Extending UML (EE5525)

Prof. Peter R Hobson

Business models and UML

- Is UML really *universal*?
- Can it sensibly be used for modelling systems where the implementation is not connected with software or electronic systems?
- Is the UML syntax rich enough?
- Can it, and should it, be extended?

Extending UML

- Constraint
    - A semantic restriction expressed in text, pseudo-code, OCL, set-theoretic language etc.
    - Useful for stating global conditions that affect a number of elements.
    - Shown as a string in braces, e.g. {value is a multiple of £10}

Extending UML

- Tagged Value
  - A pair of strings, a tag string and a value string, storing a piece of information about an element.
  - Can be used to store arbitrary information about an element; extremely useful for project management information. Shown inside braces as tag name = value. E.g. {Author = Hobson}

Extending UML

- Stereotypes
  - Enables modellers to tailor a modelling language for a particular application.

    WARNING! This makes the language less universal

  - A stereotype is a model element defined in the model itself. Information content and form are identical to the *pre-existing* base model element but its *meaning* and usage are different.
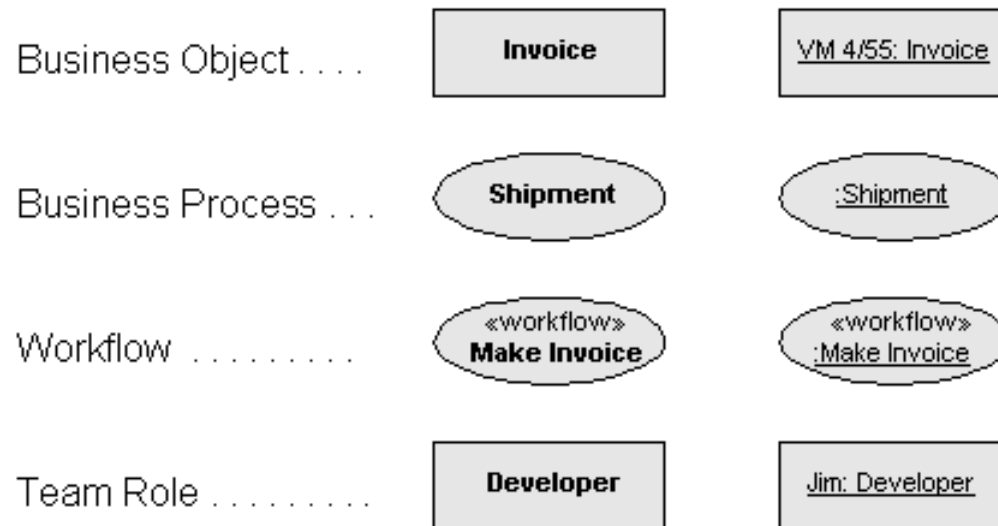
Stereotypes

- Quite often used for Business Activity Modelling.
- A stereotype is based on an existing element and has the same information content
- Can have a special icon however, e.g. A group of people might represent "Business Organisation"
- Use Tagged Values to store additional information that is not supported by the base element.
- Stereotypes are shown as text strings in *guillemets* e.g. «database»

Business activity modelling

- Processes
  - A sequence of activities or tasks to achieve a common goal. UML *sequence & activity* diagrams

- Static structures
  - E.g. an organisational chart. UML *structure chart without implementation detail*

