Activity Diagrams

When to Use Interaction Diagrams

- When you want to clarify and explore single use-cases involving several objects
  - Quickly becomes unruly if you do not watch it

- If you are interested in one object over many use-cases — **state transition diagrams**

- If you are interested in many objects over many use cases — **activity diagrams**

We Will Cover

Activity diagrams
- Swimlanes
- When to use activity diagrams
- When not to

State Machines

An alternate way of capturing scenarios
- Large classes of scenarios
- Syntax and Semantics
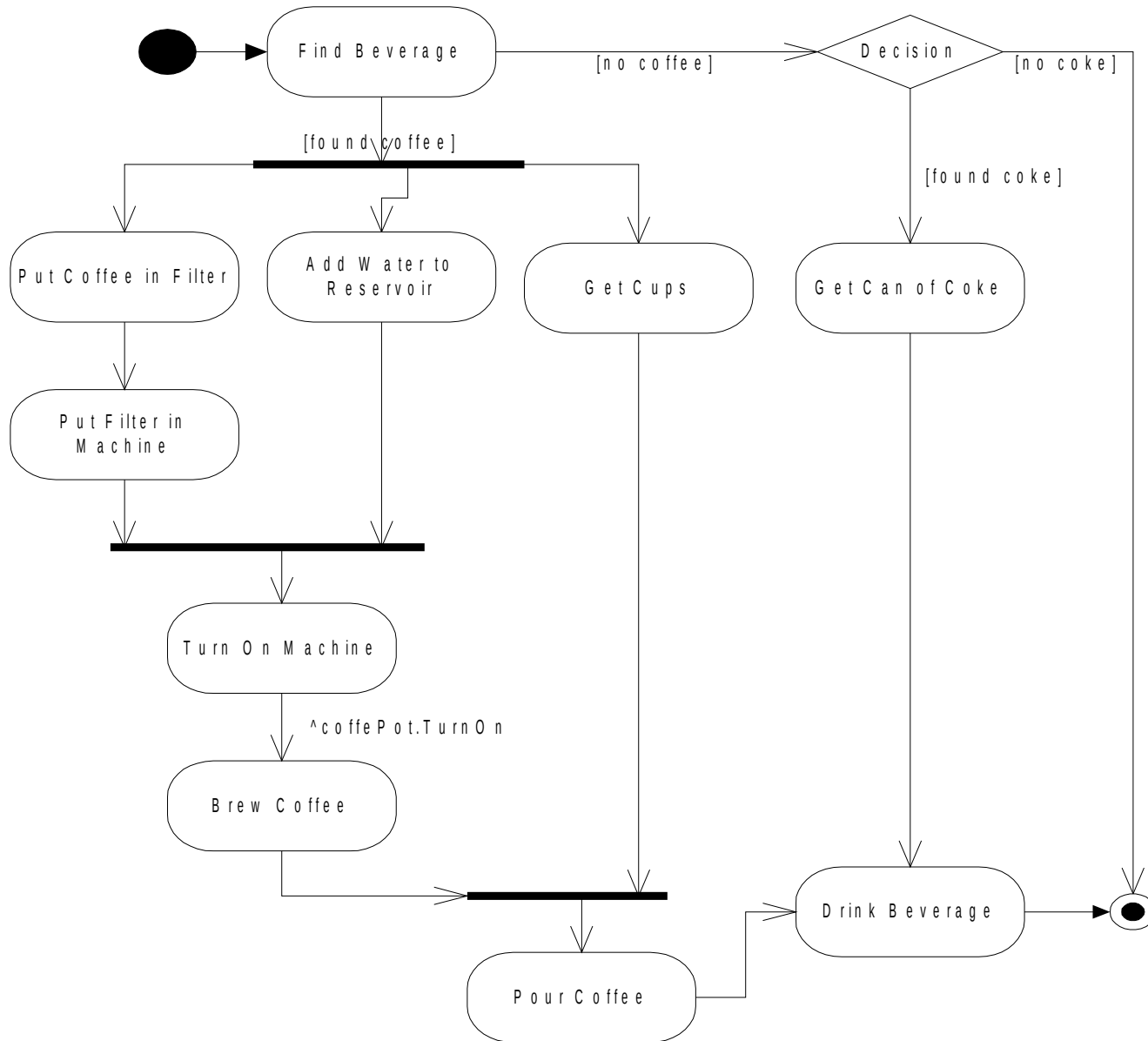- When to use state machines

