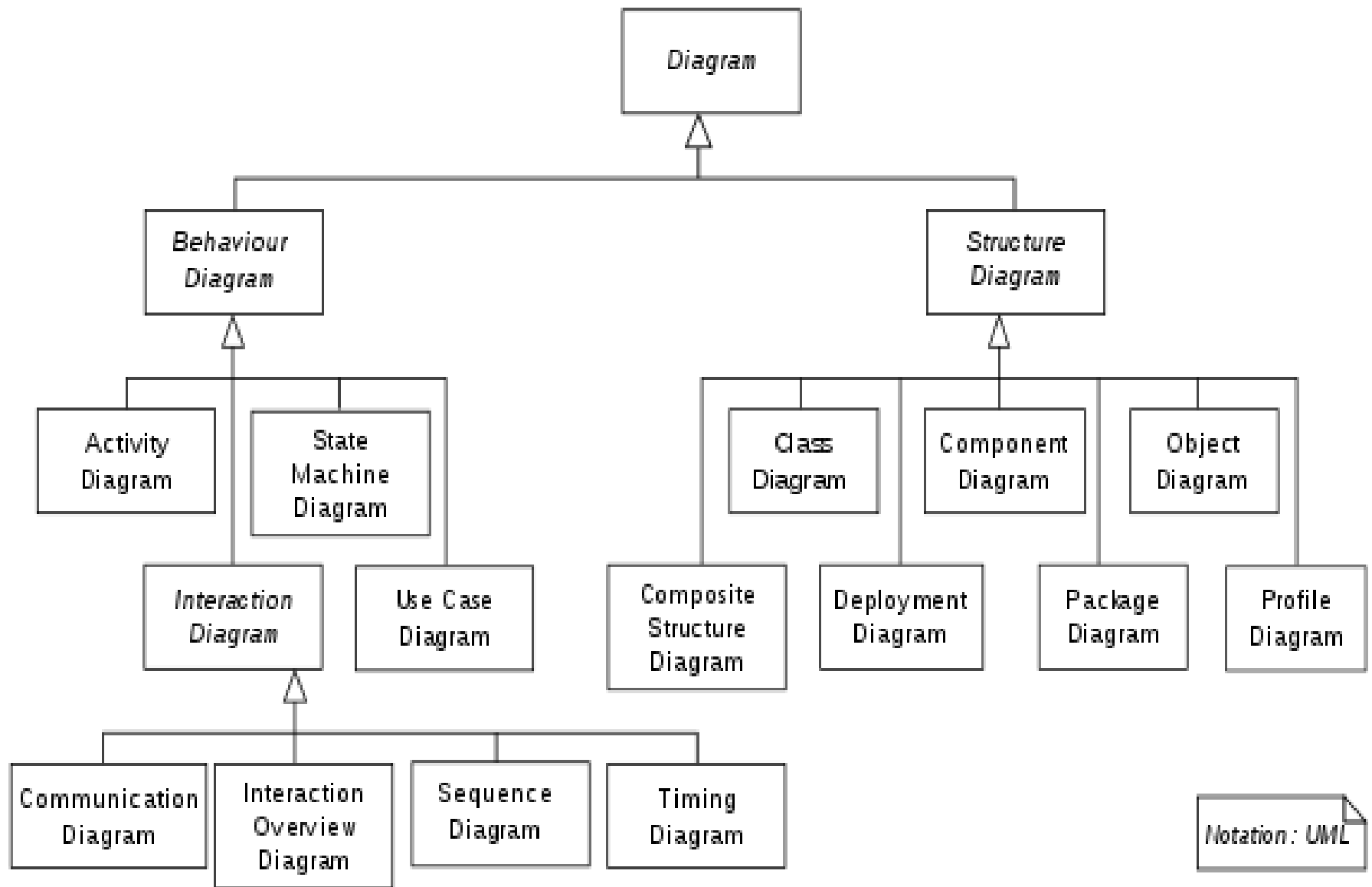


UML - ACTIVITY DIAGRAM

2021-'22 Winter SWE B.Tech



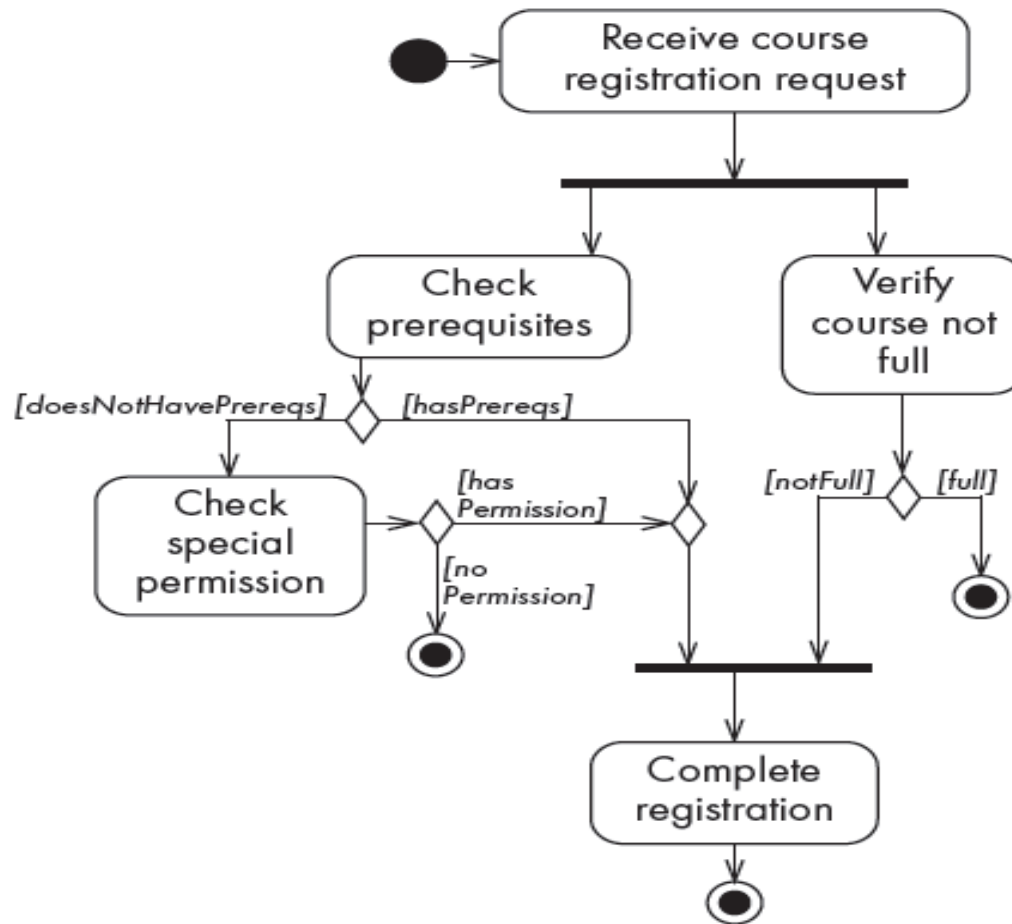
Activity Diagrams

- An *activity diagram* is like **a state diagram**.
 - Except, most transitions are caused by *internal* events, such as the completion of a computation.
- Is used to understand the flow of work that an object or component performs
- Graphical representations of workflows (performed by object or component) of stepwise activities and actions with support for choice, iteration and concurrency.
- One of the strengths of activity diagrams is the representation of **concurrent activities**.

Activity Diagram Notation

- Activity diagram uses ***rounded rectangles*** to imply a specific system function
- ***Arrows*** to represent flow through the system.
- ***Decision diamonds*** to depict a branching decision (each arrow emanating from the diamond is labelled).
- ***Solid horizontal lines*** to indicate that parallel activities are occurring.

