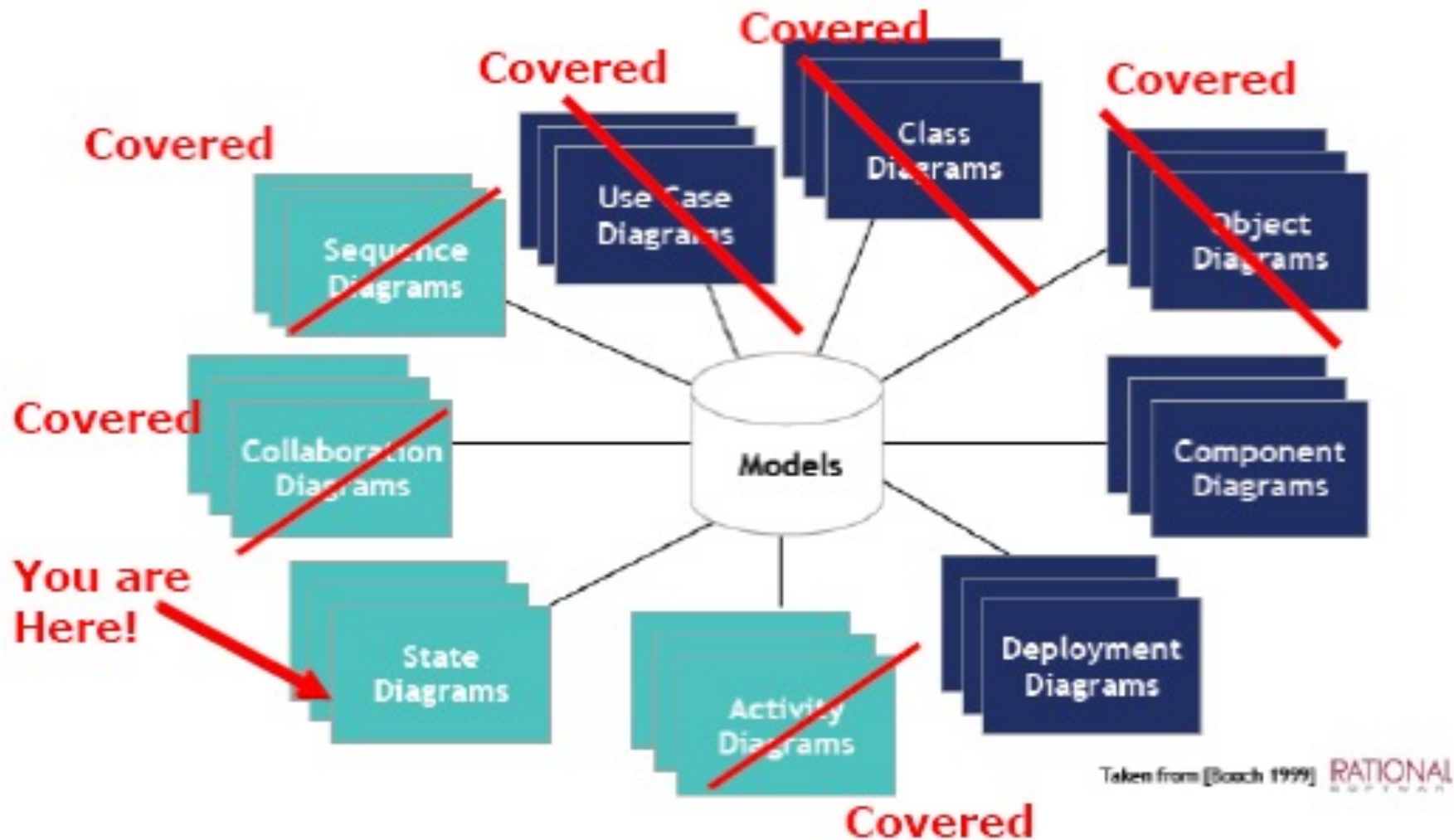


UML Diagrams



State Diagrams

Also known as statecharts (invented by David Harel)

Used primarily to model state of an object

A class has at most one state machine diagram

Models how an object's reaction to a message depends on its state

Objects of the same class may therefore receive the same message, but respond differently!

Use of State diagrams

Often used for modelling the behaviour of components (subsystems) of real time and critical systems....



