

Binding Data and Properties to UI Elements



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Outline



Properties

- Read/Write
- Read-Only
- Property Change Event

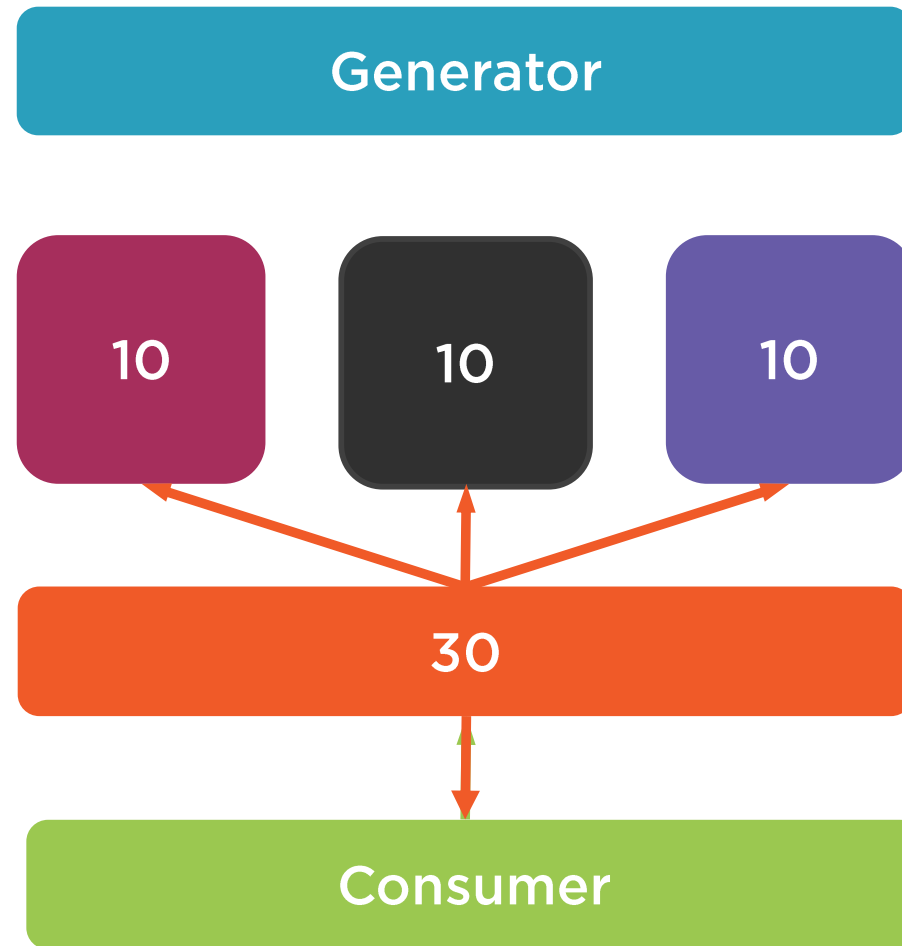
Bindings

- Unidirectional & Bidirectional
- High Level & Low Level API
- Binding the UI with Model

