

TA Programming of Interactive Systems

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Model-View-Controller (MVC) Design Pattern

Exercise 2

MVC

Based on the **divide and conquer** principle:

Model

Holds the abstract data (e.g. a number) and methods to handle it.

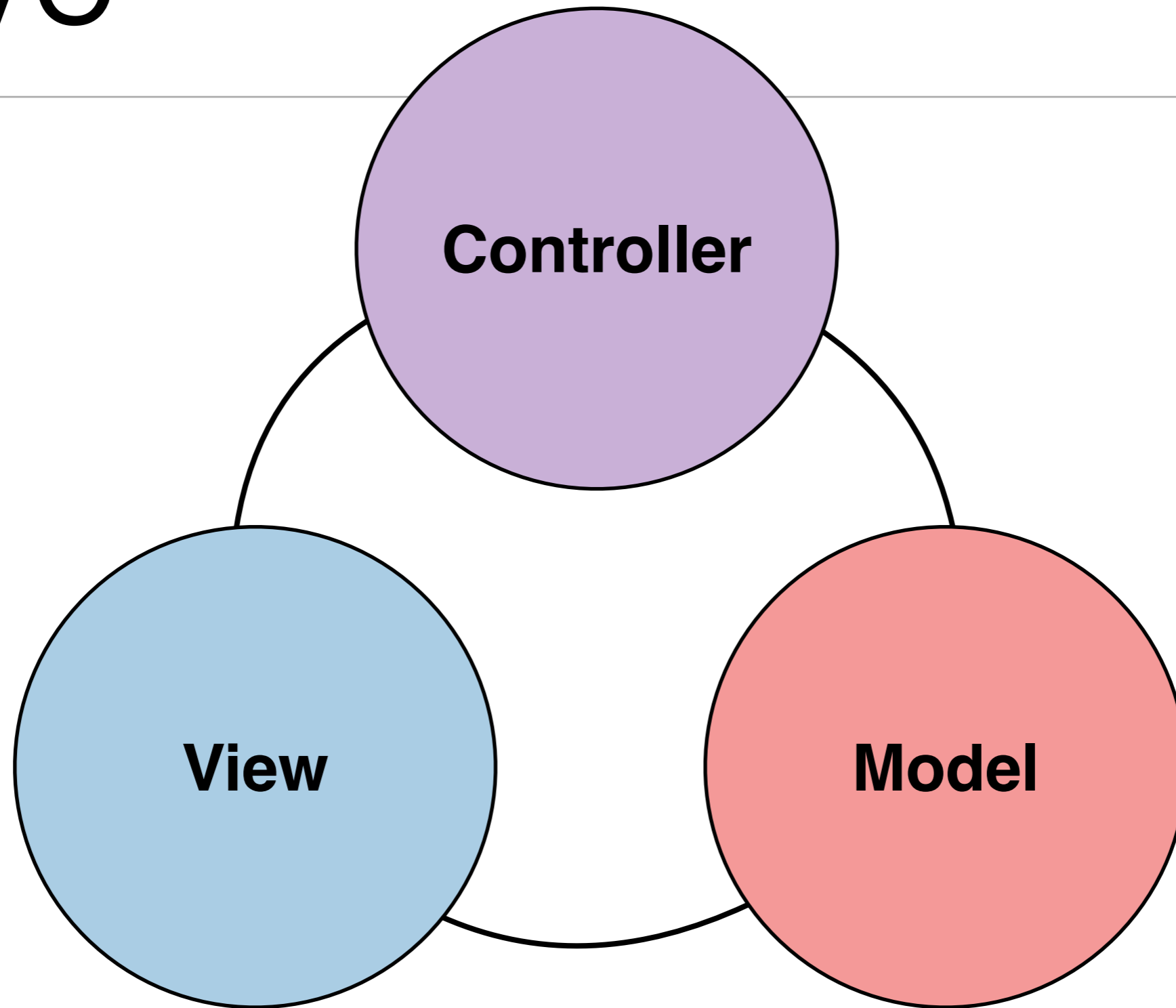
View

Defines the visual representation of a data (e.g. a slider to represent a number).

Controller

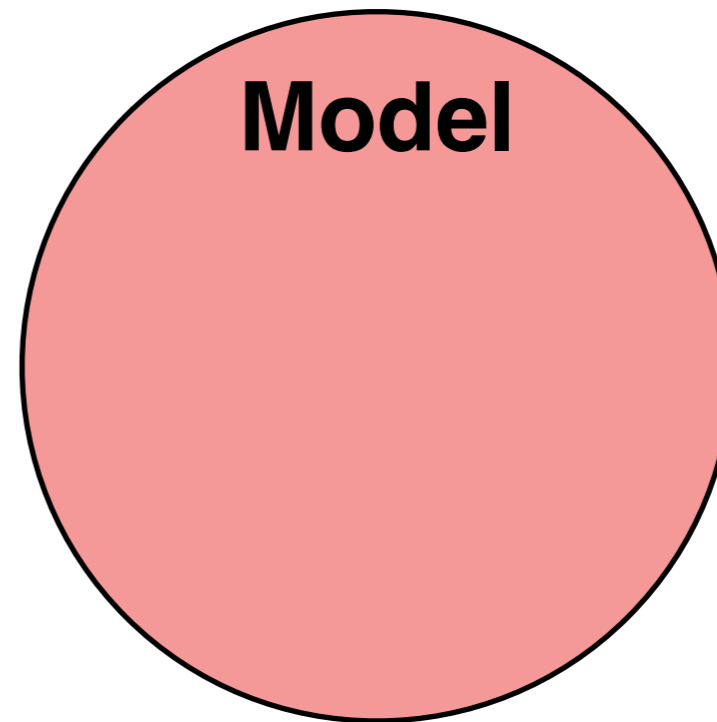
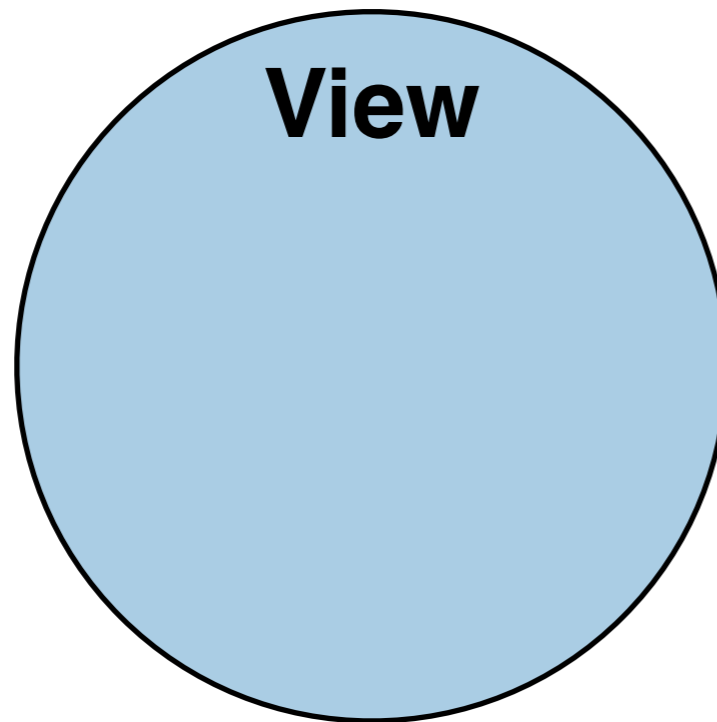
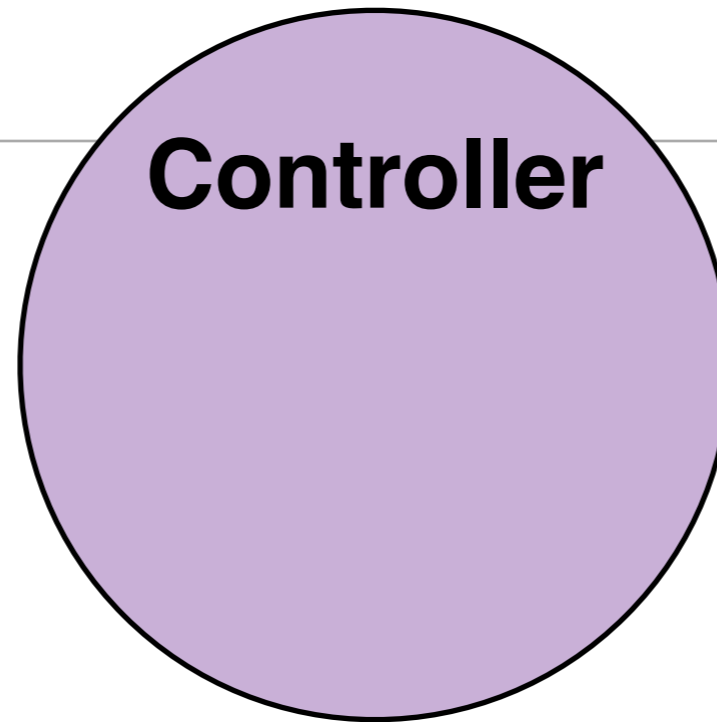
Manages the user input and sets the application behavior (e.g. adds a listener to the slider that updates the number).