Modelling states and events

The **states** of the Book could be



Copy of a Book



On shelf



On loan



maybe lost

The related “**use cases**” or **events** could be

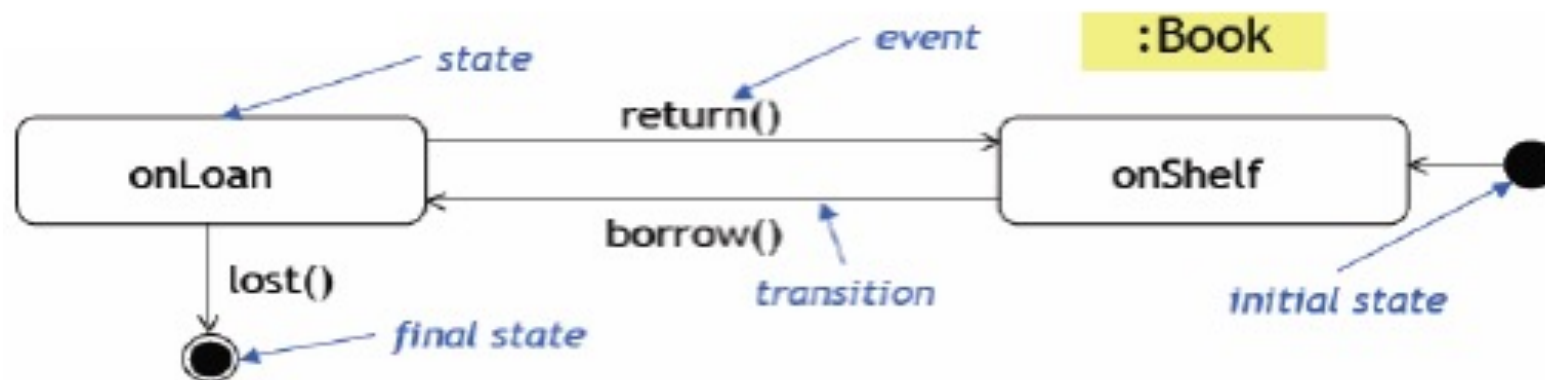
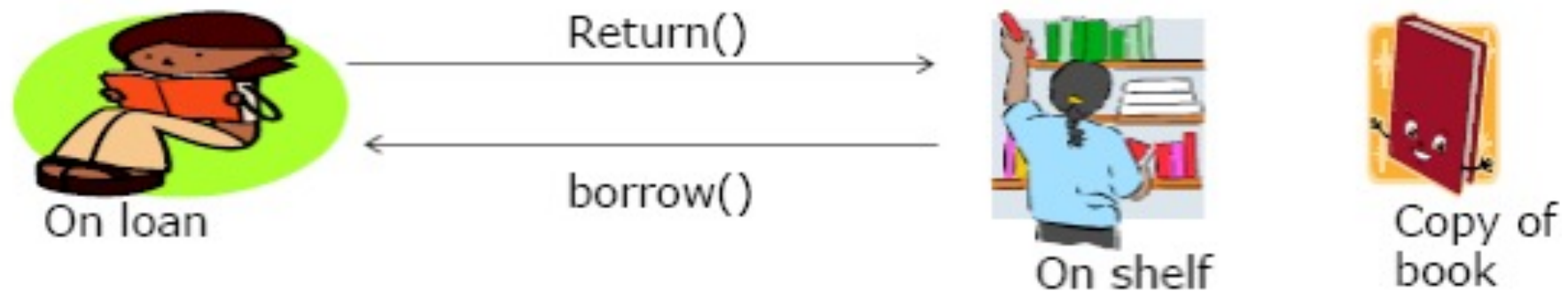