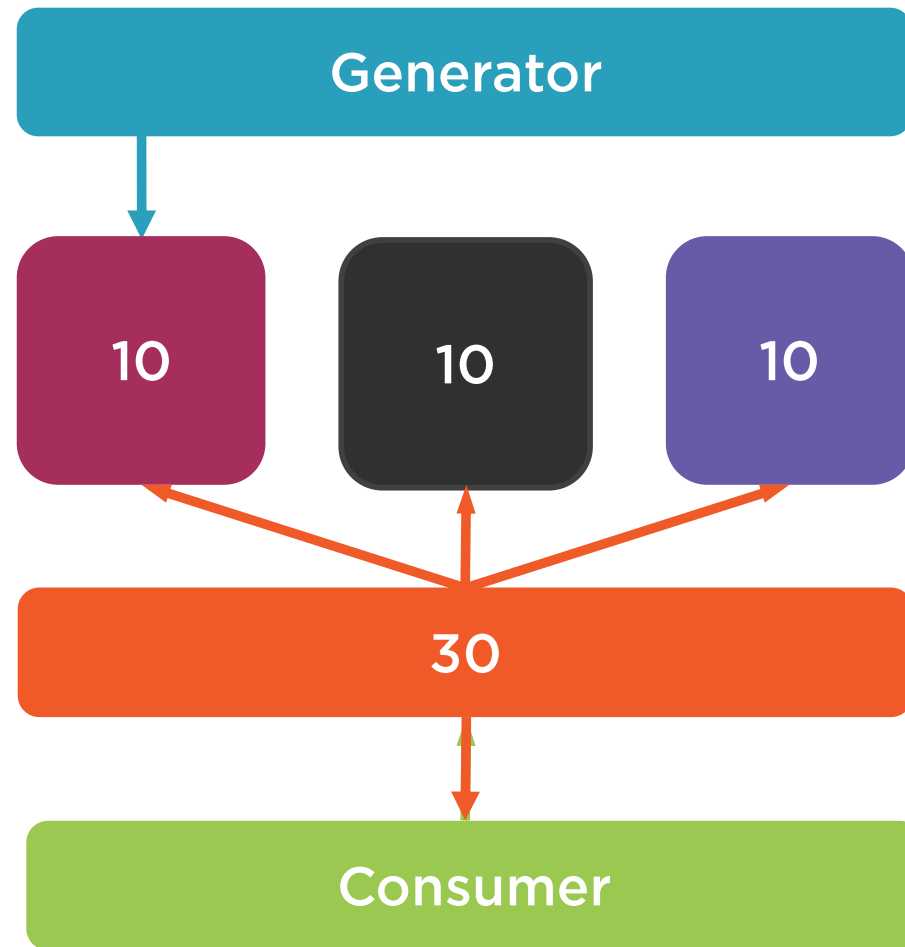
Java FX Collections



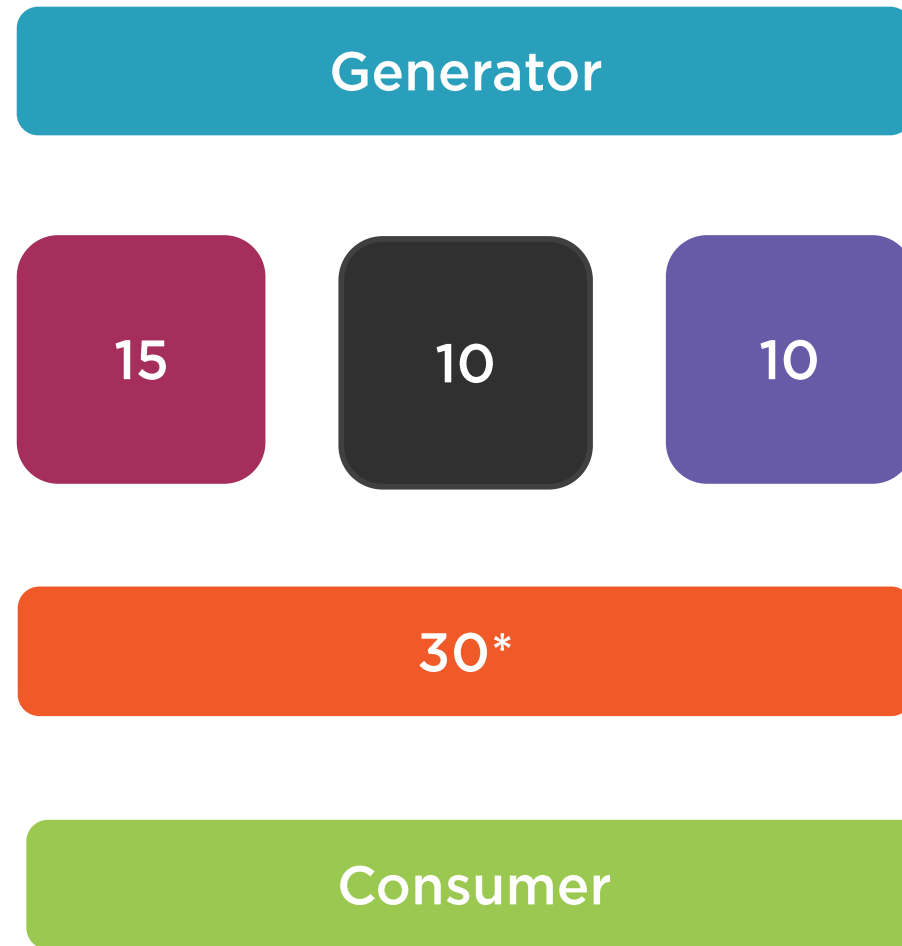
Mechanisms of Change Propagation



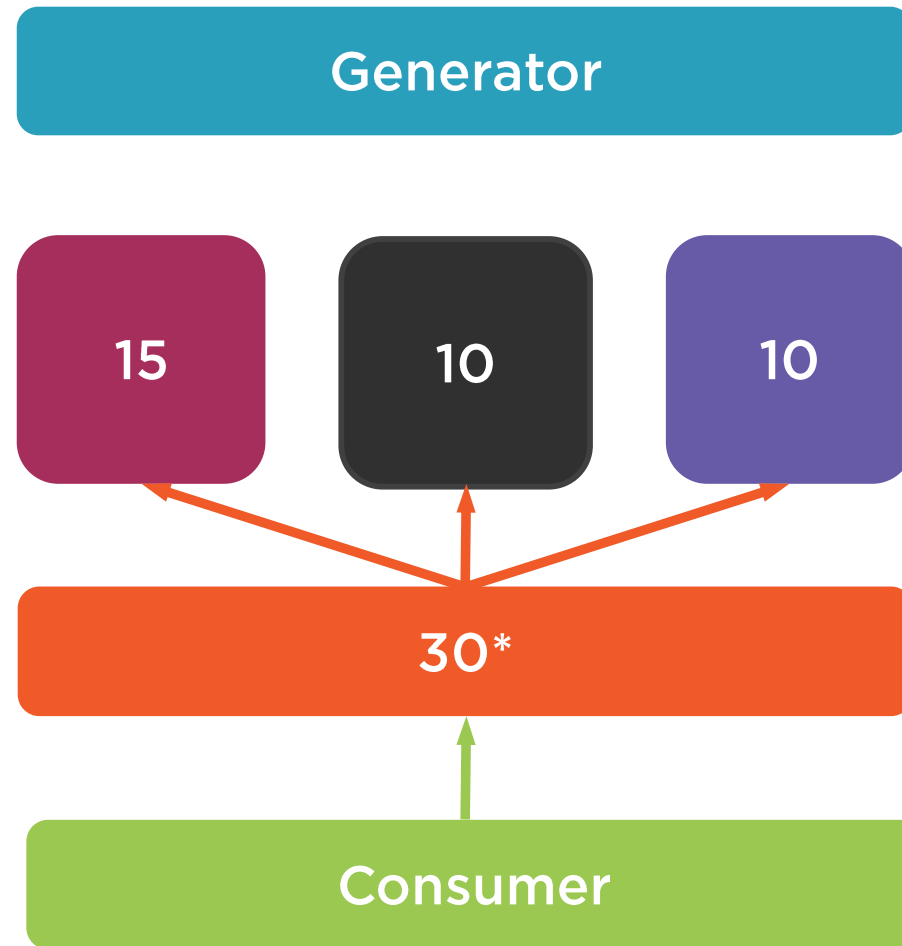