Activity diagram – an example



Activity diagram of the registration process

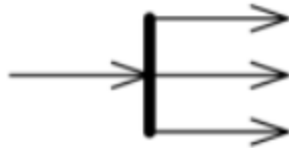
Representing concurrency

– Shown using **forks**, **joins** and **rendezvous**.

- A ***fork*** has one incoming transition and multiple outgoing transitions.
- A ***join*** has multiple incoming transitions and one outgoing transition.
- A ***rendezvous*** has multiple incoming and multiple outgoing transitions.

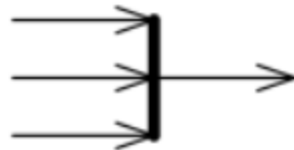
Representing concurrency

- A ***fork*** has one incoming transition and multiple outgoing transitions.
 - The execution splits into multiple concurrent threads.



Representing concurrency

- A ***join*** has multiple incoming transitions and one outgoing transition.
 - The outgoing transition will be taken when all incoming transitions have occurred.
 - The incoming transitions must be triggered in separate threads.
 - If one incoming transition occurs, a wait condition occurs at the join until the other transitions occur.



Representing concurrency

- A *rendezvous* has multiple incoming and multiple outgoing transitions.
 - Once all the incoming transitions occur all the outgoing transitions may occur.

Decision nodes and merge nodes

- An activity diagram has two types of nodes for branching within a single thread. These are represented as small ***diamonds***:

