UML Modelling (Context, UseCase, Activity Diagrams)

Context

- Working with Diagrams
- Context – Data Flow Diagram
- Use Case Diagram
- Activity Diagram
- System-Wide Requirements (SRS) Template

Working with Diagrams

- Before we explore the details of UML, it would be wise to talk about when and why we use it. Much harm has been done to software projects through the misuse and overuse of UML.

- Why do engineers build models? Why do structural engineers build models of bridges?

Working with Diagrams

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- Why do engineers build models? Why do structural engineers build models of bridges?
- Engineers build models to find out if their designs will work.
- Structural engineers build models of bridges to see if they will stand.

Working with Diagrams

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Working with Diagrams

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- Why don’t structural engineers just build the bridge and then see if it stands?
- Because bridges are a *lot* more expensive than the models.

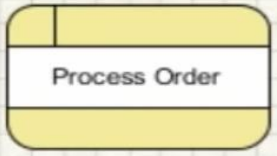
Context Diagram (Data Flow Diagram - DFD)

- A data flow diagram (DFD) illustrates how data is processed by a system in terms of inputs and outputs. As its name indicates its focus is on the flow of information, where data comes from, where it goes and how it gets stored.

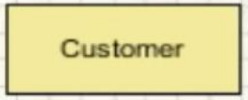
- It is usually beginning with a context diagram as the level 0 of DFD diagram, a simple representation of the whole system.

Context Diagram (Data Flow Diagram - DFD)

Building Blocks of DFD

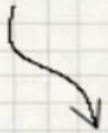


Process
A business activity or function where the manipulation and transformation of data takes place.



External Entity
An external entity can represent a human, system or subsystem. It is where certain data comes from or goes to.

Data Store
A data store represents the storage of persistent data required and/or produced by the process.



Data Flow
A data flow represents the flow of information. The arrows indicate the direction of data flow from beginning to the end.

Context Diagram (Data Flow Diagram - DFD)

Watch the video

→ https://www.visual-paradigm.com/tutorials/data-flow-diagram-dfd.jsp

UseCase Diagram

- A use case diagram is a dynamic or behavior diagram of a system.
- Use case diagram provides a graphical overview of goals (modeled by use cases) users (represented by actors) want to achieve by using the system (represented by system boundary optionally).
- Use case diagrams model the functionality of a system using actors and use cases.
- Use cases are a set of actions, services, and functions that the system needs to perform

UseCase Diagram

- **System**
  Draw your system's boundaries using a rectangle that contains use cases. Place actors outside the system's boundaries.

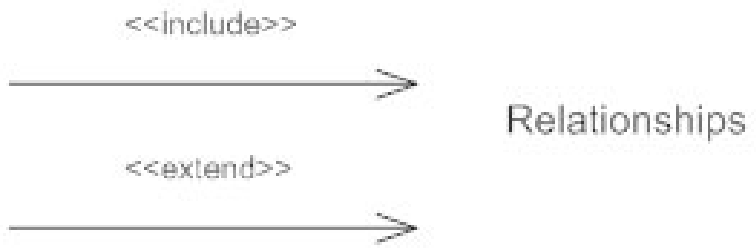
- **Use Case**
  Draw use cases using ovals. Label the ovals with verbs that represent the system's functions.

- **Actors**
  Actors are the users of a system. When one system is the actor of another system, label the actor system with the actor stereotype.

