

Activity Diagrams

Comp-304 : Activity Diagrams
Lecture 14

Alexandre Denault
Original notes by Hans Vangheluwe
Computer Science
McGill University
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Assignment 2

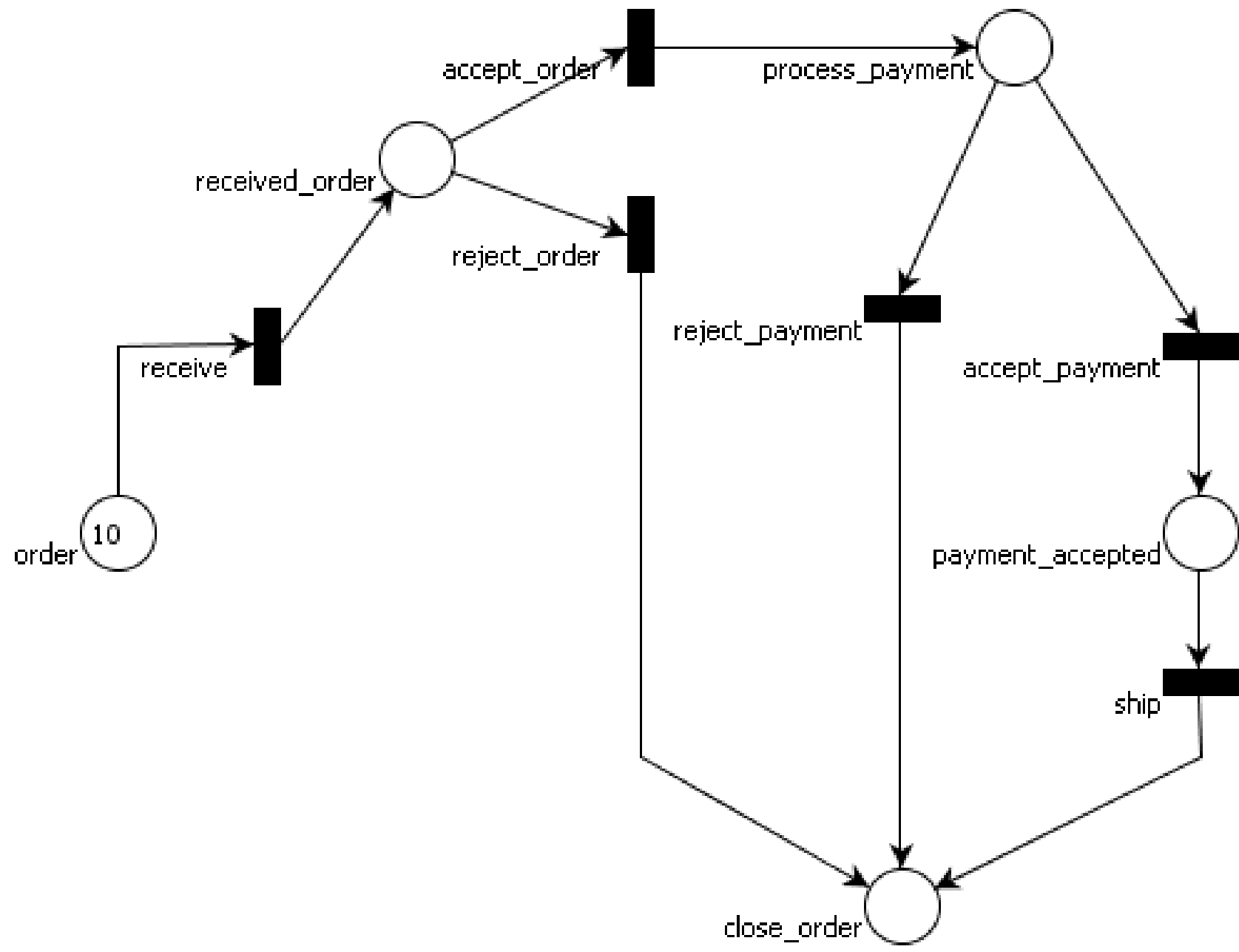
Presenting Reehan

Activity Diagrams

- Describe behavior
 - ♦ at high level of abstraction
 - ♦ focus on work flows (processes/activities)
 - ♦ elegant description of concurrency
 - ♦ can express non-determinism
 - ♦ as of UML 2.0 based on Petri Nets (before: statecharts)