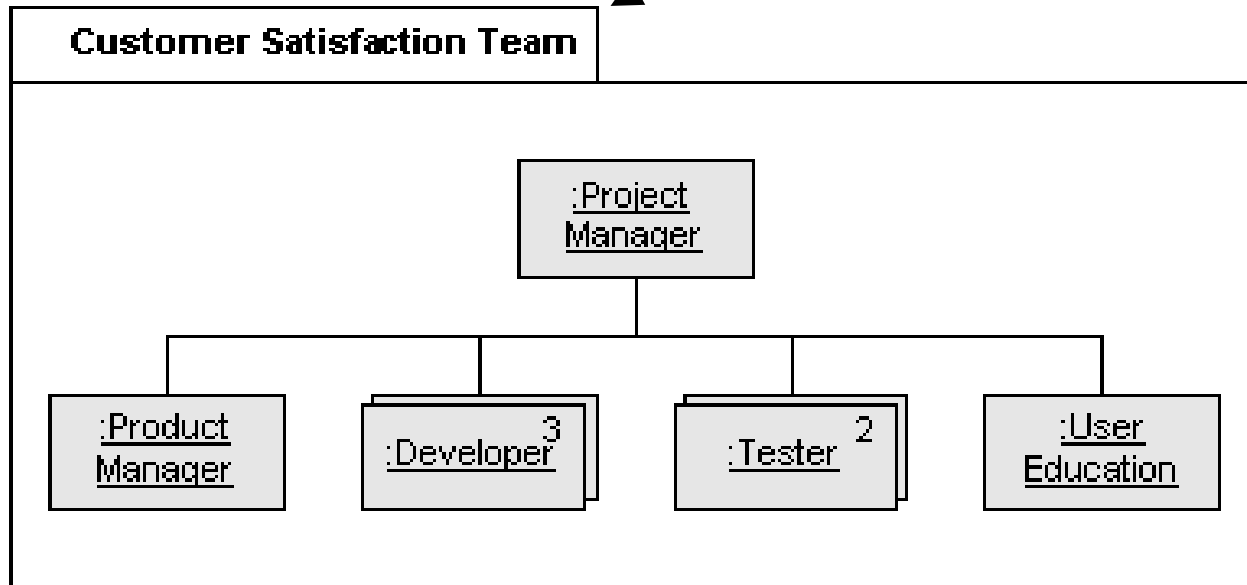- Here follow some possible mappings $\Rightarrow$

Stereotypes

Business Object	Invoice	VM 4/55: Invoice
Business Process . . .	Shipment	:Shipment
Workflow	«workflow» Make Invoice	«workflow» :Make Invoice
Team Role	Developer	Jim: Developer