Borrow



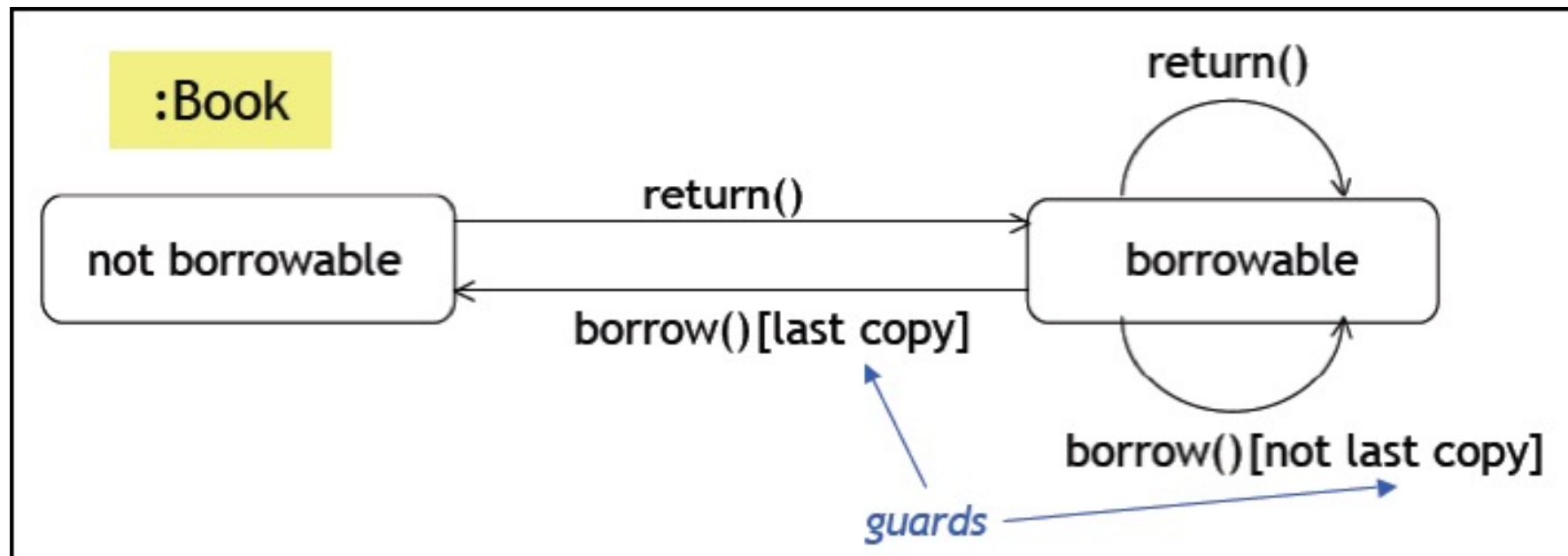
return

Realising state diagrams



Conditional notions

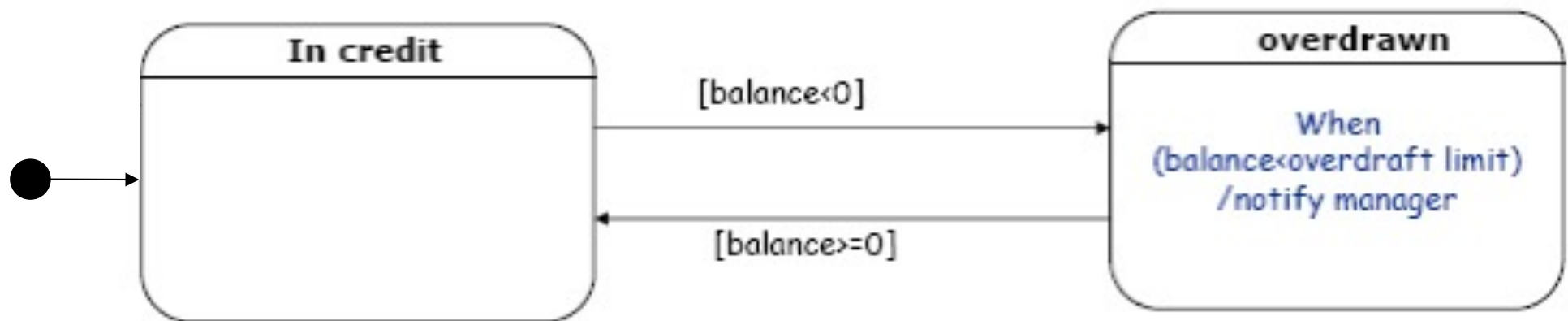
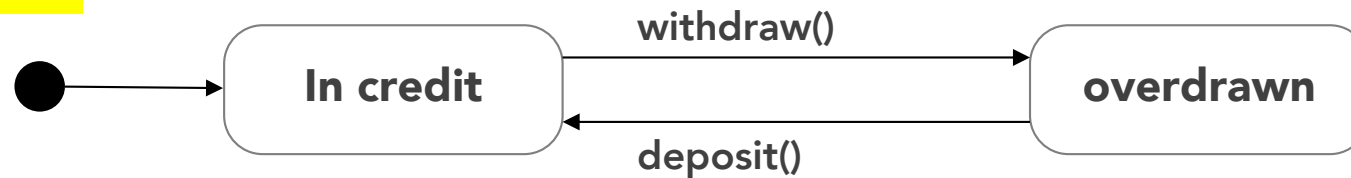
Conditional notation is used if the value of an object's attributes determines the change of state(i.e., change the state under this condition....)