MVC



Example

Temperature
Converter



Example

Temperature
Converter

Controller

View

Model

TemperatureModel

- int celsius
- int fahrenheit
- setCelsiusValue(int value)
- setFahrenheitValue(int value)
- getCelsiusValue()
- getFahrenheitValue()

Example

Temperature
Converter



Controller



View

TemperatureView

- JTextField celsiusValue
- JTextField fahrenheitValue
- JButton closeButton
- JButton resetButton



Model

TemperatureModel

- int celsius
- int fahrenheit
- setCelsiusValue(int value)
- setFahrenheitValue(int value)
- getCelsiusValue()
- getFahrenheitValue()

Example

Temperature
Converter

Controller

TemperatureController

- Listeners on JTextFields
- Listener on closeButton
- Listener on resetButton

View

TemperatureView

- JTextField celsiusValue
- JTextField fahrenheitValue
- JButton closeButton
- JButton resetButton

Model

TemperatureModel

- int celsius
- int fahrenheit
- setCelsiusValue(int value)
- setFahrenheitValue(int value)
- getCelsiusValue()
- getFahrenheitValue()

Example

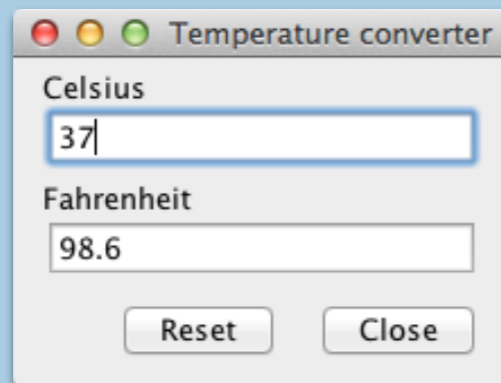
Temperature
Converter

Controller

TemperatureController

- TemperatureModel model
- View[] views
- setCelsiusValue(int value, Object caller)
- setFahrenheitValue(int value, Object caller)
- bind(View view)

View



A screenshot of a graphical user interface window titled "Temperature converter". The window contains two input fields: "Celsius" with the value "37" and "Fahrenheit" with the value "98.6". Below the input fields are two buttons: "Reset" and "Close".

Model

TemperatureModel

- int celsius
- int fahrenheit
- setCelsiusValue(int value)
- setFahrenheitValue(int value)
- getCelsiusValue()
- getFahrenheitValue()

Example

Temperature Converter

Controller

TemperatureController

- TemperatureModel model
- View[] views
- setCelsiusValue(int value, Object caller)
- setFahrenheitValue(int value, Object caller)
- bind(View view)

View

Temperature converter

Celsius
37

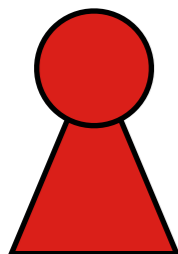
Fahrenheit
98.6

Reset Close

Model

TemperatureModel

- int celsius
- int fahrenheit
- setCelsiusValue(int value)
- setFahrenheitValue(int value)
- getCelsiusValue()
- getFahrenheitValue()



User

Example

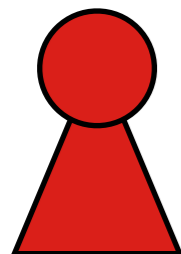
Temperature Converter

Controller

TemperatureController

- TemperatureModel model
- View[] views
- setCelsiusValue(int value, Object caller)
- setFahrenheitValue(int value, Object caller)
- bind(View view)

View



User

input

A screenshot of a 'Temperature converter' window. It has two input fields: 'Celsius' with the value '37' and 'Fahrenheit' with the value '98.6'. There are 'Reset' and 'Close' buttons at the bottom.

