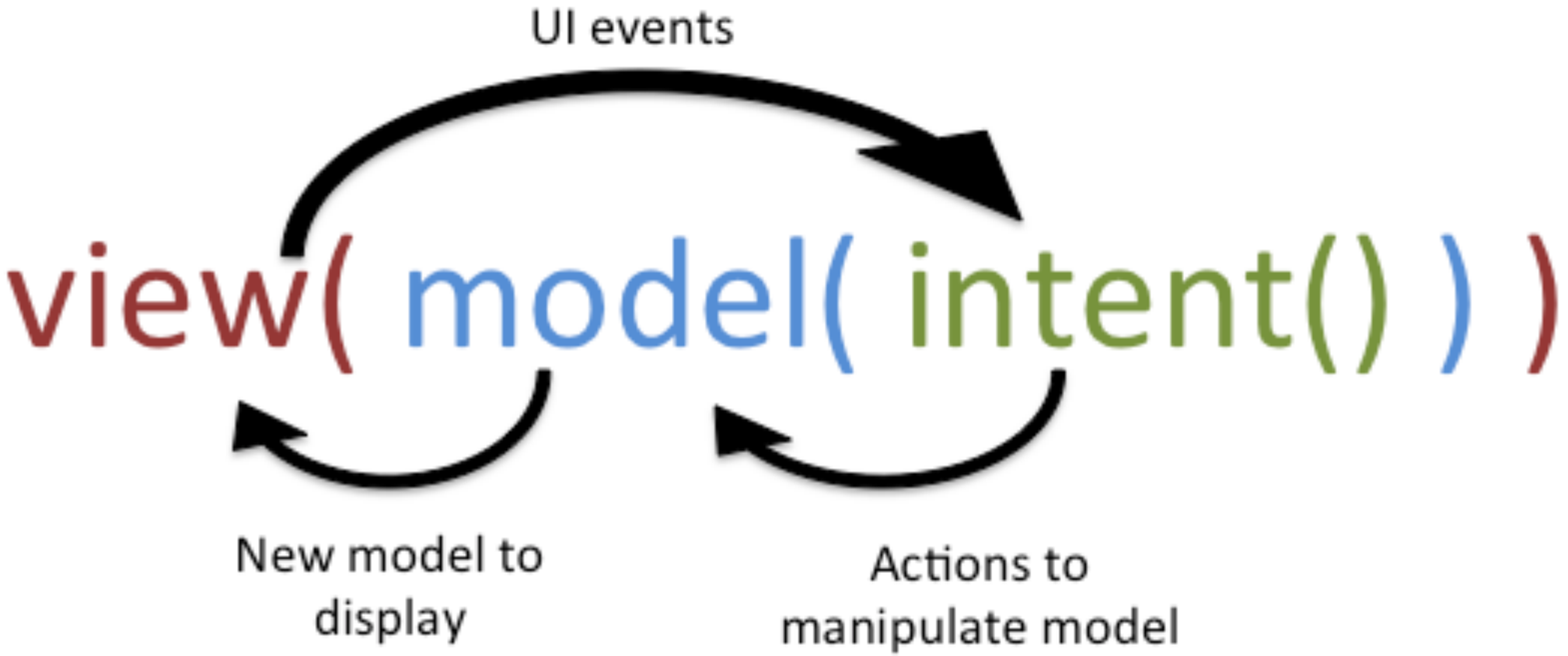
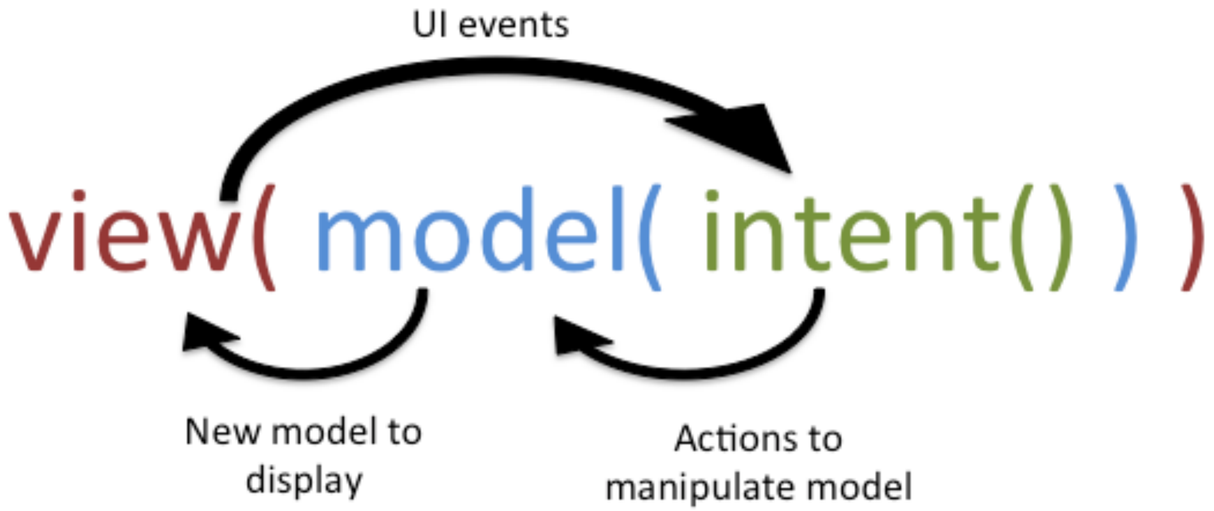
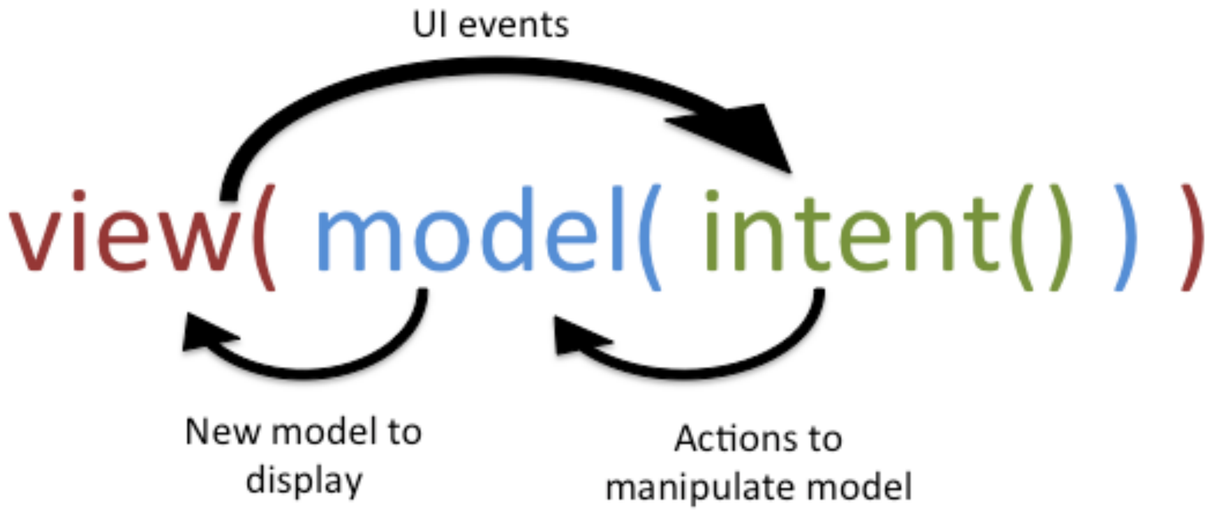
Simple MVI Architecture for Android



http://hannesdorfmann.com/android/mosby3-mvi-1

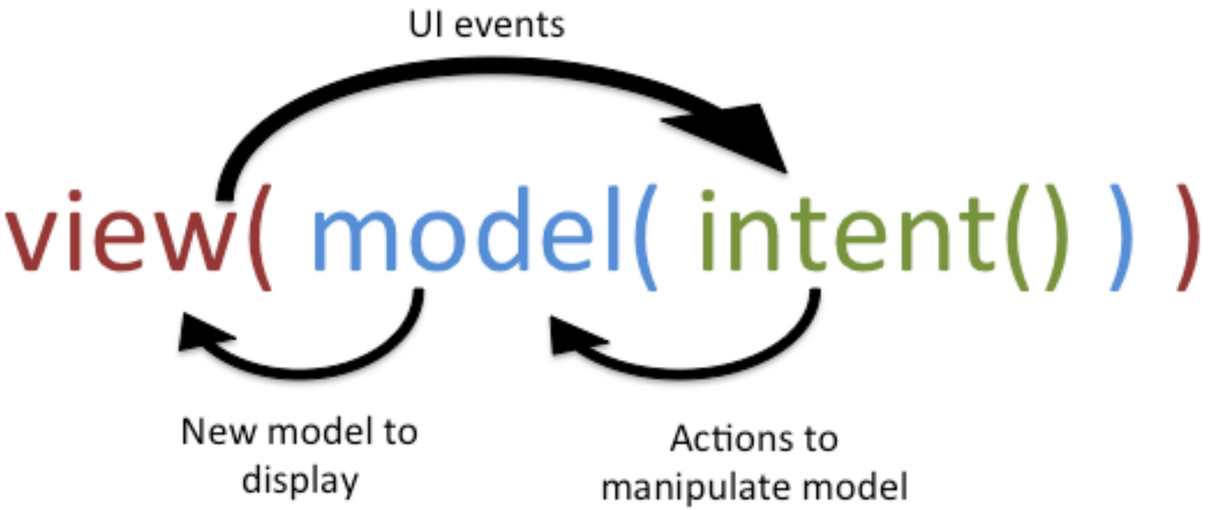

UI events
view(model(intent()))
New model to display
Actions to manipulate model

$$f(x)$$



$$f(x)$$

https://xkcd.com/1312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Simple MVI Architecture for Android