Important hint: For some *guards/conditions* use keywords like
After (followed by expression)
When (followed by expression)

Conditional Notions

:BankAccount



Means..... when the withdraw()/deposit() use cases (or their corresponding methods) are invoked, then
If $\text{balance} < 0$, then change the state to overdrawn
If $\text{balance} \geq 0$, then change the state to in-credit

Important hint:

For expressing some events use keywords like

After (followed by expression)

When (followed by expression)

Conditional Notions

:BankAccount



Important hint:

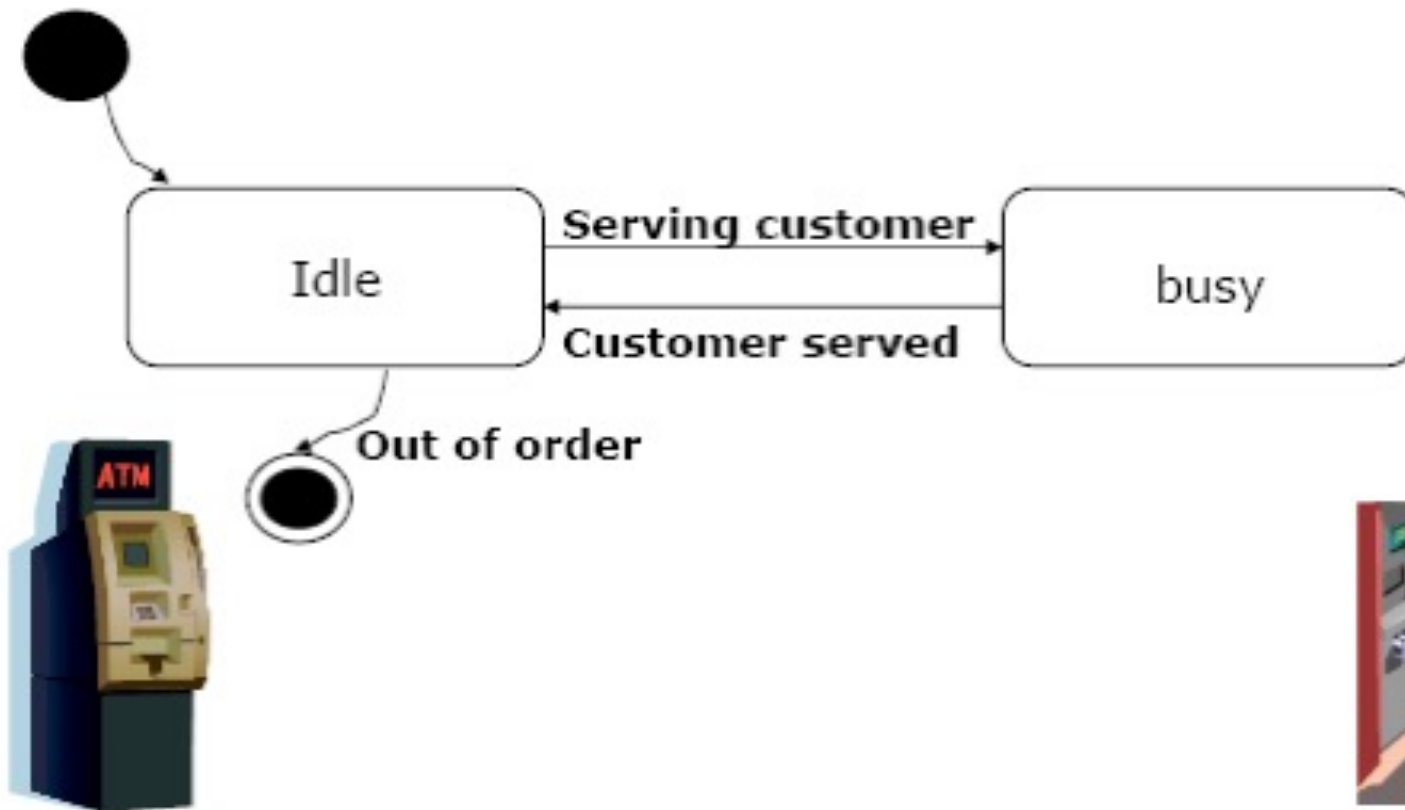
For expressing some events use keywords like