Model

TemperatureModel

- int celsius
- int fahrenheit
- setCelsiusValue(int value)
- setFahrenheitValue(int value)
- getCelsiusValue()
- getFahrenheitValue()

Example

Temperature Converter

Controller

TemperatureController

- TemperatureModel model
- View[] views
- setCelsiusValue(int value, Object caller)
- setFahrenheitValue(int value, Object caller)
- bind(View view)

notify

View

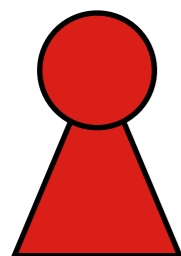
A screenshot of a window titled "Temperature converter". It has two input fields: "Celsius" with the value "37" and "Fahrenheit" with the value "98.6". Below the fields are two buttons: "Reset" and "Close".

input

Model

TemperatureModel

- int celsius
- int fahrenheit
- setCelsiusValue(int value)
- setFahrenheitValue(int value)
- getCelsiusValue()
- getFahrenheitValue()



User

Example

Controller

Temperature Converter

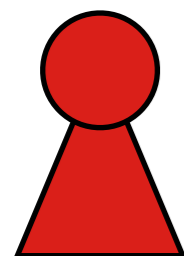
TemperatureController

- TemperatureModel model
- View[] views
- setCelsiusValue(int value, Object caller)
- setFahrenheitValue(int value, Object caller)
- bind(View view)

notify

modify

View



User

input

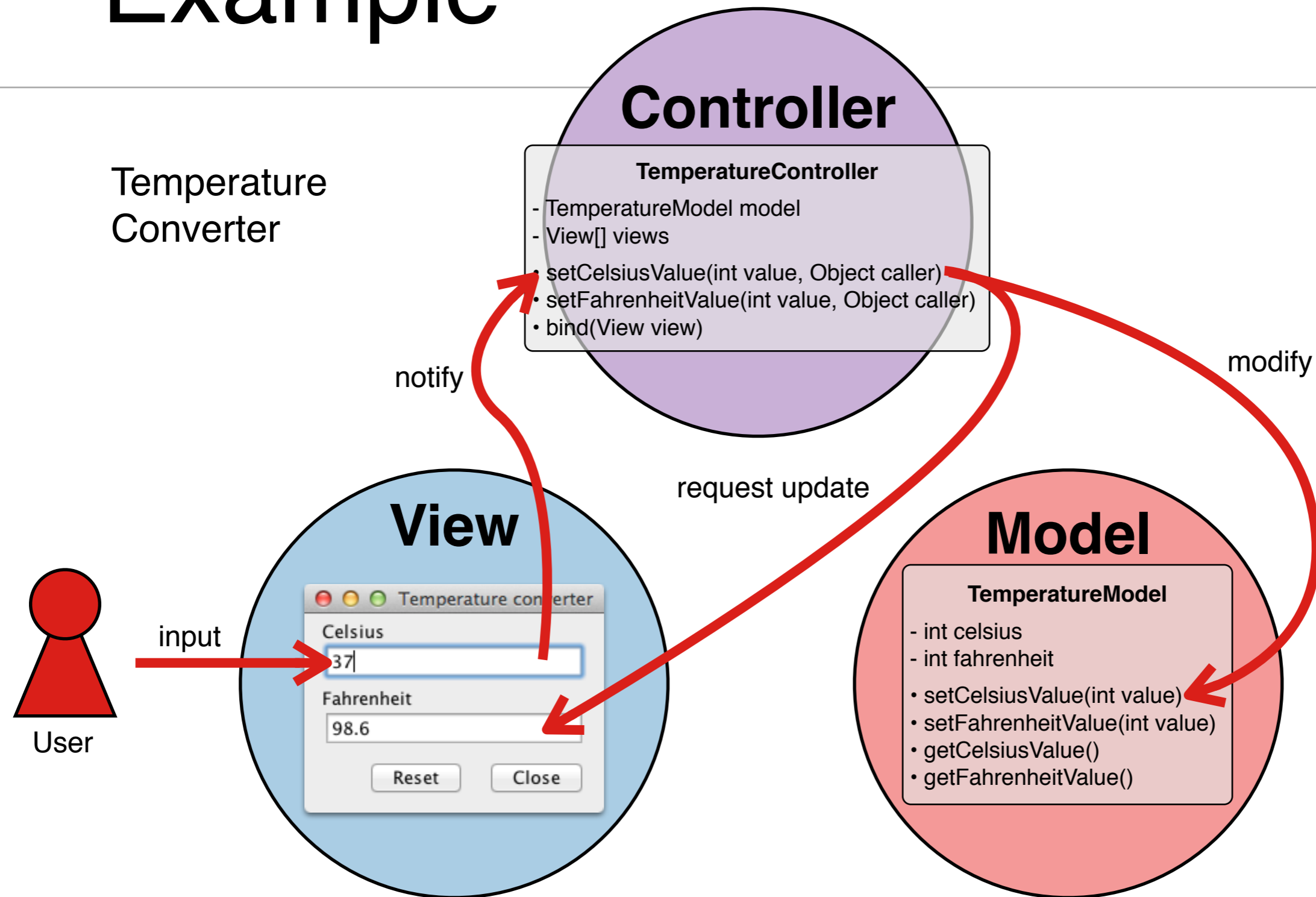
A screenshot of a 'Temperature converter' window. It has a title bar with three colored buttons (red, yellow, green) and the text 'Temperature converter'. Below the title bar, there are two input fields. The first is labeled 'Celsius' and contains the number '37'. The second is labeled 'Fahrenheit' and contains the number '98.6'. At the bottom of the window, there are two buttons: 'Reset' and 'Close'.