Mechanisms of Change Propagation



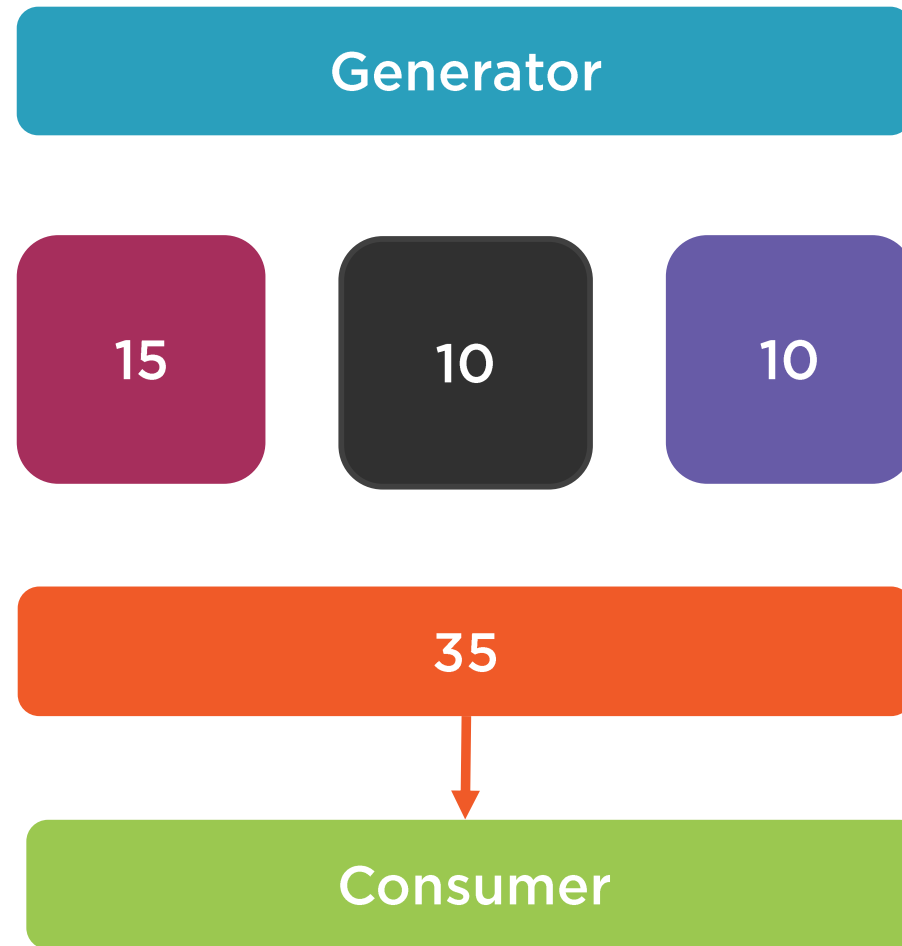
Mechanisms of Change Propagation



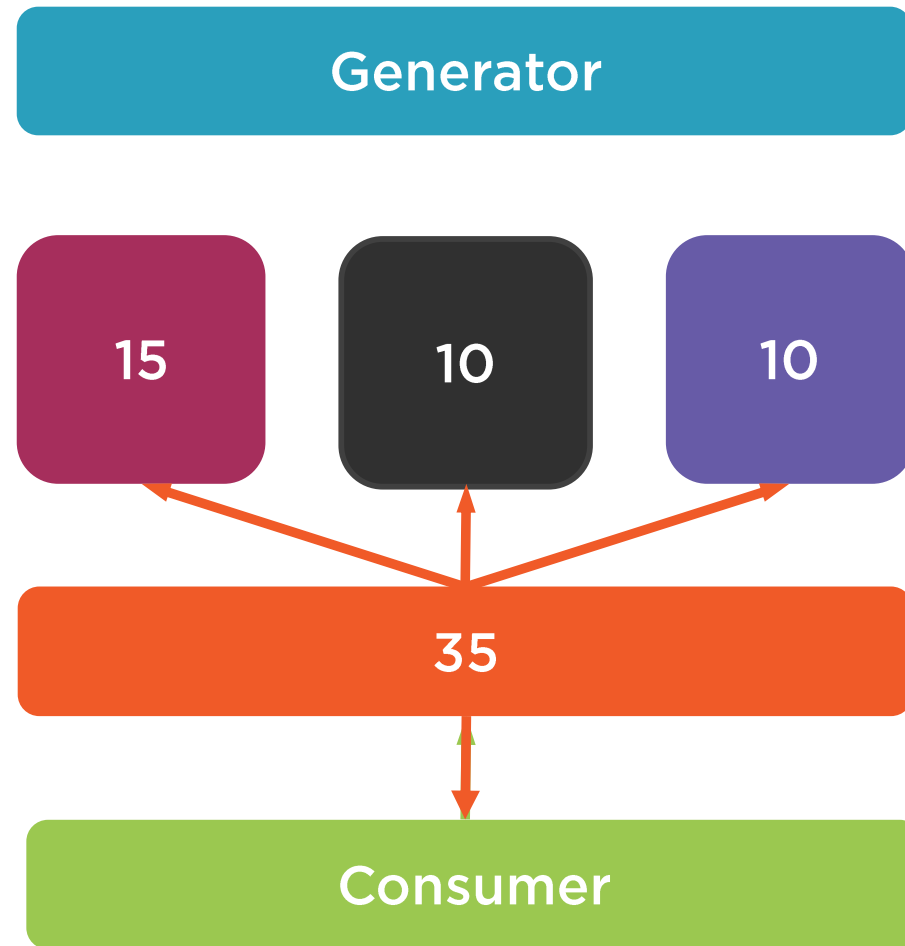
Mechanisms of Change Propagation



