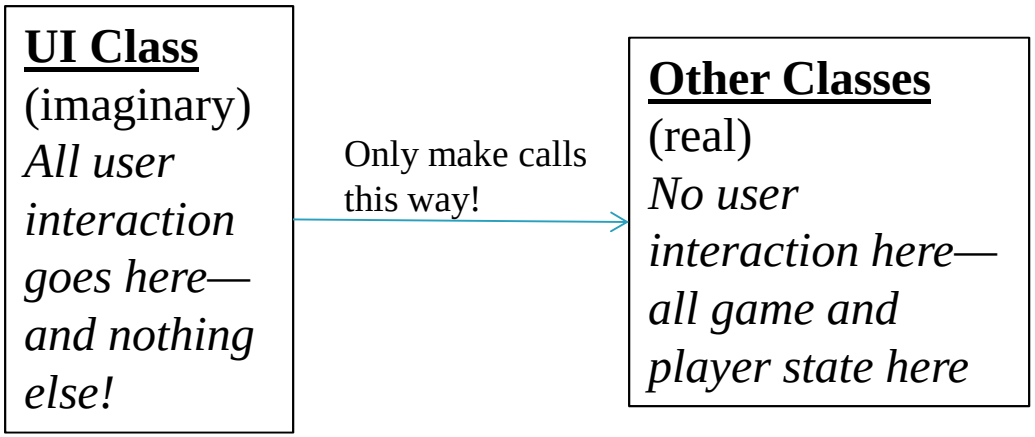
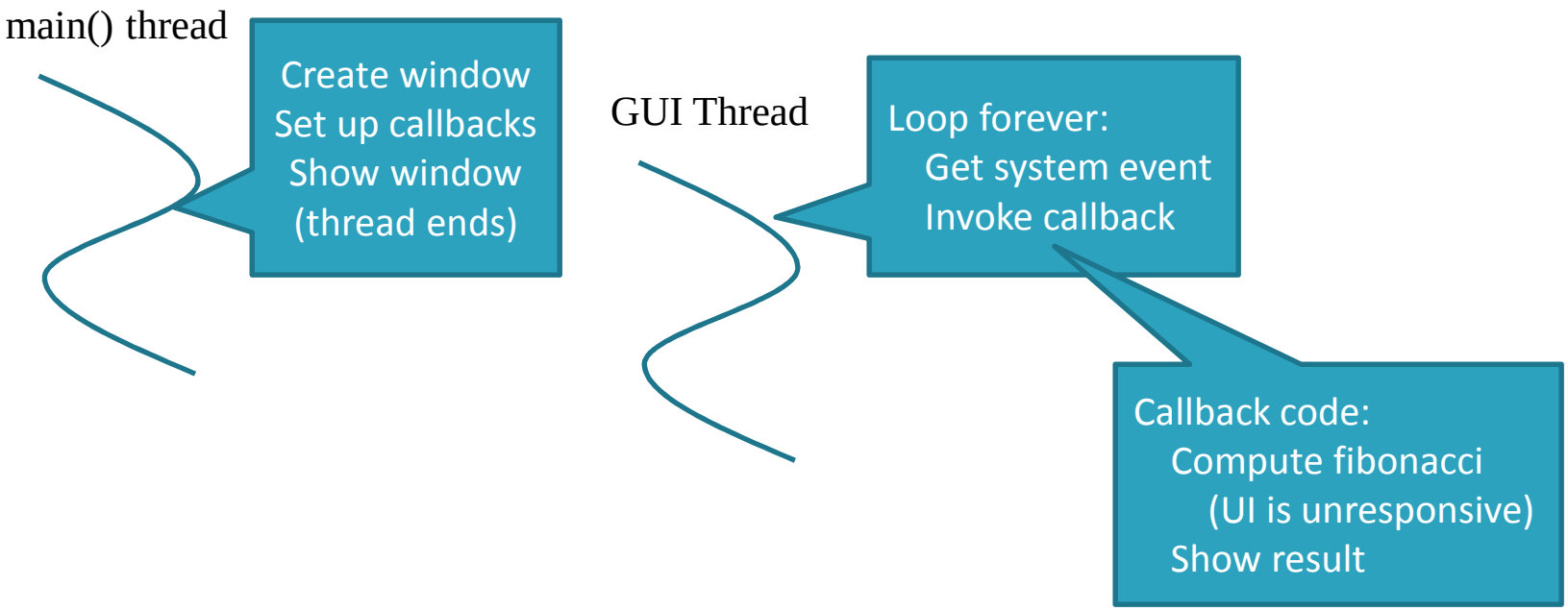
Homework Hint!