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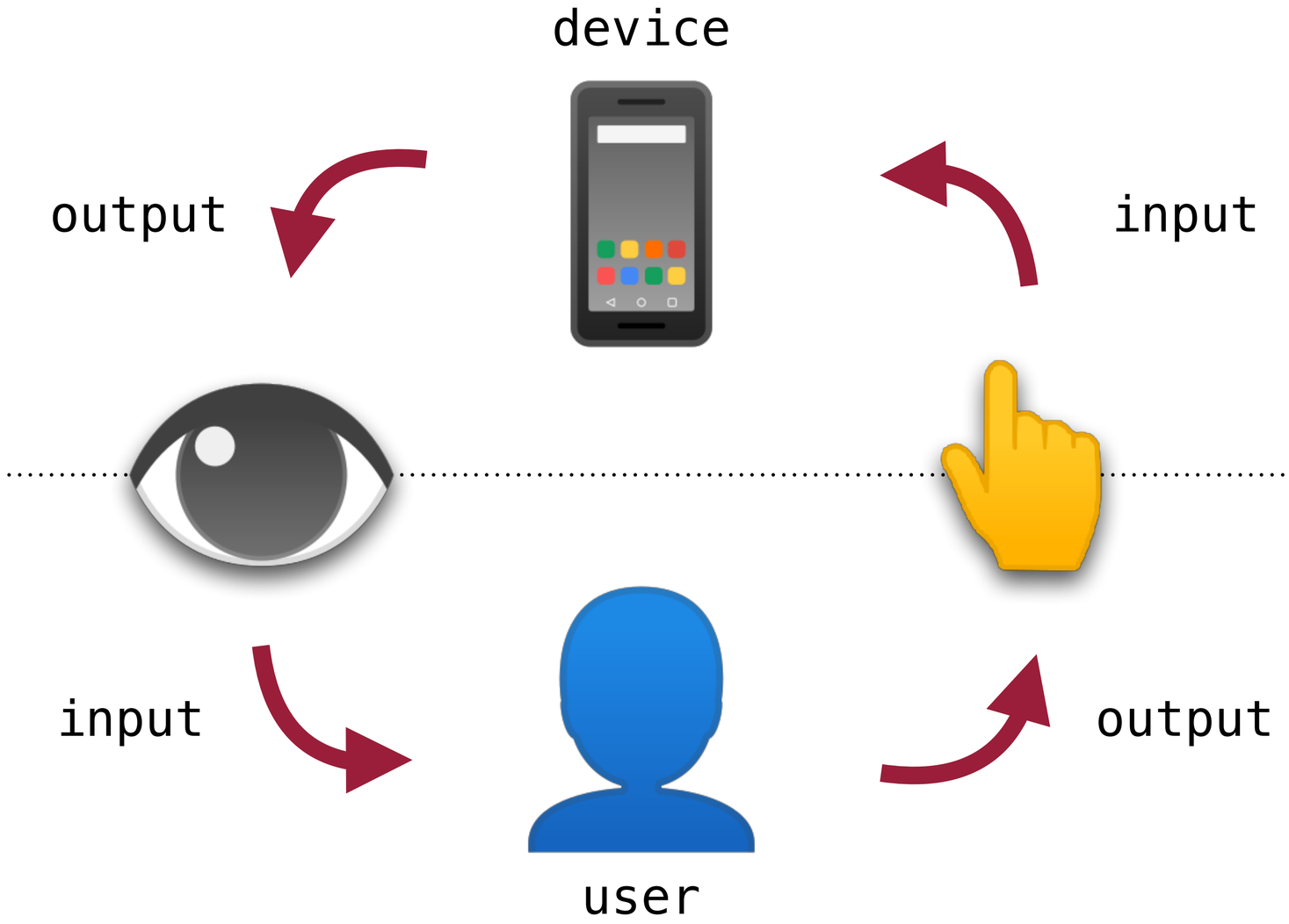
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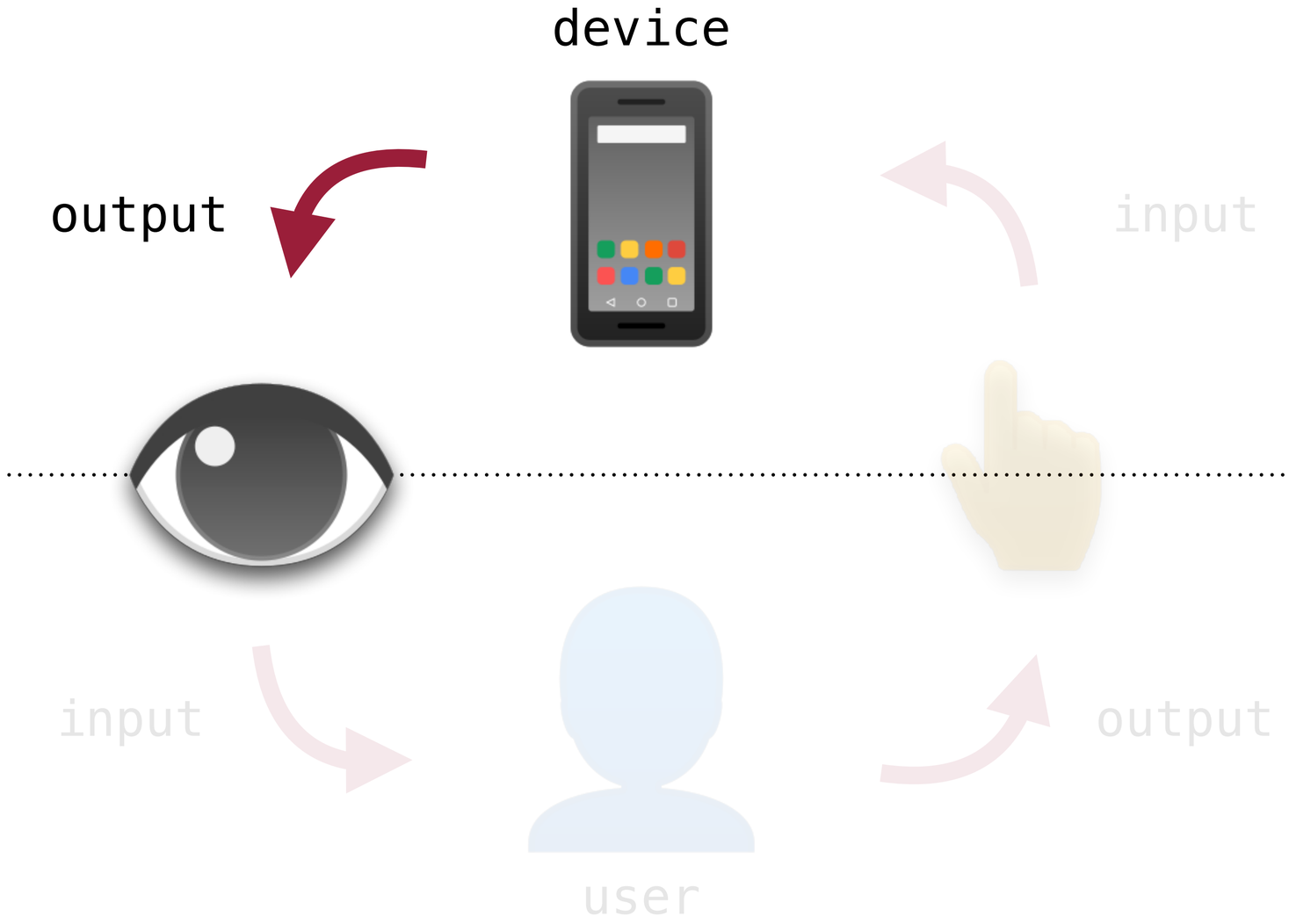
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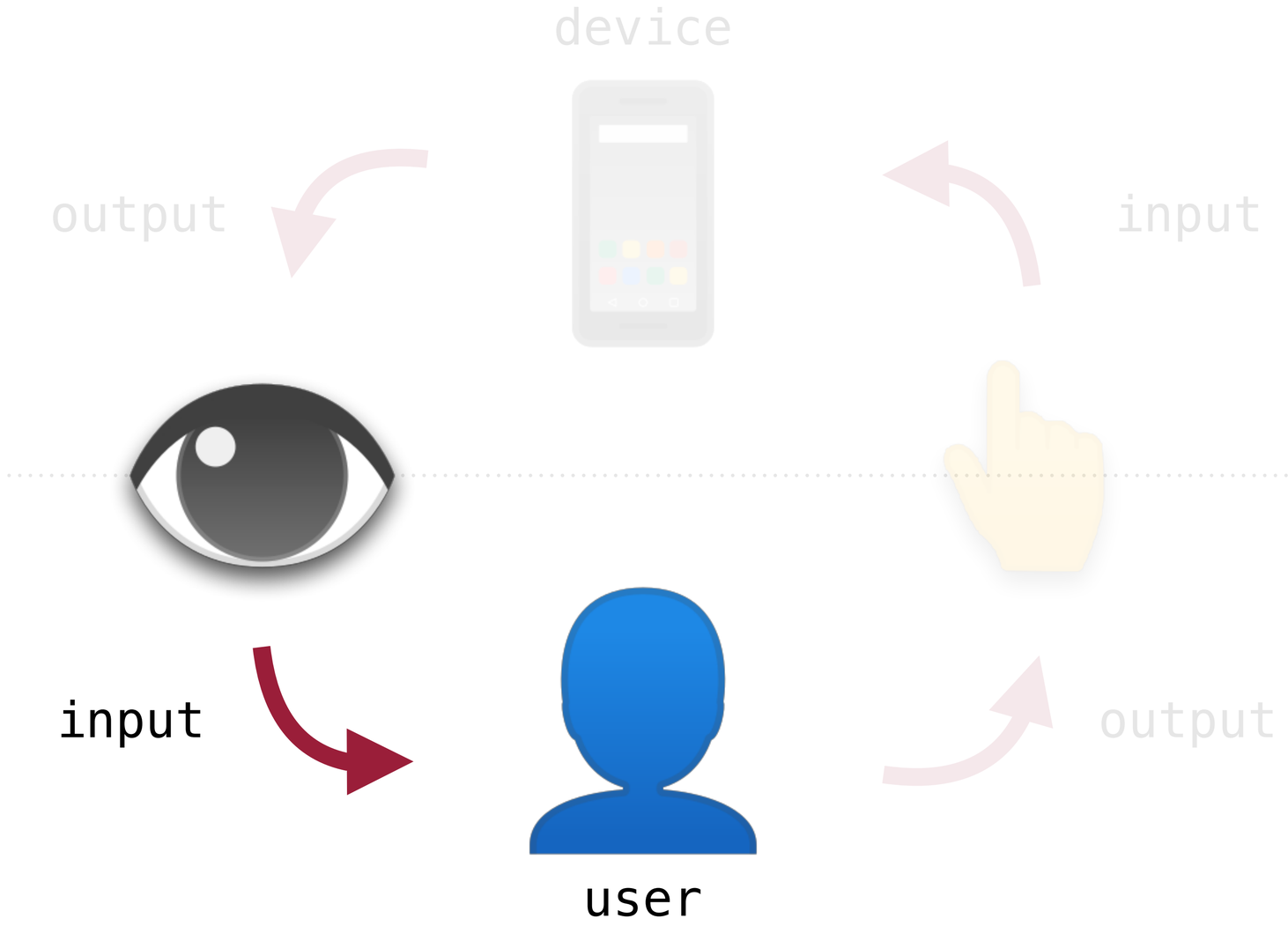
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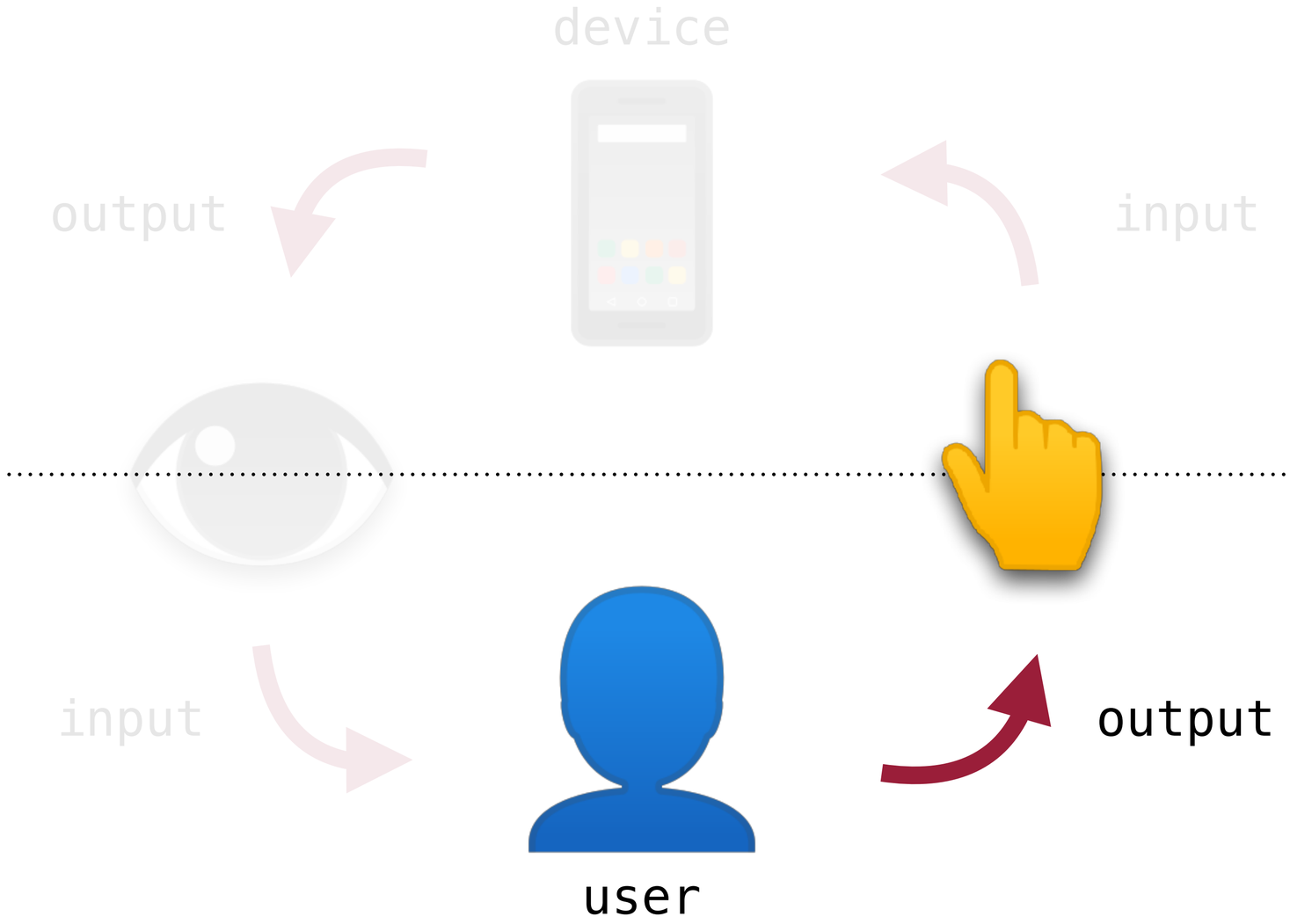
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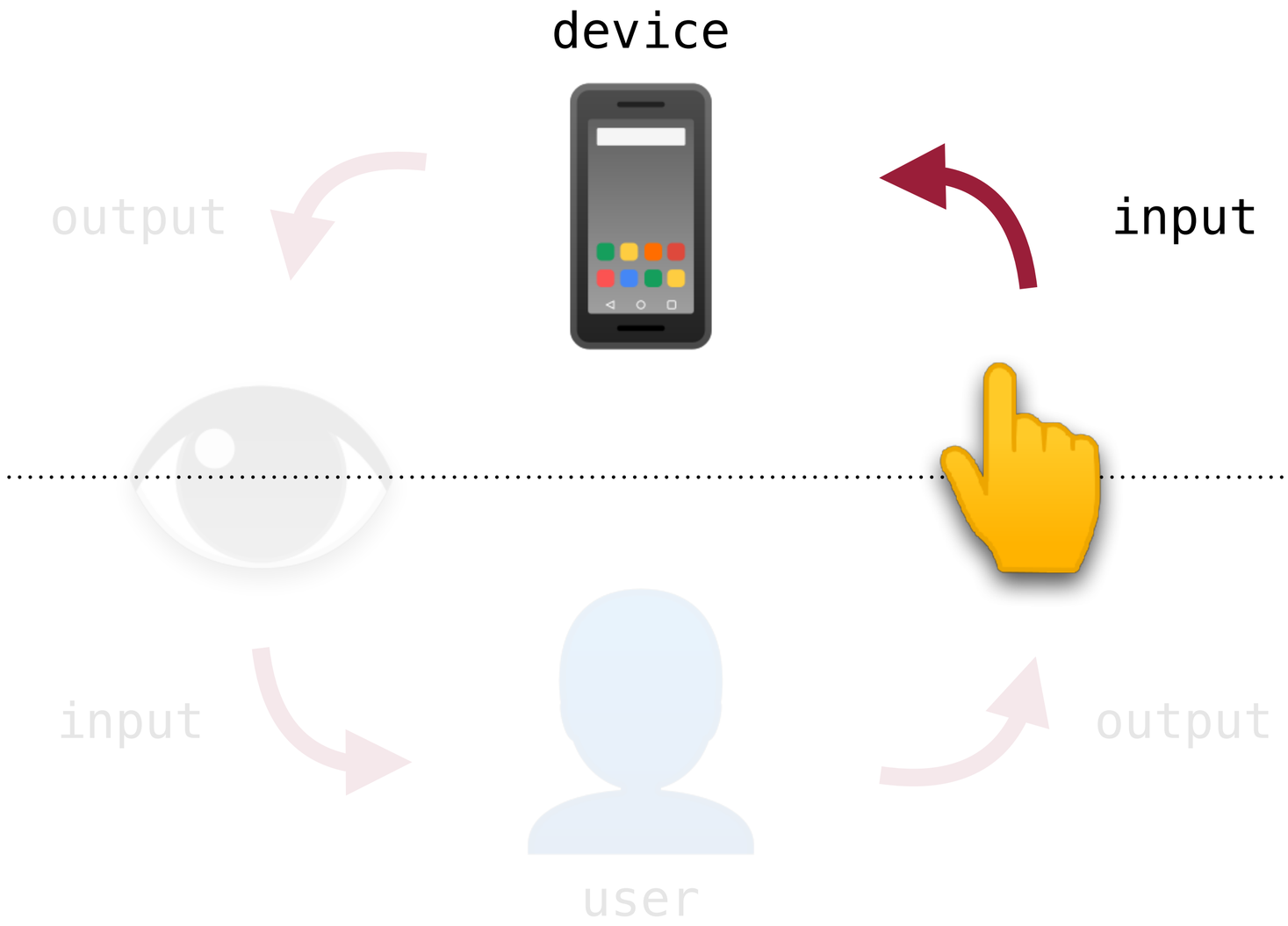
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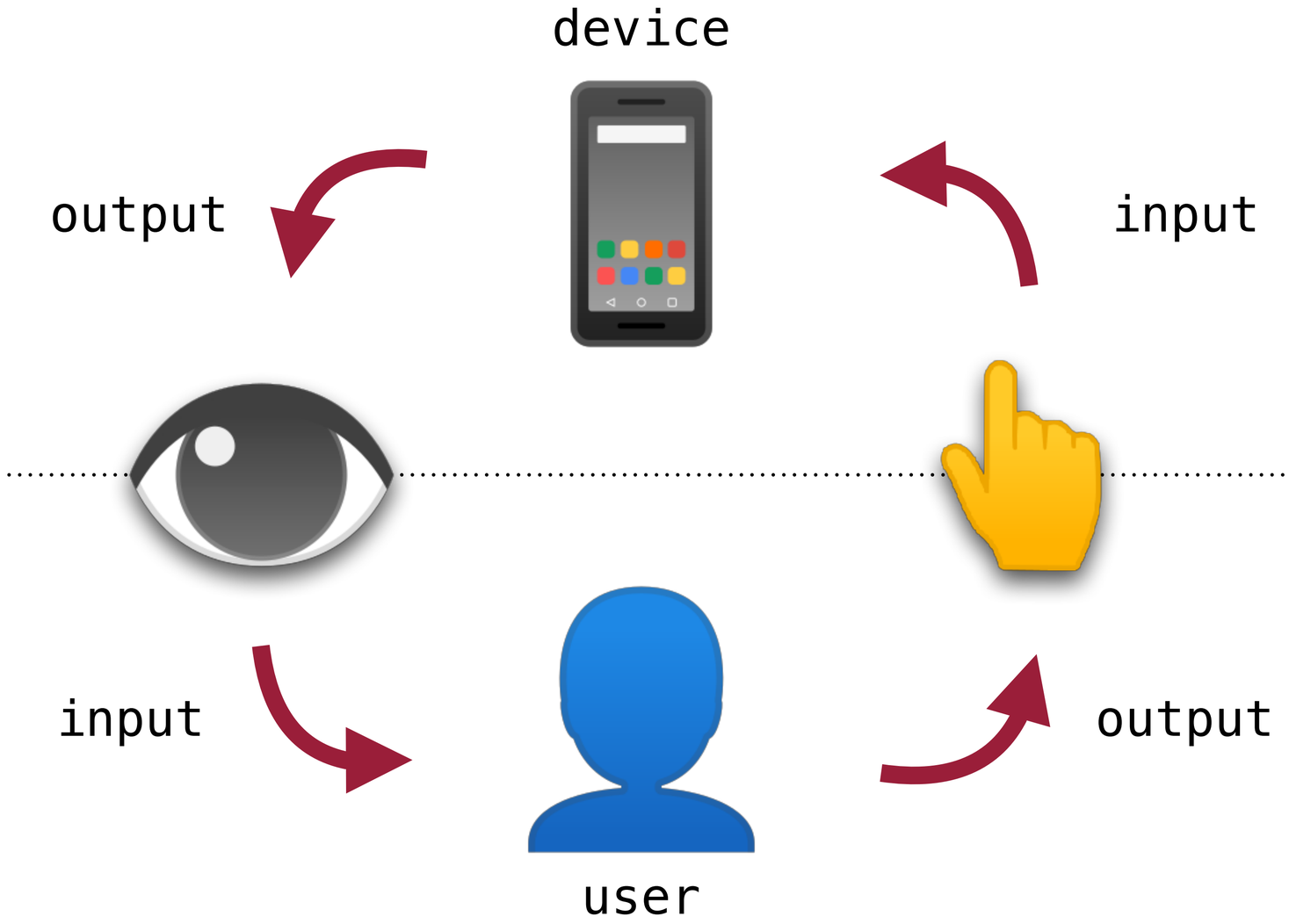
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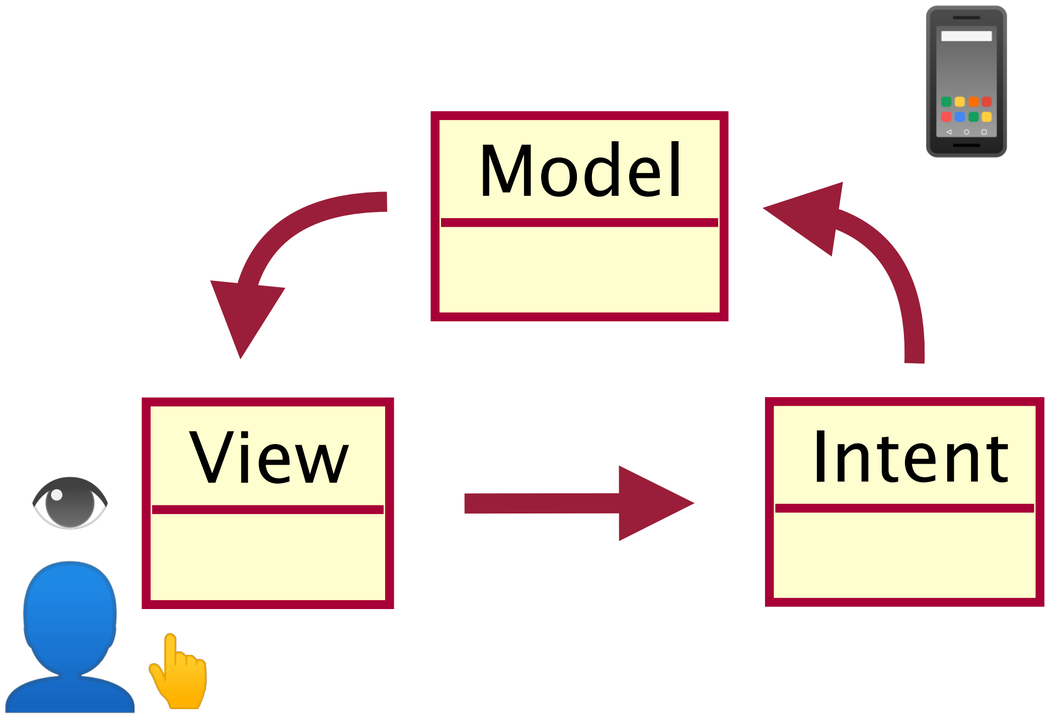
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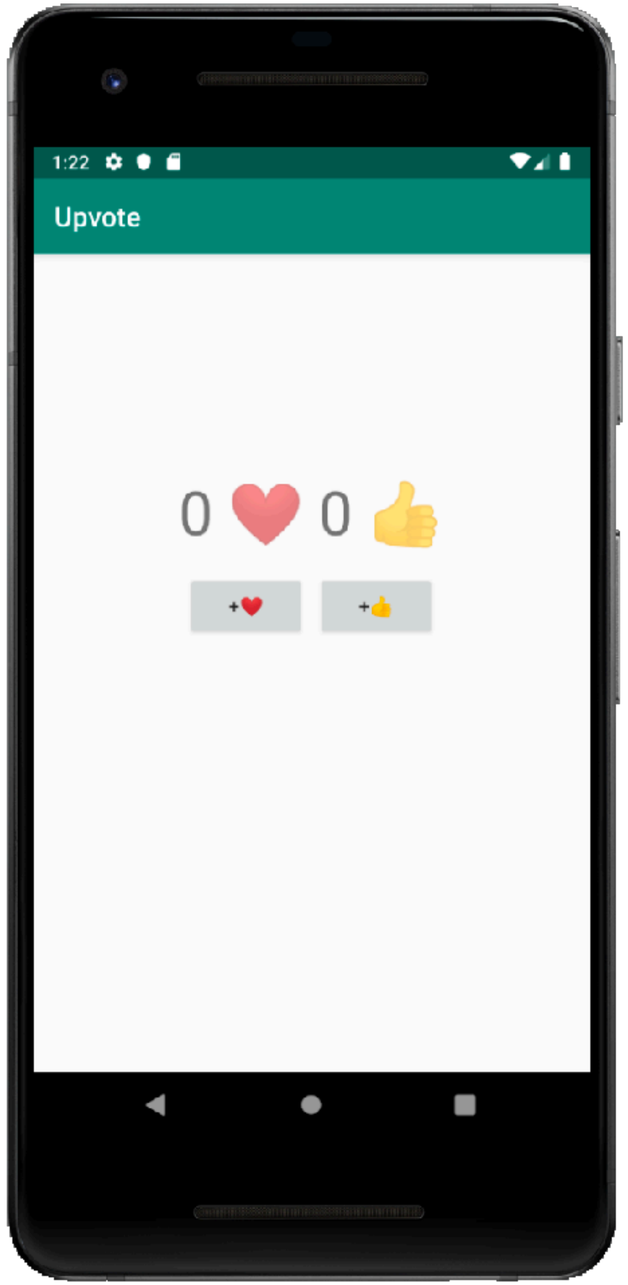
Intent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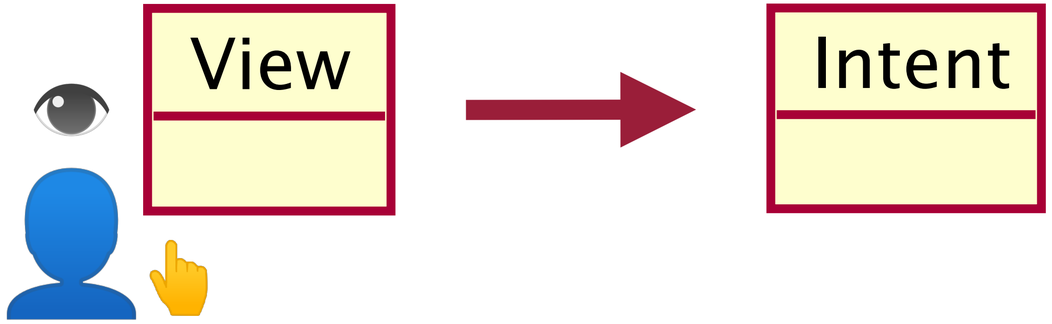
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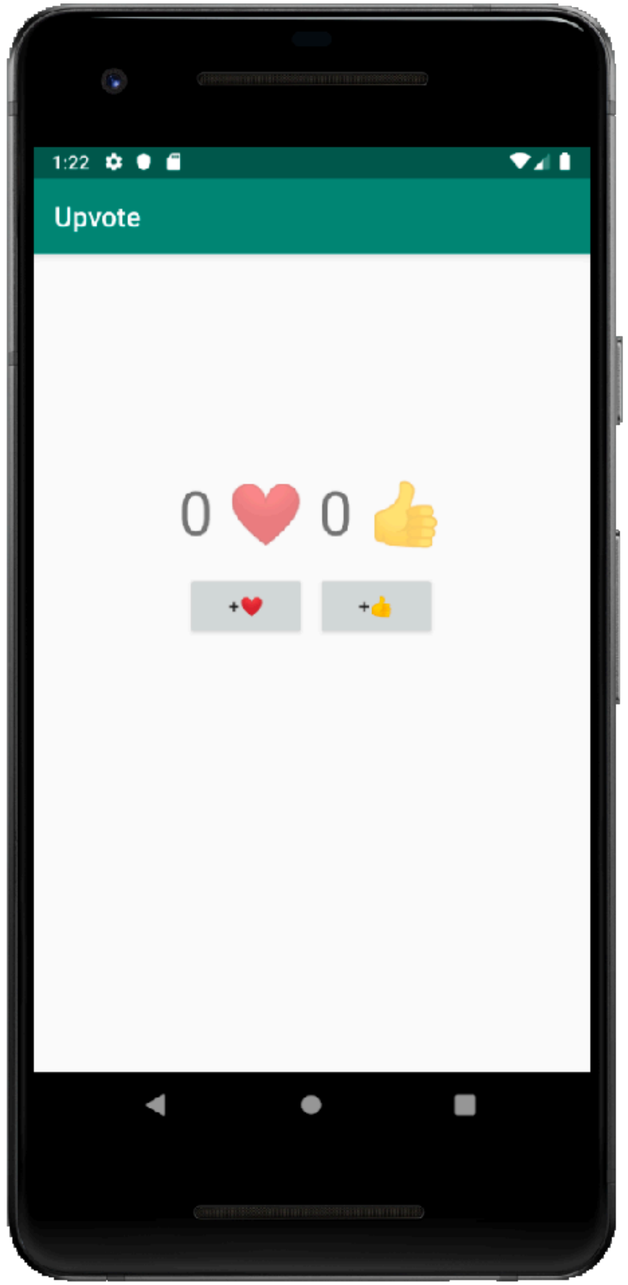
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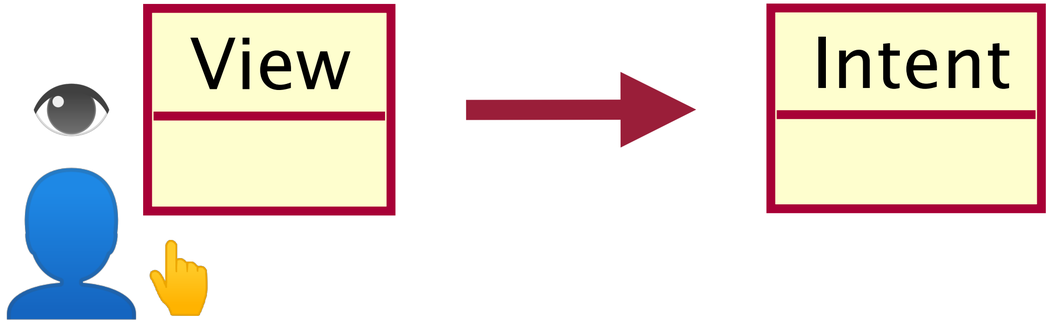