Model

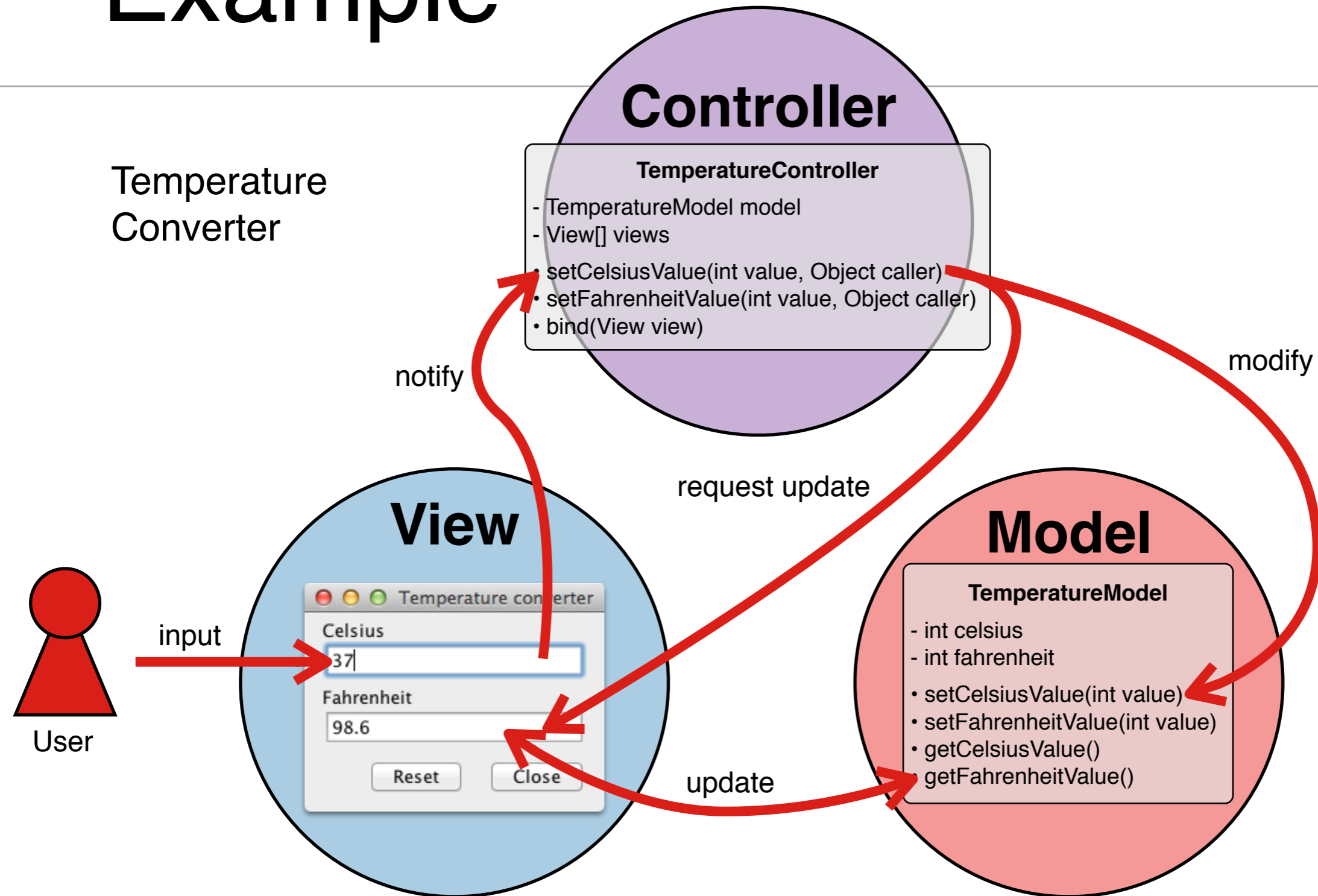
TemperatureModel

- int celsius
- int fahrenheit
- setCelsiusValue(int value)
- setFahrenheitValue(int value)
- getCelsiusValue()
- getFahrenheitValue()

