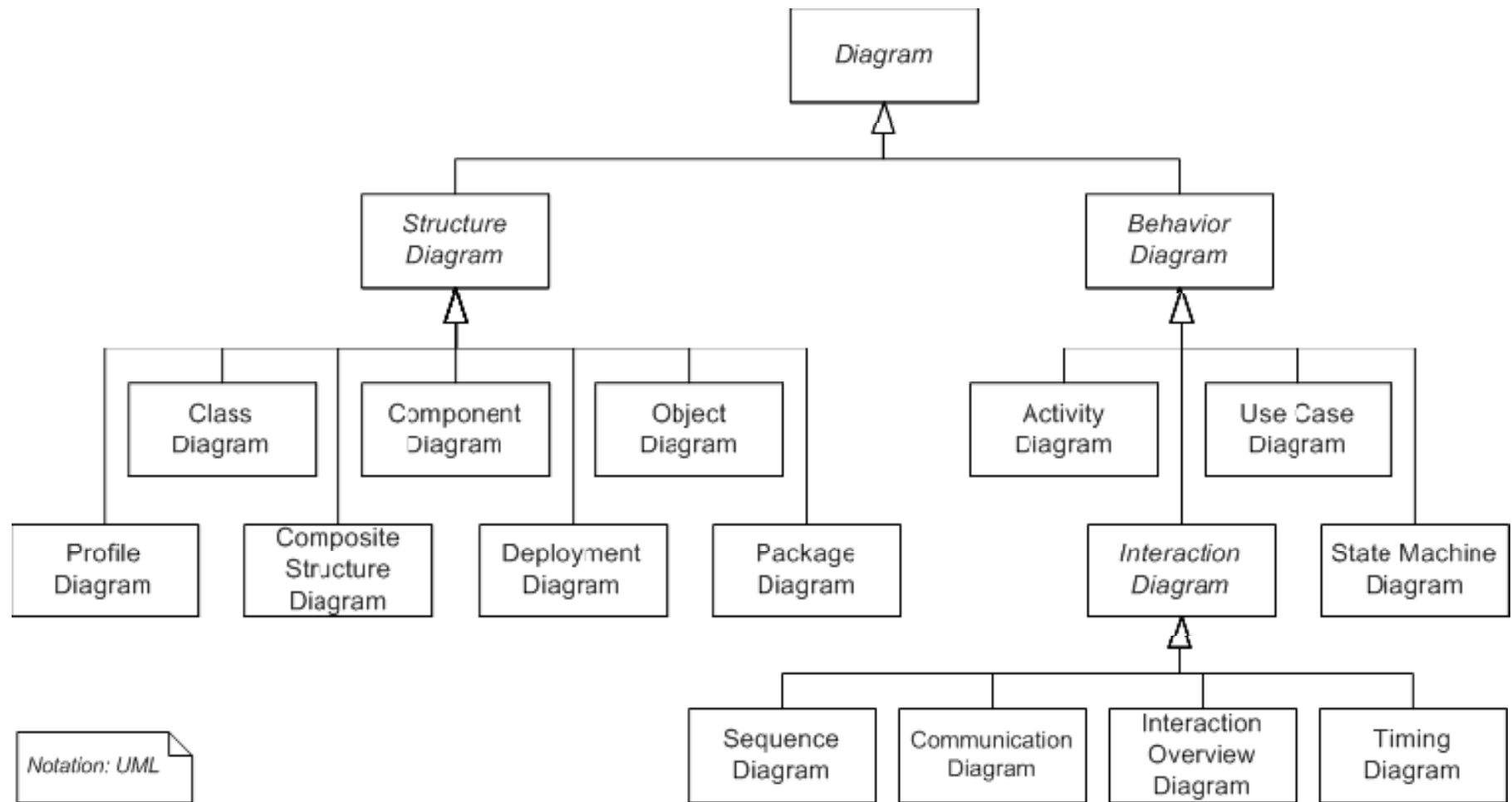
--Wikipedia

Unified Modeling Language

Unified Modeling Language (**UML**)

A standardized general-purpose modeling language in the field of software engineering.