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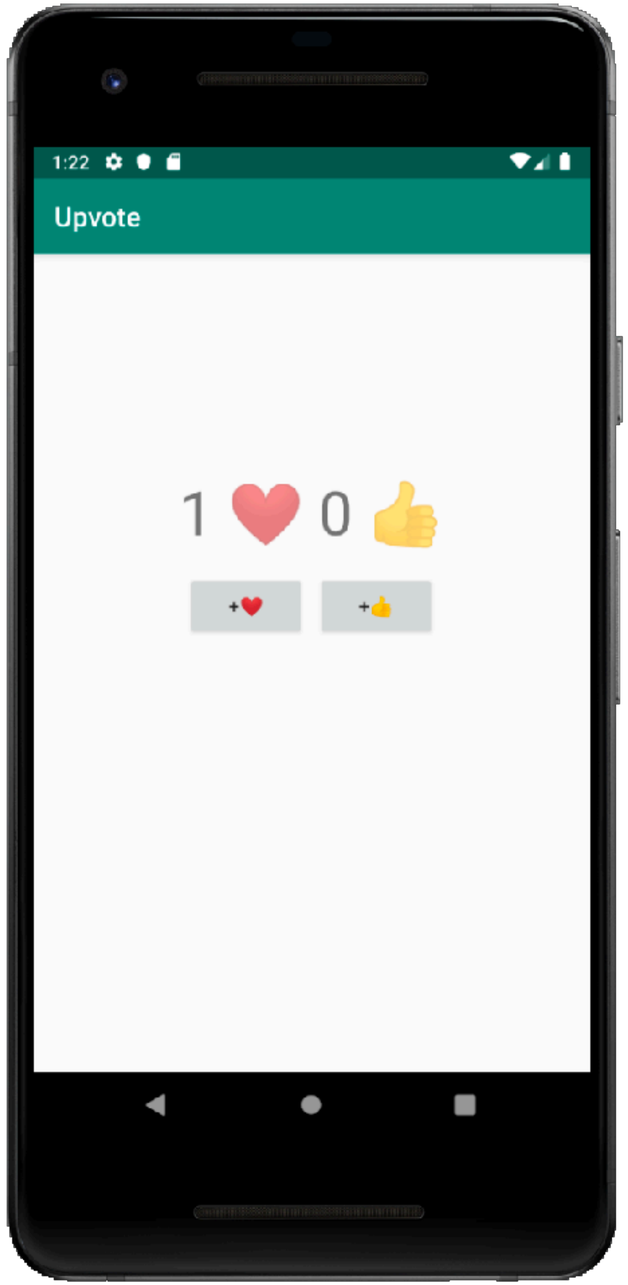
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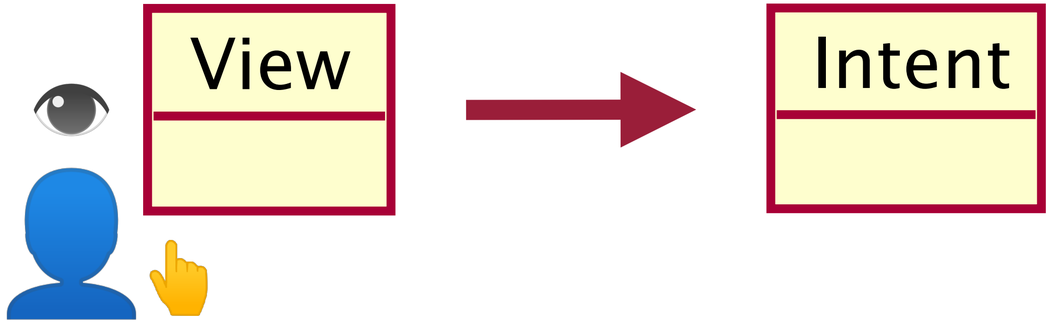
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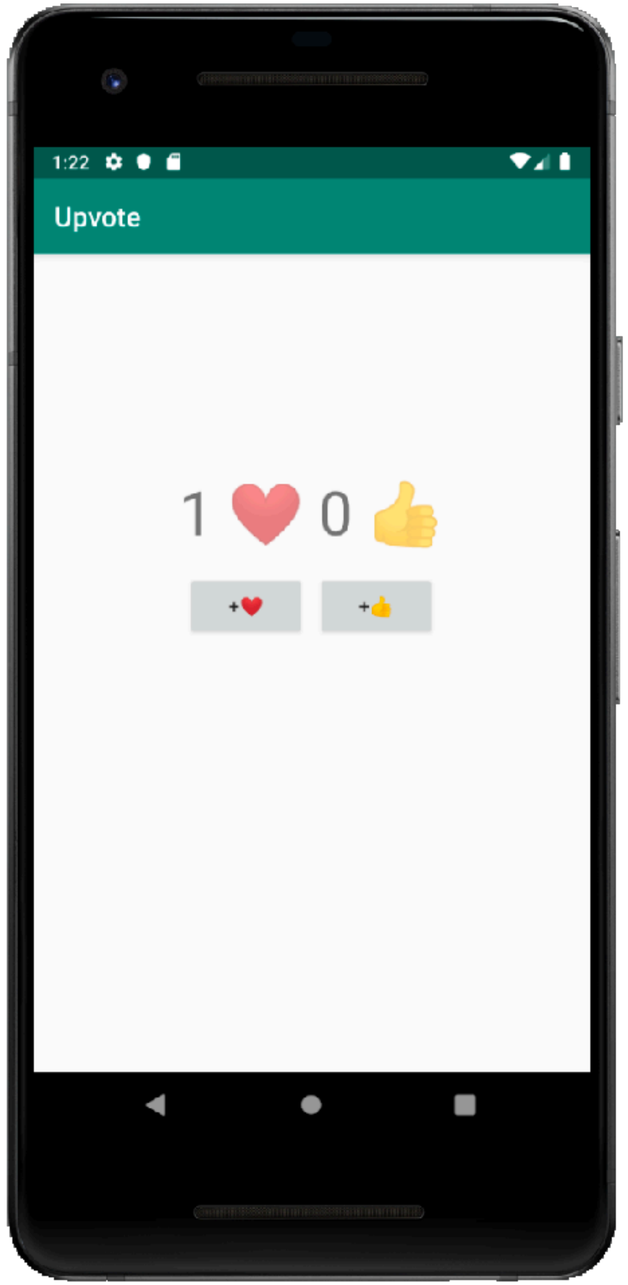
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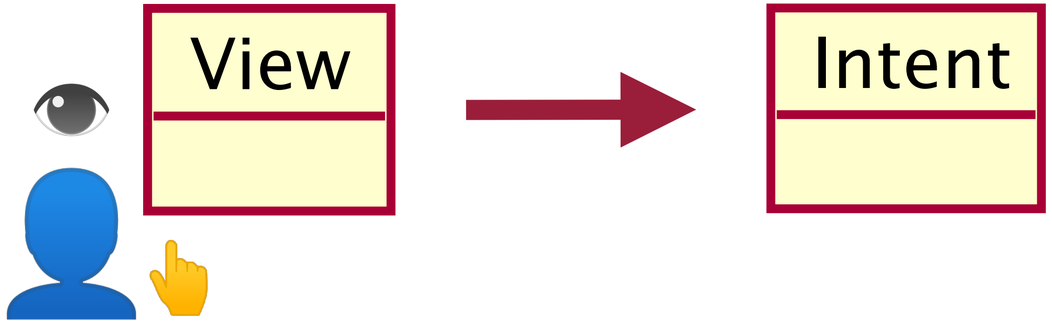
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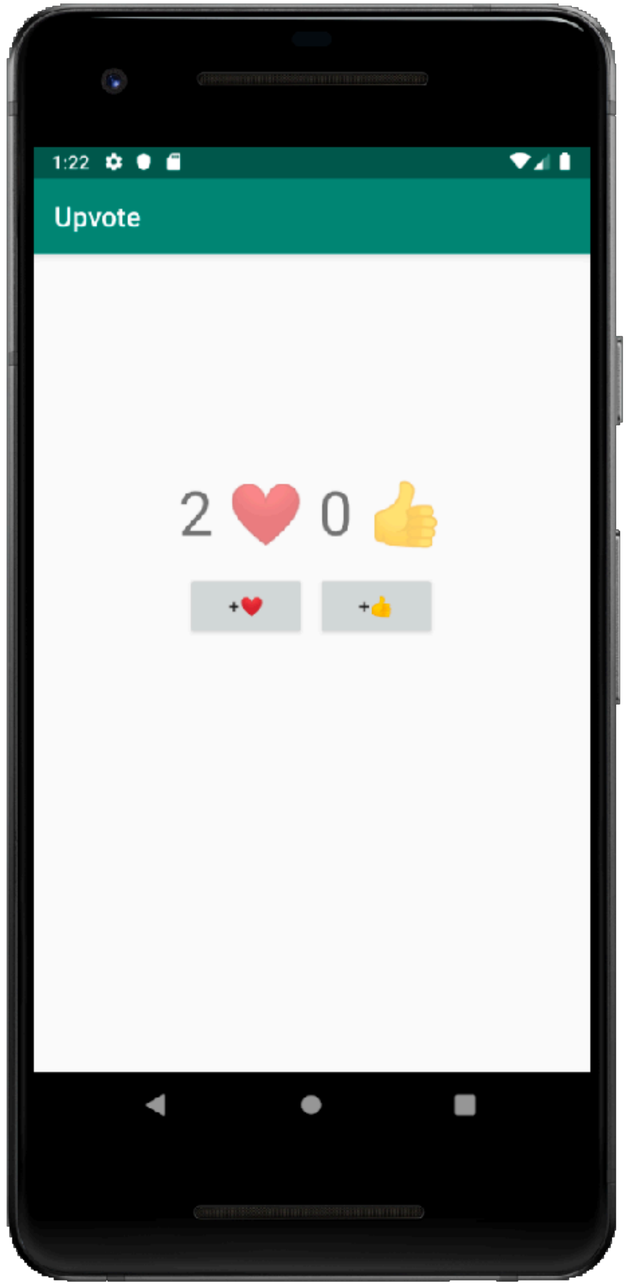
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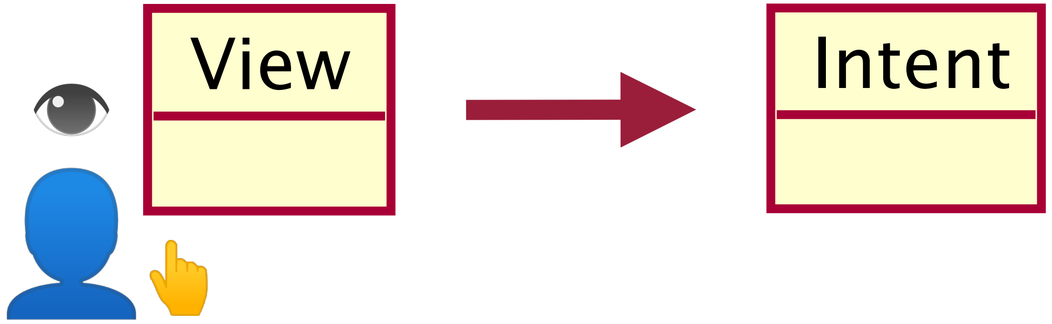
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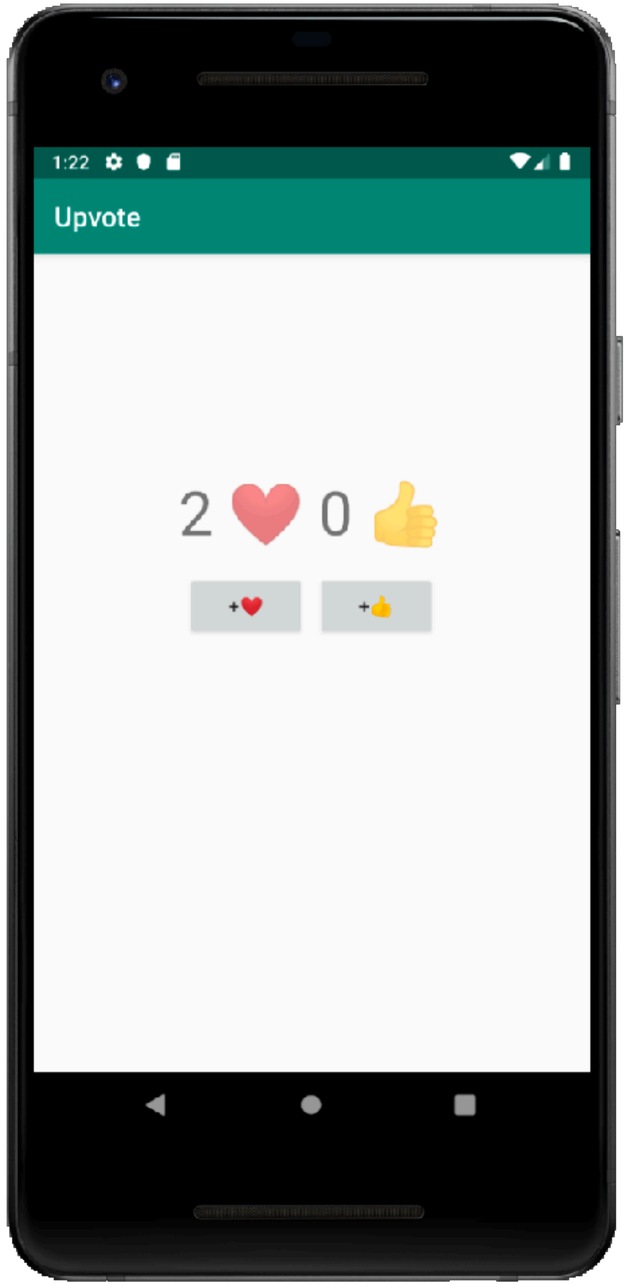
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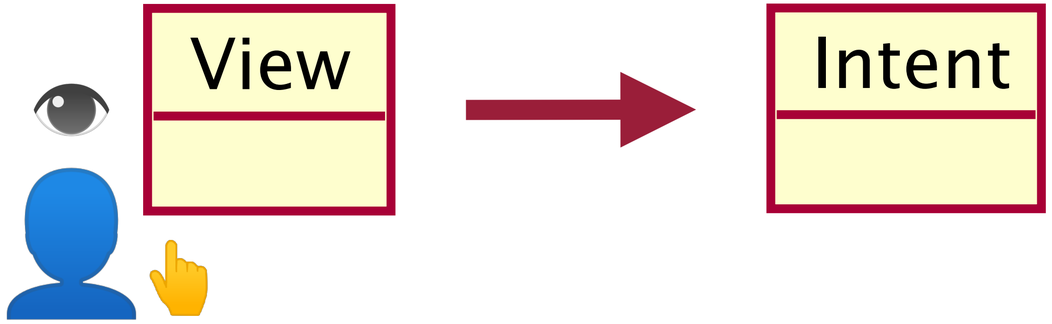
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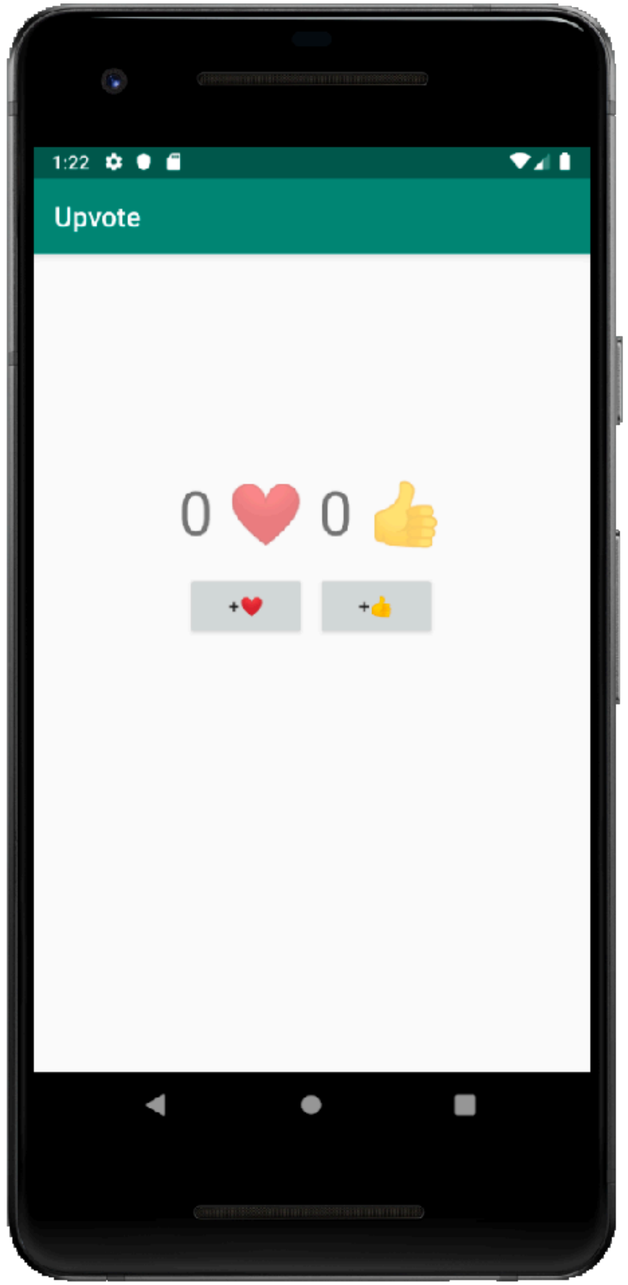
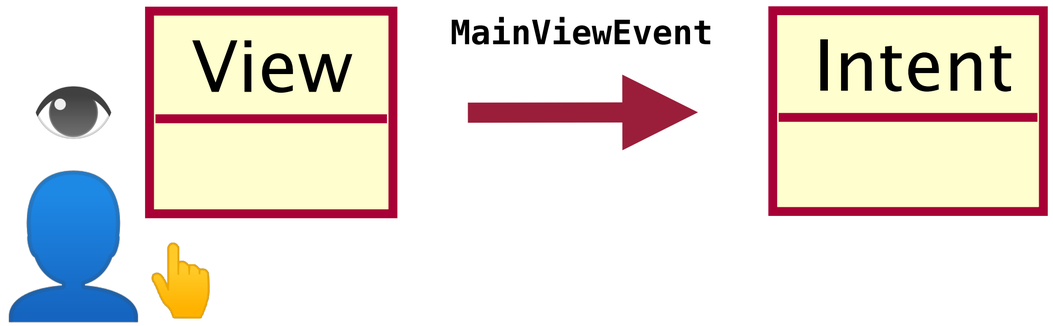
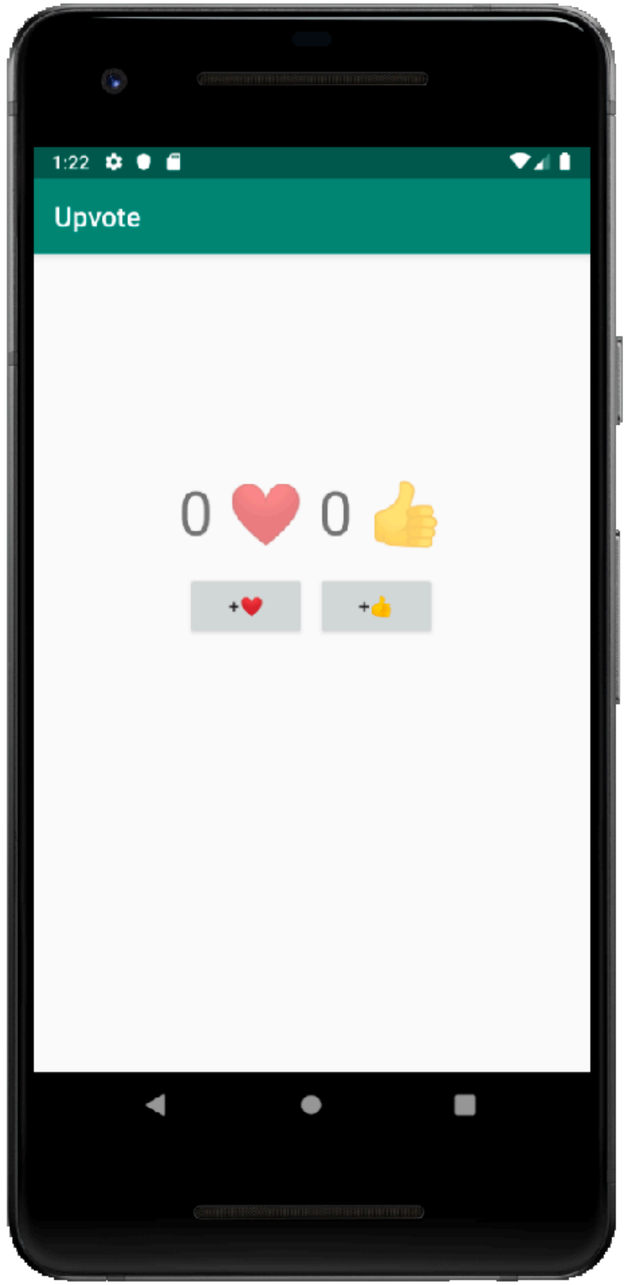



```
sealed class MainViewEvent {
    object ThumbsUpClick : MainViewEvent()
    object LoveItClick : MainViewEvent()
}
```