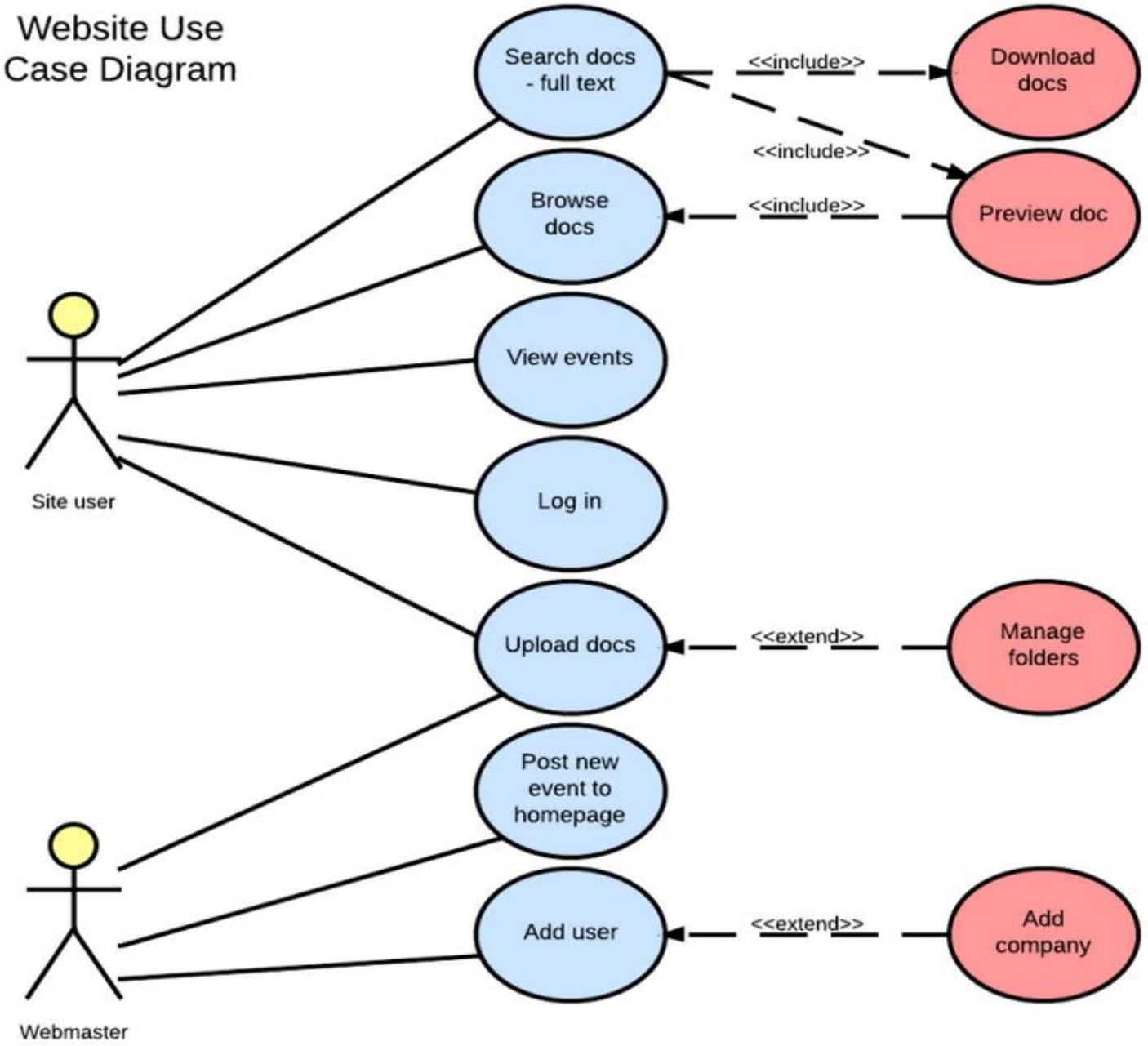
UseCase Diagram

Relationships

Illustrate relationships between an actor and a use case with a simple line. For relationships among use cases, use arrows labeled either "uses" or "extends." A "uses" relationship indicates that one use case is needed by another in order to perform a task. An "extends" relationship indicates alternative options under a certain use case.