GUIDemo Example

- Shows how to construct a basic UI
- Illustrates an interesting UI responsiveness issue

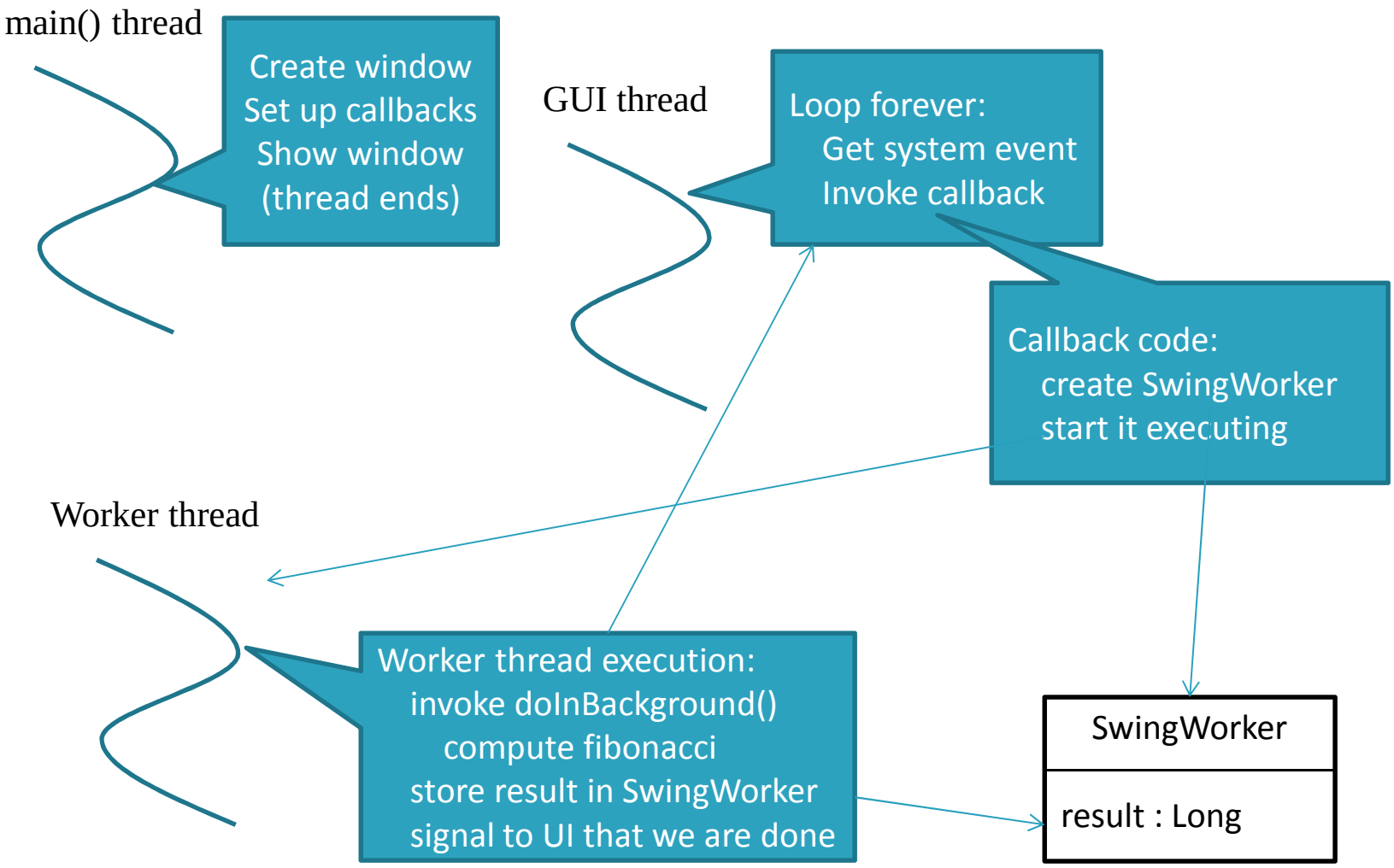
The GUI Threading Architecture



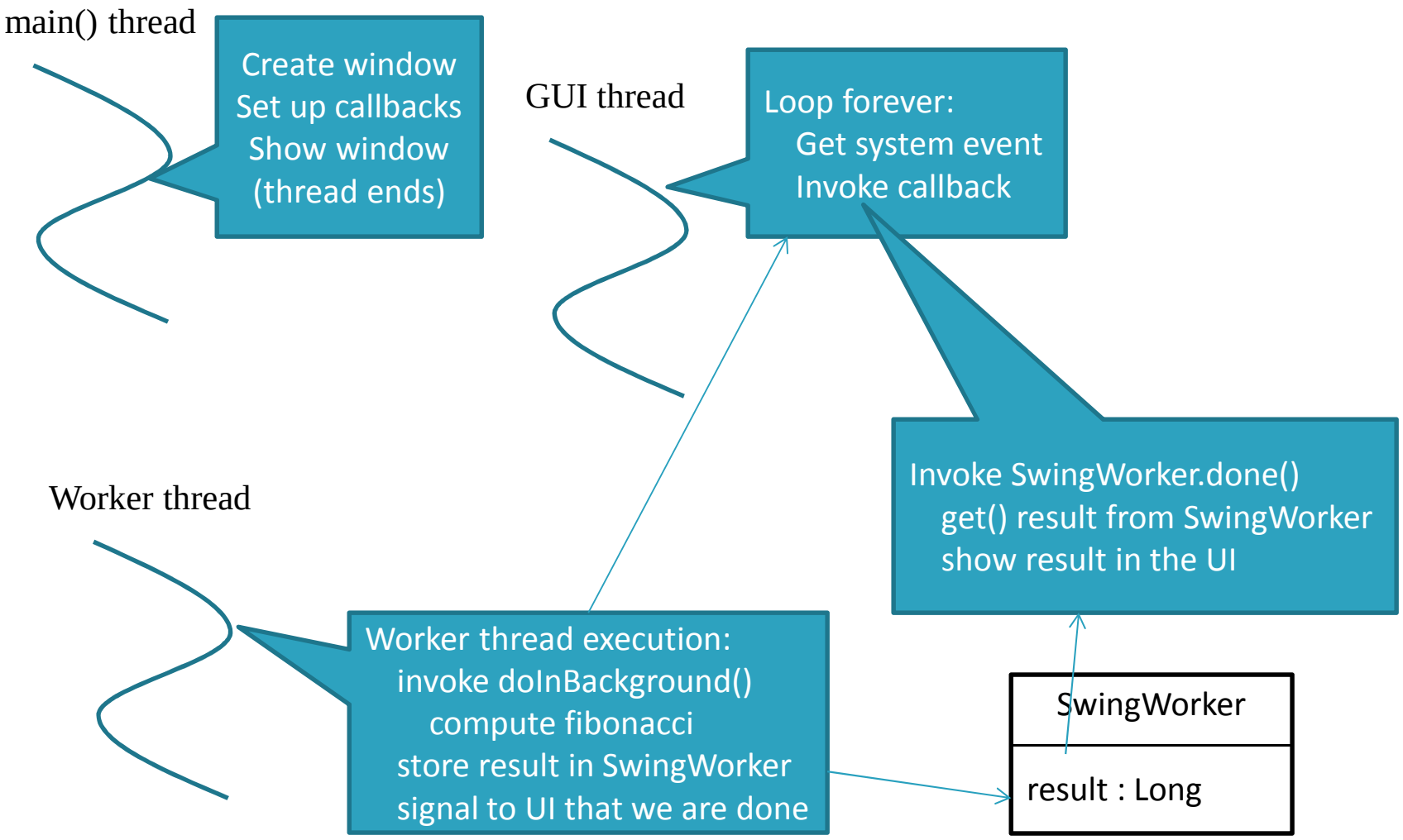
GUIDemo Example

- A fix: SwingWorker

The GUI Threading Architecture



The GUI Threading Architecture



Organizational Tips

- Declare references to components you'll be manipulating as instance variables
- Put the code that performs the actions in private "helper" methods. (Keeps things neat)