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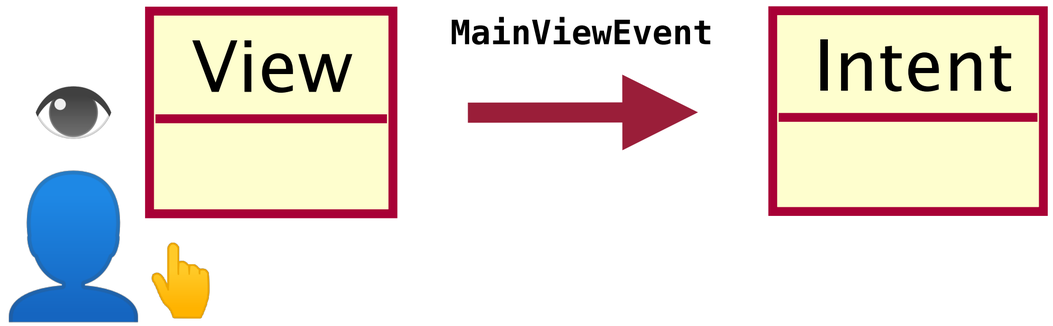

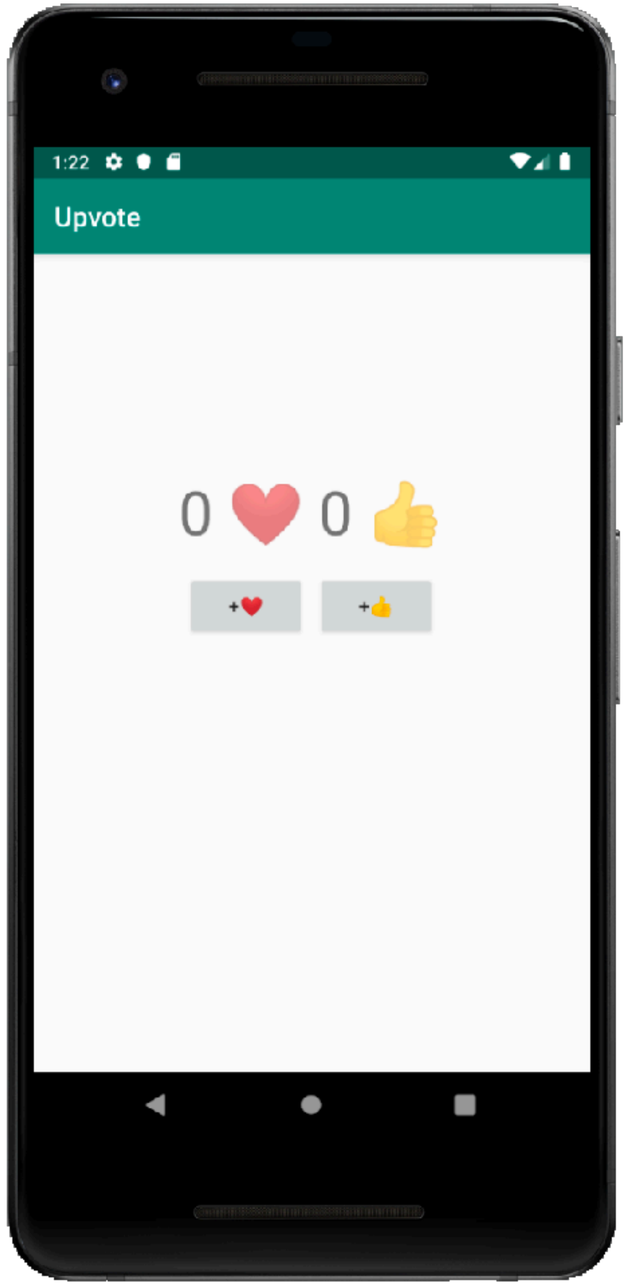


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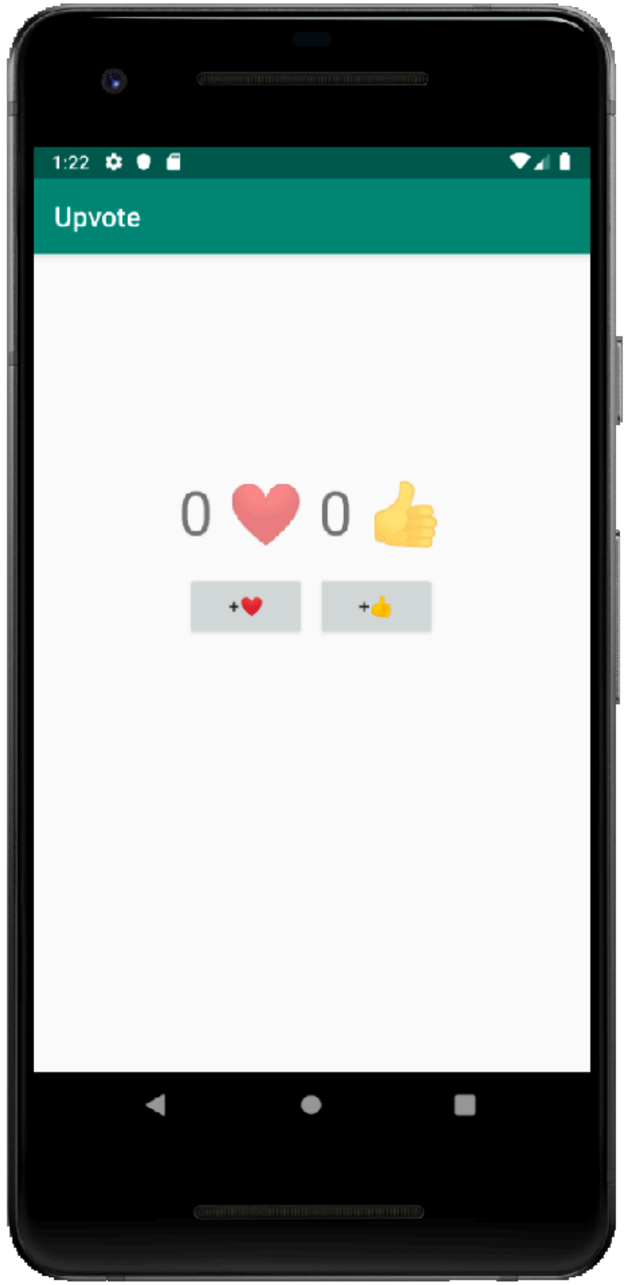
- MainViewEvent
  - +👍 ThumbsUpClick
  - +❤️ LoveItClick

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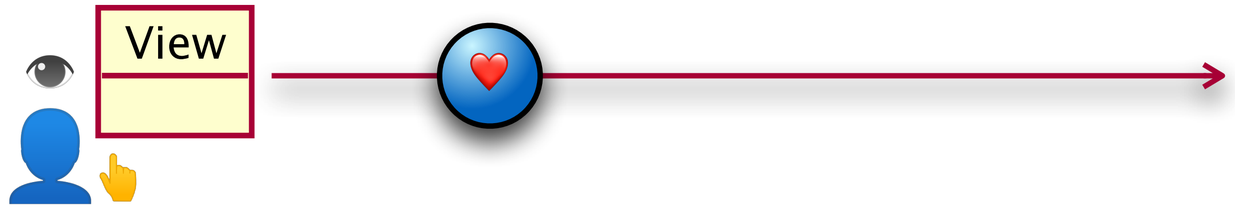

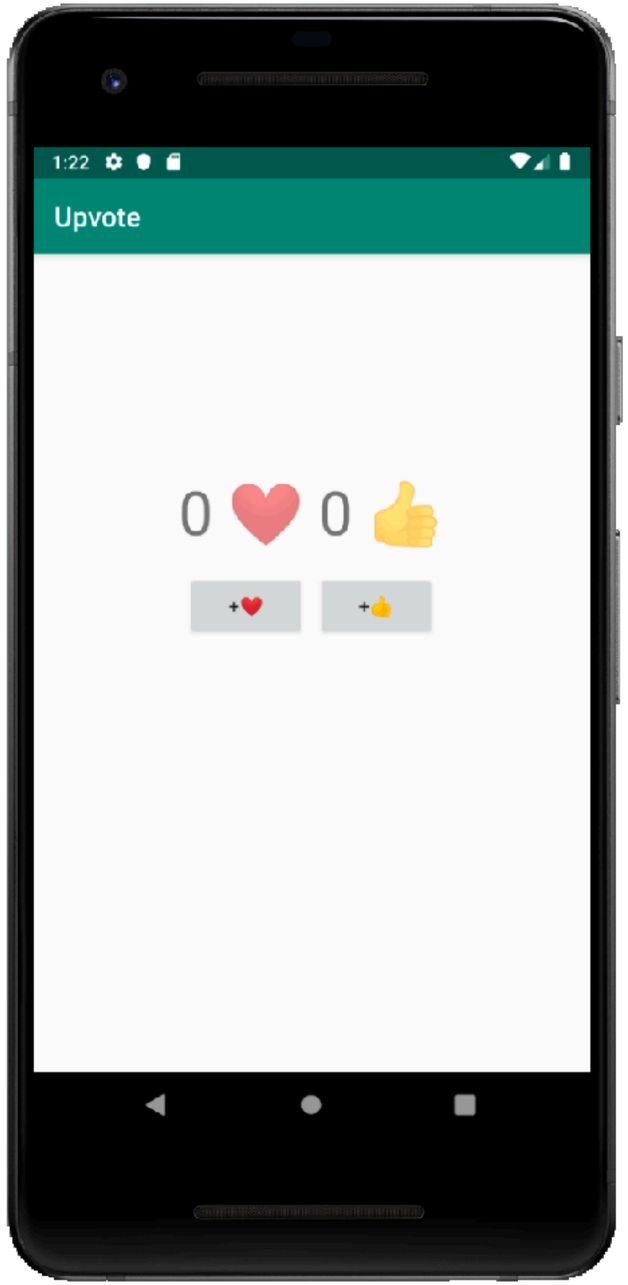


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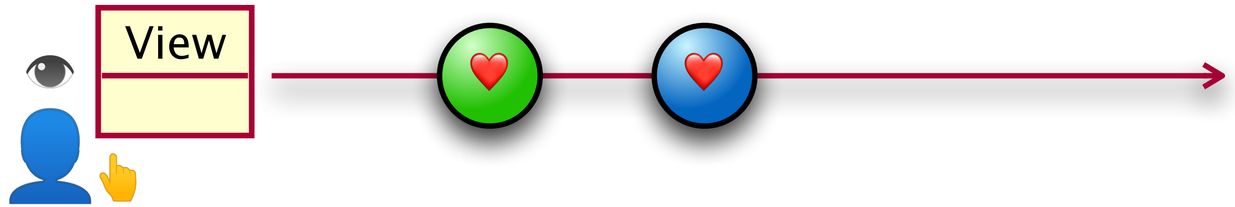