Activity Diagrams

- Shows how activities are connected together
  - Shows the order of processing
  - Captures parallelism

- Mechanisms to express
  - Processing
  - Synchronization
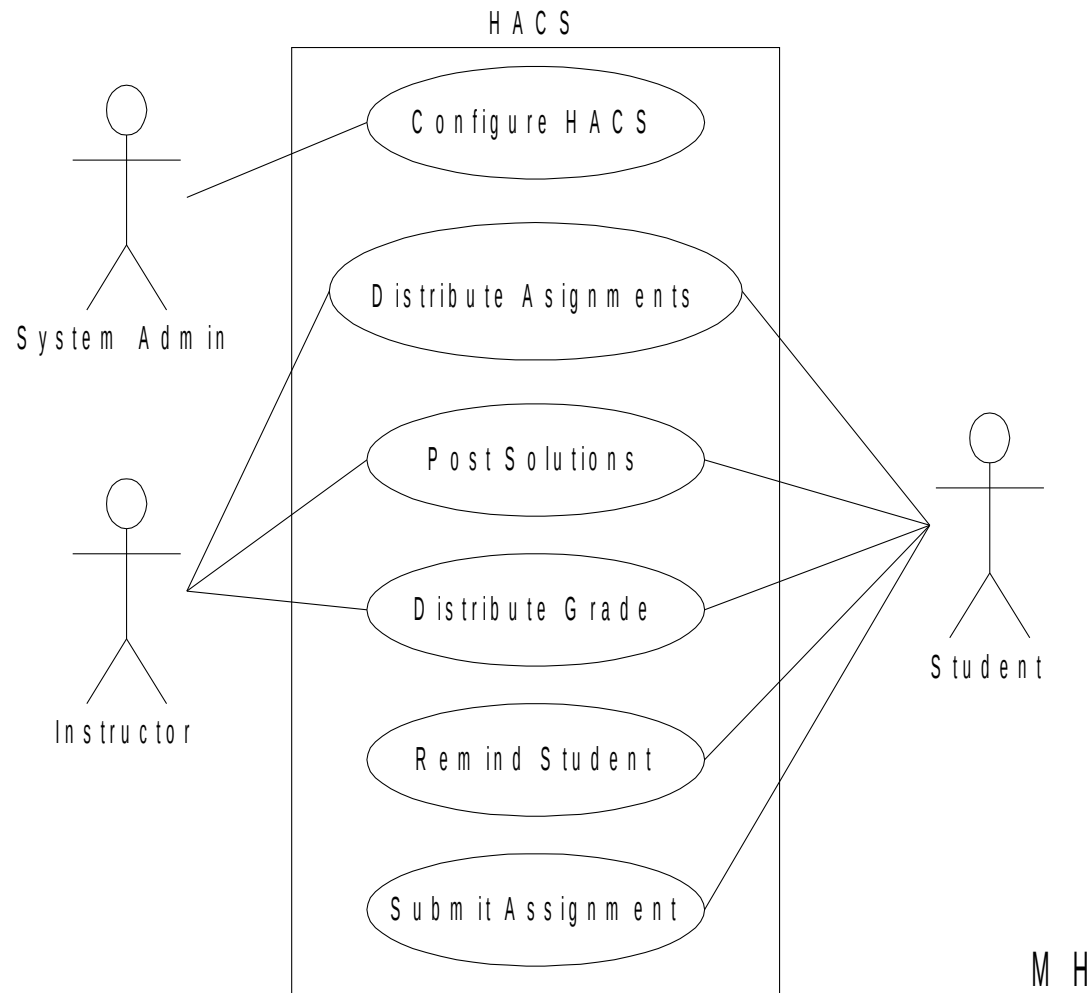 - Conditional selection of processing

Why Activity Diagrams

- **Very good question**
  - Not part of any previous (UML related) method
  - Introduced to sell products
- **Suitable for modeling of business activities**
  - UML and OO is becoming more prevalent in business applications
  - Object frameworks are making an inroad
  - Stay within one development approach and notation

Coffee Example

Find Beverage

[no coffee] → Decision → [no coke]

[found coffee]

[found coke]