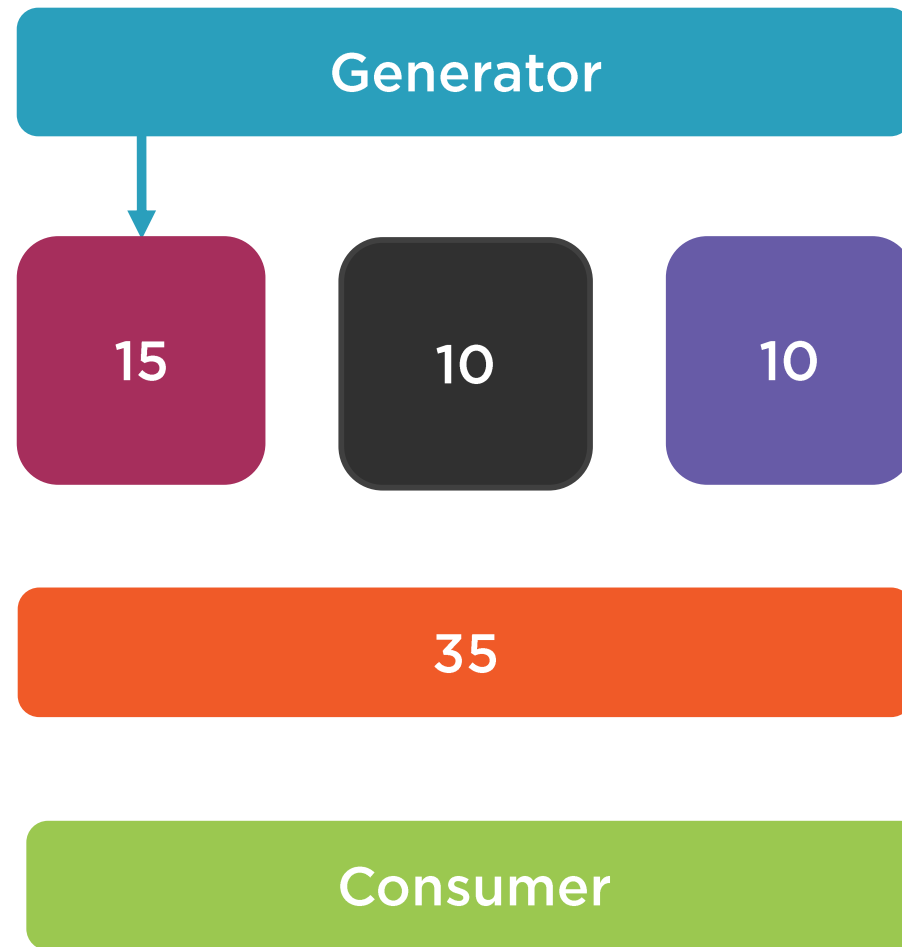
Mechanisms of Change Propagation



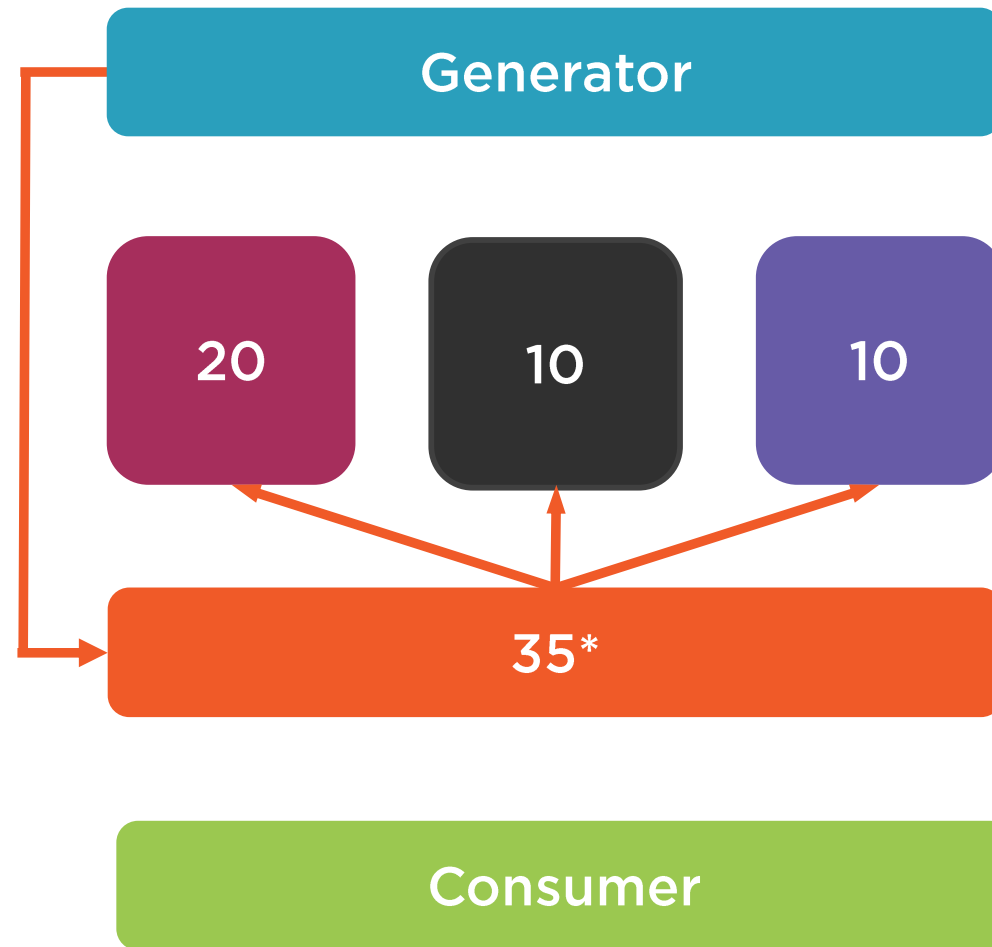
Mechanisms of Change Propagation



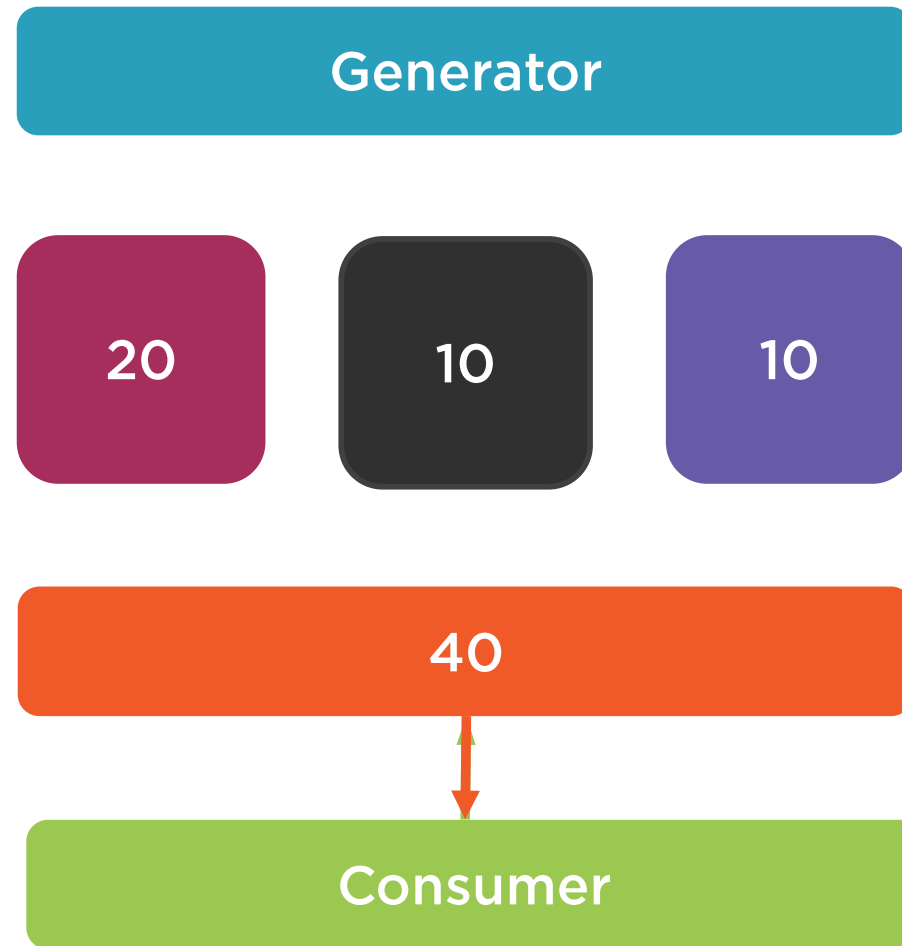