Example

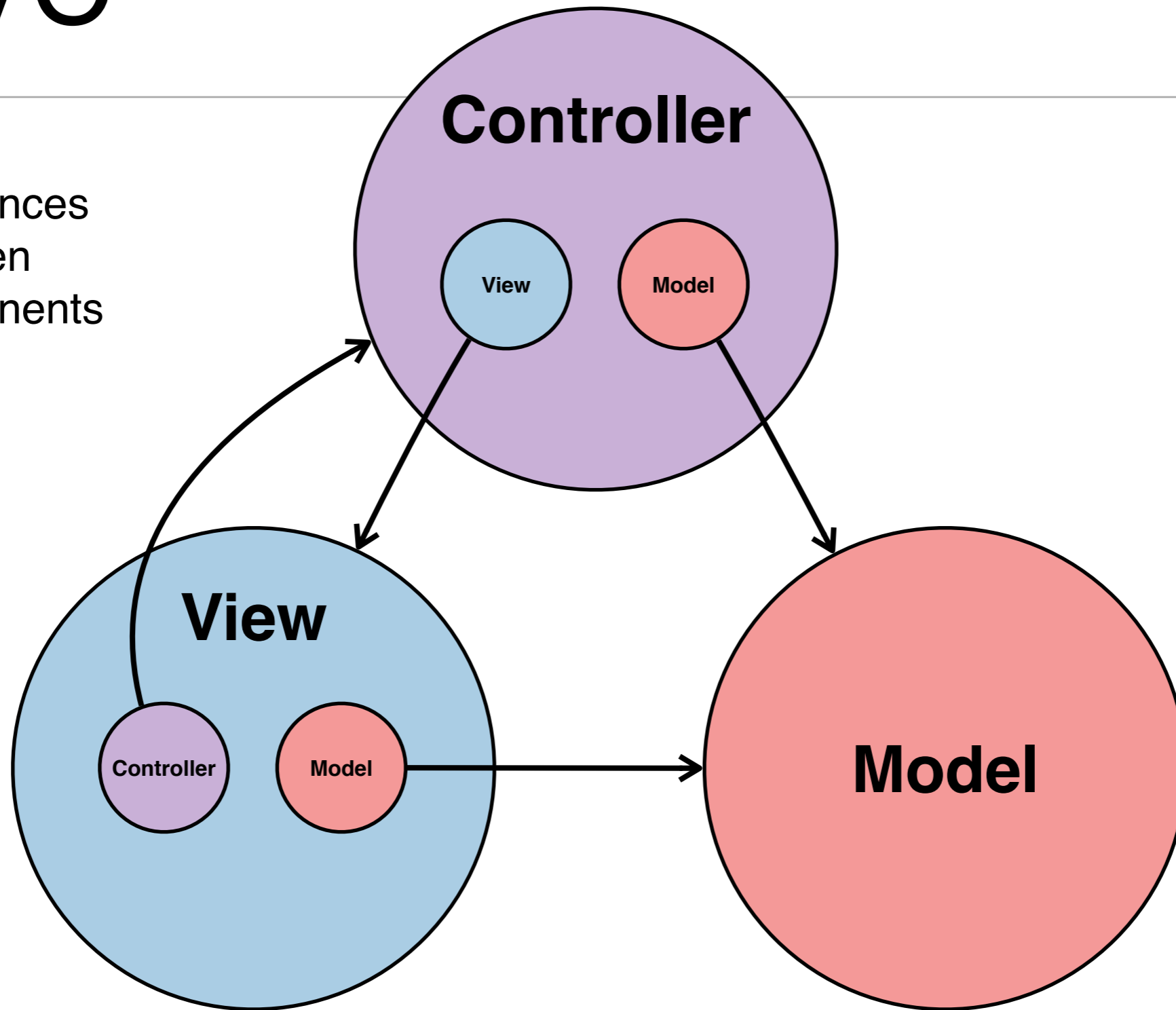


Example



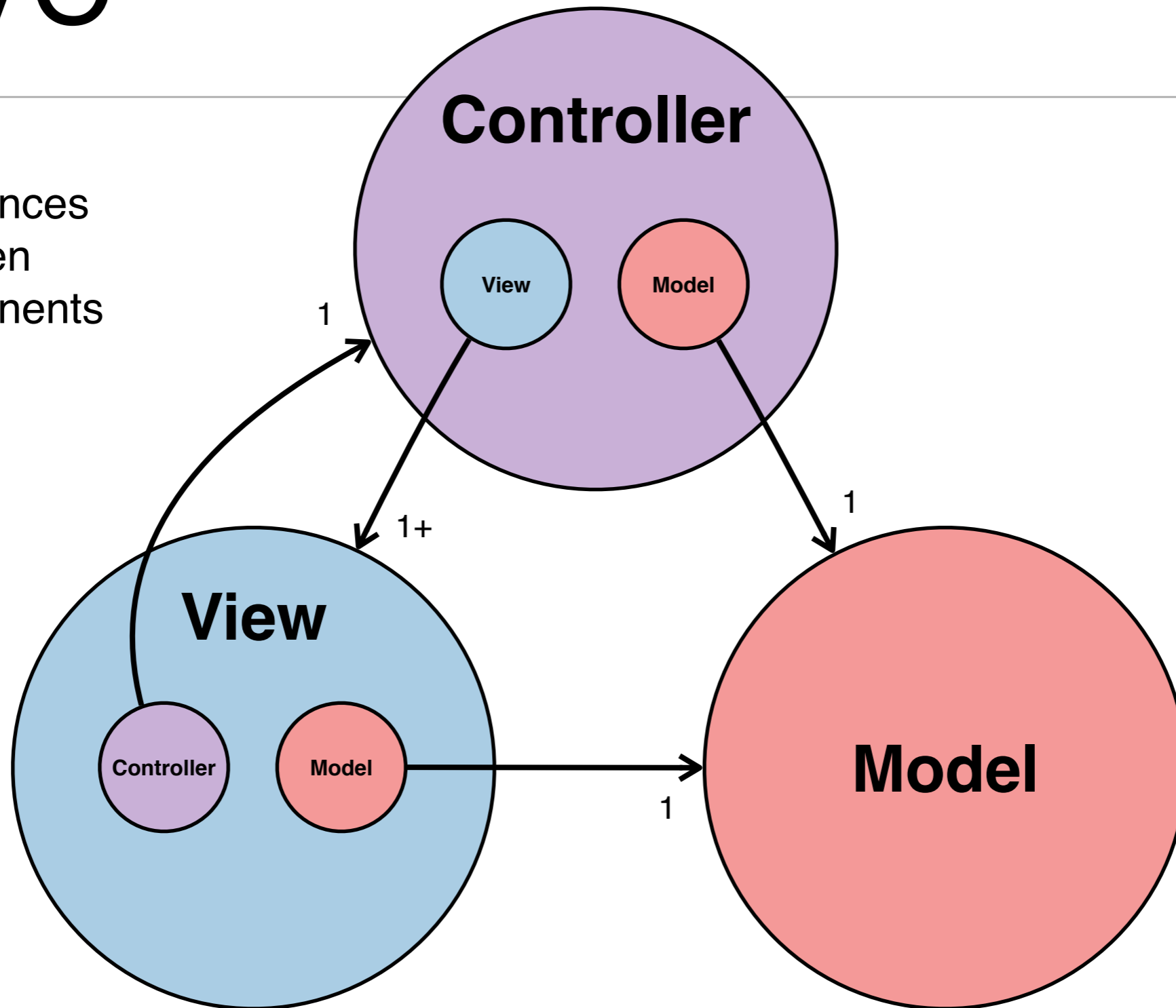
MVC

References
between
components



MVC

References
between
components



Example

Color
Chooser

Controllers



Views



Models



Example

Color
Chooser

Controllers



Views



Models



Example

Color
Chooser

Controllers

Views

Models

ColorModel

- CM red
- CM green
- CM blue
- CM getRed()
- CM getGreen()
- CM getBlue()
- String toHex()

ComponentModel (CM)

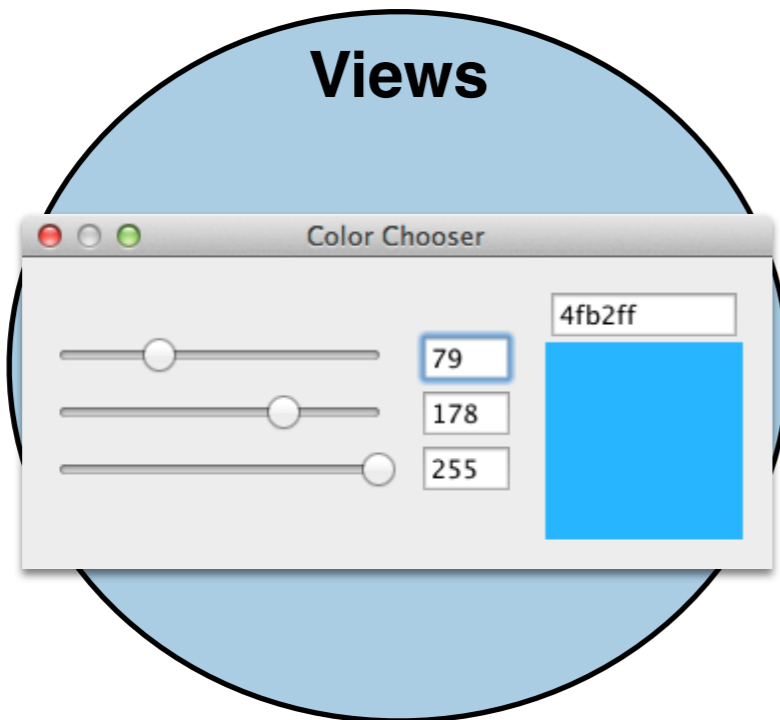
- int value
- ColorModel parent
- setValue(int value)
- int getValue()
- String toHex([int minLength])

Example

Color
Chooser

Controllers

Views



Models

ColorModel

ComponentModel (CM)

- CM red
 - CM green
 - CM blue
 - CM getRed()
 - CM getGreen()
 - CM getBlue()
 - String toHex()
- int value
 - ColorModel parent
 - setValue(int value)
 - int getValue()
 - String toHex([int minLength])

Example

Color
Chooser

Controllers

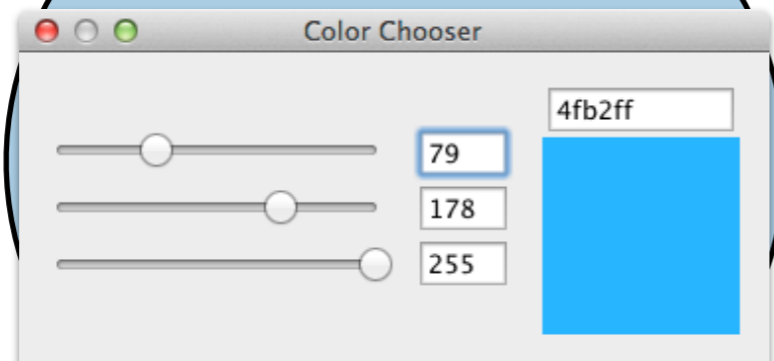
ColorController

- ColorModel model
- CM red
- CM green
- CM blue
- setRed(int value, Object caller)
- setGreen(int value, Object caller)
- setBlue(int value, Object caller)
- bind(View view)