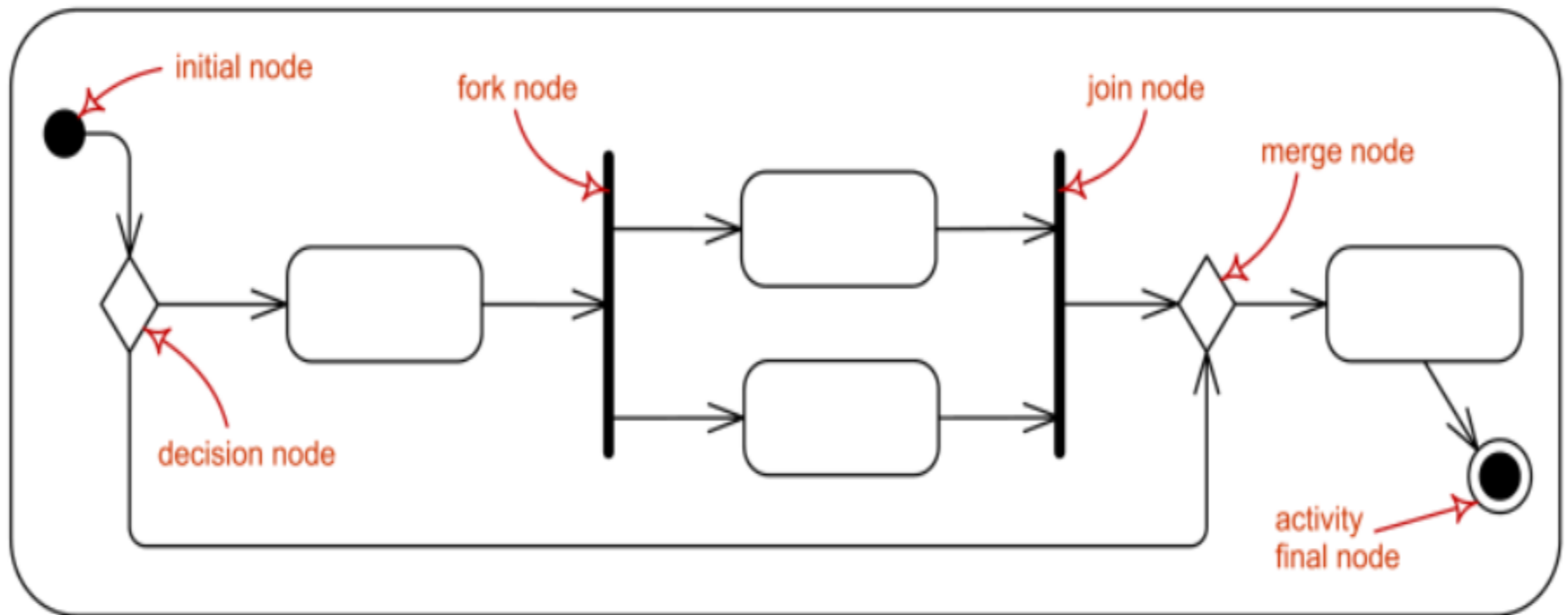
■ ***Decision node***

- *has one incoming transition and multiple outgoing transitions* each with a Boolean guard in square brackets. Exactly one of the outgoing transitions will be taken.

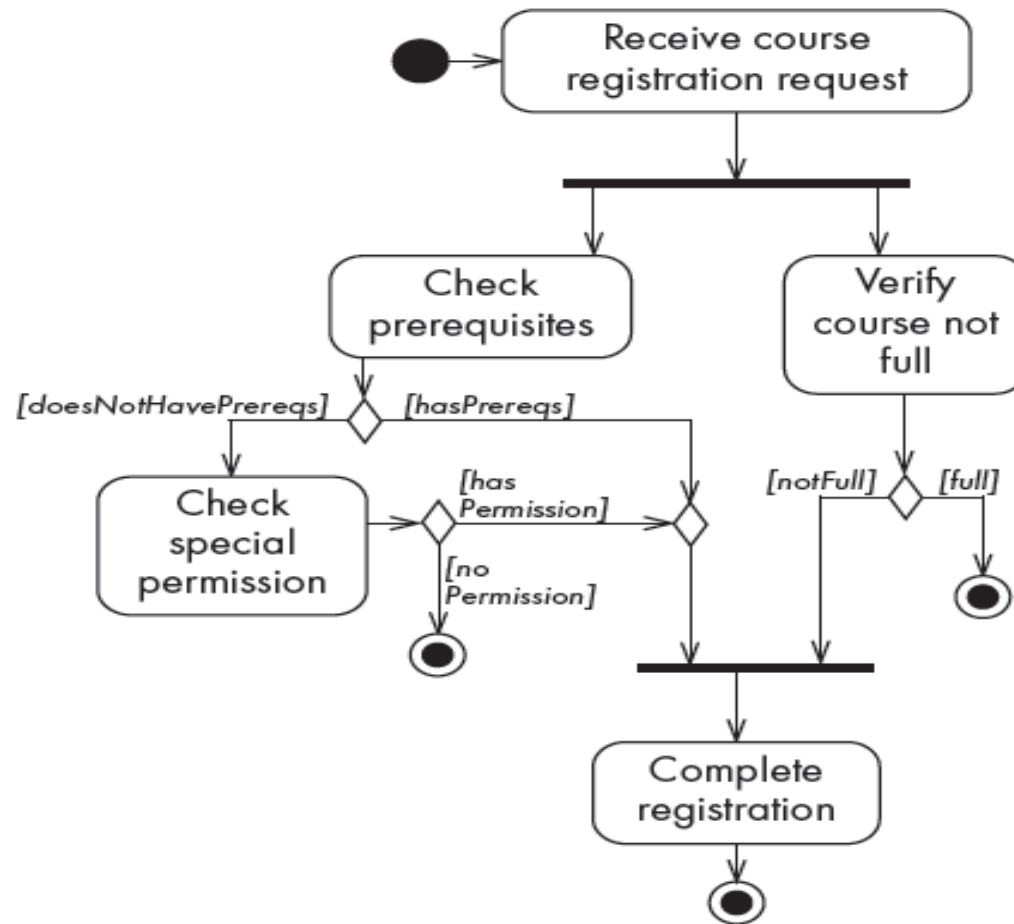
■ ***Merge node***

- *has two incoming transitions and one outgoing transition. It is used to bring together paths that had been split by decision nodes.*