Mechanisms of Change Propagation



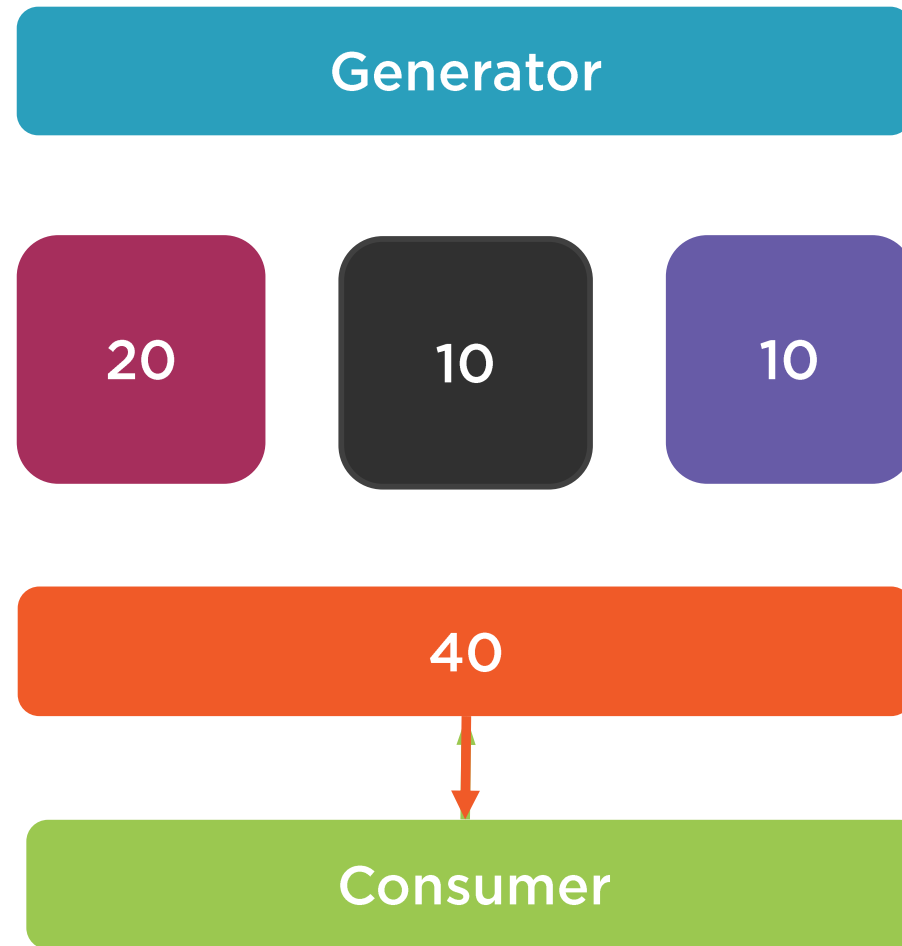
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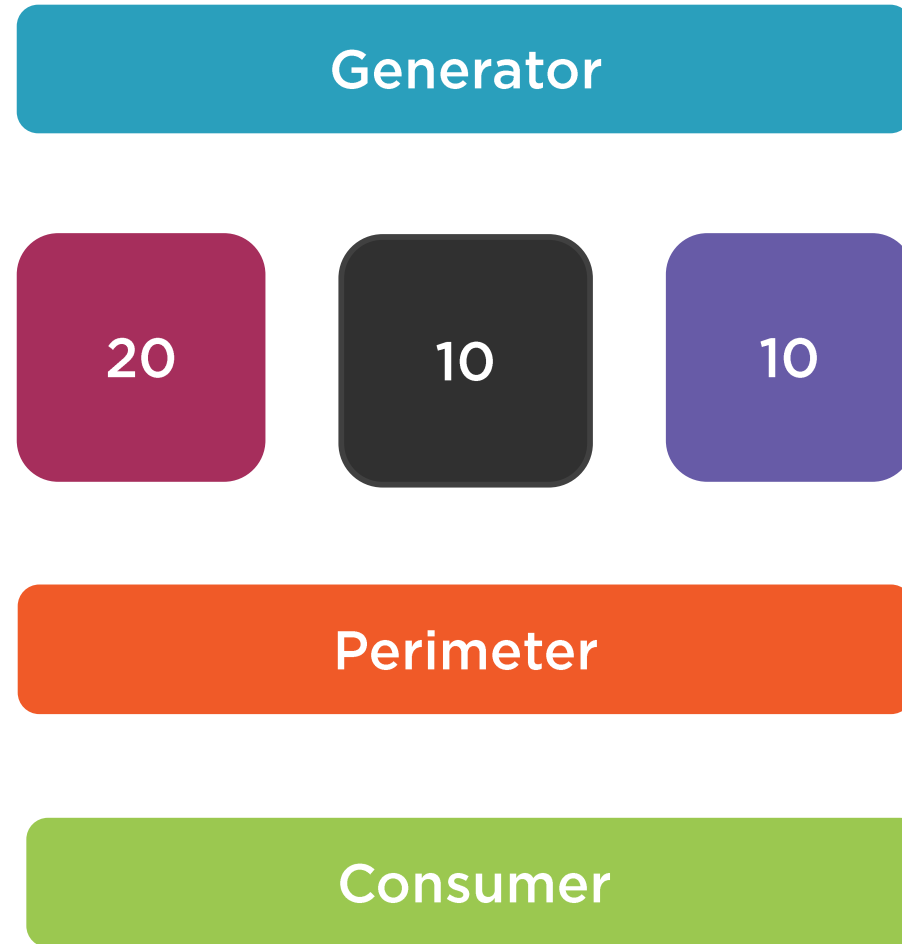
Mechanisms of Change Propagation