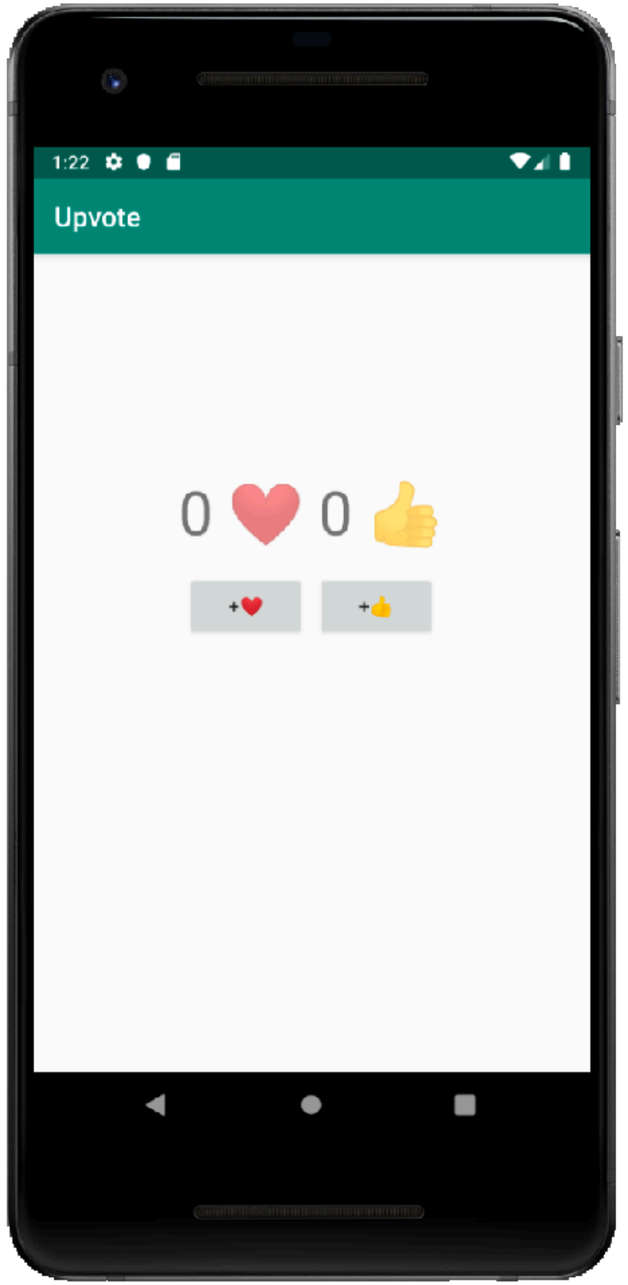


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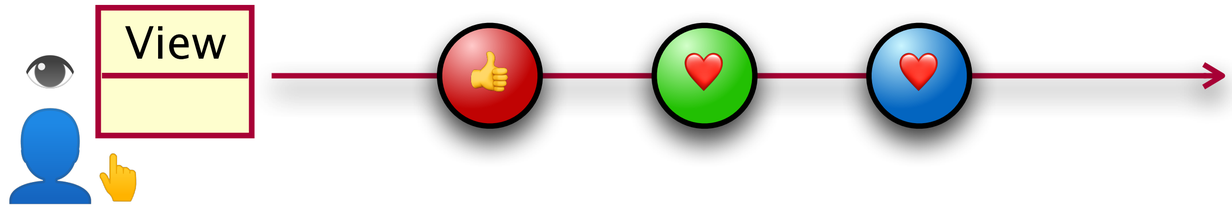
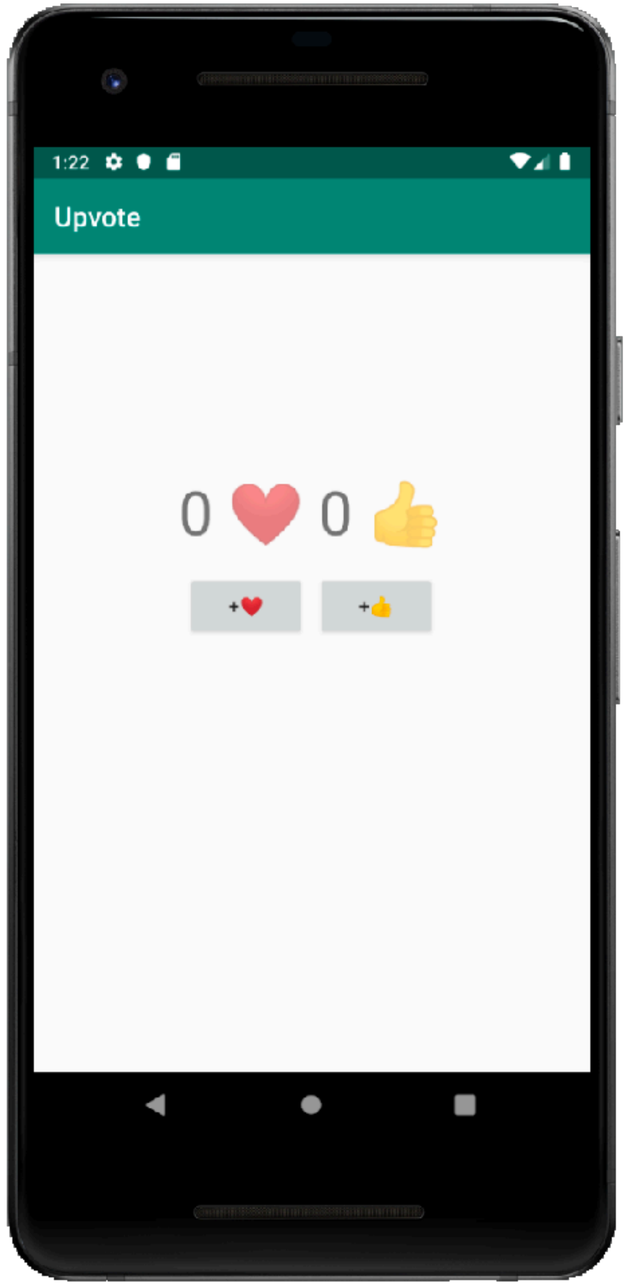
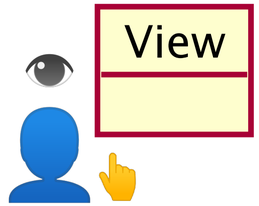
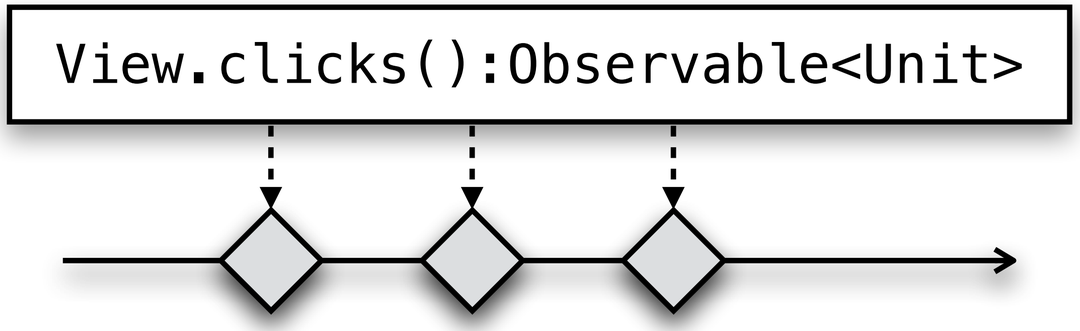
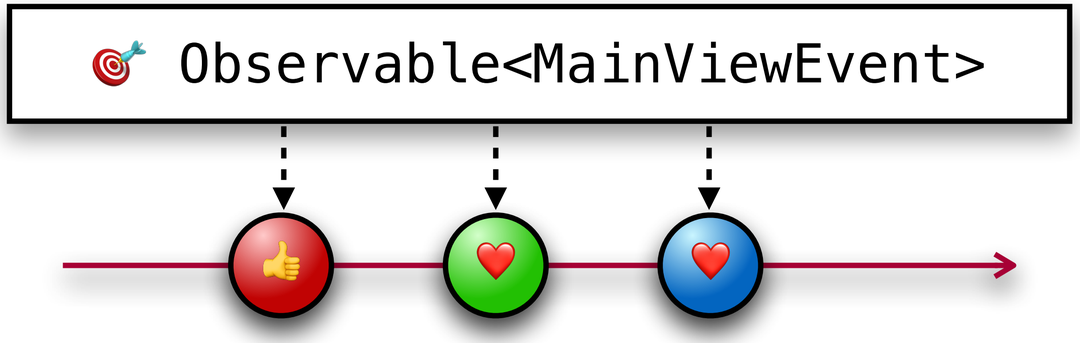


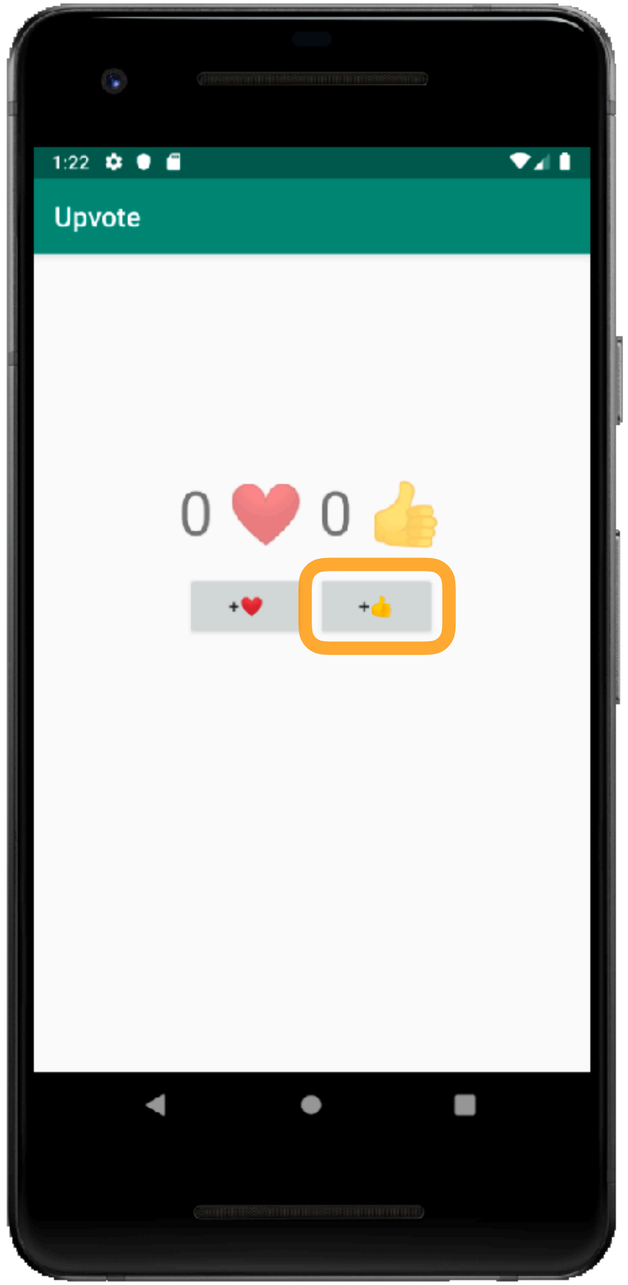


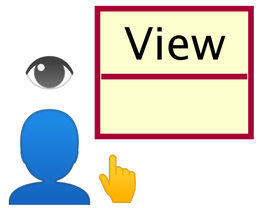



```
package com.jakewharton.rxbinding2.view
```





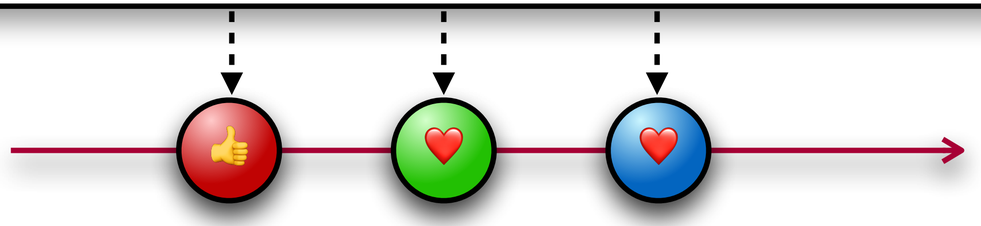


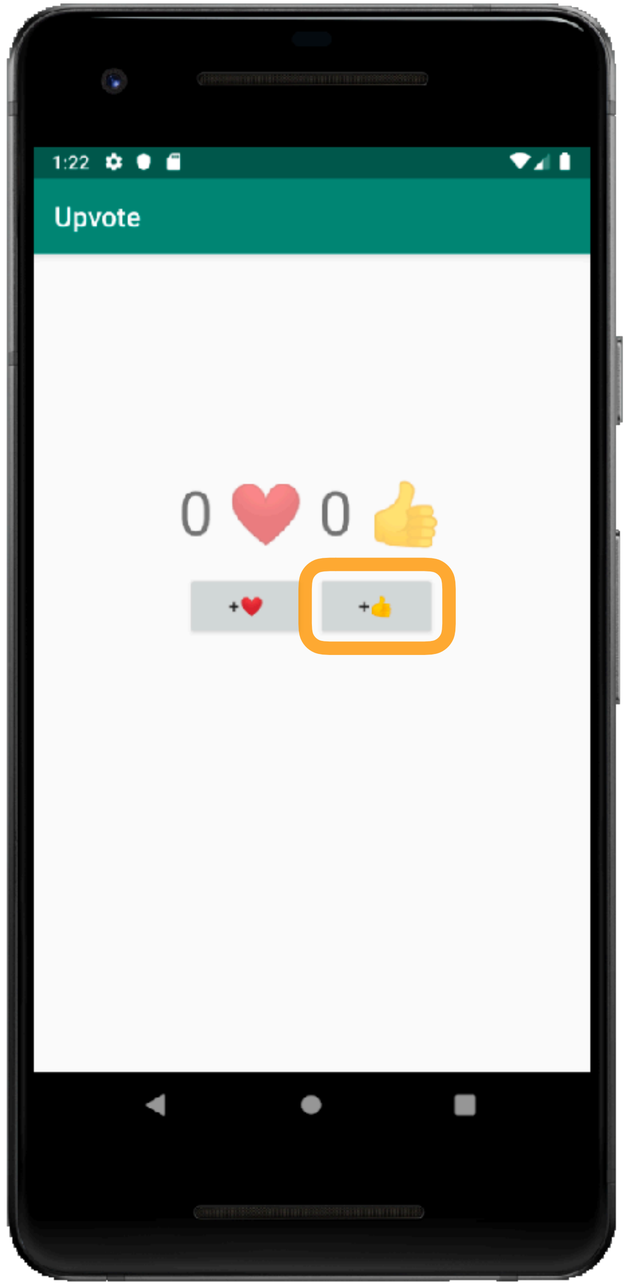


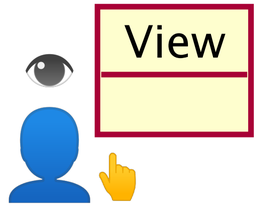

```
package com.jakewharton.rxbinding2.view
```

```
thumbButton.clicks()
```

```
🎯 Observable<MainViewEvent>
```





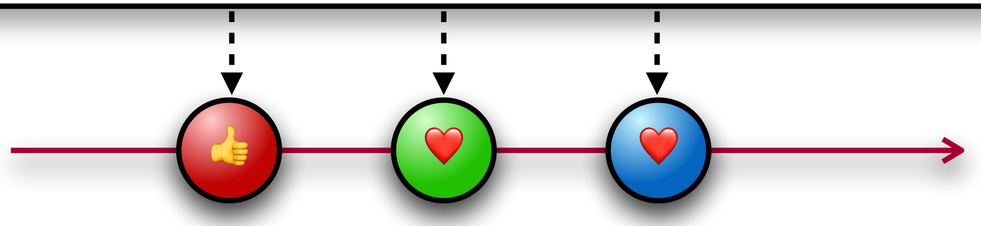


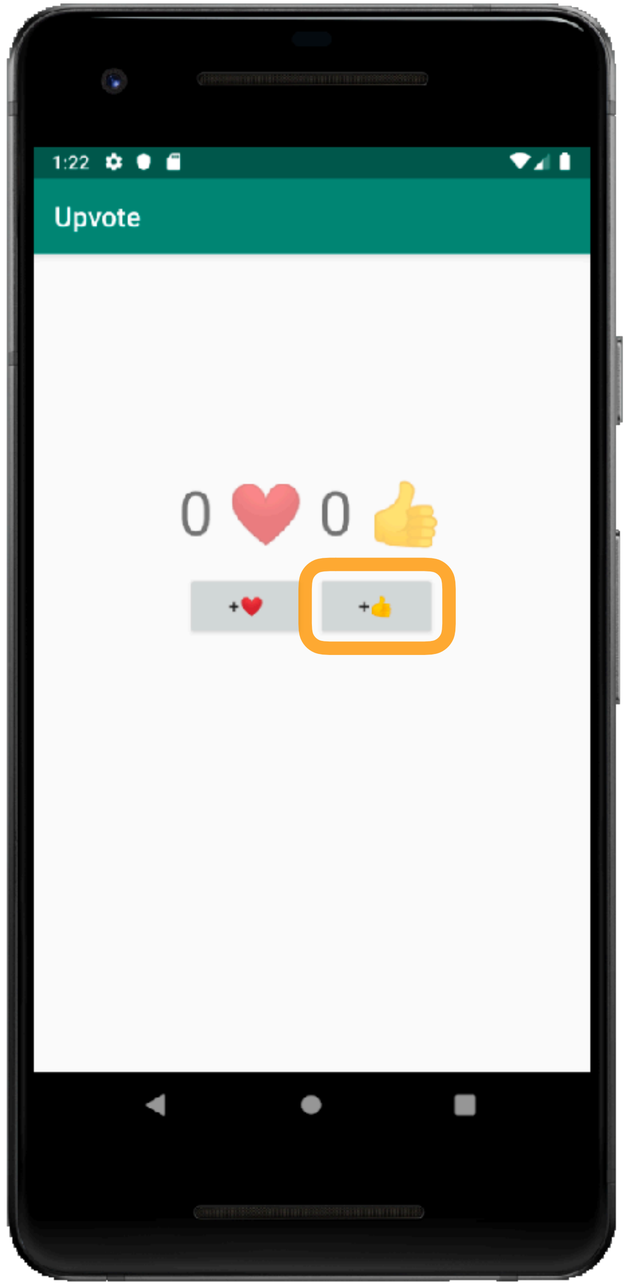

```
package com.jakewharton.rxbinding2.view
```