--Wikipedia

- You should learn UML → jobs

Types of UML diagram (Wikipeda)

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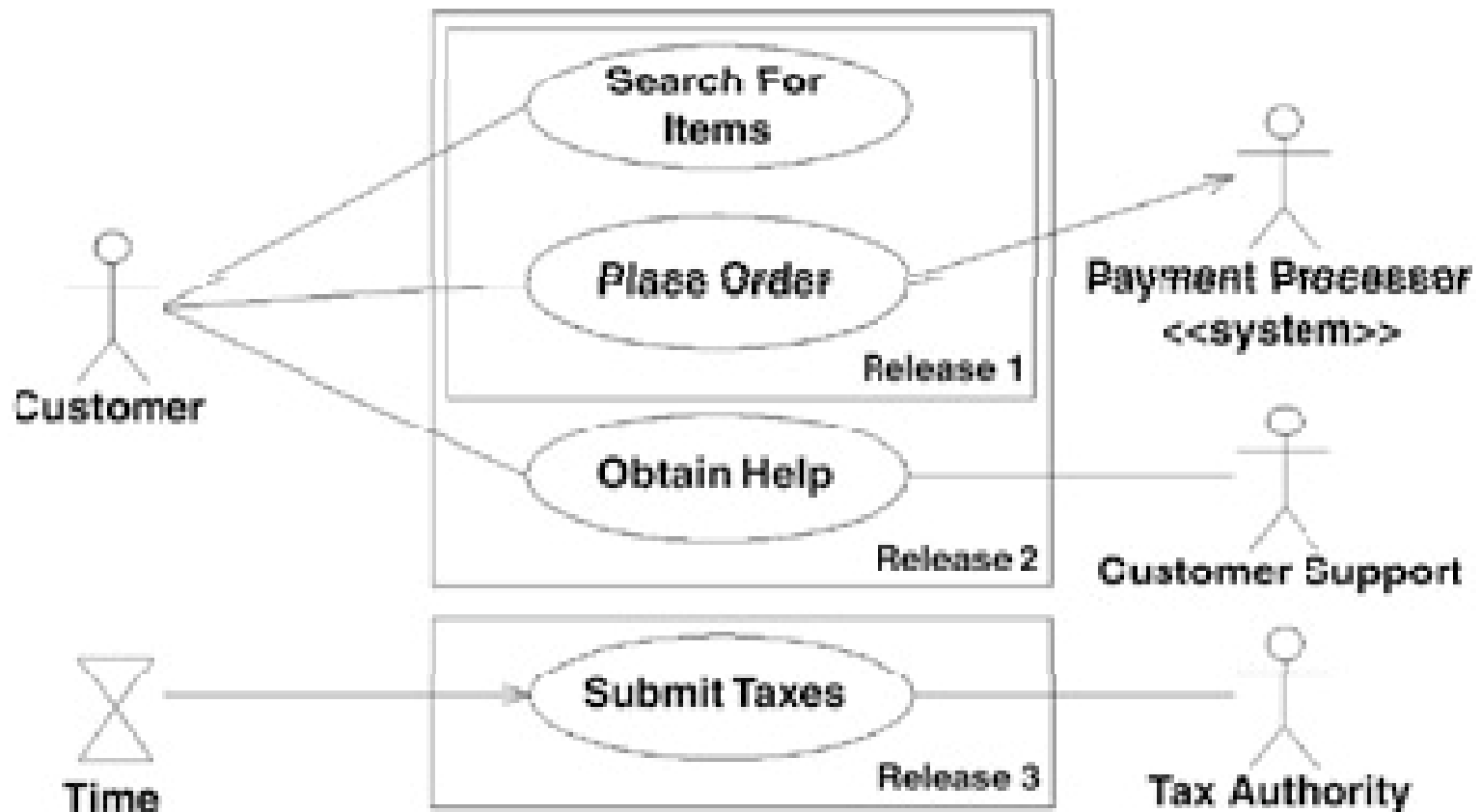
UML: Use Case Diagram

- Purpose:
  - to present a graphical overview of the functionality provided by a system in terms of actors, their goals (represented as use cases), and any dependencies between those use cases.