ComponentController

- CM model
- View[] views
- setValue(int Value, Object caller)
- addView(View view)
- removeView(View view)
- bind(View view)

Views



Models

ColorModel

- CM red
- CM green
- CM blue
- CM getRed()
- CM getGreen()
- CM getBlue()
- String toHex()

ComponentModel (CM)

- int value
- ColorModel parent
- setValue(int value)
- int getValue()
- String toHex([int minLength])

Example

Color
Chooser

Controllers

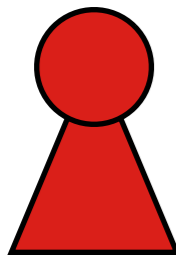
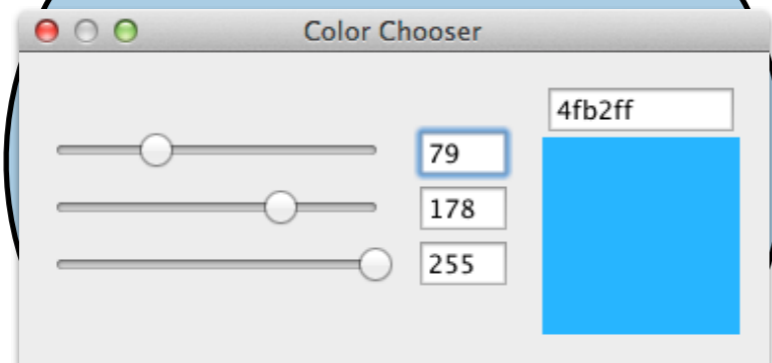
ColorController

- ColorModel model
- CM red
- CM green
- CM blue
- setRed(int value, Object caller)
- setGreen(int value, Object caller)
- setBlue(int value, Object caller)
- bind(View view)

ComponentController

- CM model
- View[] views
- setValue(int Value, Object caller)
- addView(View view)
- removeView(View view)
- bind(View view)

Views



User

Models

ColorModel

- CM red
- CM green
- CM blue
- CM getRed()
- CM getGreen()
- CM getBlue()
- String toHex()

ComponentModel (CM)

- int value
- ColorModel parent
- setValue(int value)
- int getValue()
- String toHex([int minLength])

Example

Color
Chooser

Controllers

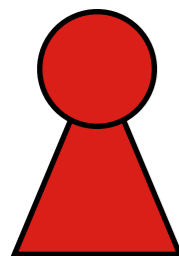
ColorController

- ColorModel model
- CM red
- CM green
- CM blue
- setRed(int value, Object caller)
- setGreen(int value, Object caller)
- setBlue(int value, Object caller)
- bind(View view)

ComponentController

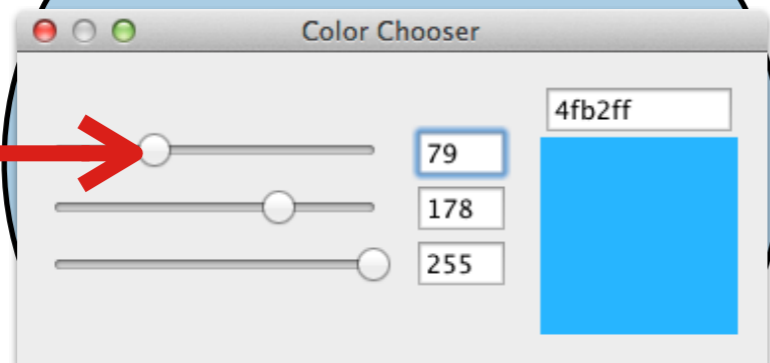
- CM model
- View[] views
- setValue(int Value, Object caller)
- addView(View view)
- removeView(View view)
- bind(View view)