UseCase Diagram

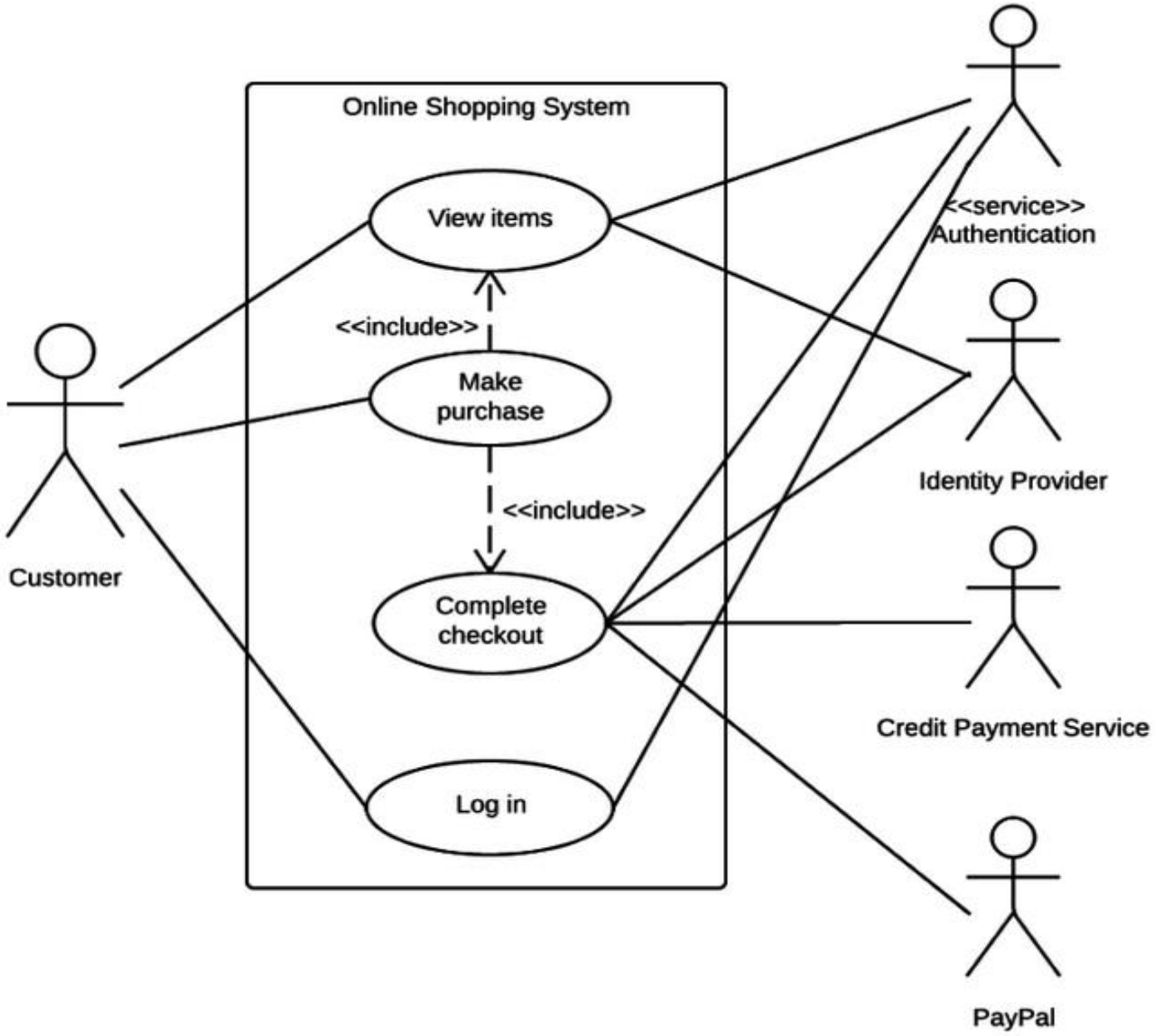


UseCase Diagram

- It’s your turn!
  - Create a basic UseCase Diagram for Online Shopping System