After (followed by expression)

When (followed by expression)

Modelling states and substates

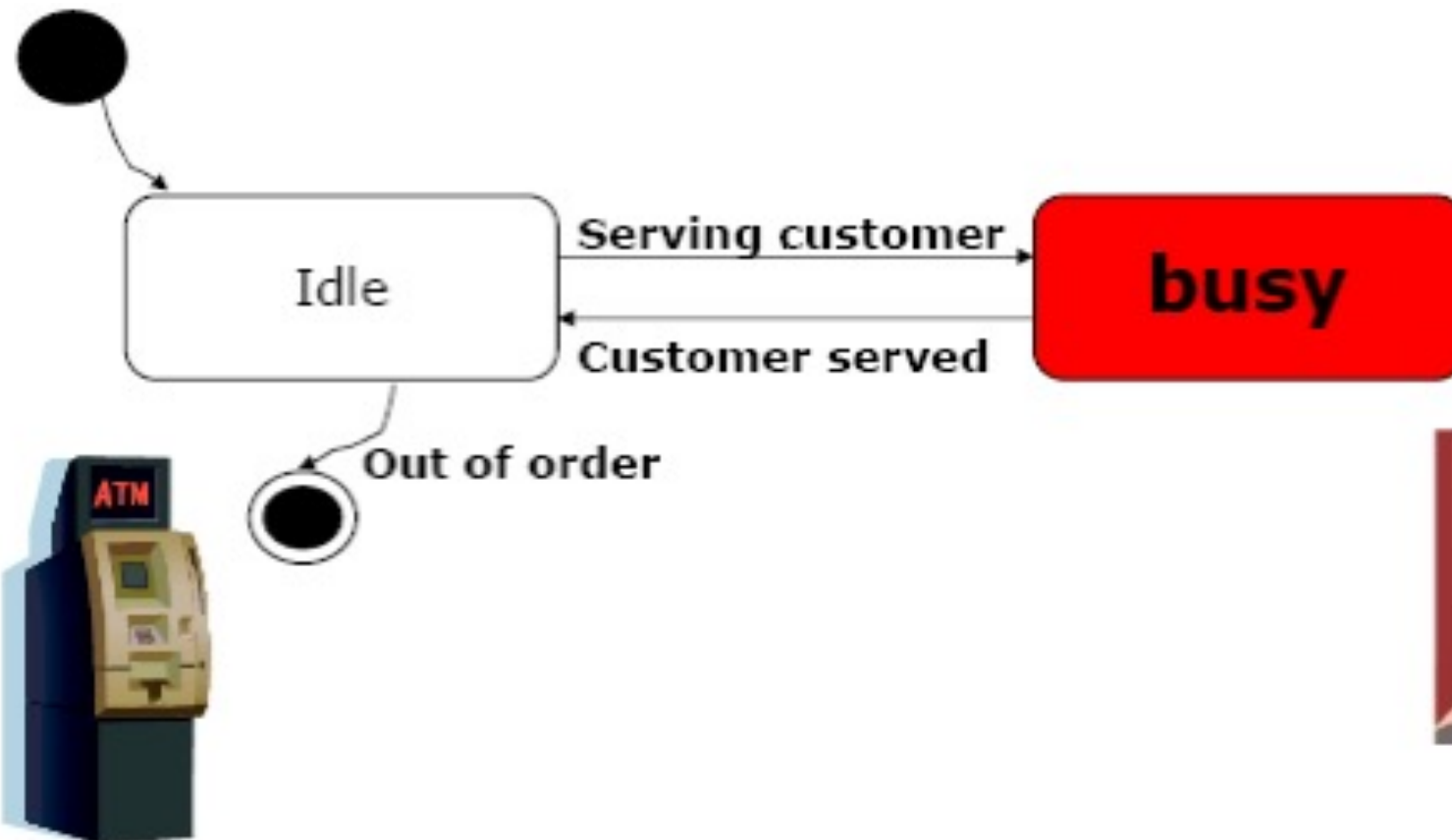
States of ATM machine itself...