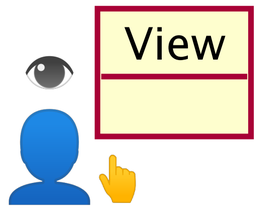
```
thumbButton.clicks()
```

```
map { MainViewEvent.ThumbsUpClick }
```

```
🎯 Observable<MainViewEvent>
```





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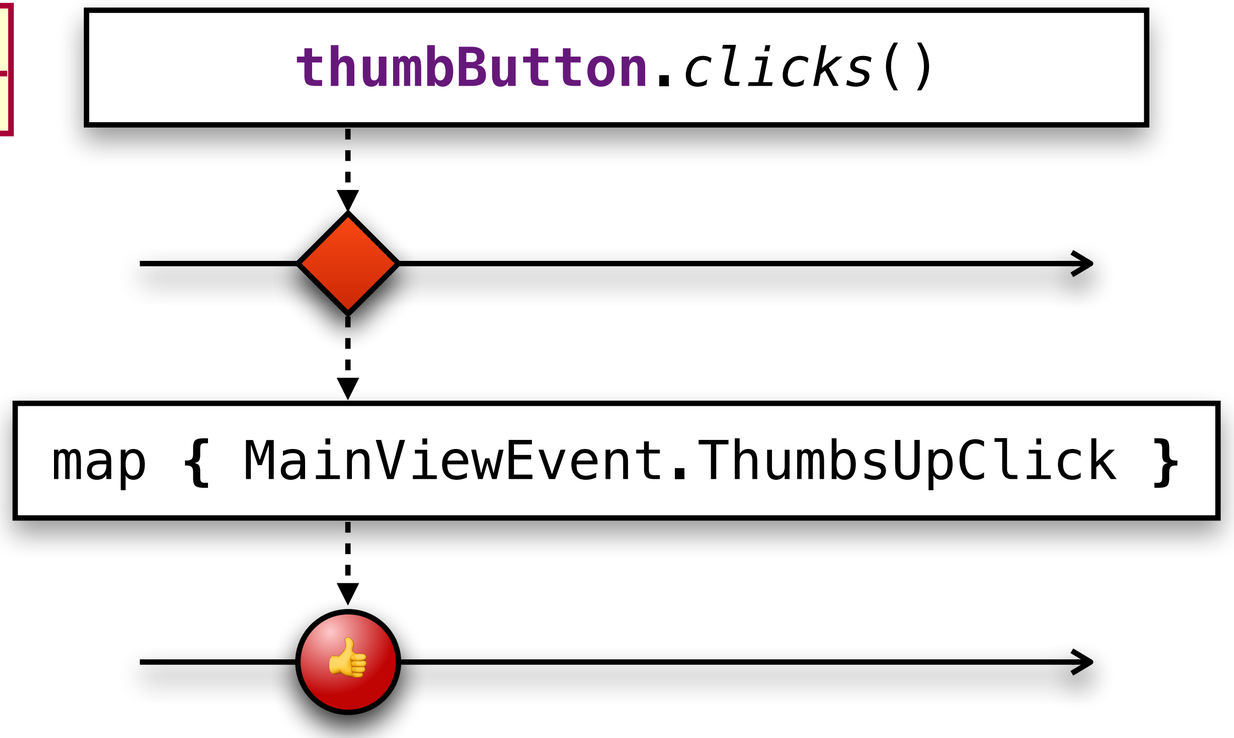
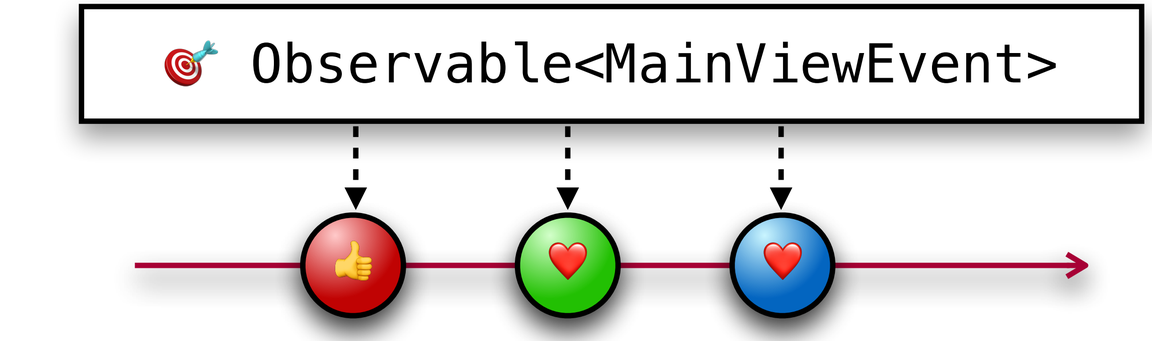
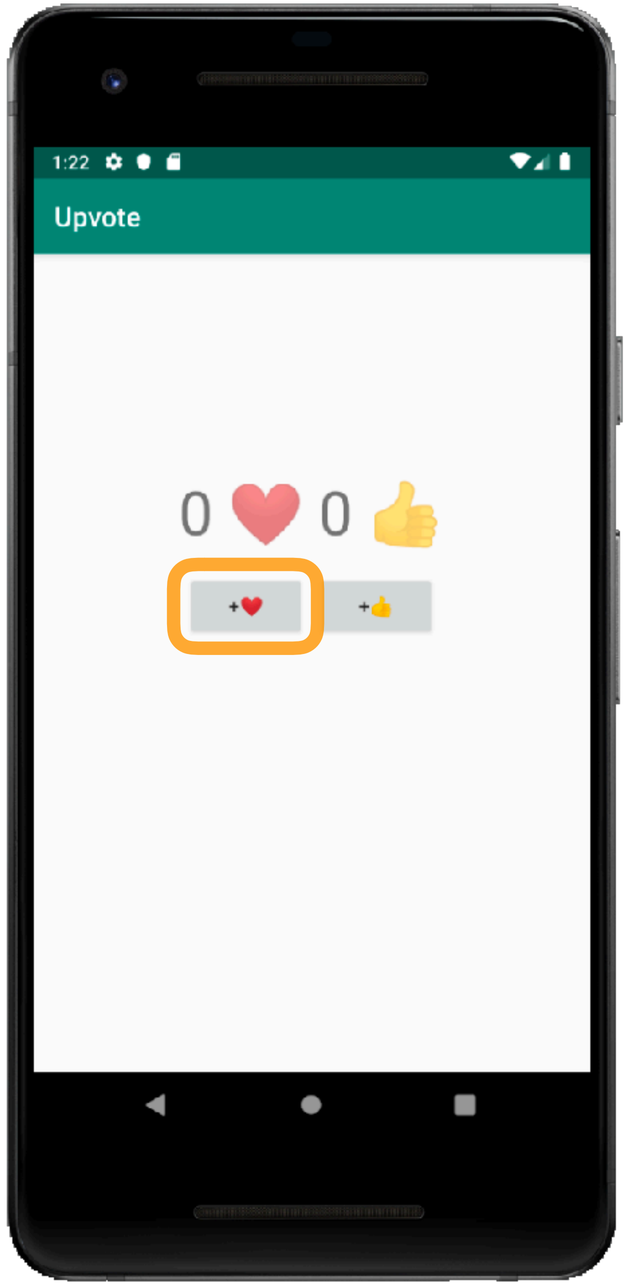
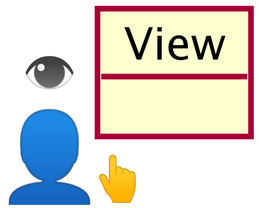




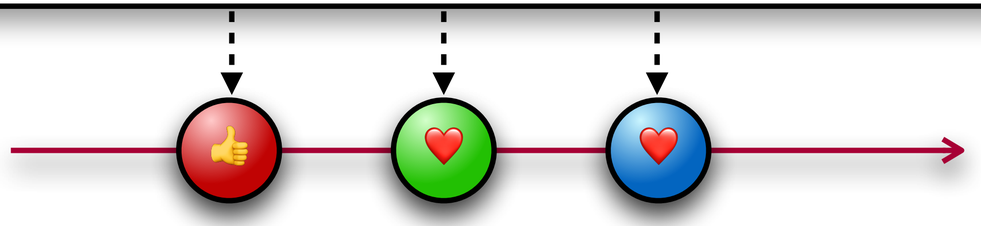


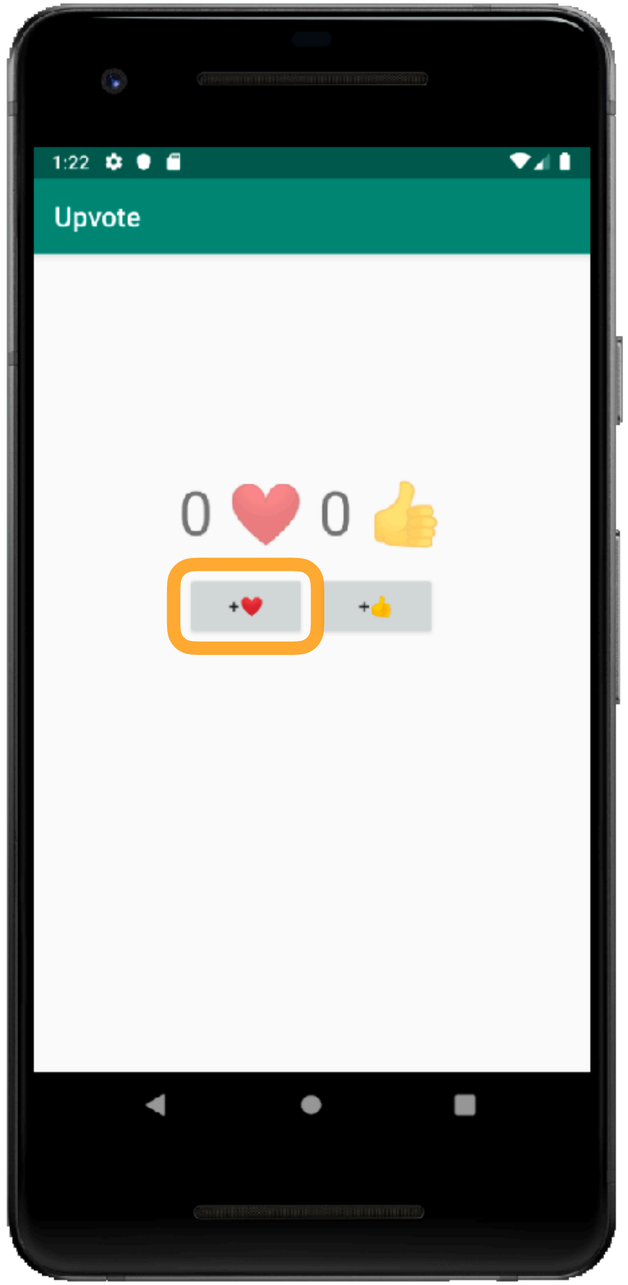


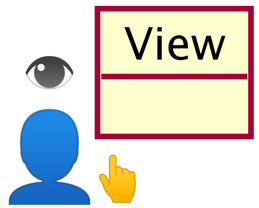

```
package com.jakewharton.rxbinding2.view
```

```
heartButton.clicks()
```

```
🎯 Observable<MainViewEvent>
```





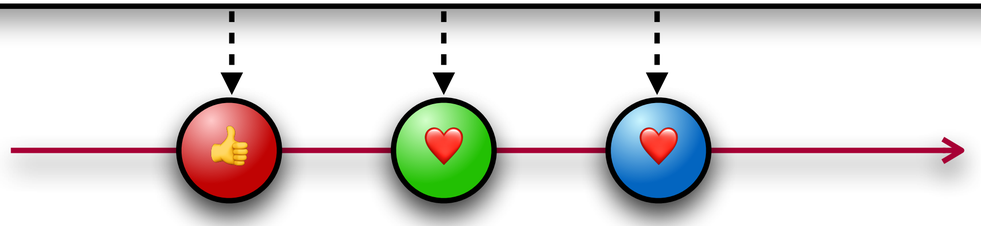


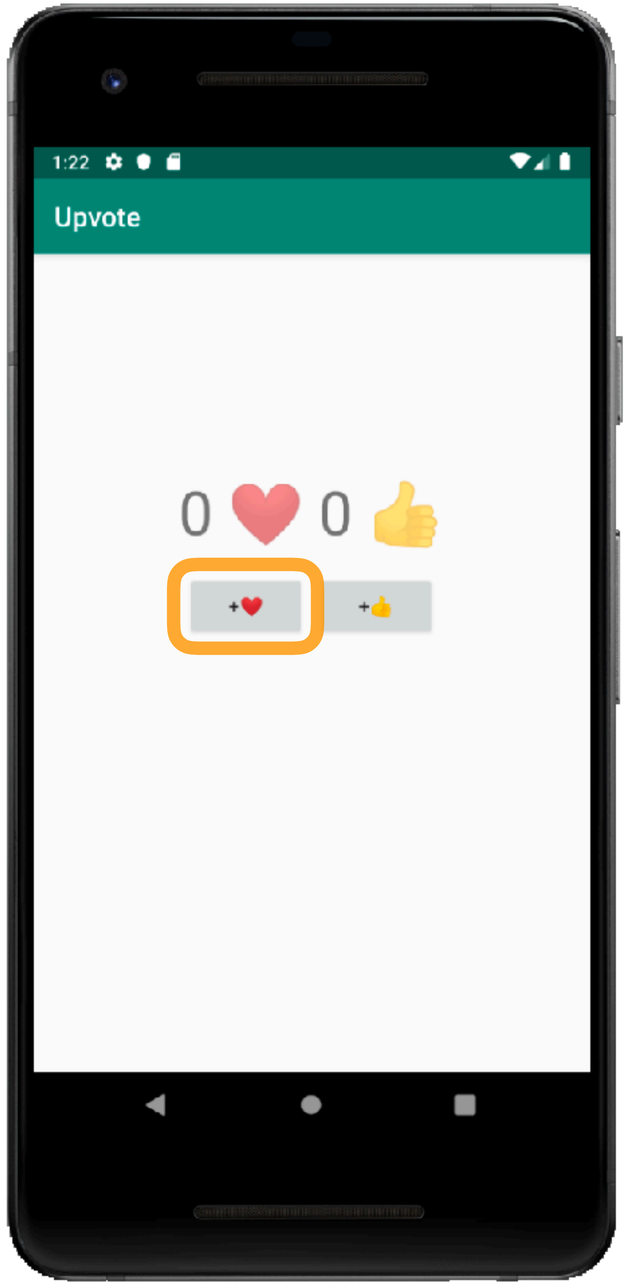

```
package com.jakewharton.rxbinding2.view
```

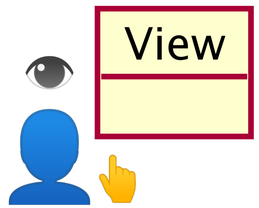
```
heartButton.clicks()
```

```
map { MainViewEvent.LoveItClick }
```