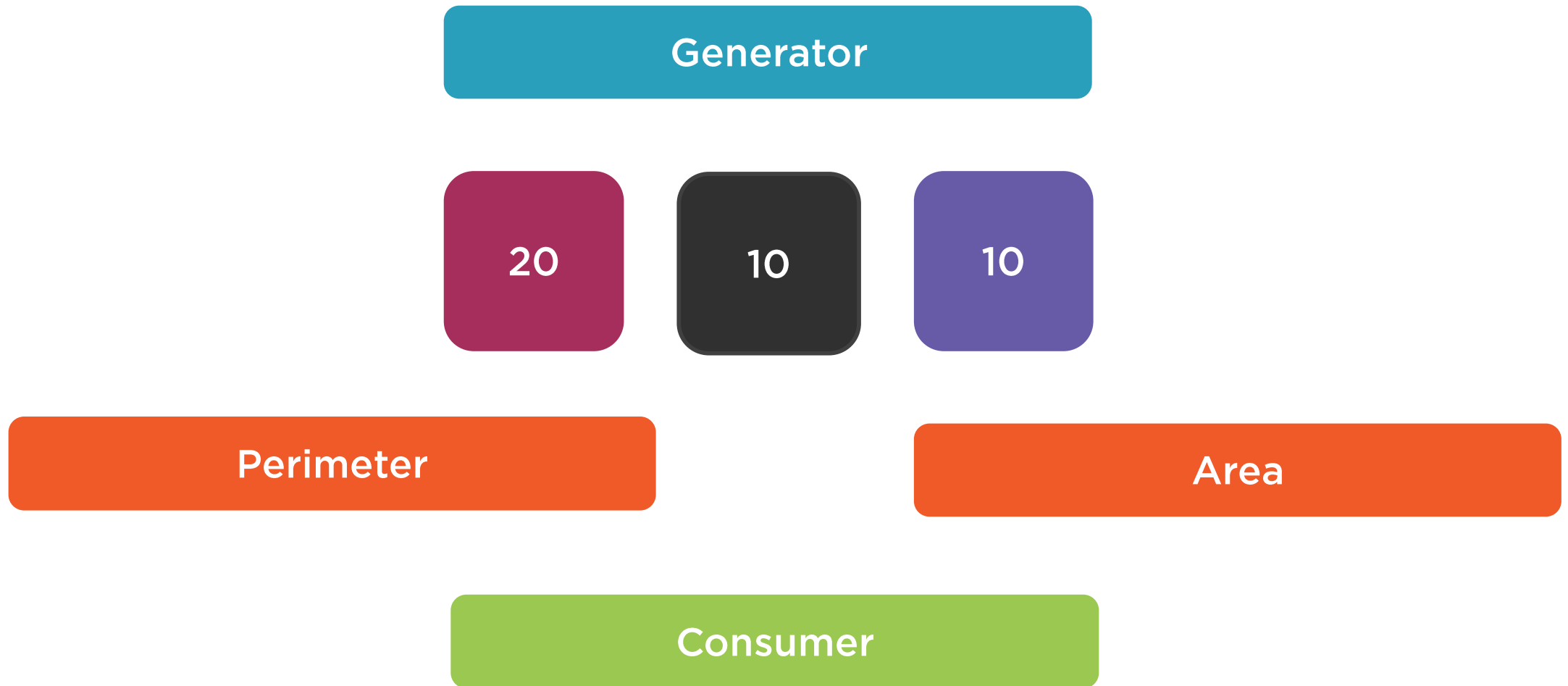
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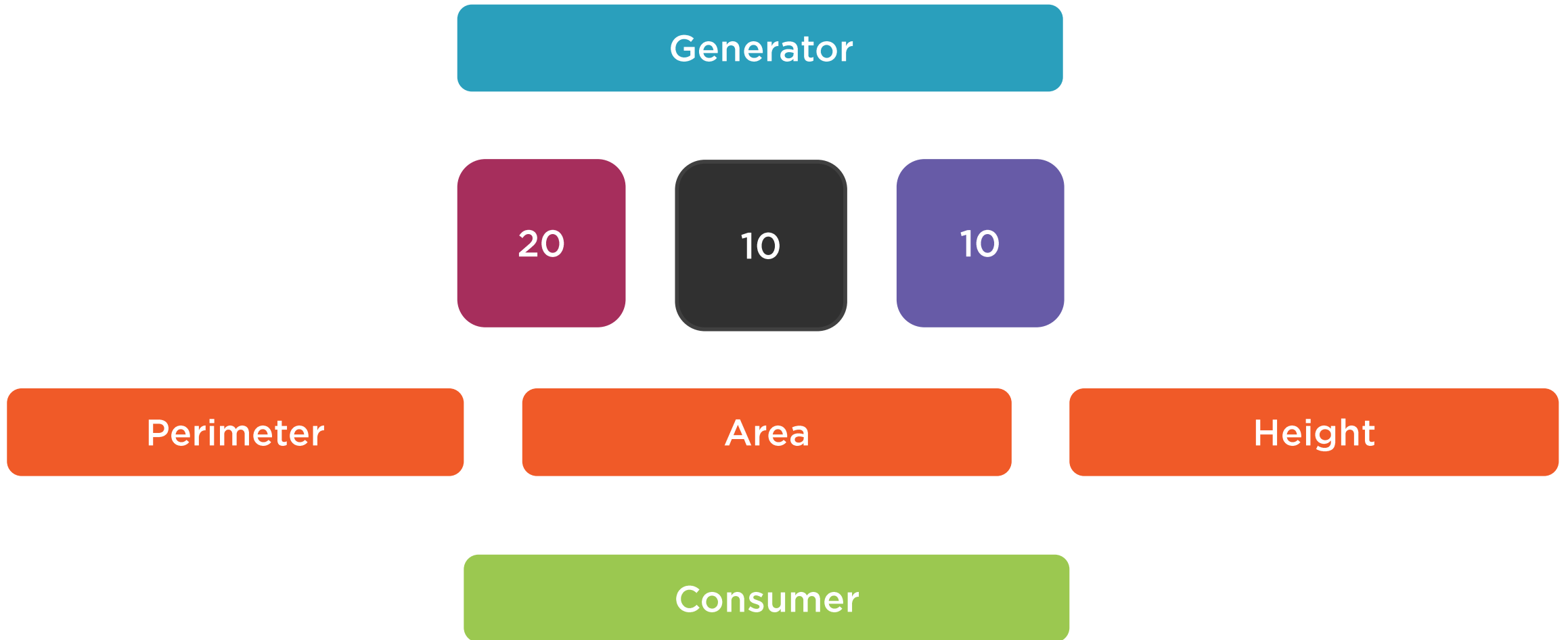
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