Put Coffee in Filter

Add Water to Reservoir

Get Cups

Get Can of Coke

Put Filter in Machine

Turn On Machine

^coffePot.TurnOn

Brew Coffee

Pour Coffee

Drink Beverage

M H

HACS

HACS Use-Cases

Use case: **Distribute Assignments**
**Actors:** Instructor (initiator), Student
Type: Primary and essential
Description: The Instructor completes an assignment and submits it to the system. The instructor will also submit the delivery date, due date, and the class the assignment is assigned for. The system will at the due date mail the assignment to the student.
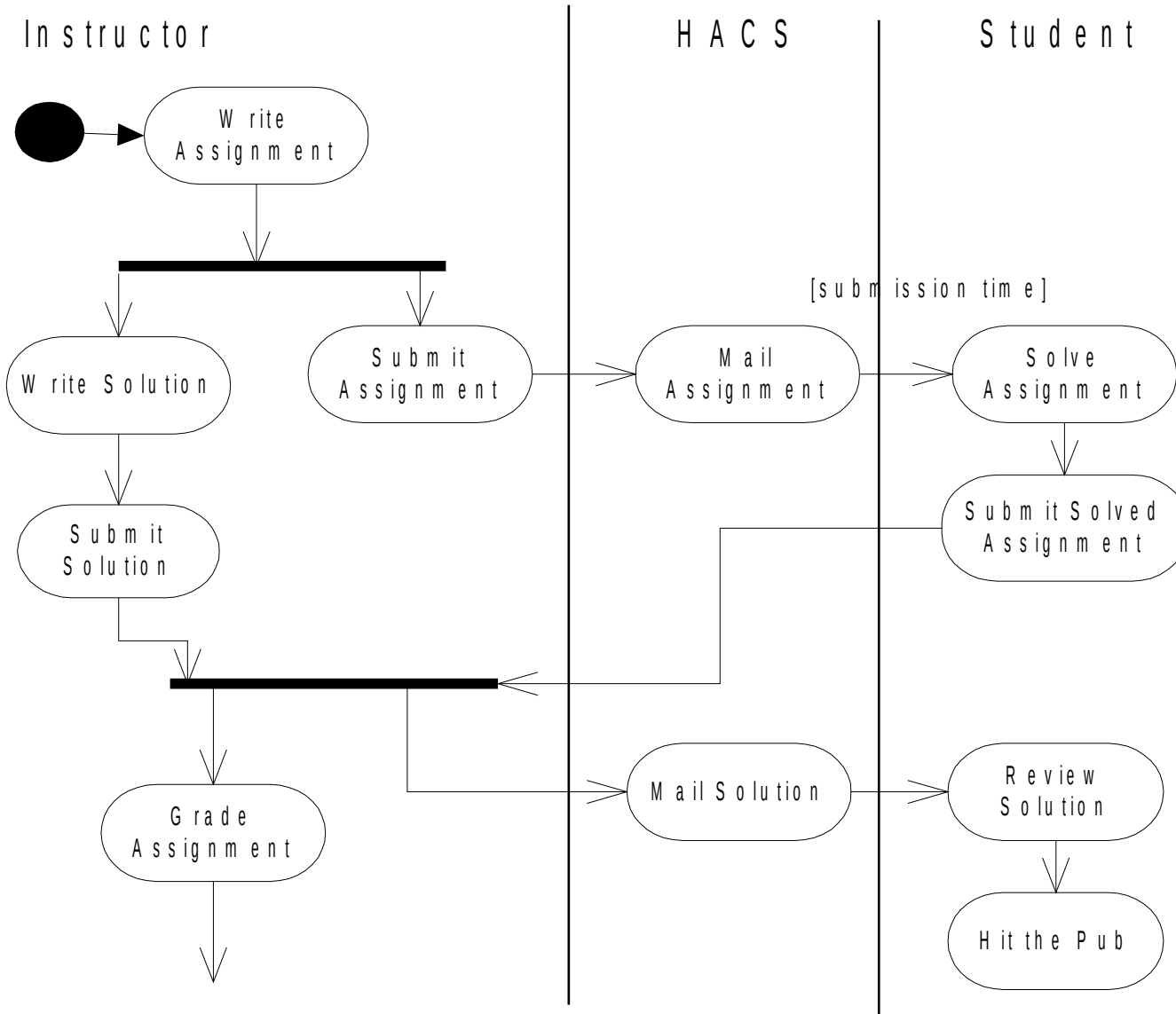**Cross Ref.:** Requirements XX, YY, and ZZ
Use-Cases: *Configure HACS* must be done before any user (Instructor or Student) can use HACS