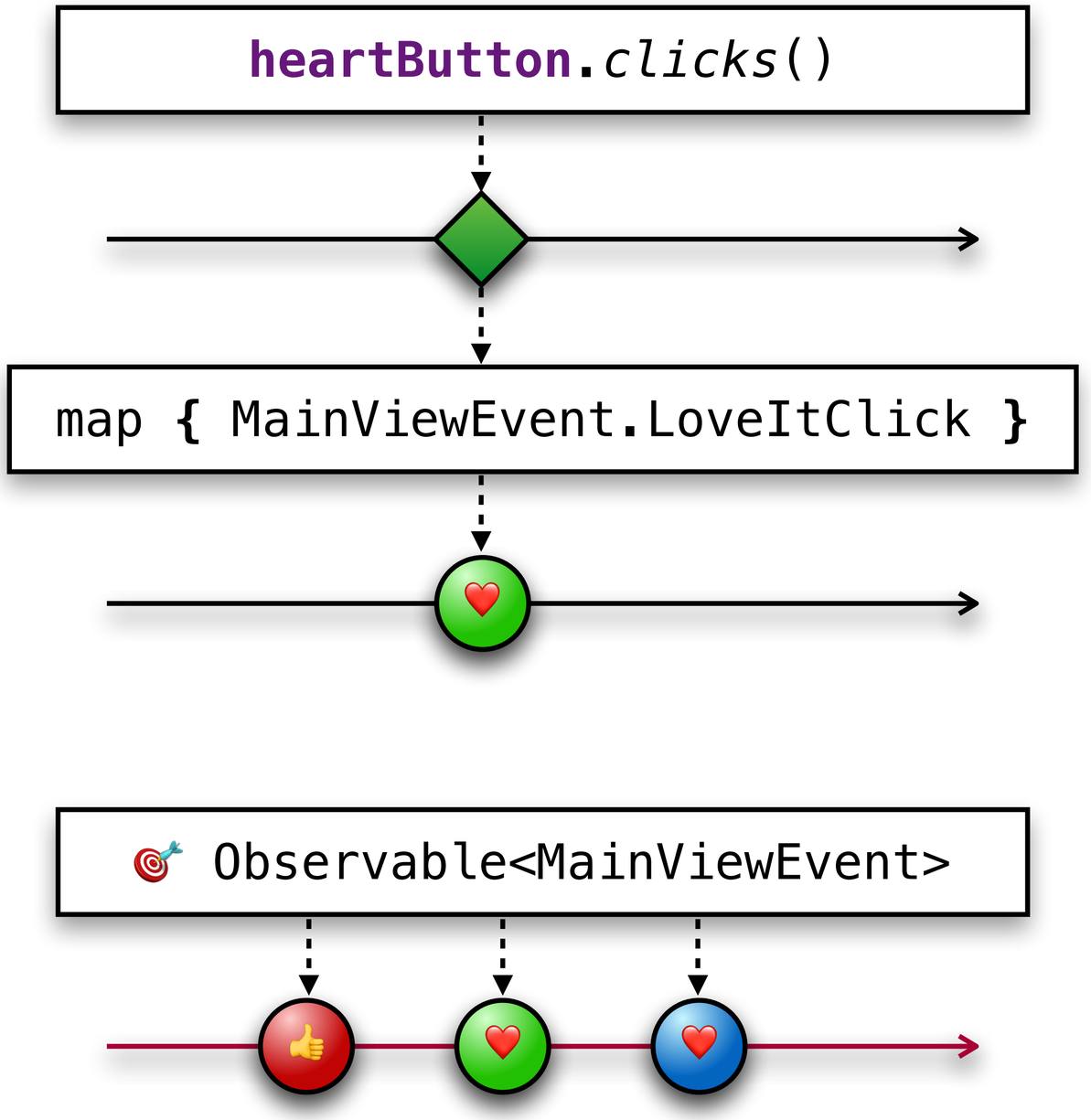
```
🎯 Observable<MainViewEvent>
```

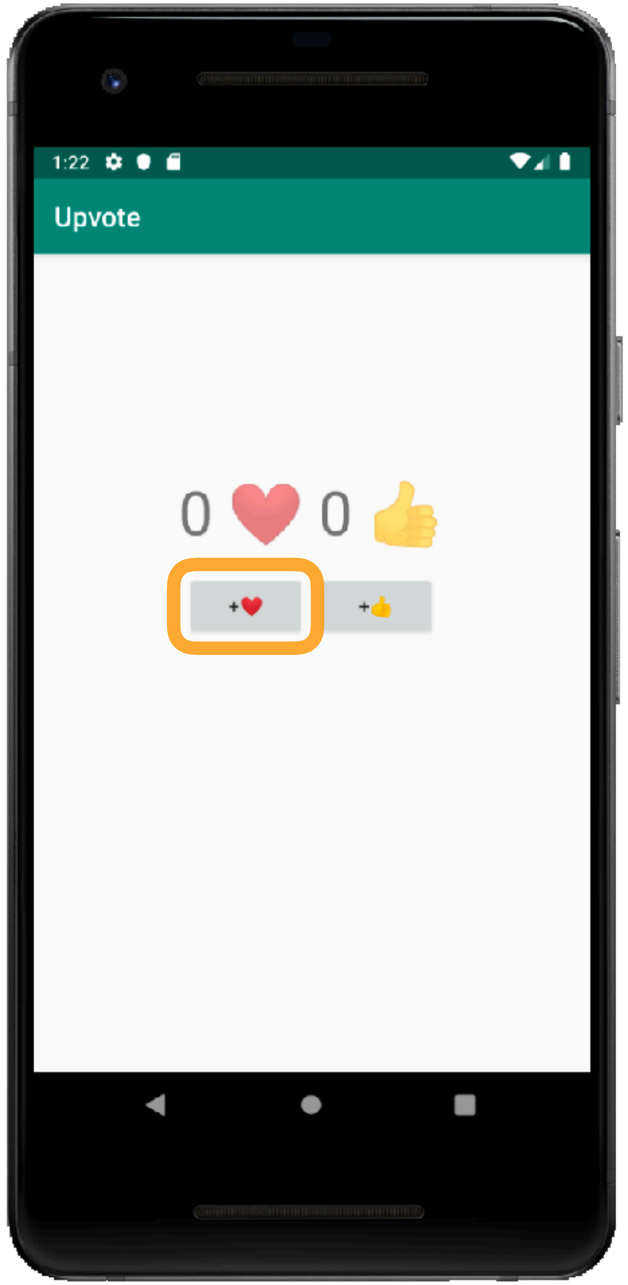


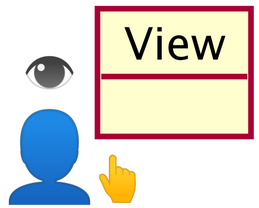




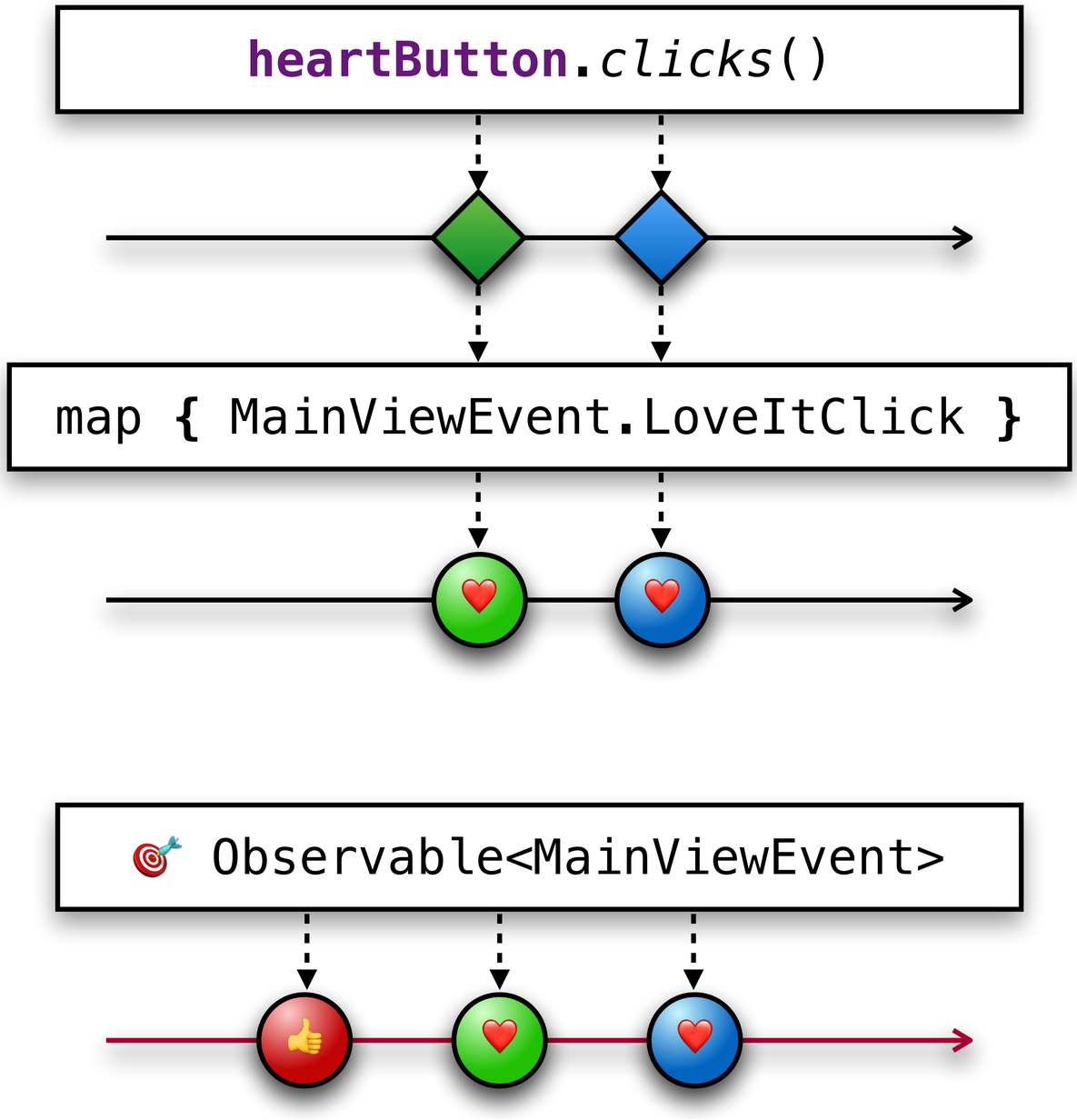

```
package com.jakewharton.rxbinding2.view
```

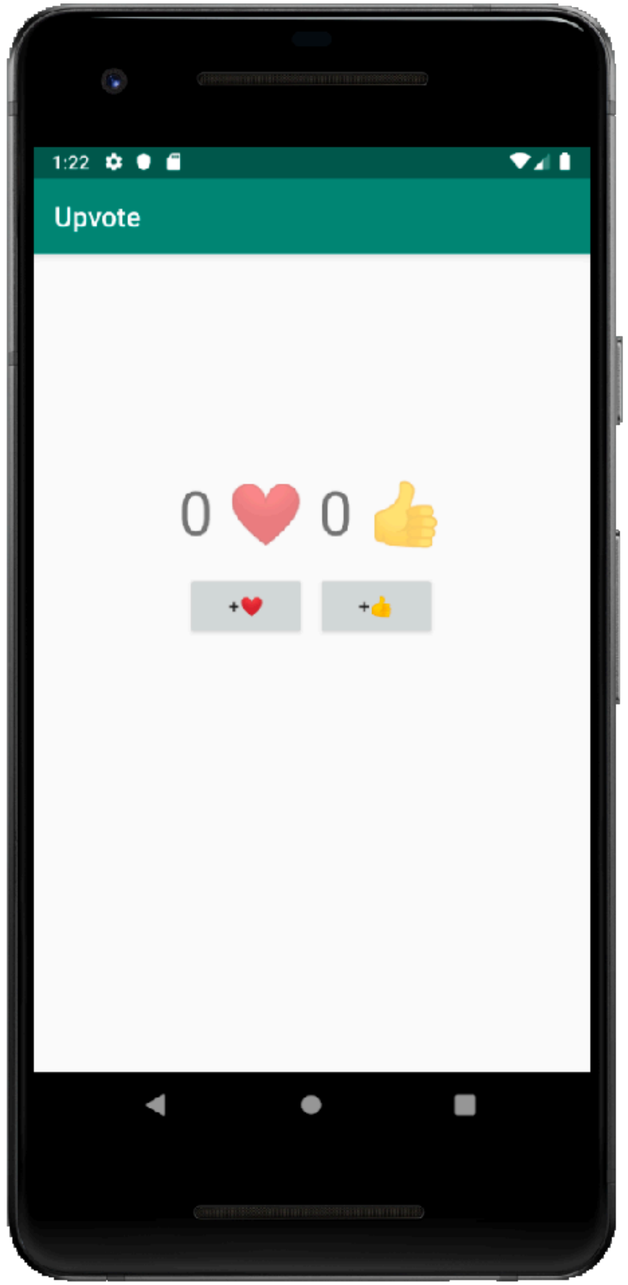


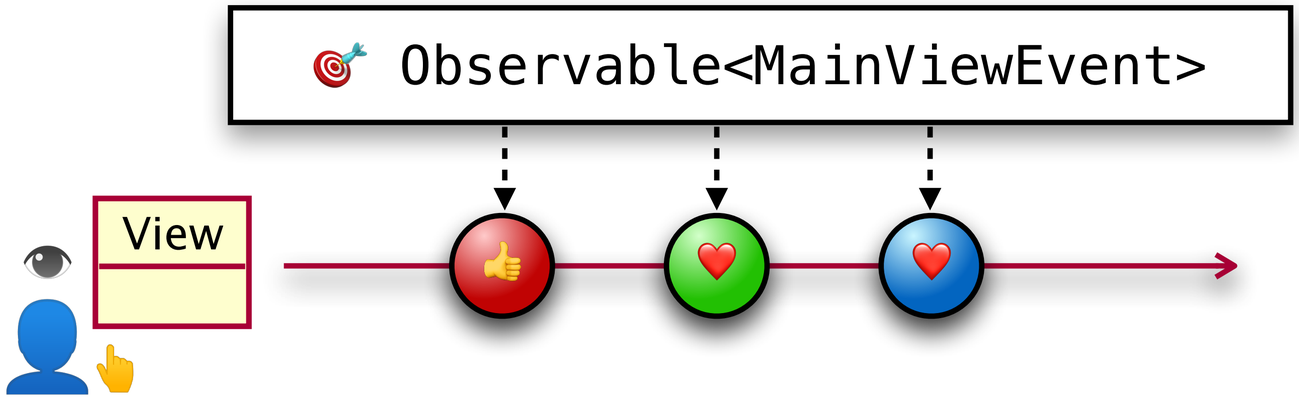


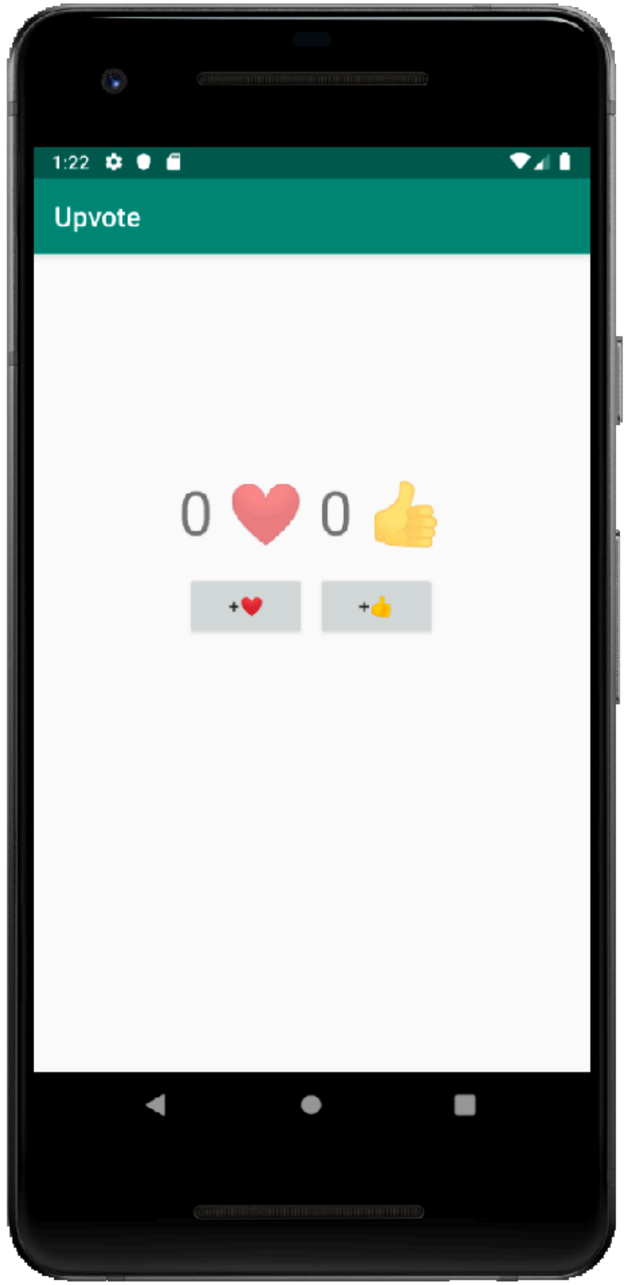



```
package com.jakewharton.rxbinding2.view
```