- Formalism similar to FSA, PetriNets are a graphical notation.
- They were developed by C.A. Petri in the 1960's as part of his PhD thesis.
- Additions to FSA:
 - ◆ Explicitly (graphically) represents when an event is enabled
 - describe control logic
 - ◆ Elegant notation of concurrency, synchronization
 - ◆ Express non-determinism

Example



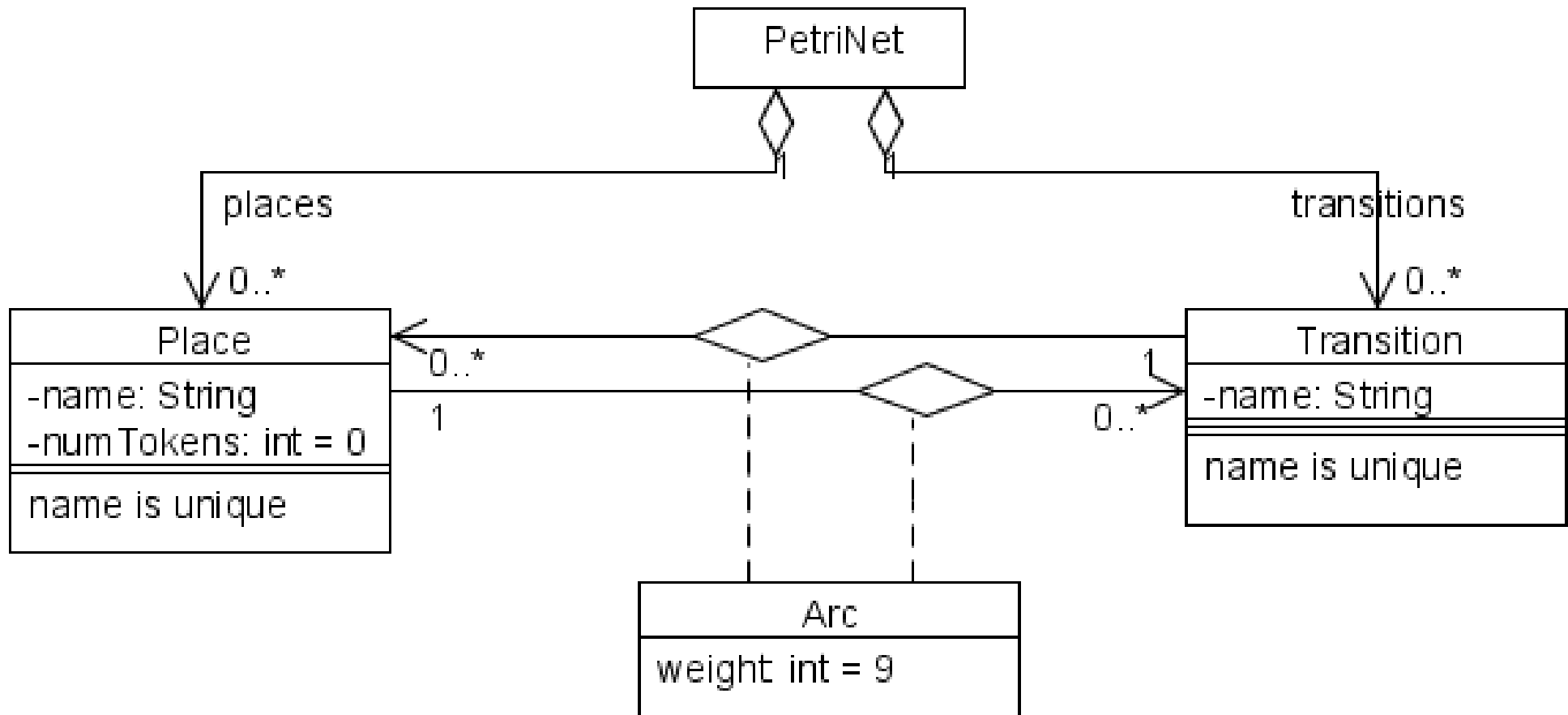
Petrinet Notation and Definition

- A Petri net is defined by the following tuple

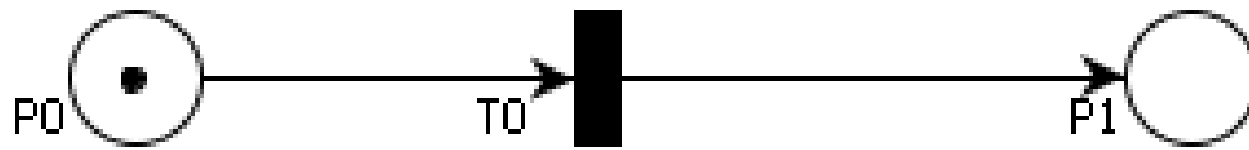
$$(P, T, A, w)$$

- $P = \{ p_1, p_2, \dots \}$ is a finite set of places
- $T = \{ t_1, t_2, \dots \}$ is a finite set of transitions
- $A \subseteq (P \times T) \cup (T \times P)$ is a set of arcs
- $w: A \rightarrow \mathbb{N}$ is a weight function