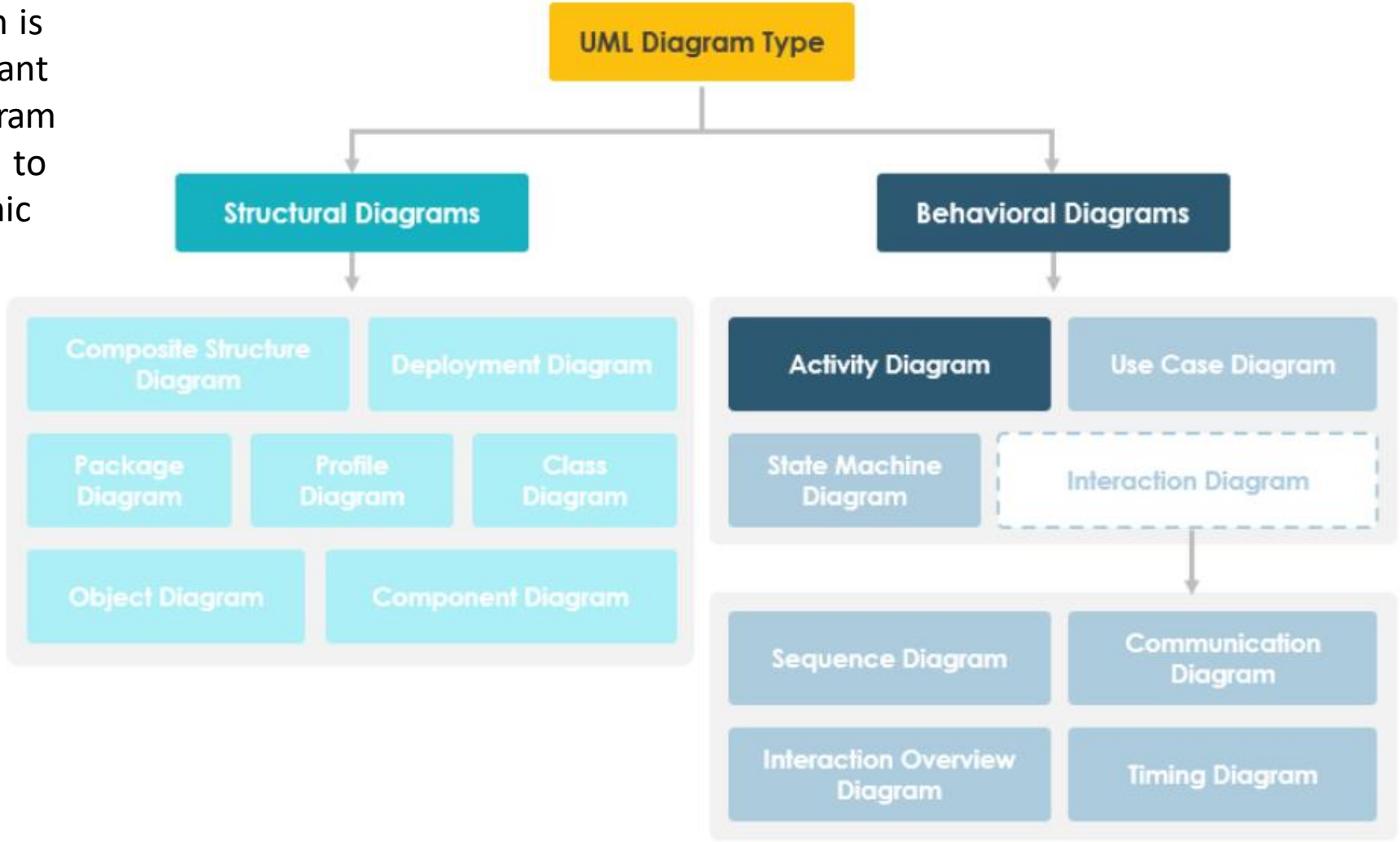
UseCase Diagram

- Online Shopping System



Activity Diagram