GUI design issues

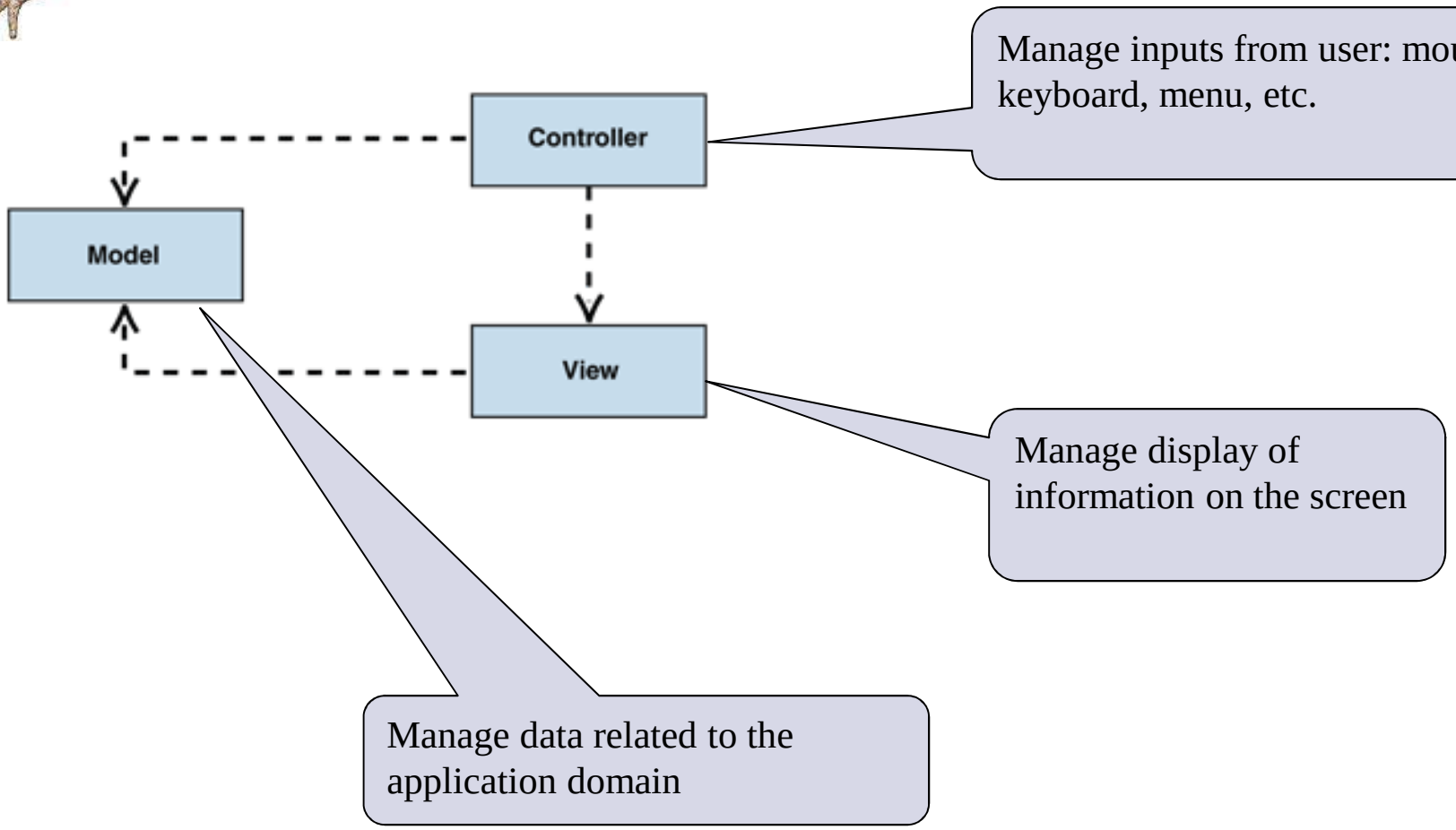
- Interfaces vs. inheritance
  - Inherit from JPanel with custom drawing functionality
  - Implement the ActionListener interface, register with button
  - Why this difference?