- Contains:
  - Actors
  - Use cases

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Use Case Diagram Example

Use Case Diagram Example
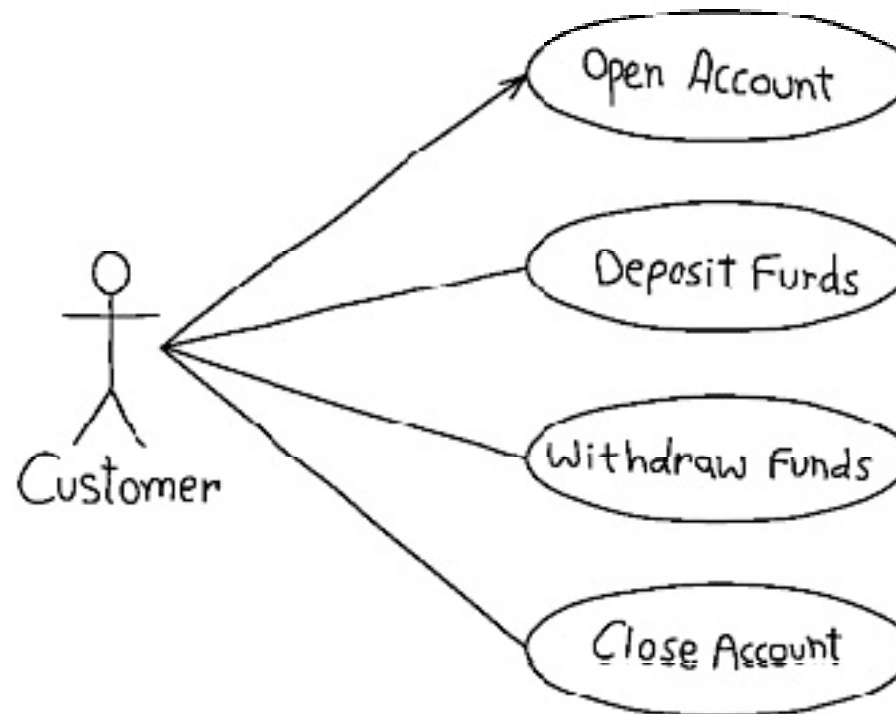
Use Case Diagram Example

Use Case Diagram Brainstorm

- Story:
  - Over beer (or martini) on a Friday night, you and your friends decided to build the next generation of web browser called Web Diving. Web Diving will totally change the way people surf the web. It will allow friends and family view website simultaneously while doing video and audio chat.

- Tasks:
  - Identify actors
  - Identify the use cases
  - Draw a use case diagram

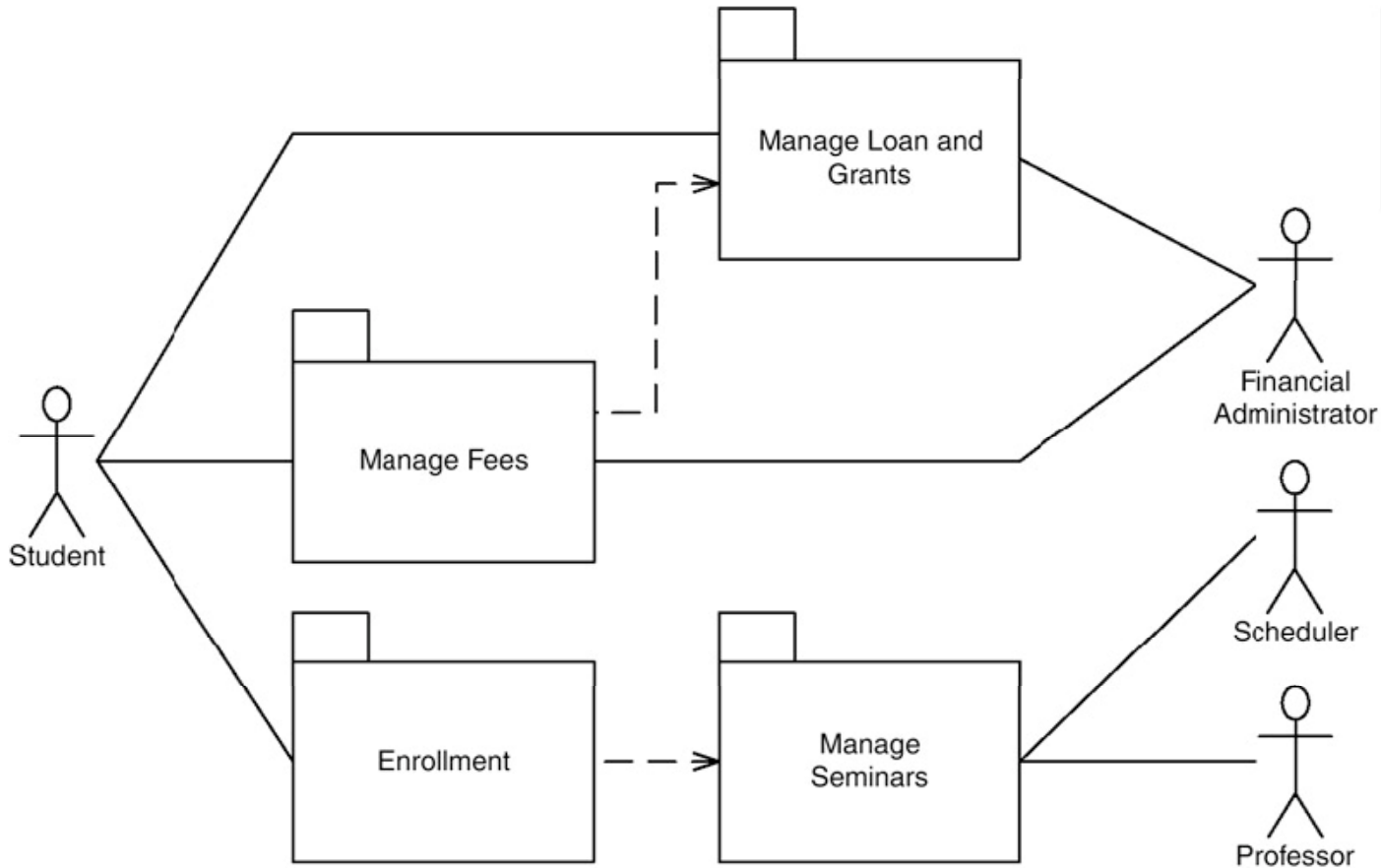Thanh H. D. Nguyen (thanhnguyen@cs.queensu.ca)