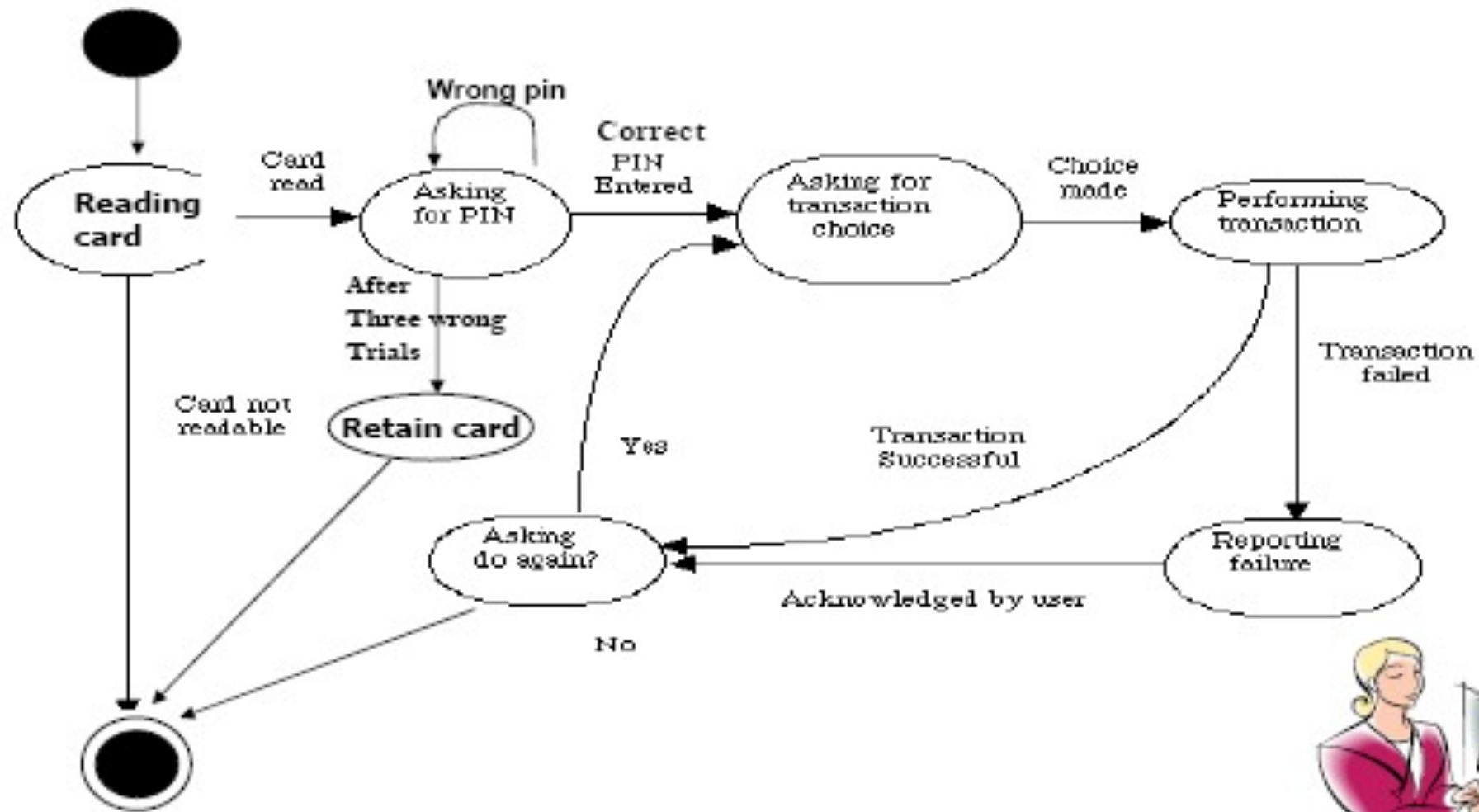
Modelling substates

States of ATM machine itself... are rather trivial!