Static structure

UML Package notation

Customer Satisfaction Team

:Project Manager

:Product Manager

:Developer 3

:Tester 2

:User Education

An instance of the business process

Time increases down $\Rightarrow$

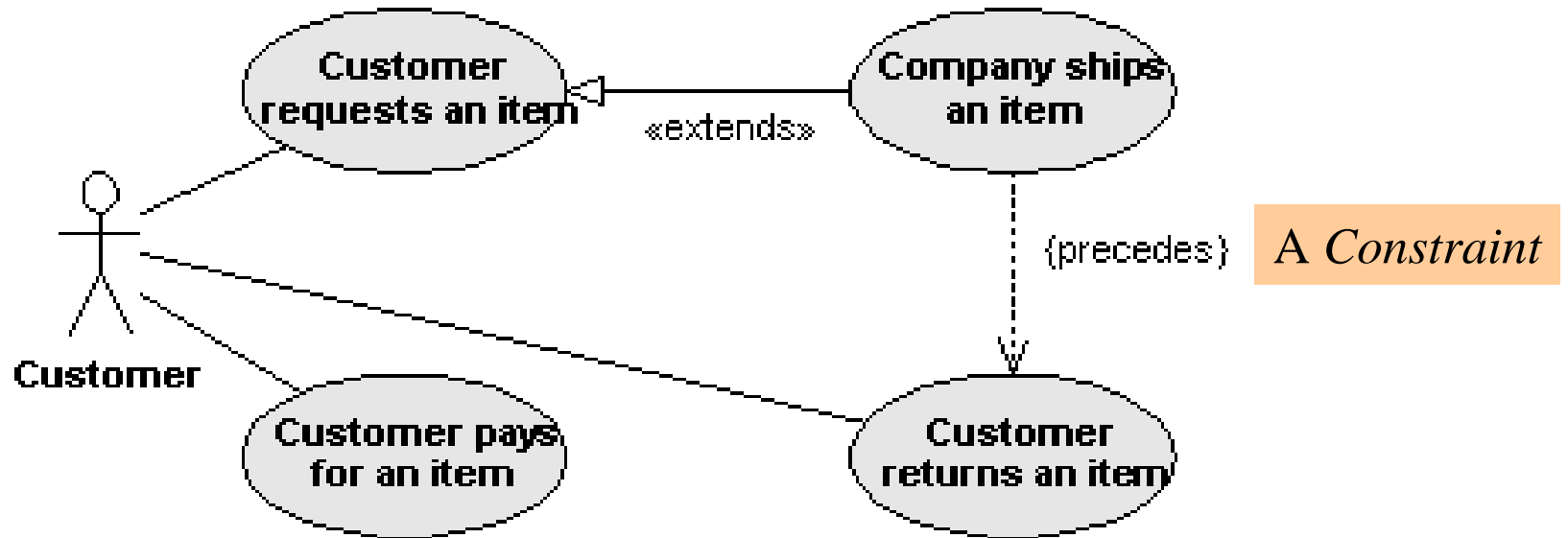:Customer

:Sales

:Company ships