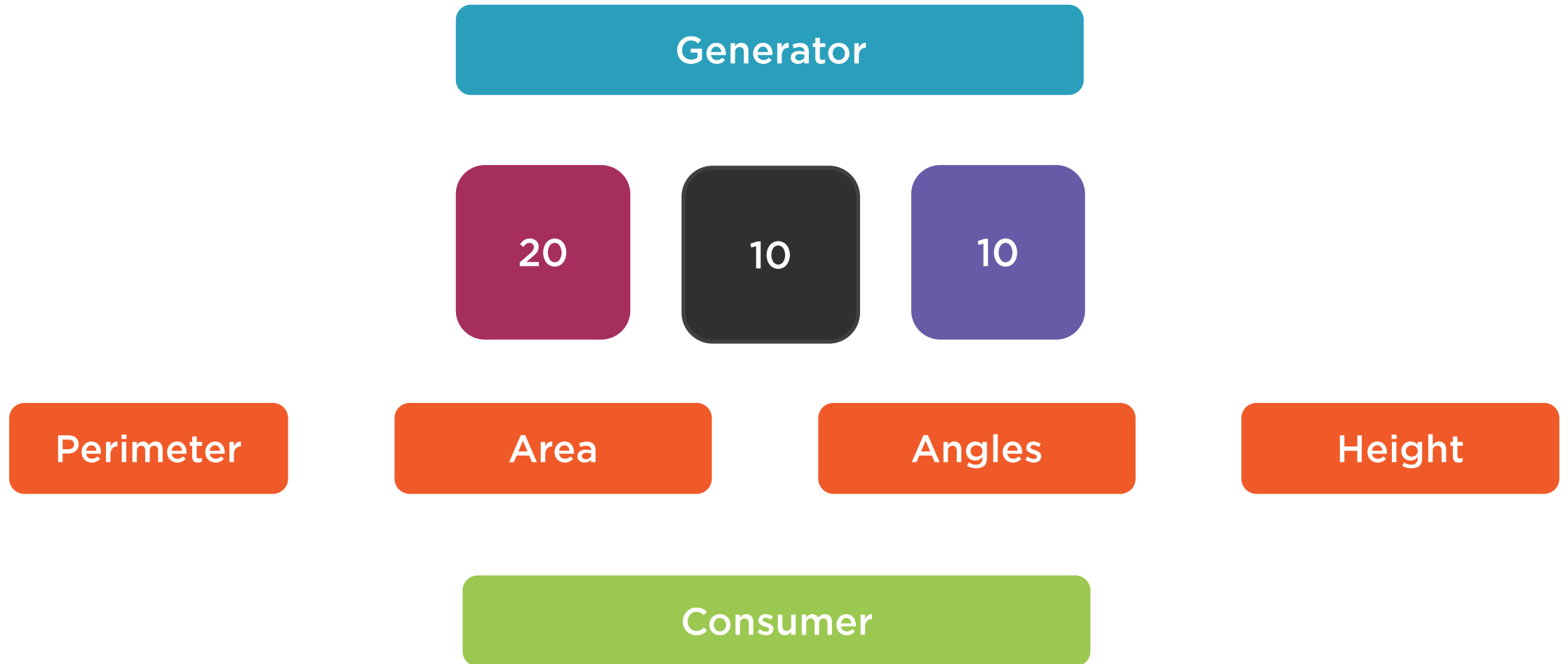
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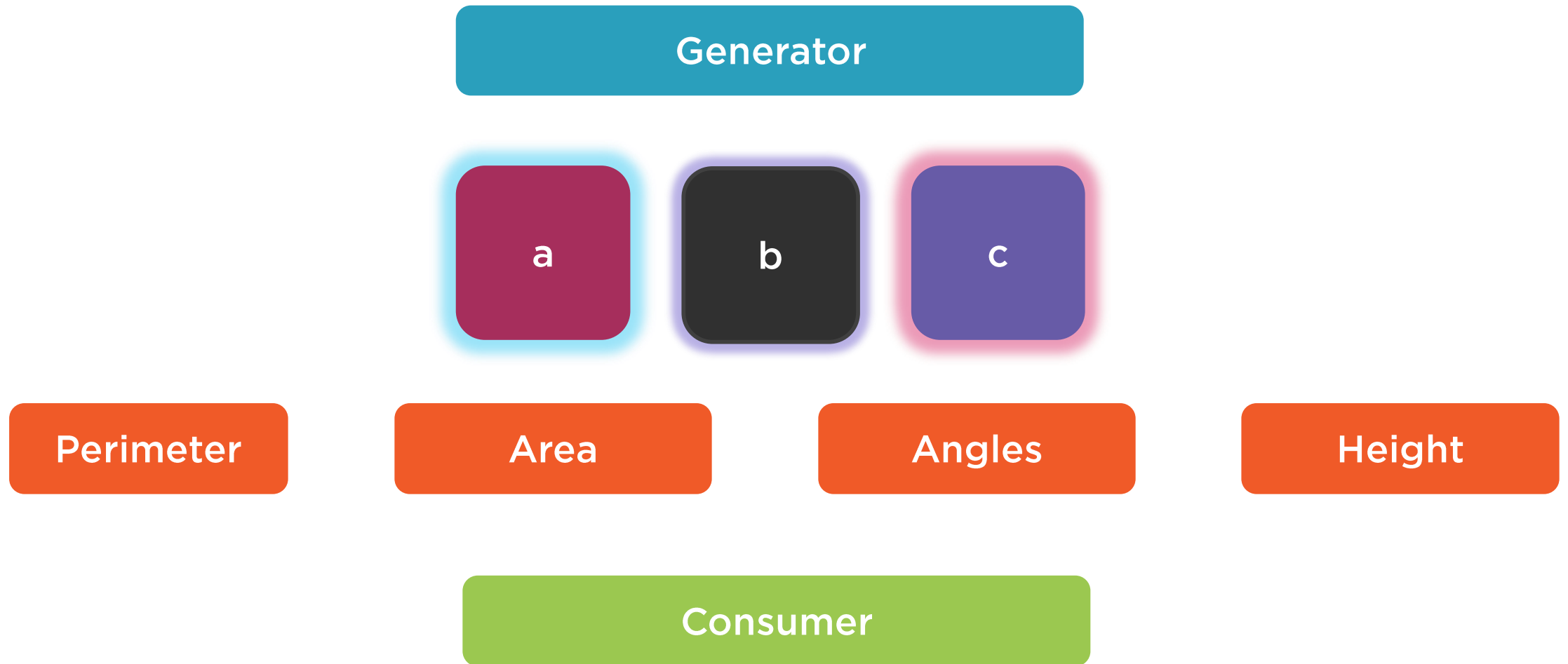
Mechanisms of Change Propagation