- Models and views

GUI design issues

- Interfaces vs. inheritance
  - Inherit from JPanel with custom drawing functionality
    - Subclass “is a” special kind of Panel
    - The subclass interacts closely with the JPanel – e.g. the subclass calls back with super()
    - The way you draw the subclass doesn’t change as the program executes
  - Implement the ActionListener interface, register with button
    - The action to perform isn’t really a special kind of button; it’s just a way of reacting to the button. So it makes sense to be a separate object.
    - The ActionListener is decoupled from the button. Once the listener is invoked, it doesn’t call anything on the Button anymore.
    - We may want to change the action performed on a button press—so once again it makes sense for it to be a separate object
- Models and views

Model-View-Controller (MVC)



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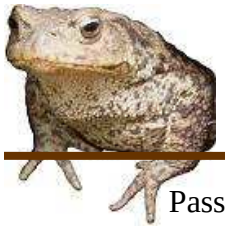
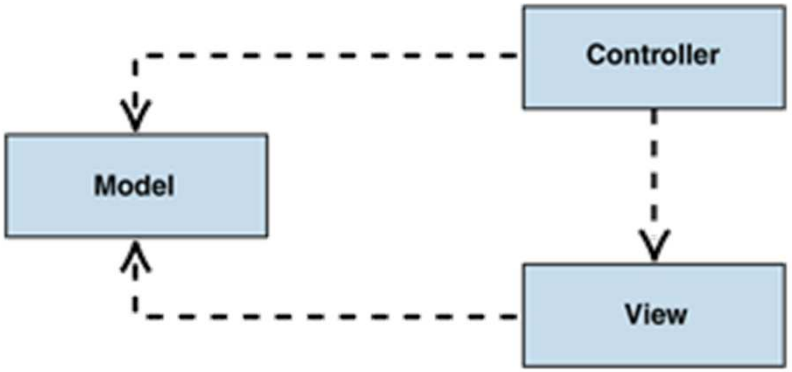
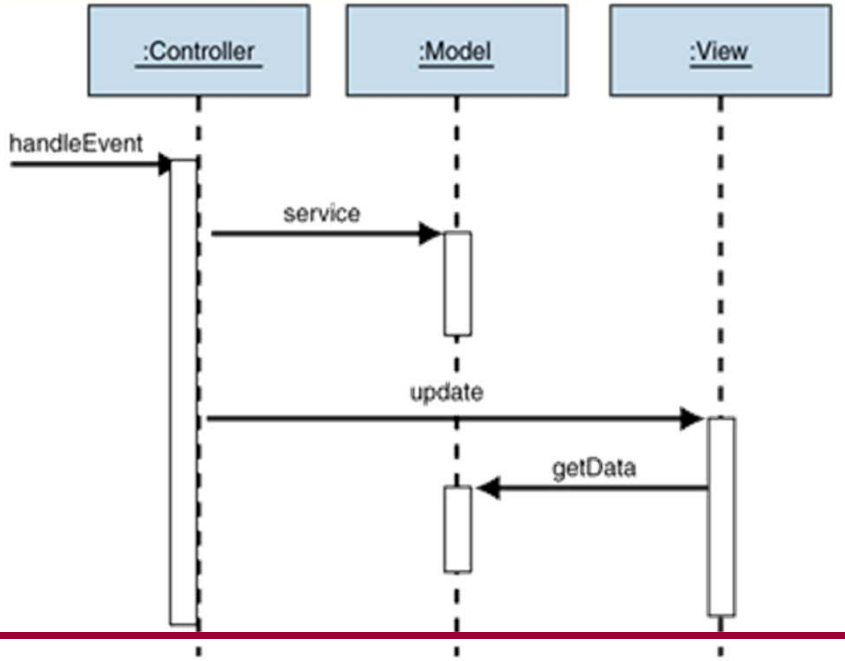