Views



User

input



Models

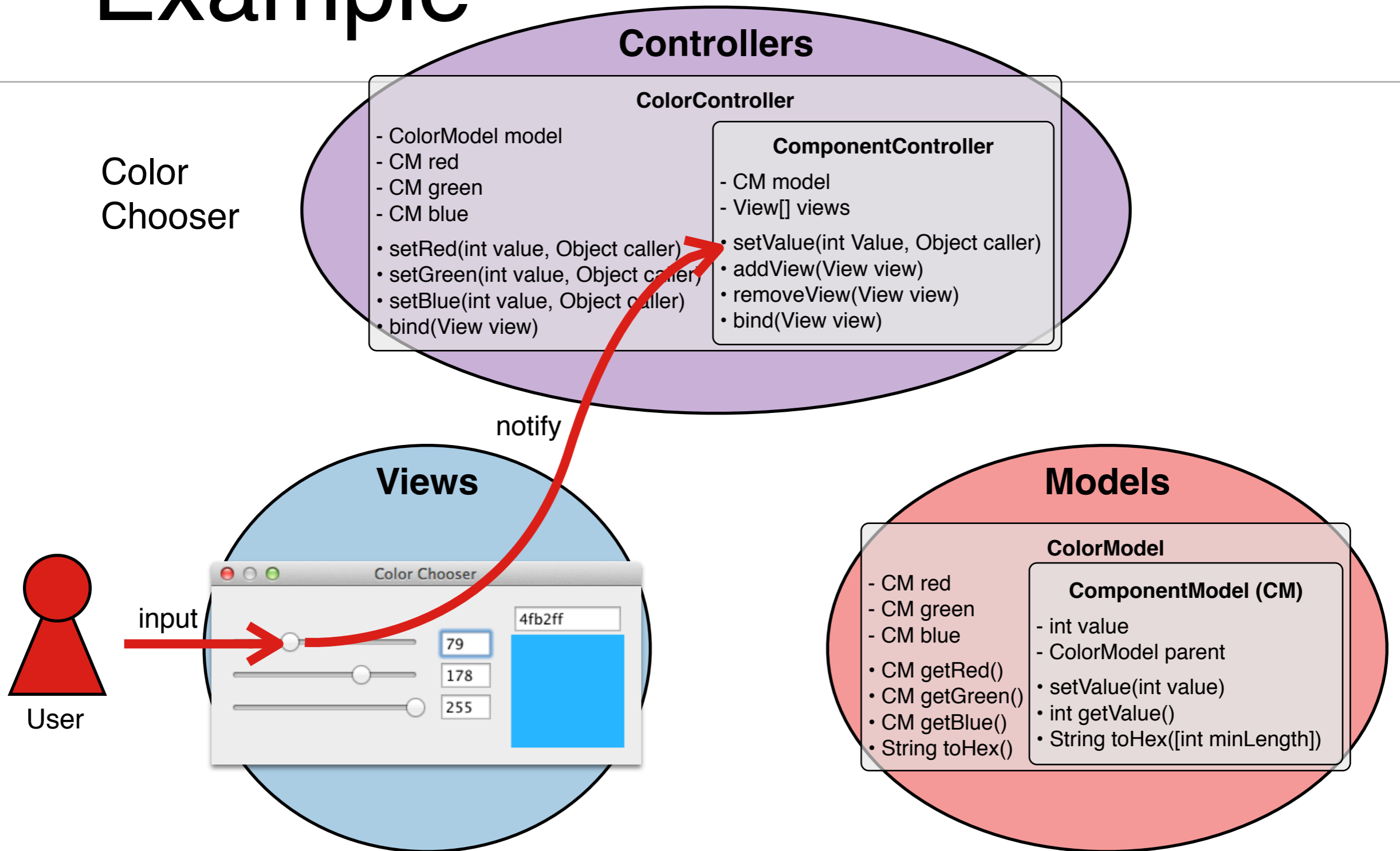
ColorModel

- CM red
- CM green
- CM blue
- CM getRed()
- CM getGreen()
- CM getBlue()
- String toHex()

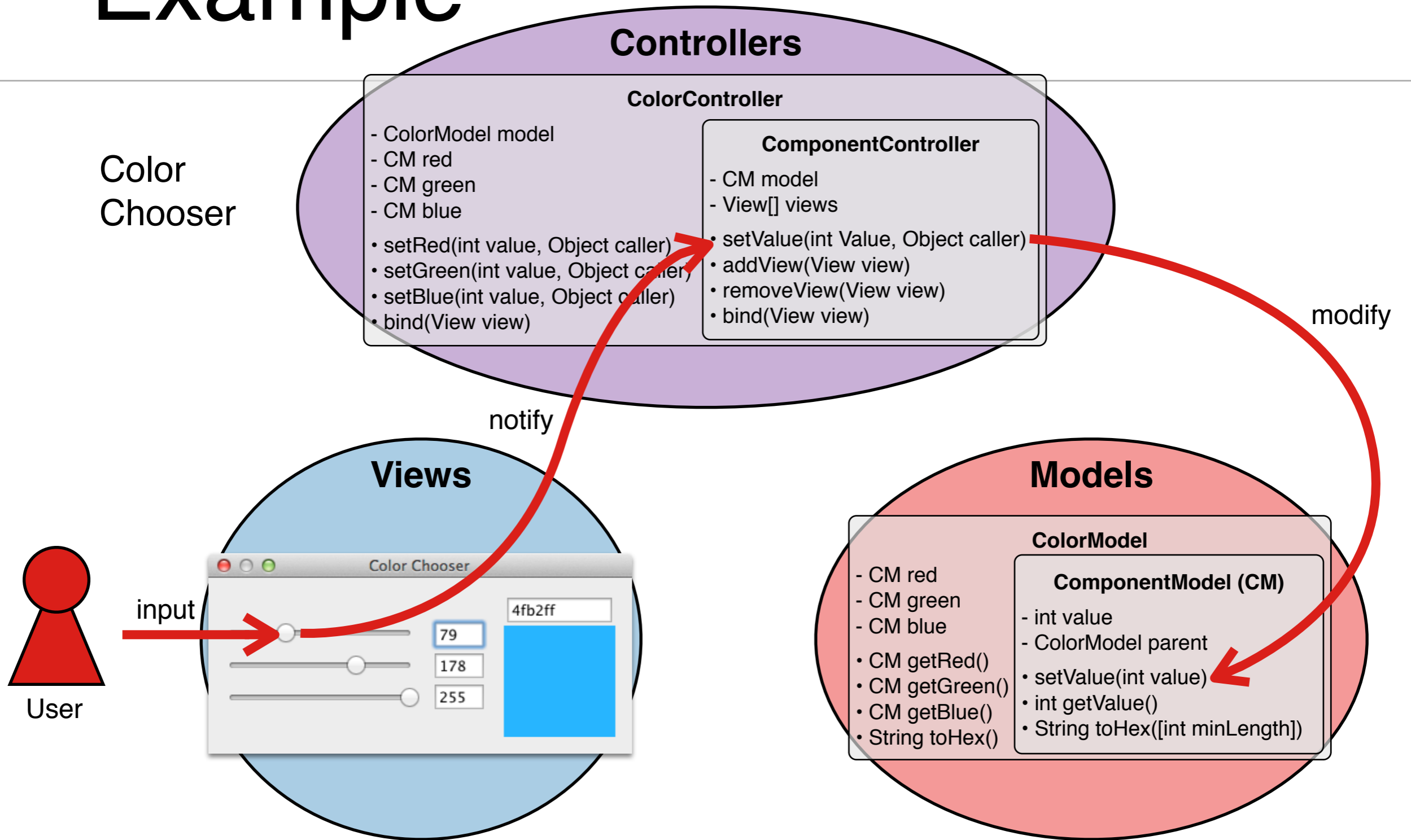
ComponentModel (CM)

- int value
- ColorModel parent
- setValue(int value)
- int getValue()
- String toHex([int minLength])