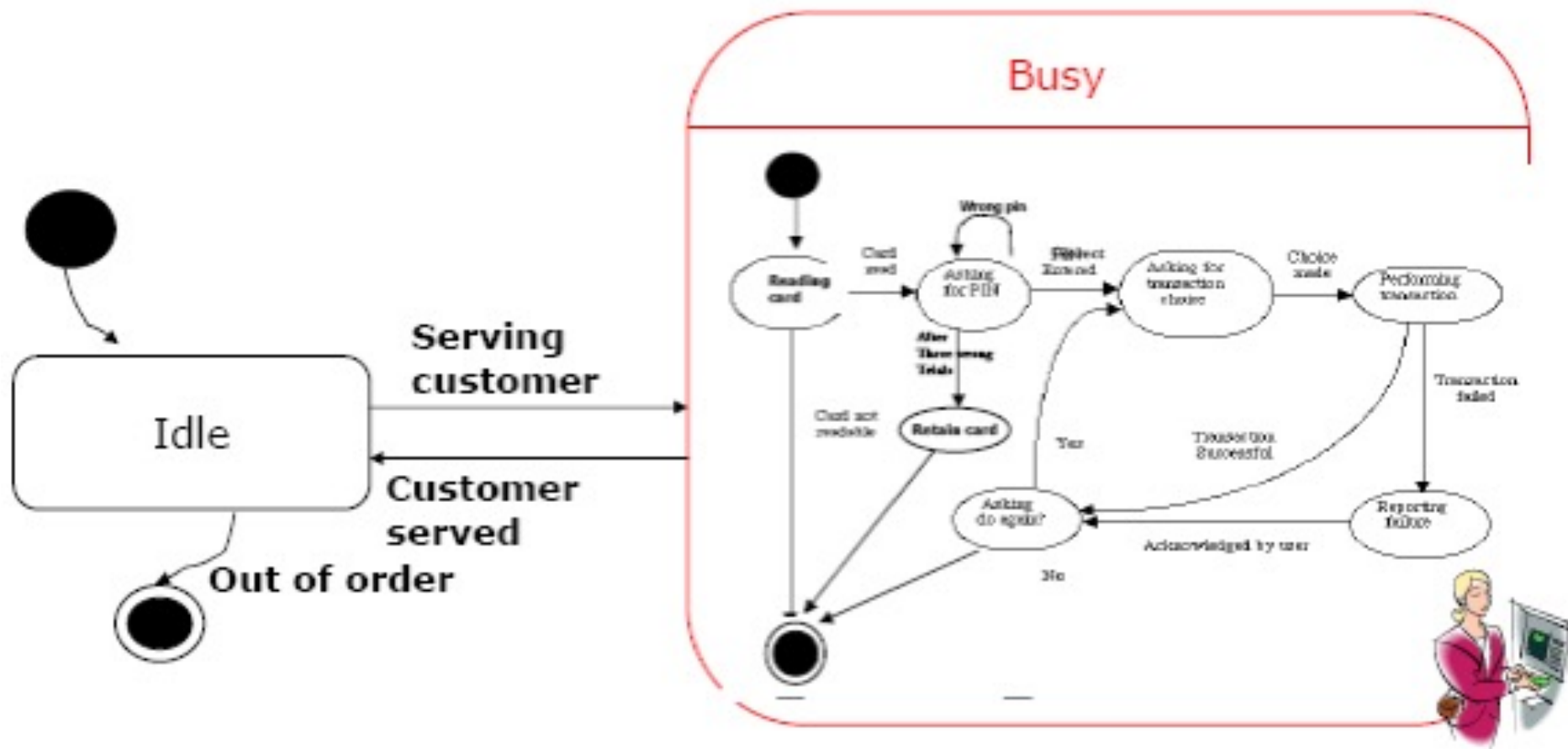
But useful to model the composed state busy to create its sub states to understand more fully the ATM states for a developer to implement.