Use Case Diagram

- Further reading:
  - http://www.methodsandtools.com/archive/archive.php?id=24
  - "Chapter 4 - UML Use-Case Diagrams" - The Elements of UML 2.0 Style by Scott W. Ambler

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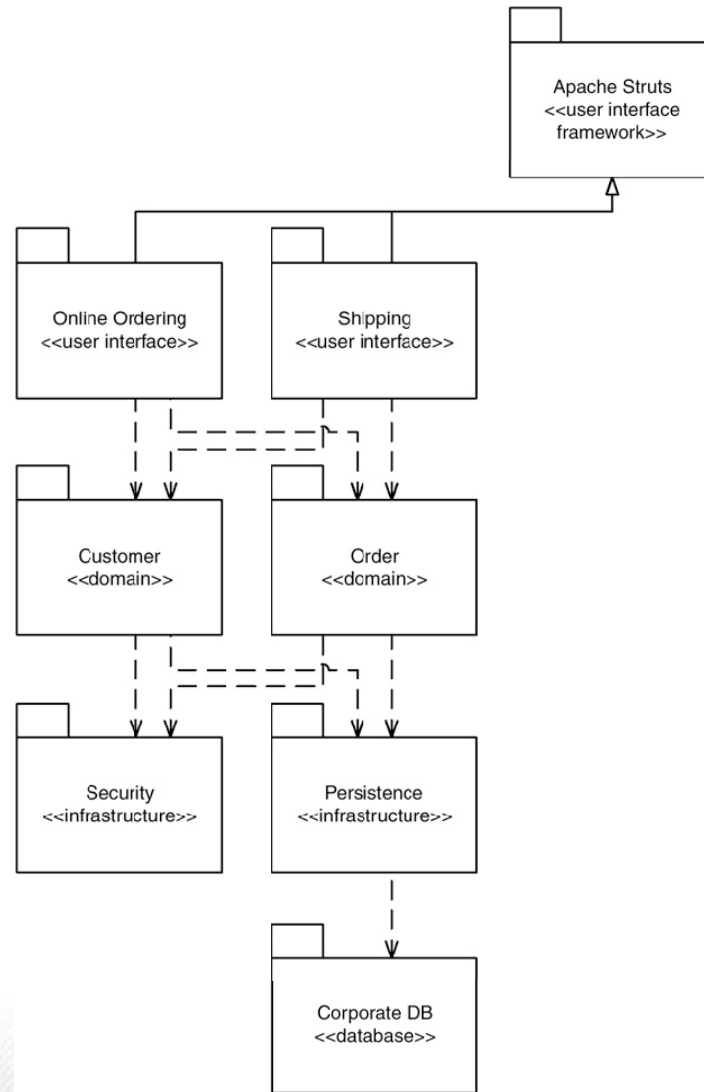
UML: Package Diagram

- Purpose:
  - depict a high-level overview of your requirements,
  - depict a high-level overview of your design,
- Contains:
  - Packages