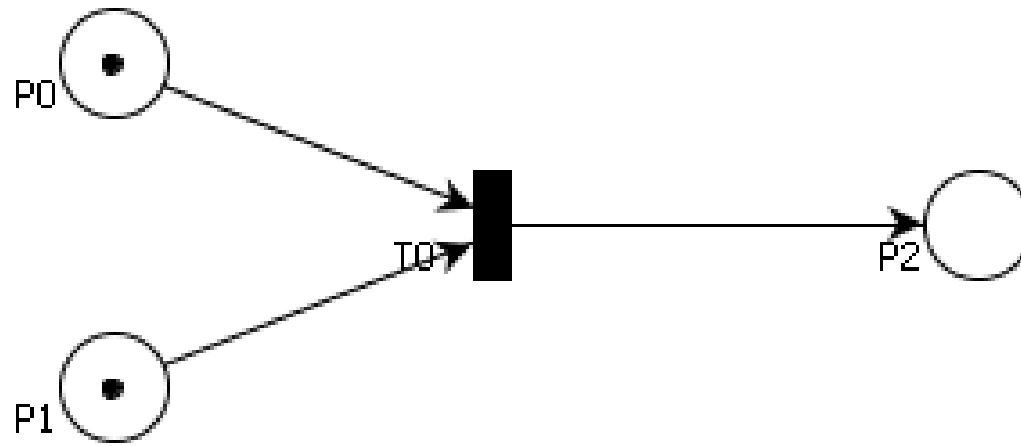
Components of a Petrinet



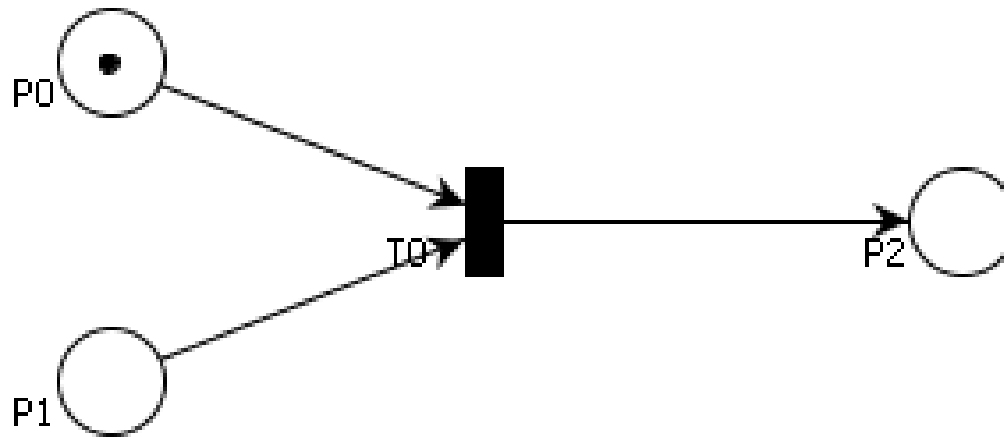
Simple



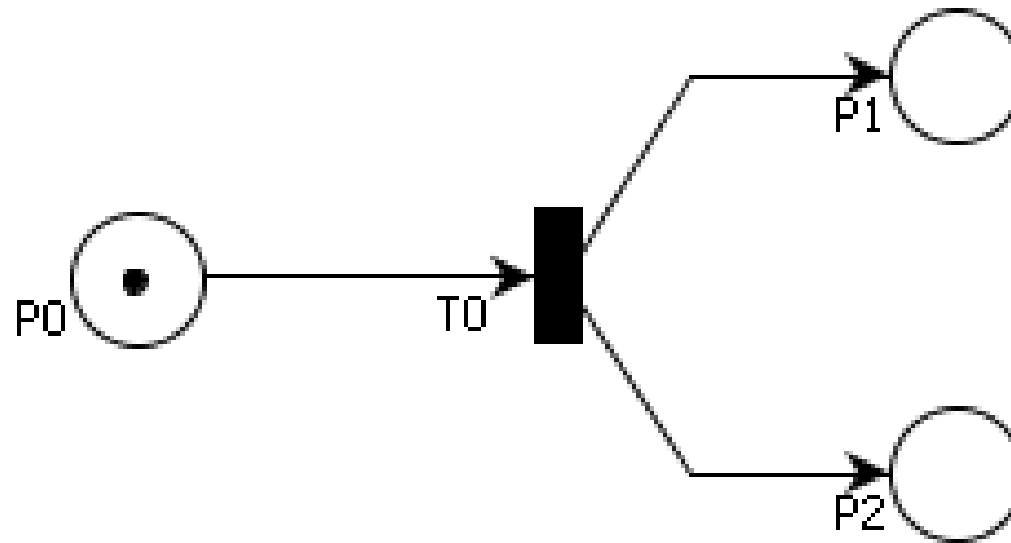