an item

Place an order

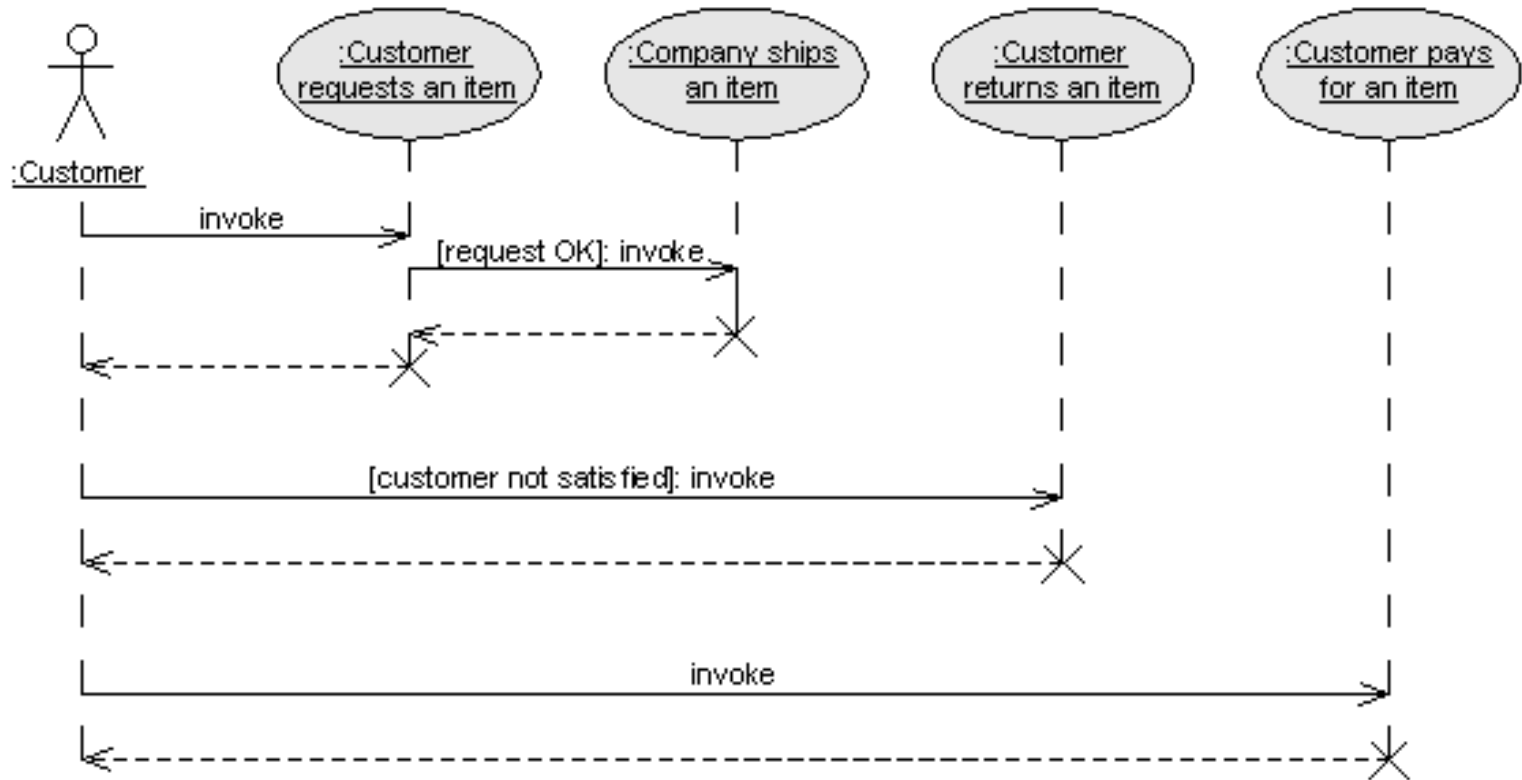Validate the order

[Order OK]: Invoke
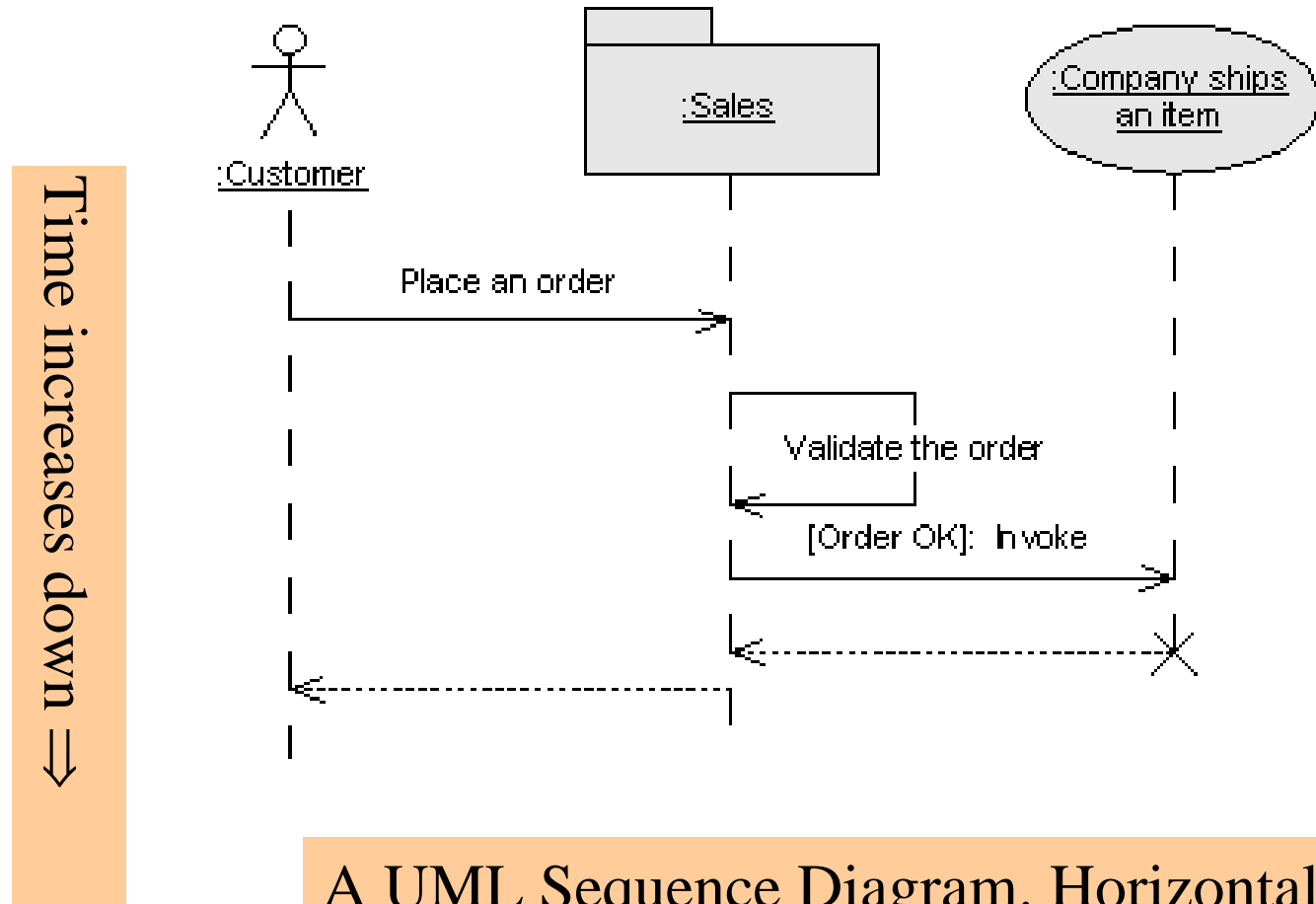