Use Case Package Diagram Example

University Information System

High-Level Use-Case Diagram

Manage Loan and Grants

Manage Fees

Enrollment

Manage Seminars

Student

Financial Administrator

Scheduler

Professor

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Class Package Diagram Example

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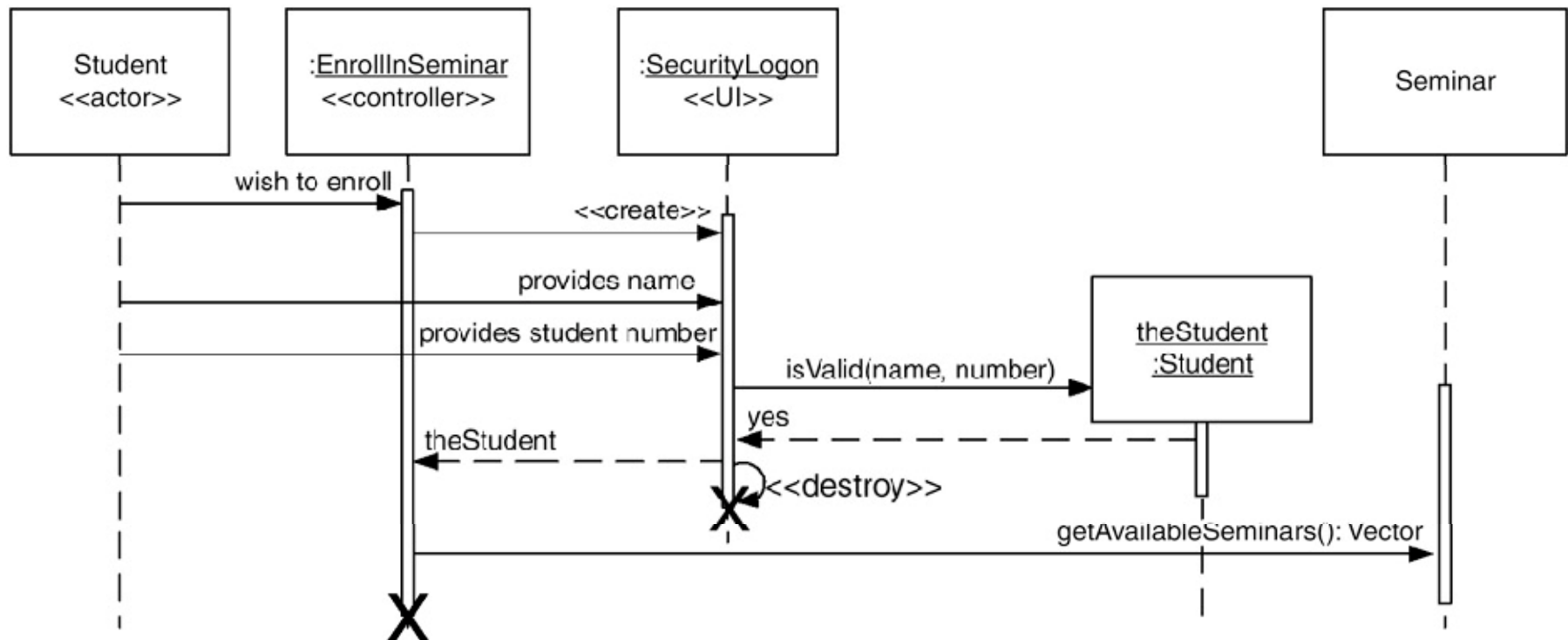# Package Diagram Brainstorm

- Story:
  - Turns out that Web Dive will have 5 components. Each component is a package as followed:
    - Network: to fetch pages, send authentication packages, …
    - Audio video chat engine: encode and decode video and audio signal
    - Audio/Video session control engine: manage audio and video chat session, authentication, …
    - Rendering engine: to render the web pages
    - Browser control engine: manage the browser session, issue network requests, handle user controls
    - User interface: to house all the required interface elements
- Task:
  - Draw a package diagram with all the possible «call» relationship

UML: Sequence Diagram

- Purpose:
  - shows how processes operate with one another and in what order.