Join



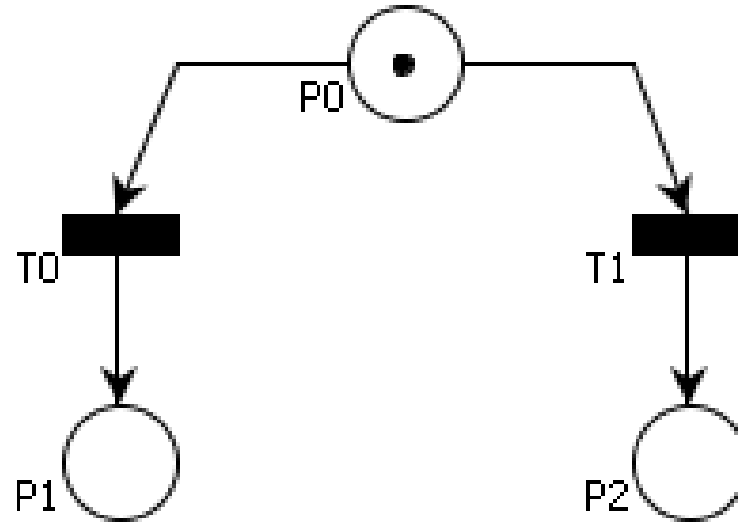
Not Live



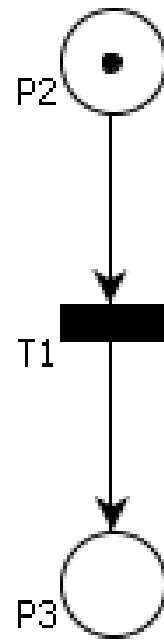
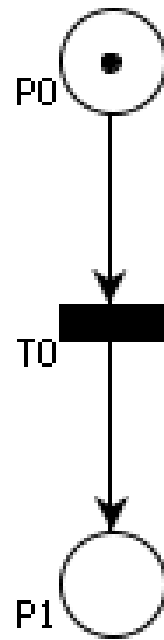
Fork