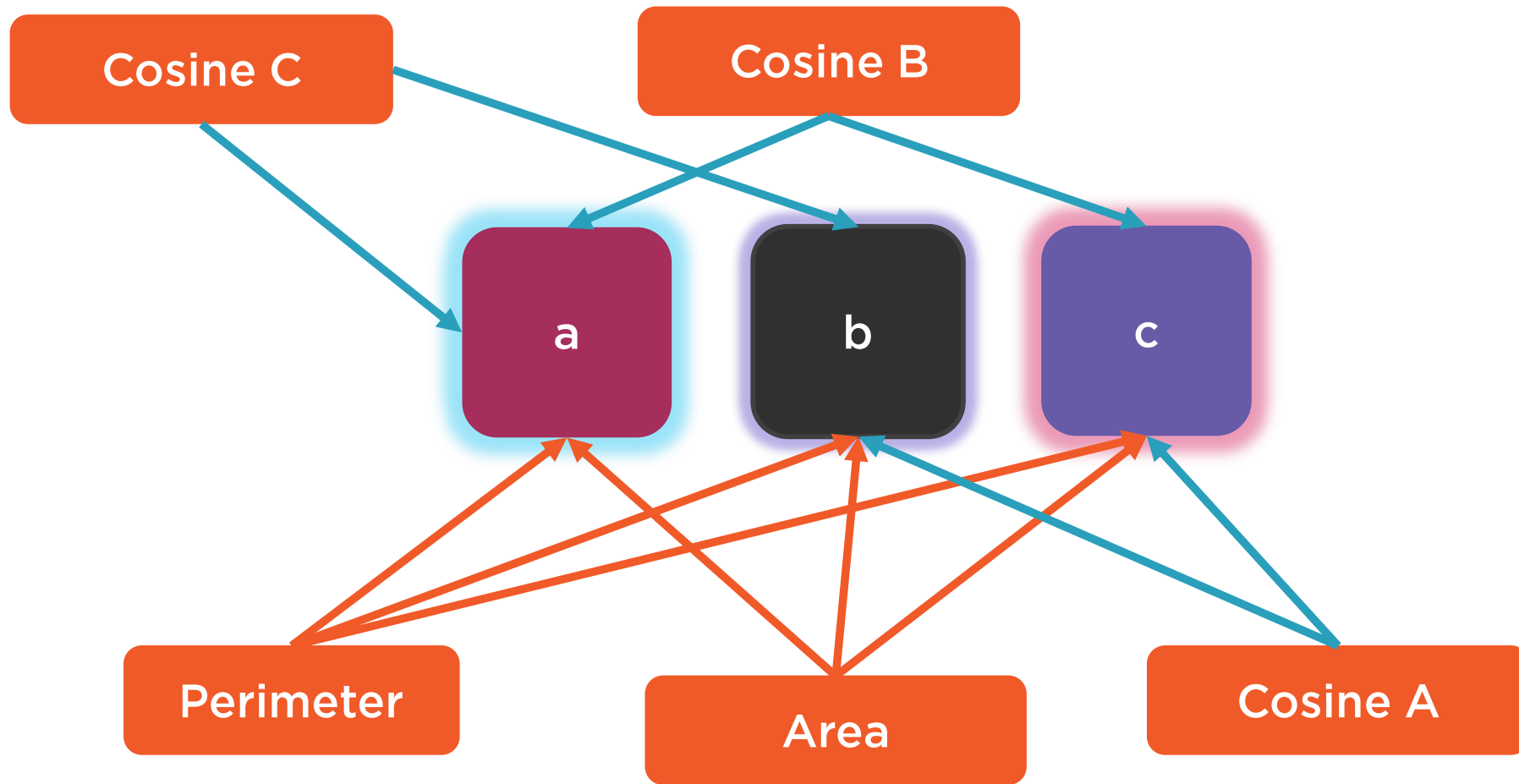
Mechanisms of Change Propagation



Mechanisms of Change Propagation



Mechanisms of Change Propagation



Property

An observable data, which allows us to automatically be notified upon change of data wrapped inside



Capabilities

**Holds Actual
Value**

**Provides Change
Support**

**Invalidation
Support**

**Binding
Capabilities**

**Read-only
Properties**



Examples

SimpleBooleanProperty

SimpleIntegerProperty

ReadOnlyBooleanWrapper

ReadOnlyIntegerWrapper



Demo



Properties

- SimpleStringProperty
- SimpleIntegerProperty
- ReadOnlyDoubleWrapper

JavaFX Control Properties

Change Listener

Progress Bar Control

- Add to UI
- Update using change listener



Bindings



A property can be bound to a target

Creates a link among properties

Synchronizes two properties

Uni-Directional or Bi-Directional

Fluent API support for high level binding

Support for low level binding

```
StringProperty lastNameProp = new SimpleStringProperty();  
StringProperty surNameProp = new SimpleStringProperty();  
surNameProp.bind(lastNameProp);  
lastNameProp.set("Diggory");  
System.out.println(surNameProp.get());
```

Uni-Directional Binding




```
StringProperty lastNameProp = new SimpleStringProperty();  
StringProperty surNameProp = new SimpleStringProperty();  
surNameProp.bindBidirectional(lastNameProp);  
lastNameProp.set("Diggory");  
surNameProp.set("Potter");
```

Bi-Directional Binding



```
IntegerProperty length = new SimpleIntegerProperty(10);  
IntegerProperty width = new SimpleIntegerProperty(15);
```

```
NumberBinding area = length.multiply(width);  
NumberBinding per = Bindings.add(length, width).multiply(2);
```

```
NumberBinding twiceTheArea = area.multiply(2);
```

High-Level Binding

Creation of Bindings between two or more parameters using fluent API.



```
DoubleProperty radius = new SimpleDoubleProperty(15);
DoubleBinding volumeBinding = new DoubleBinding() {
    {
        super.bind(radius);
    }
    protected double computeValue() {
        return (4/3 * Math.PI * Math.pow(radius.get(),3));
    }
};
```

Low-Level Binding

For complex bindings that can't be achieved by fluent API. Achieved by overriding abstract binding classes.



Demo



Examples of

- Uni-Directional Binding
- Bi-Directional Binding
- High-Level Binding
- Low-Level Binding

Practical applications in Do-It



Observable Collections

Detect Changes to a Collection

- Adding Items
- Removing items

FXCollections is utility class

Classes/Interfaces

- ObservableList
- ObservableSet
- ObservableIntegerArray
- ObservableFloatArray
- ...



Observable Collections

Classes/Interfaces

ObservableList

ObservableMap/ObservableHashMap

ObservableSet

ObservableIntegerArray

ObservableFloatArray

ObservableArray

Change Listeners

ListChangeListener

MapChangeListener

SetChangeListener

ArrayChangeListener

ArrayChangeListener

ArrayChangeListener



Demo



Demonstrate usage of ObservableList

Display list of tasks in TableView

Few more useful binding examples



Summary



Properties

Bindings

Observable Collections

Improved our UI using bindings