- Contains:
  - Component/Packages/Object
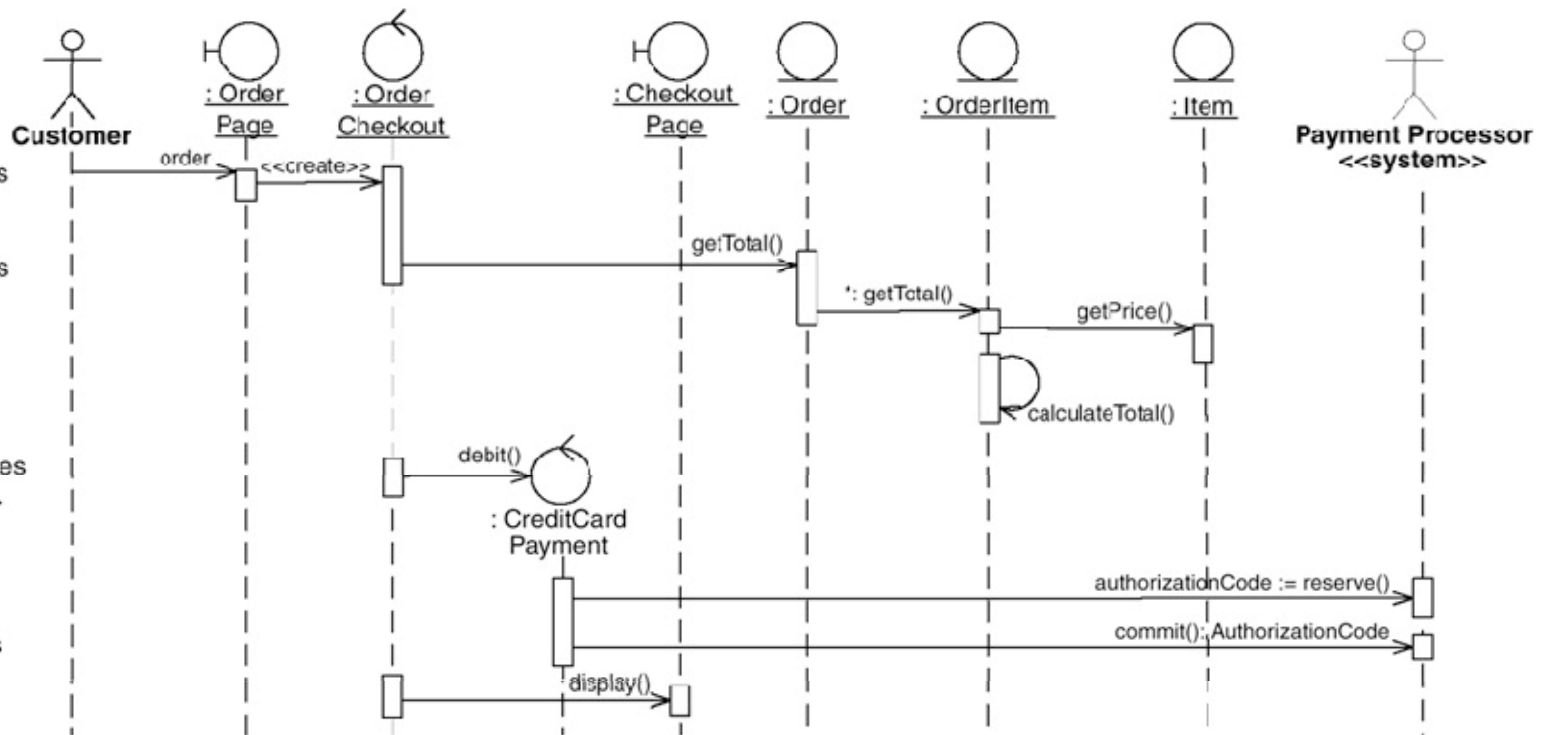 - Activation boxes
  - Messages

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Sequence Diagram Example

Sequence Diagram Example

Sequence Diagram Brainstorm

- Story:
  - As in previous example, each component in Web Dive is a package as followed:
    - Network: to fetch pages, send authentication packages, ...
    - Audio video chat engine: encode and decode video and audio signal
    - Audio/Video session control engine: manage audio and video chat session, authentication, ...
    - Rendering engine: to render the web pages
    - Browser control engine: manage the browser session, issue network requests, handle user controls
    - User interface: to house all the required interface elements
- Task:
  - Draw a sequence diagram when:
    - The user wants to display a web page
    - The user wants to see the same page with another user

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UML Tutorial

- Further Readings:
  - **Wikipedia** of course
  - **UML 2 for Dummies** by Michael Jesse Chonoles and James A. Schardt, John Wiley & Sons © 2004 (Available online on books 24x7 through the library access)
  - **The Elements of UML 2.0 Style** by Scott W. Ambler, Cambridge University Press © 2005 (Available online on books 24x7 through the library access)

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