Conflict, Choice, Decision



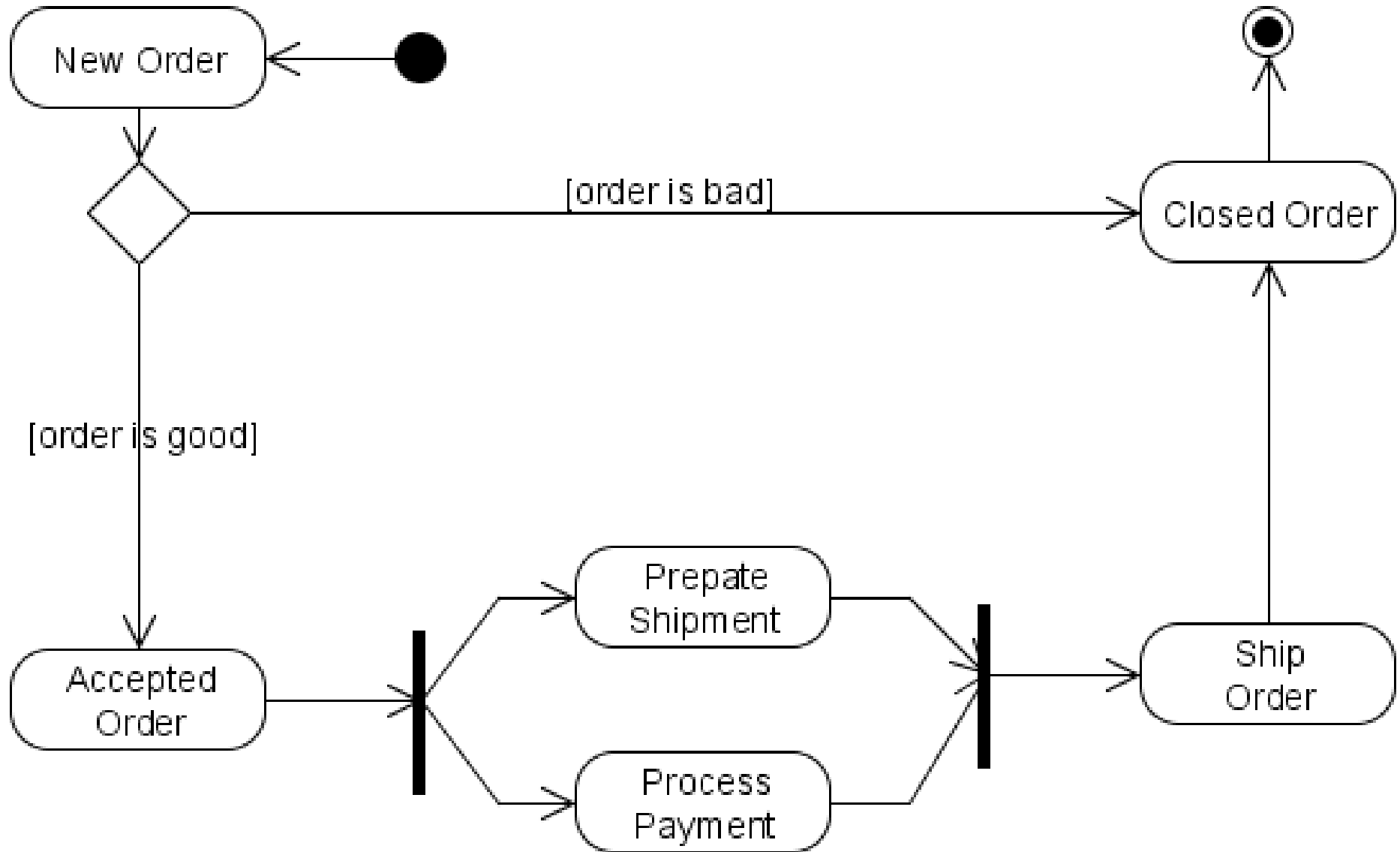
Concurrency



Back to Activity Diagrams

- As already mentioned, Activity Diagrams in UML 2.0 are based on PetriNets.
- Although the notion of tokens is not used, critical elements such as places and transitions remain.

Activity Diagram

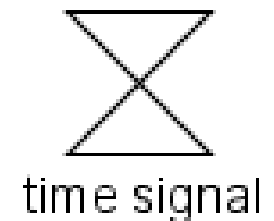


And a bit of this ...