A UML Sequence Diagram. Horizontal
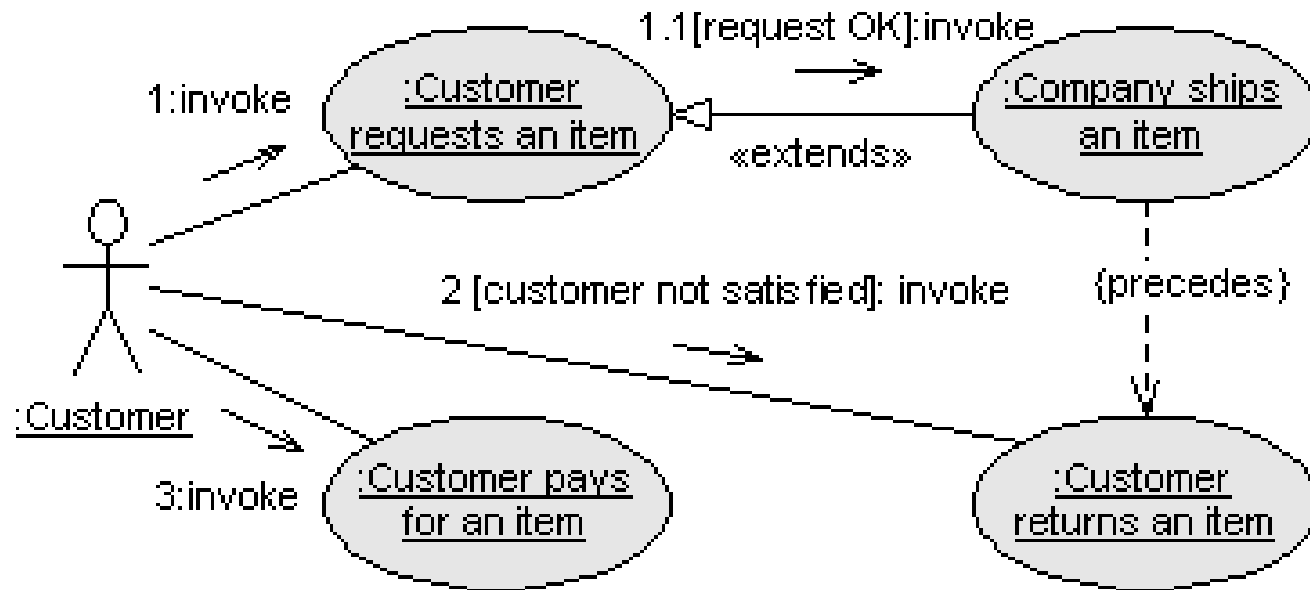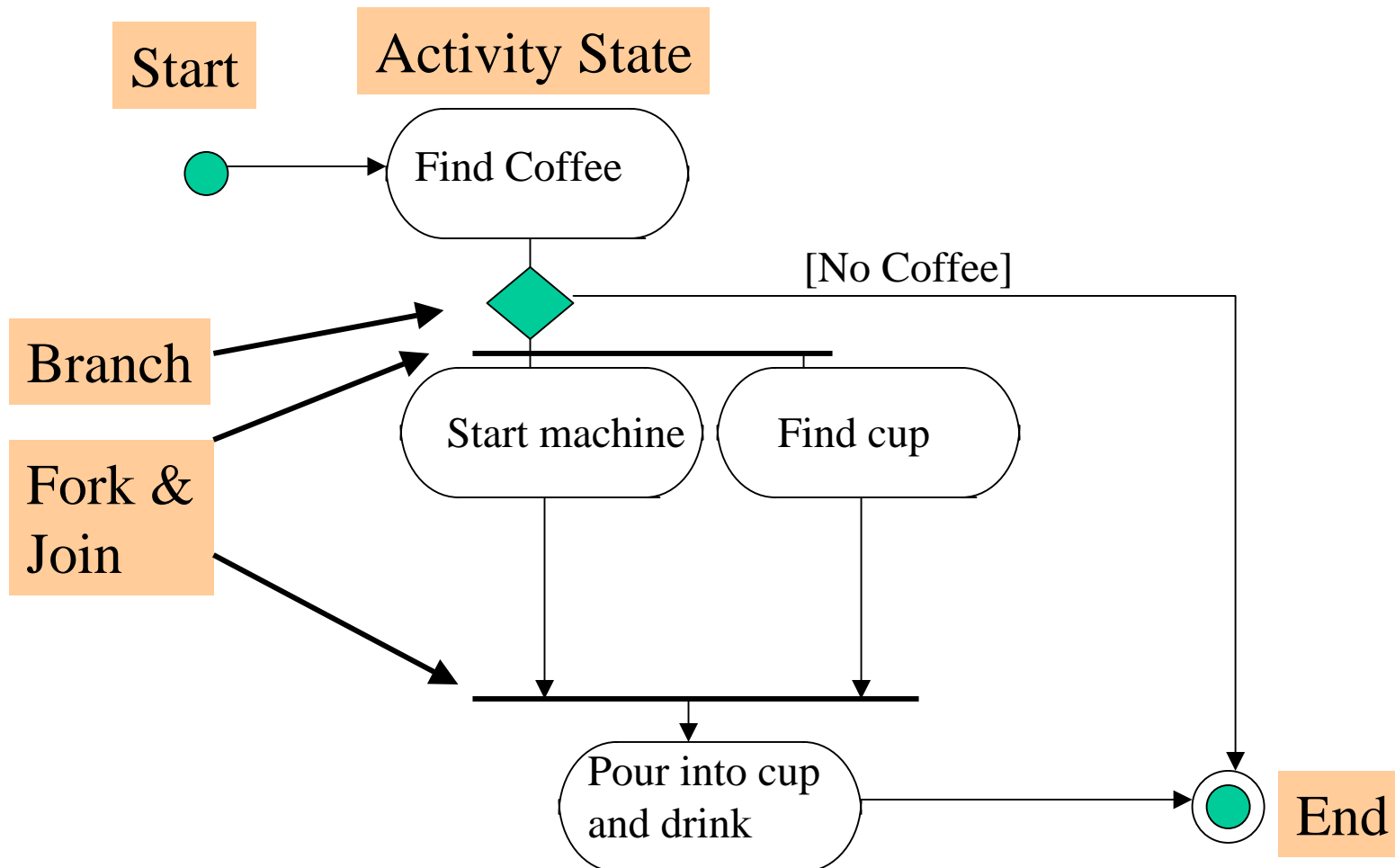order is *not* significant.