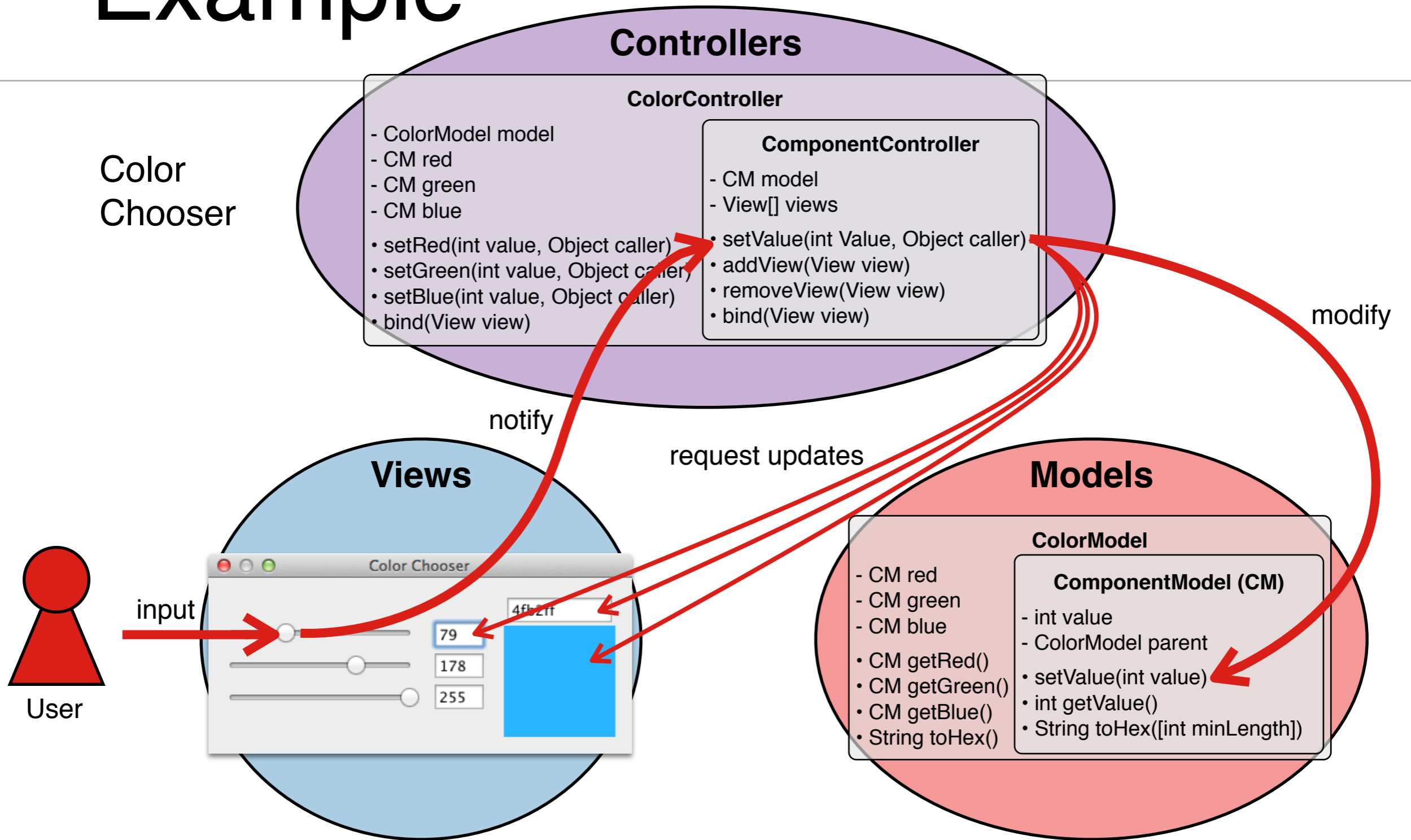
Example



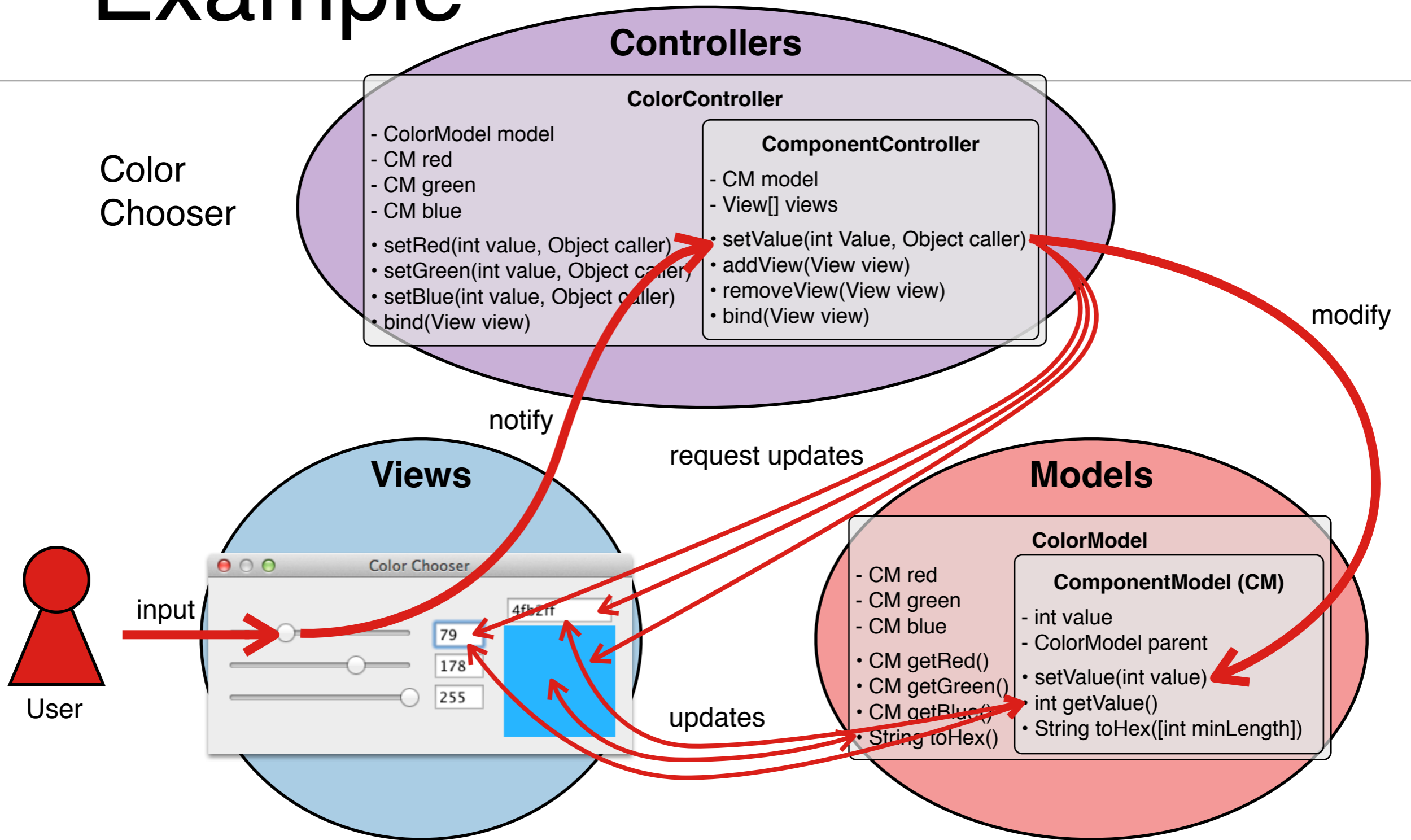
Example



Example



Example



Models

Different types

Values

String, numbers

Sequences

Lists (`AbstractListModel`)

Views

Provide a **representation** of a model

The representation is often **discrete**

Examples from Java **Swing**:

String

JTextField, JLabel

Numbers

JSlider, JTextField, JLabel

Sequences

JLists, JComboBox

Methods

JButton, JMenuItem