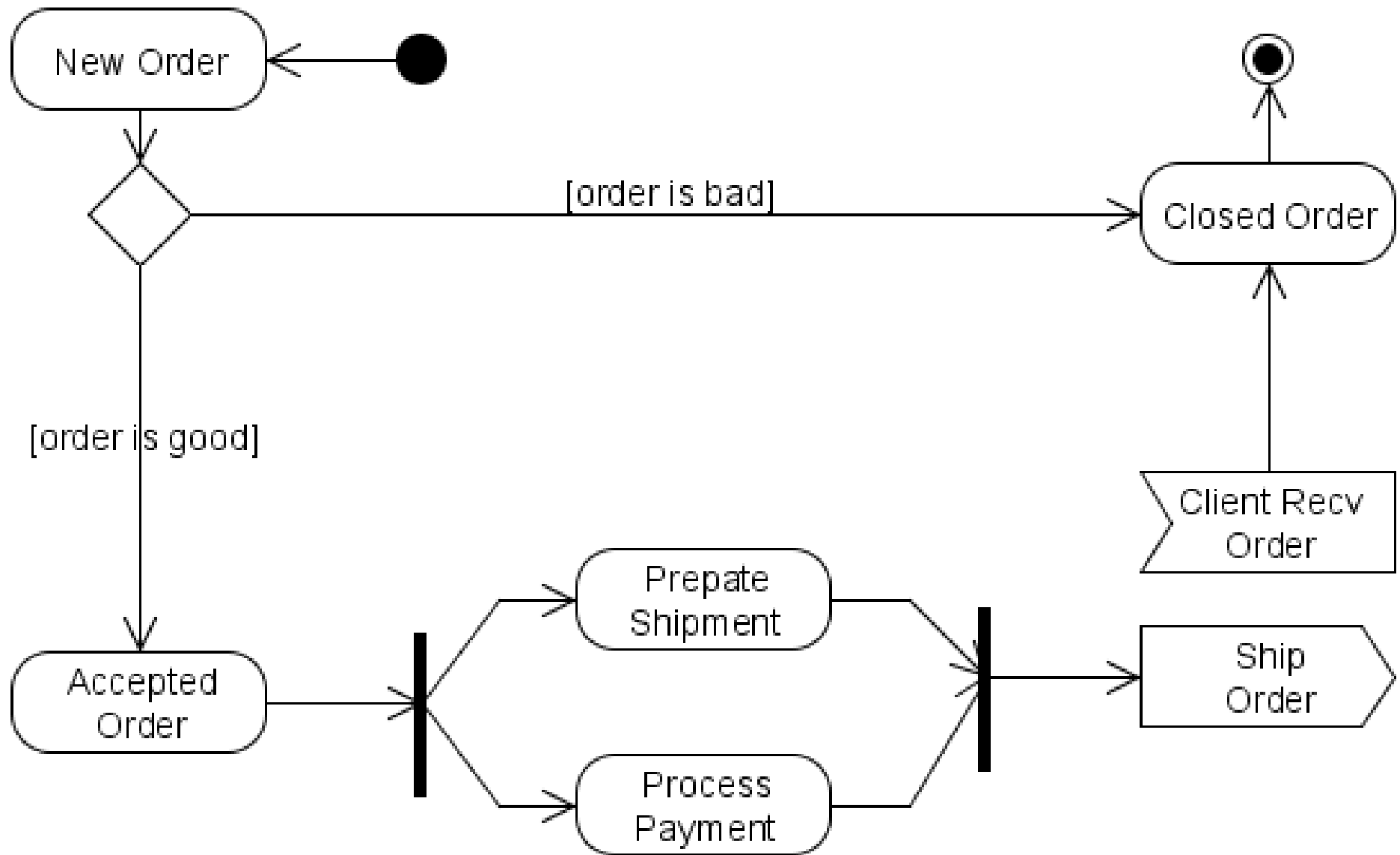
- As you can see, Activity diagrams use constructs from many formalisms.
- The core of the diagram is PetriNets, using places and transitions.
- You can see a FSA influence, with the presence of an Initial state and an Accept state.
- Activity diagrams also provide additional constructs, such as conditionals, signaling and timing.

Signals and Timing

- The signal construct allows a Activity diagram to interact with external components.
 - ♦ The block with the outwards triangle indicates that a signal is sent to an external component.
 - ♦ The block with an inwards triangle indicates that the activity is blocked until a message is received.
- The timing construct allows an activity diagram to trigger certain tasks at specific times.
 - ex: 8h00 am, April 1st, etc



Signal Example



Timing Example