Static relationship Use Case

Actors and processes

Interactions and relationships
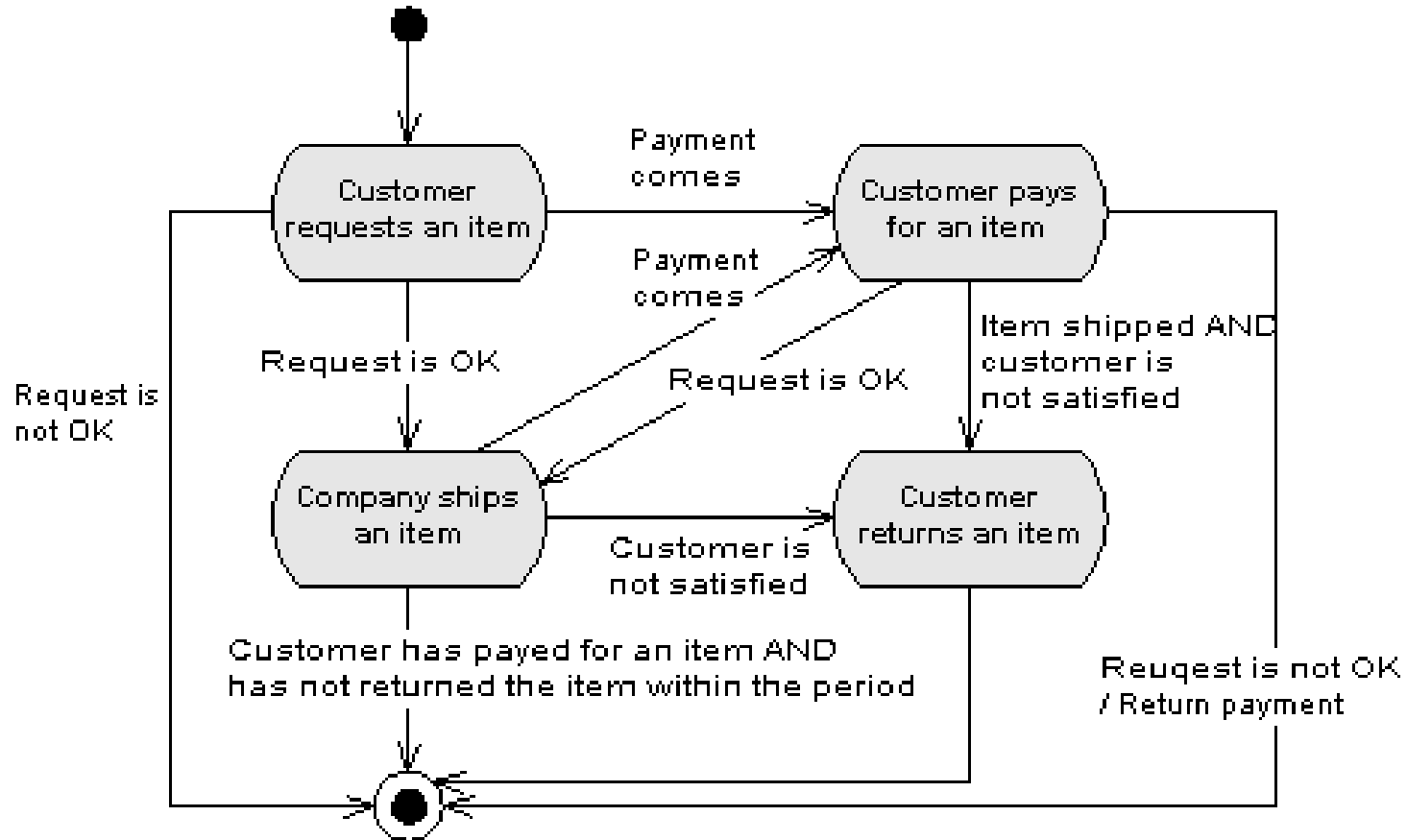
Activity Diagram (UML analogue of a Flow Chart)

Start

Activity State

Find Coffee

[No Coffee]

Branch

Fork & Join

Start machine

Find cup

Pour into cup and drink

End

Activity diagram showing permitted order of processes

How to find out more

- Business Application Modelling with UML:
  http://jeffsutherland.org/oopsla98/pavel.html

- Rumbach J, Jacobson I, Booch G "The Unified Modeling Language Reference Manual (2nd Edition)", Addison-Wesley, 2004

- OCL specification:
  http://www.omg.org/technology/documents/formal/ocl.htm

- UML+OCL with Java:
  http://www.parlezuml.com/tutorials/umlforjava/java_ocl.pdf