Activity Diagrams for Use Cases
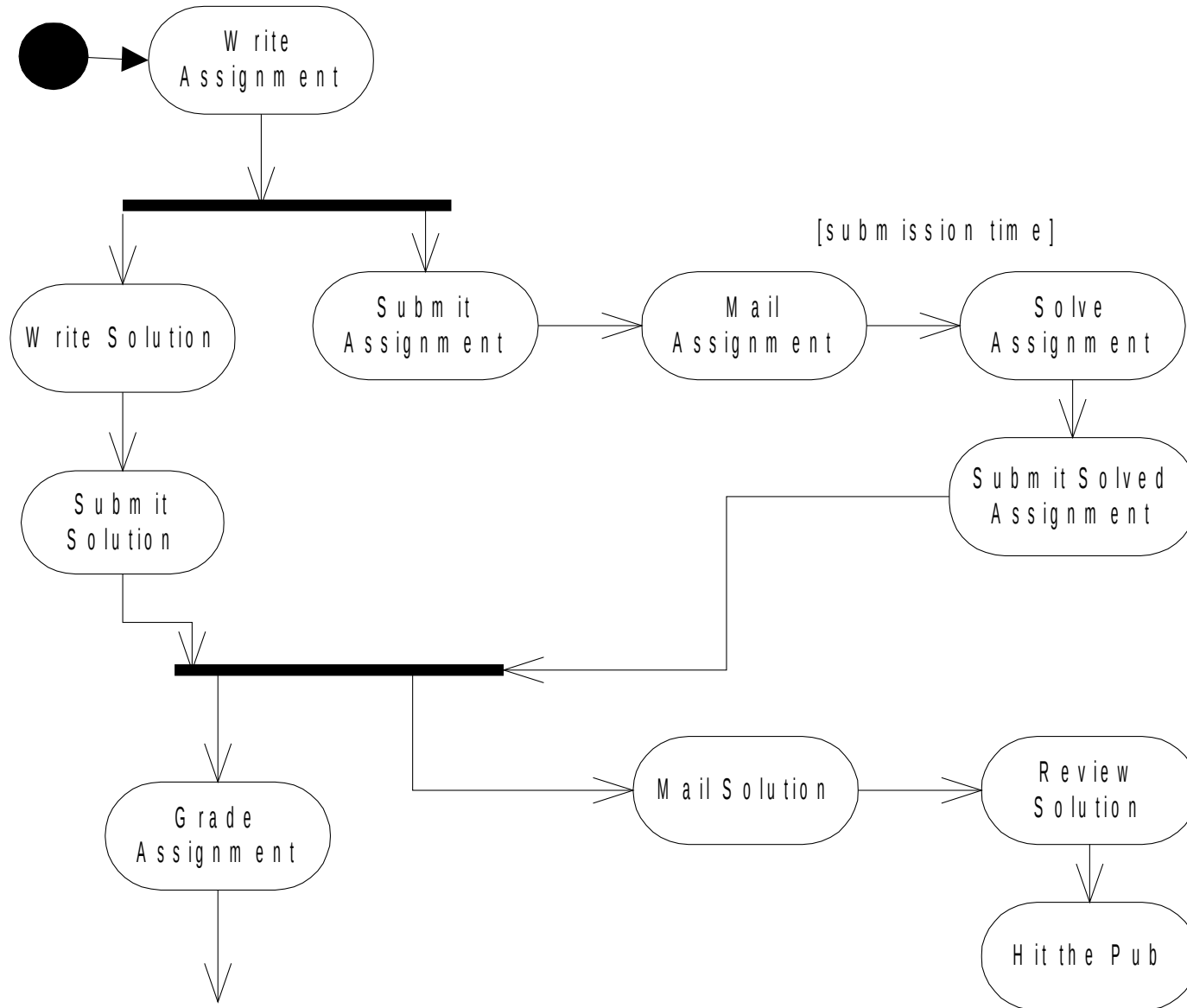
Swimlanes (Who Does What?)

Problems with Activity Diagrams

- They are glorified flowcharts
  - Very easy to make a traditional data-flow oriented design
- Switching to the OO paradigm is hard enough as it is
  - Extensive use of activity charts can make this shift even harder
- However….
  - Very powerful when you know how to use them correctly

When to Use Activity Diagrams

- I do not find them that useful in OO modeling
  - But, I am severely biased and work in control systems
- Useful when
  - Analyzing a use case (or collection of use cases)
  - Understanding workflow in an organization
  - Working with multi-threaded applications
  - For instance, process control applications

- Do not use activity diagrams
  - To figure out how object collaborate
  - See how objects behave over time

Next Time

- To Design and Implementation
  - Design Assignment Due on October 16th
- **No lecture on Tuesday**

- Reading
  - Web resources