Activity Diagram Notation



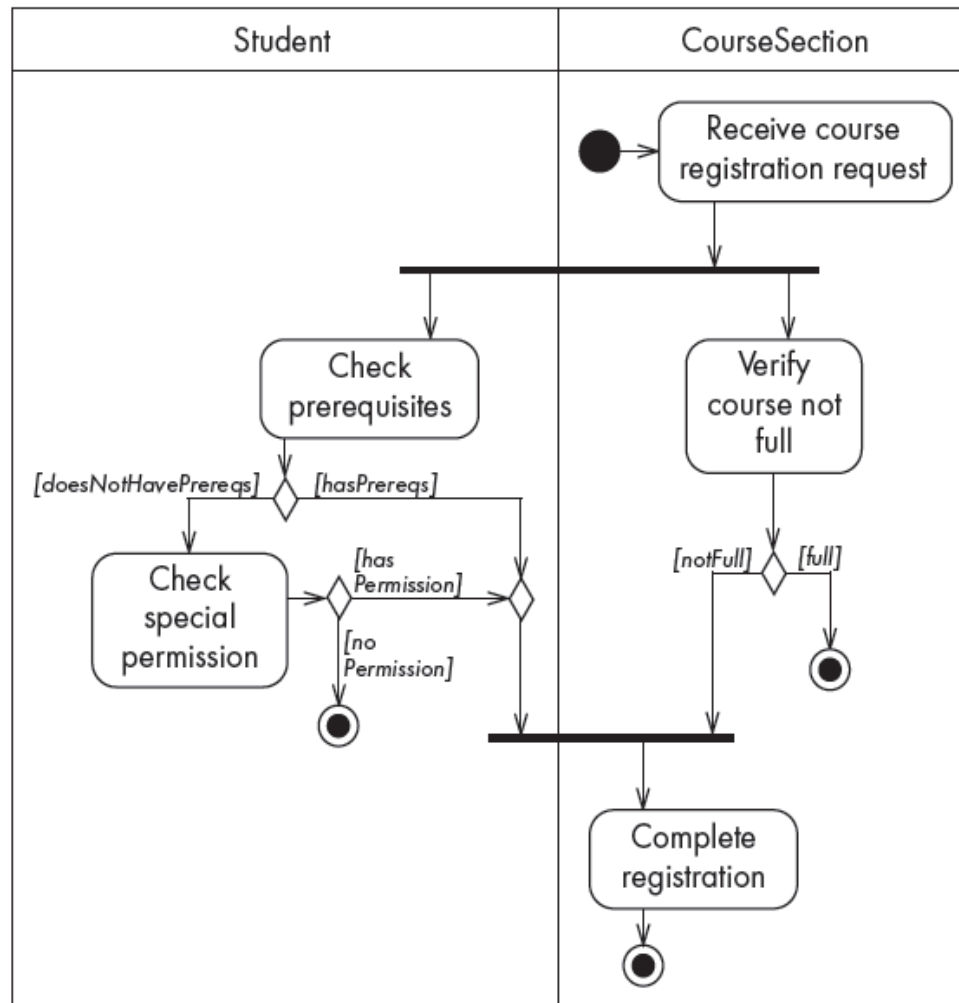
Activity diagrams – an example



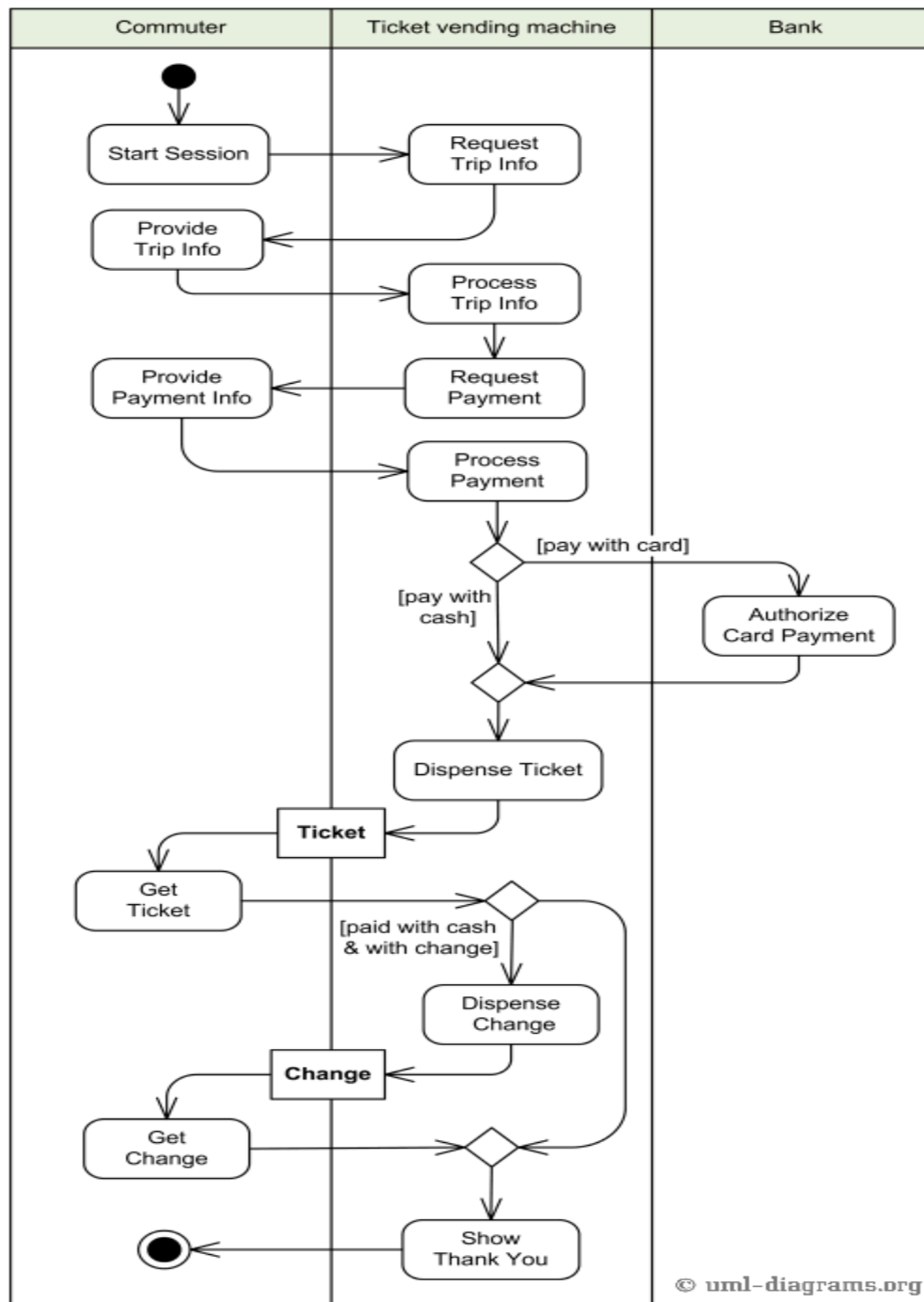
Activity diagram of the registration process

Swimlanes

- Activity diagrams are most often associated with several classes.
- The partition of activities among the existing classes can be explicitly shown in an activity diagram by the introduction of *swimlanes*.
 - *Allows* you to represent the flow of activities described by the use case
 - indicate which actor or analysis class has responsibility for the action described by an activity rectangle.
- Responsibilities are represented as parallel segments that divide the diagram vertically, like the lanes in a swimming pool.



Activity diagram with swimlanes



- Test 2 on Friday, 04th March 2022