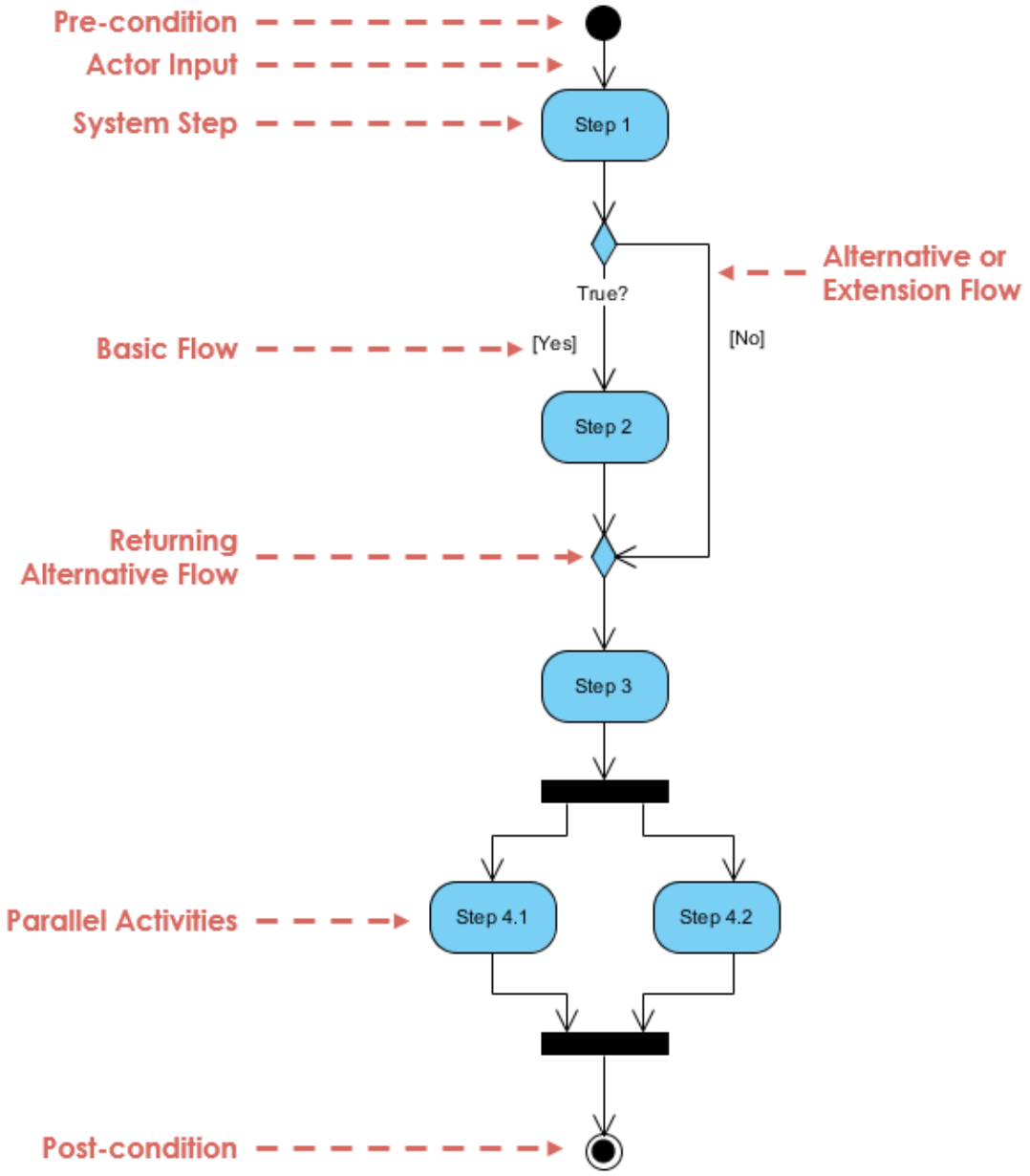
Activity diagram is another important behavioral diagram in UML diagram to describe dynamic aspects of the system.