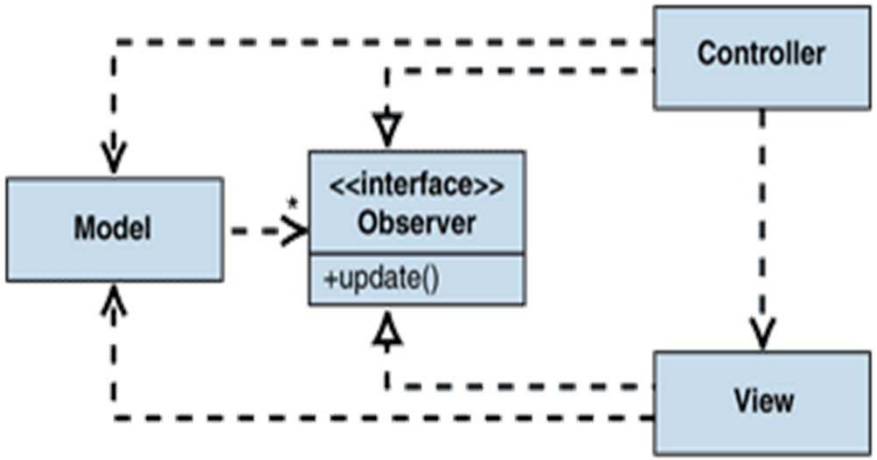
Model-View-Controller (MVC)

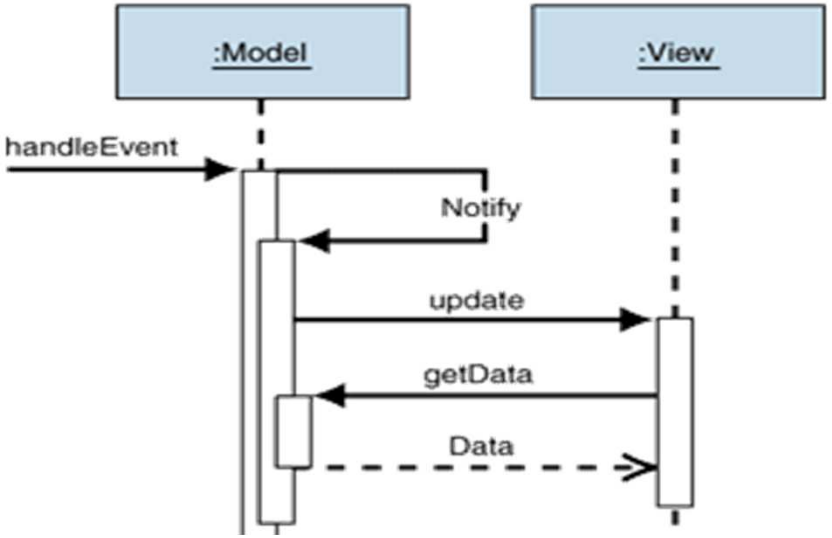
Passive model





Active model





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Example: RabbitWorld GUI

- …hw2.lib.ui.WorldImpl
  - The Model class
  - Model is passive: does not have a reference to the view
- …hw2.lib.ui.WorldUI
  - The Controller class
  - Listener callbacks in constructor react to events
    - Delegating to the view (is this design ideal?)
- …hw2.lib.ui.WorldPanel
  - The View class
  - Gets data from Model to find out where to draw rabbits, foxes, etc.
  - Implements stepping (in step())
    - Invokes model to update world
    - Invokes repaint() on self to update UI

Find That Pattern!

- What pattern is BorderLayout a part of?
- What pattern is JPanel a part of?
- What pattern are the ActionListeners part of?
- There are classes representing the AI's decision to Eat, Breed, or Move. What pattern are these representing?
- Look at the documentation for JComponent.paint(). What pattern is used?

For More Information

- Oracle's Swing tutorials
  - http://download.oracle.com/javase/tutorial/uiswing/
- Introduction to Programming Using Java, Ch. 6
  - http://math.hws.edu/javanotes/c6/index.html

Questions?