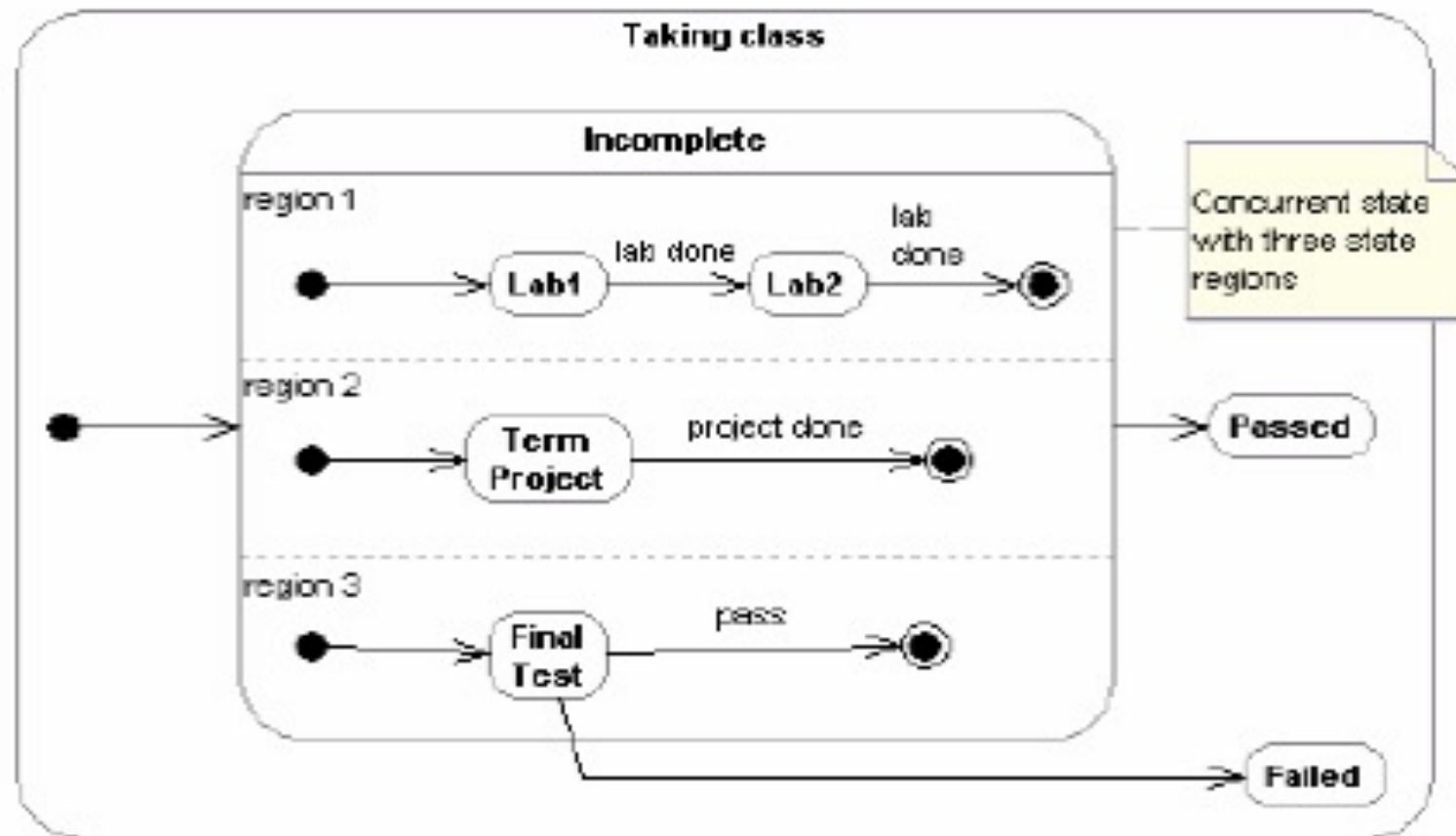
Modelling substates of ATM machine



Modelling substates of ATM machine



Modelling concurrent states



States that occur in parallel

Exercise: Draw a State diagram of a DVD player



- What are the states of the player?
- What are the events/use-cases/operations that cause state changes?
- What are the guards for the transitions?

Reference: David Rosenblum, UCL