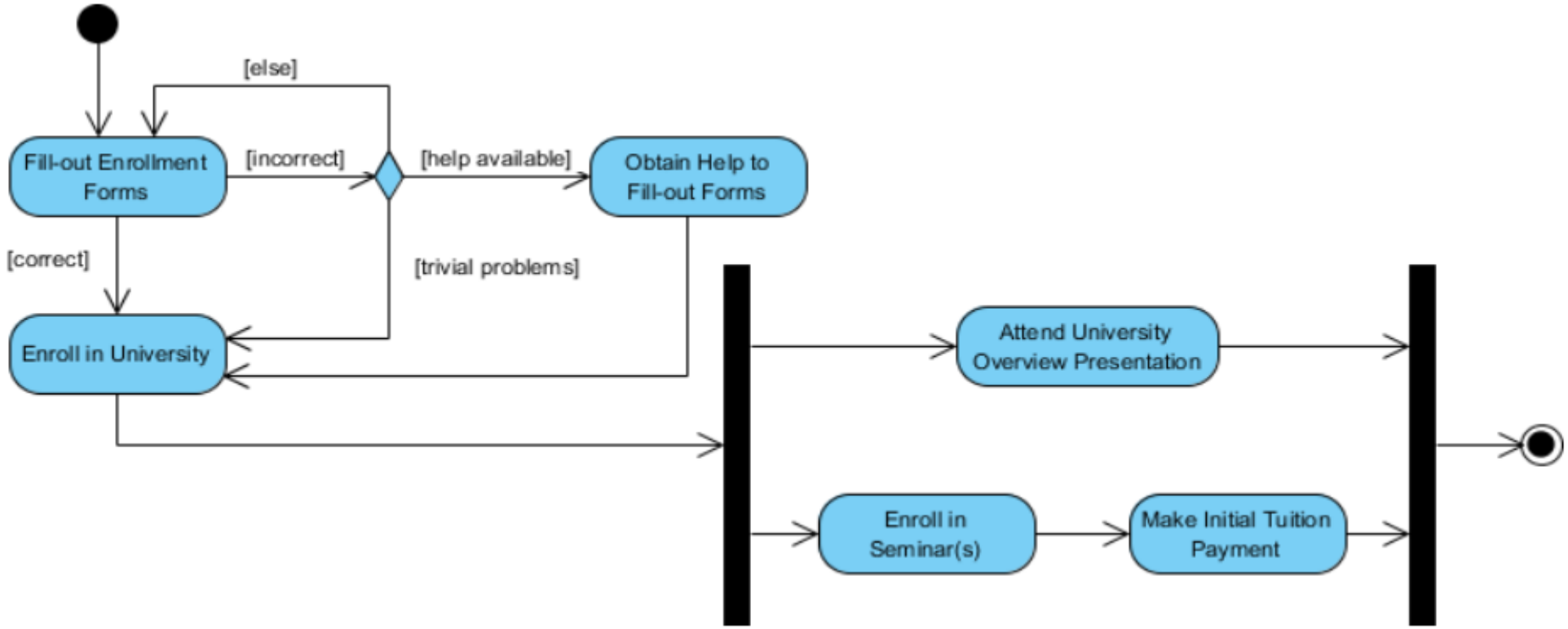
Activity Diagram

Activity diagram is essentially an advanced version of flow chart that modeling the flow from one activity to another activity.

- Identify candidate use cases, through the examination of business workflows
- Identify pre- and post-conditions (the context) for use cases
- Model workflows between/within use cases
- Model complex workflows in operations on objects
- Model in detail complex activities in a high level activity Diagram



- This UML activity diagram example describes a process for student enrollment in a university as follows:
  - An applicant wants to enroll in the university.
  - The applicant hands a filled out copy of Enrollment Form.
  - The registrar inspects the forms.
  - The registrar determines that the forms have been filled out properly.
  - The registrar informs student to attend in university overview presentation.
  - The registrar helps the student to enroll in seminars
  - The registrar asks the student to pay for the initial tuition.



System-Wide Requirements (SRS) Template

- This artifact captures the quality attributes and constraints that have system-wide scope. It also captures system-wide functional requirements.

→http://epf.eclipse.org/wikis/openup/core.tech.common.extend_supp/guidances/templates/systemwide_requirements_specification_B621CDD6.html

See you next week.