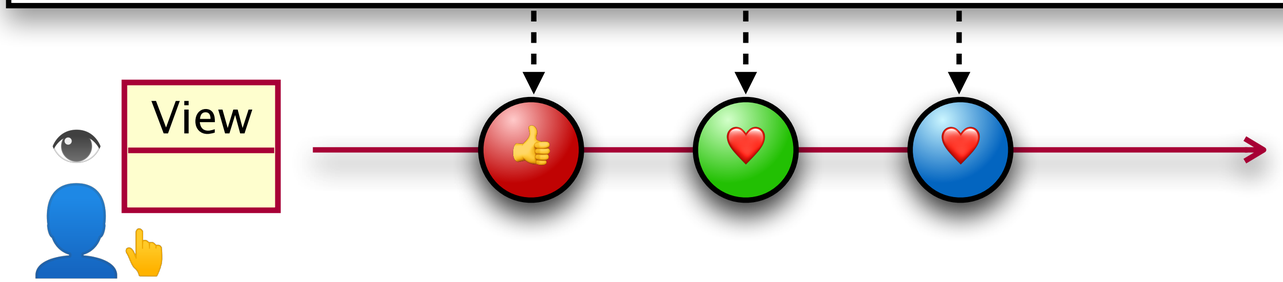

1:22
Upvote
0
0
+
+

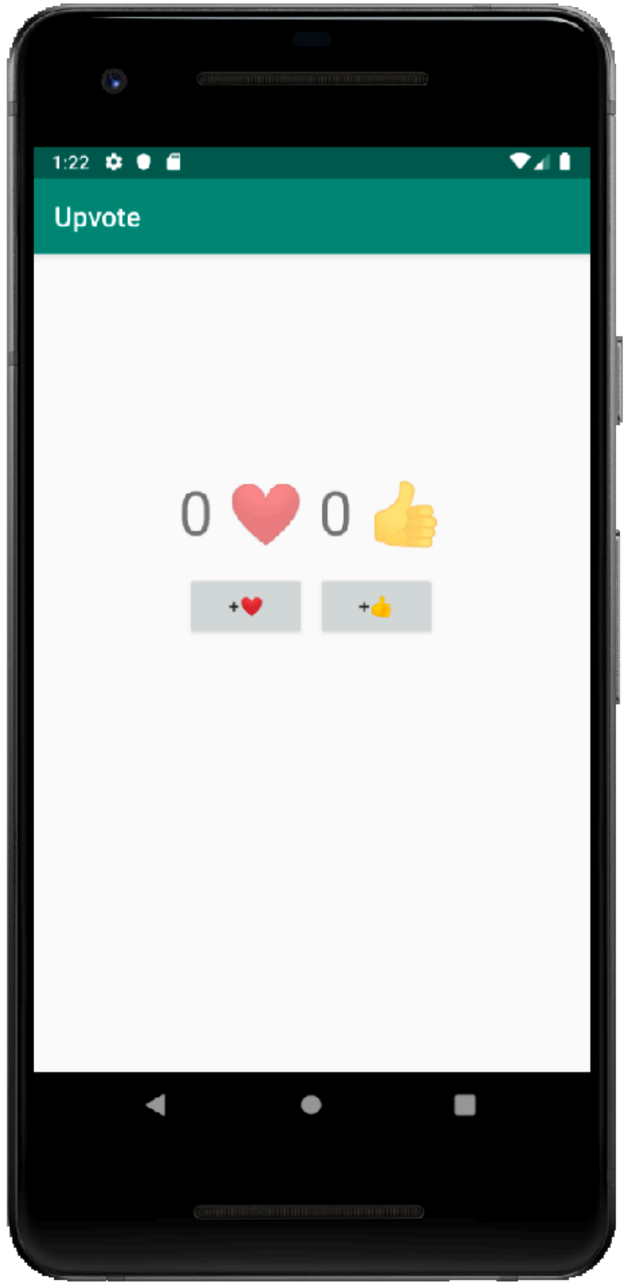

Observable<MainViewEvent>
View



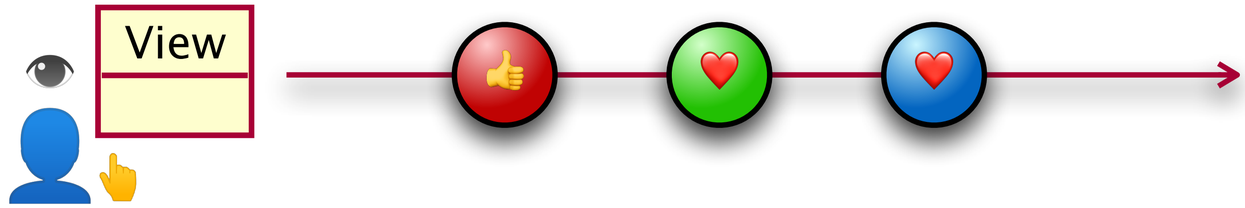
🎯 Observable<MainViewEvent>

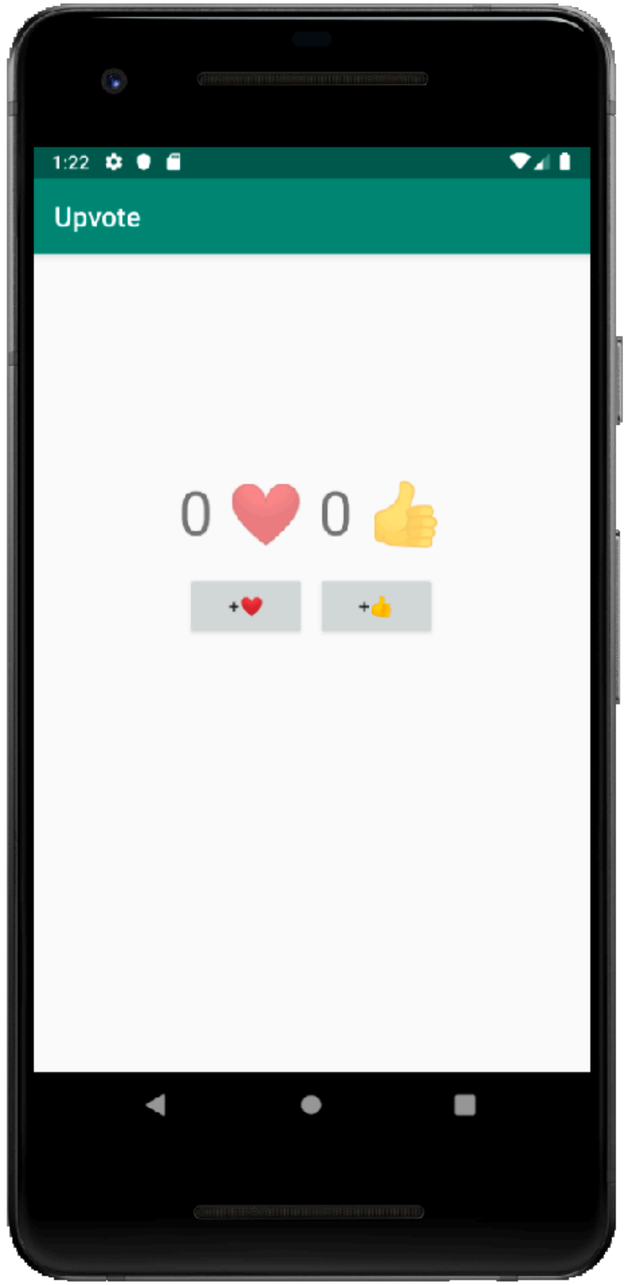
```
Observable.merge(
    heartButton.clicks().map { LoveItClick },
    thumbButton.clicks().map { ThumbsUpClick }
)
```



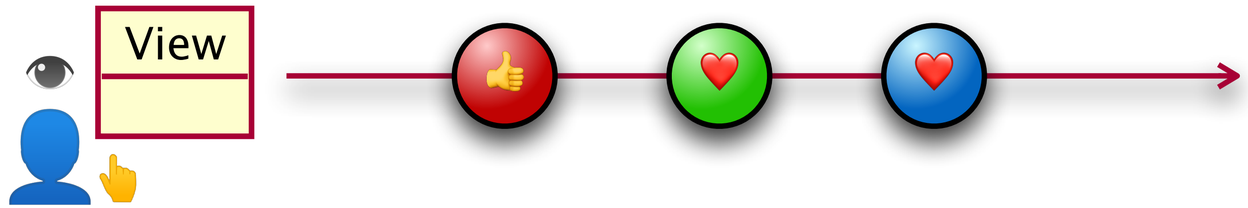


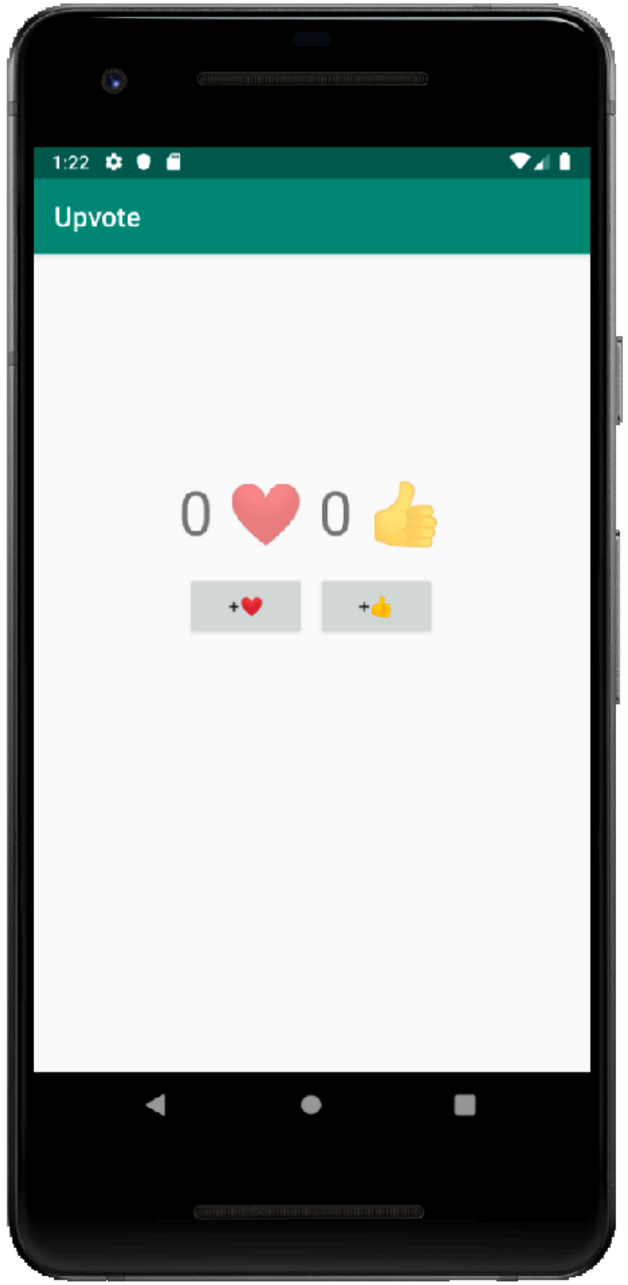

```
class MainActivity {

    override fun viewEvents(): Observable<MainViewEvent> {
        return Observable.merge(
                heartButton.clicks().map { LoveItClick },
                thumbButton.clicks().map { ThumbsUpClick }
        )
    }

}
```



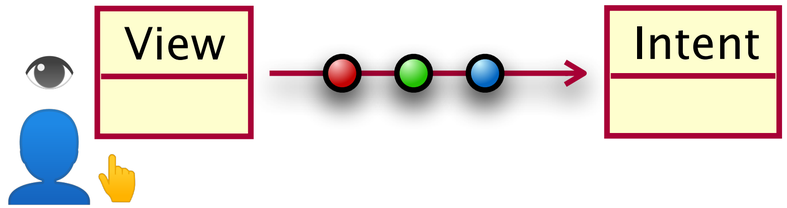


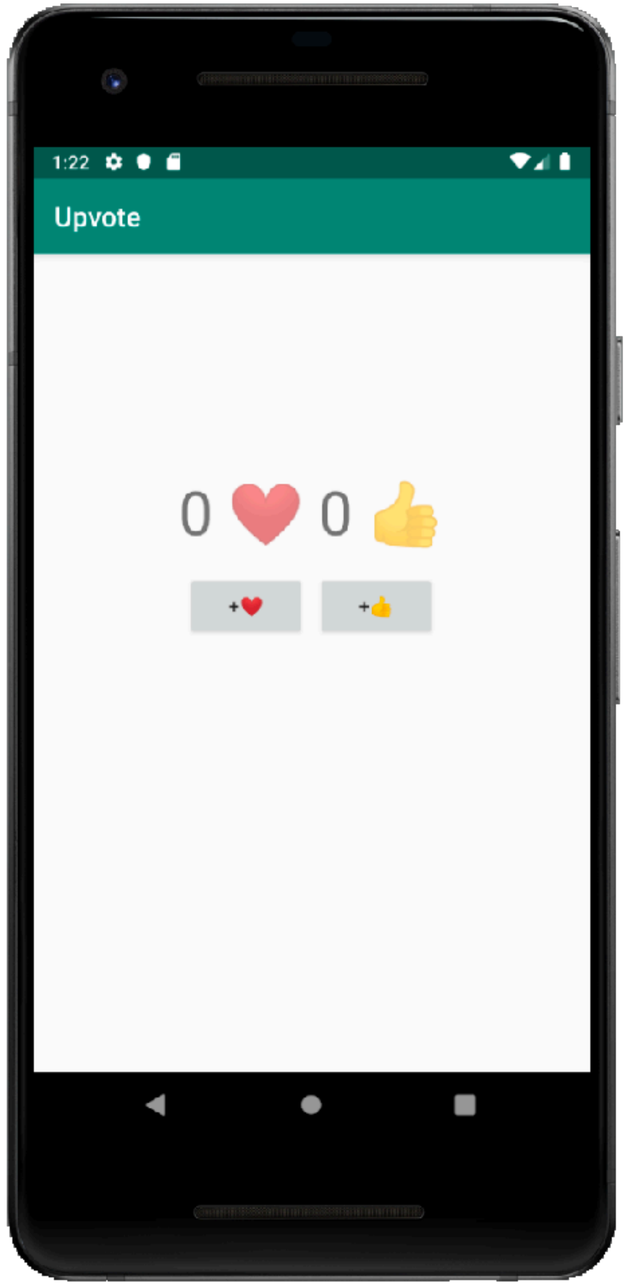

```kotlin
/**
 * This allows us to group all the viewEvents from
 * one view in a single Observable.
 */
interface ViewEventObservable<E> {
    fun viewEvents(): Observable<E>
}

class MainActivity : ViewEventObservable<MainViewEvent> {

    override fun viewEvents(): Observable<MainViewEvent> {
        return Observable.merge(
                heartButton.clicks().map { LoveItClick },
                thumbButton.clicks().map { ThumbsUpClick }
        )
    }

}
```






```
class MainActivity : ViewEventObservable<MainViewEvent> {

    private val disposables = CompositeDisposable()

    override fun onResume() {
        super.onResume()
        disposables += viewEvents().subscribe(   )
    }

    override fun onPause() {
        super.onPause()
        disposables.clear()
    }

    override fun viewEvents(): Observable<MainViewEvent> {
        return Observable.merge(
                heartButton.clicks().map { LoveItClick },
                thumbButton.clicks().map { ThumbsUpClick }
        )
    }

}
```



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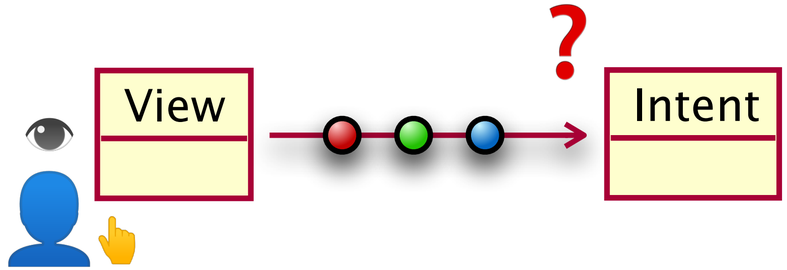
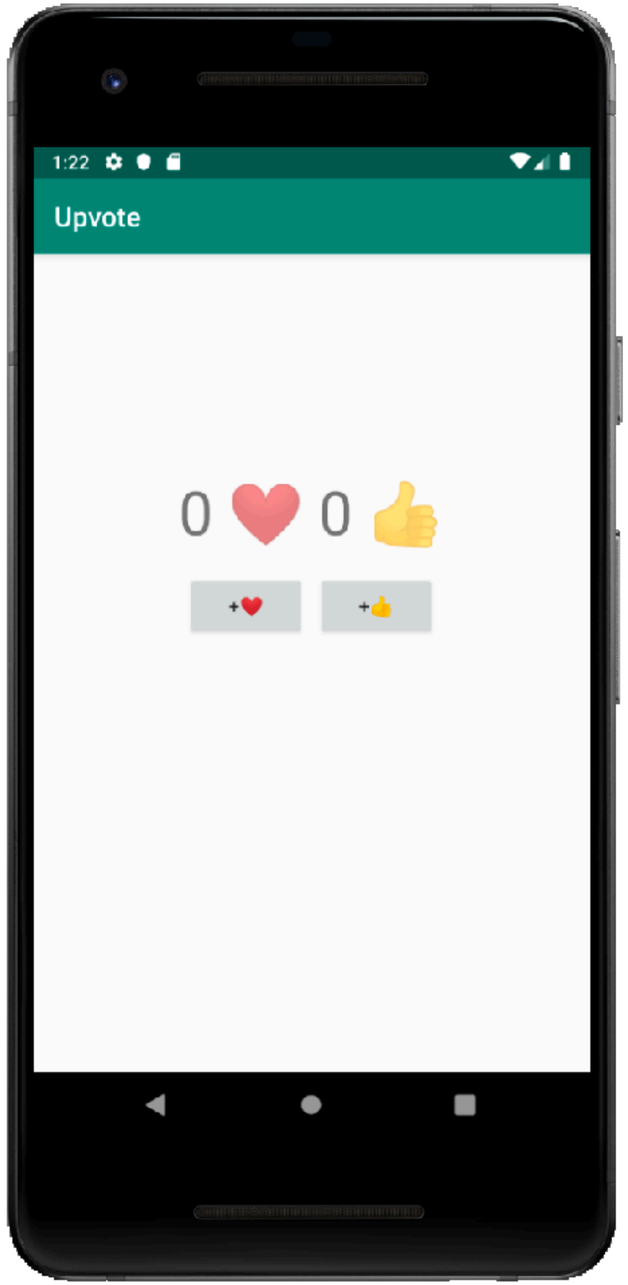
    }

    override fun onPause() {
        super.onPause()
        disposables.clear()
    }

    override fun viewEvents(): Observable<MainViewEvent> {
        return Observable.merge(
                heartButton.clicks().map { LoveItClick },
                thumbButton.clicks().map { ThumbsUpClick }
        )
    }

}
```






```
class MainActivity : ViewEventObservable<MainViewEvent> {

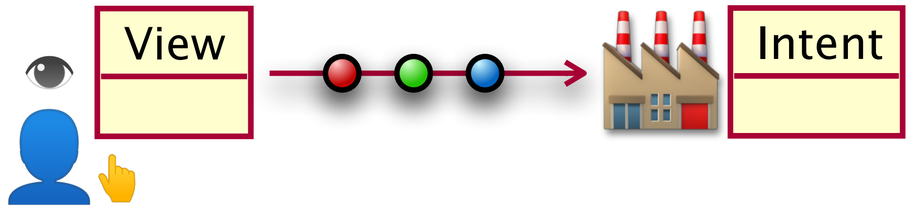
    private val disposables = CompositeDisposable()

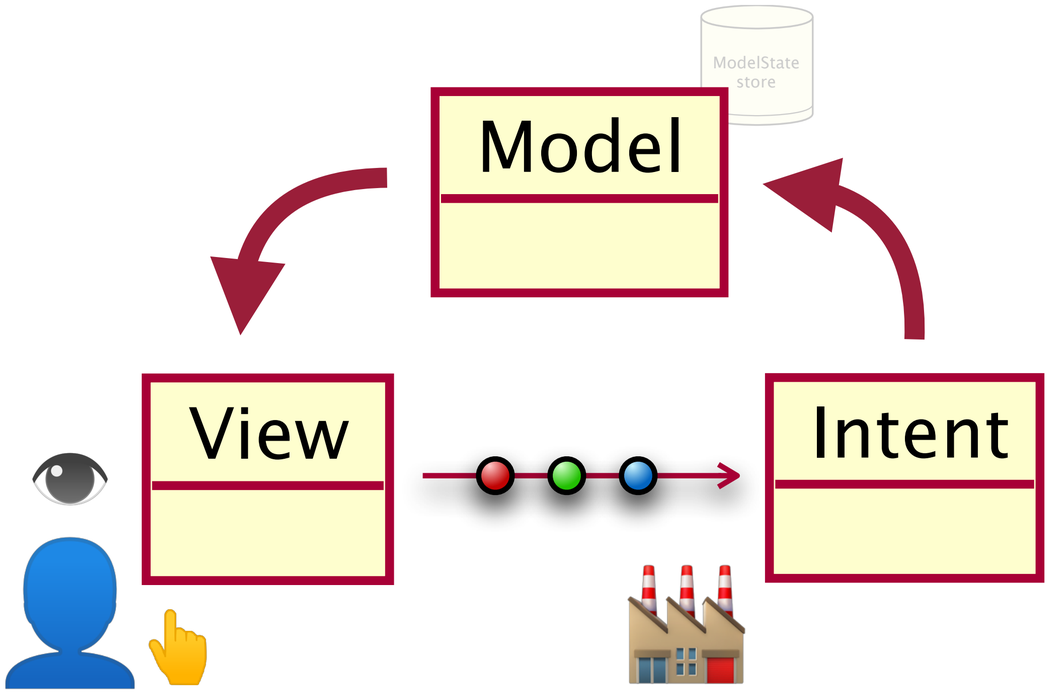
    override fun onResume() {
        super.onResume()
        disposables += viewEvents().subscribe(
            MainViewIntentFactory::process
        )
    }

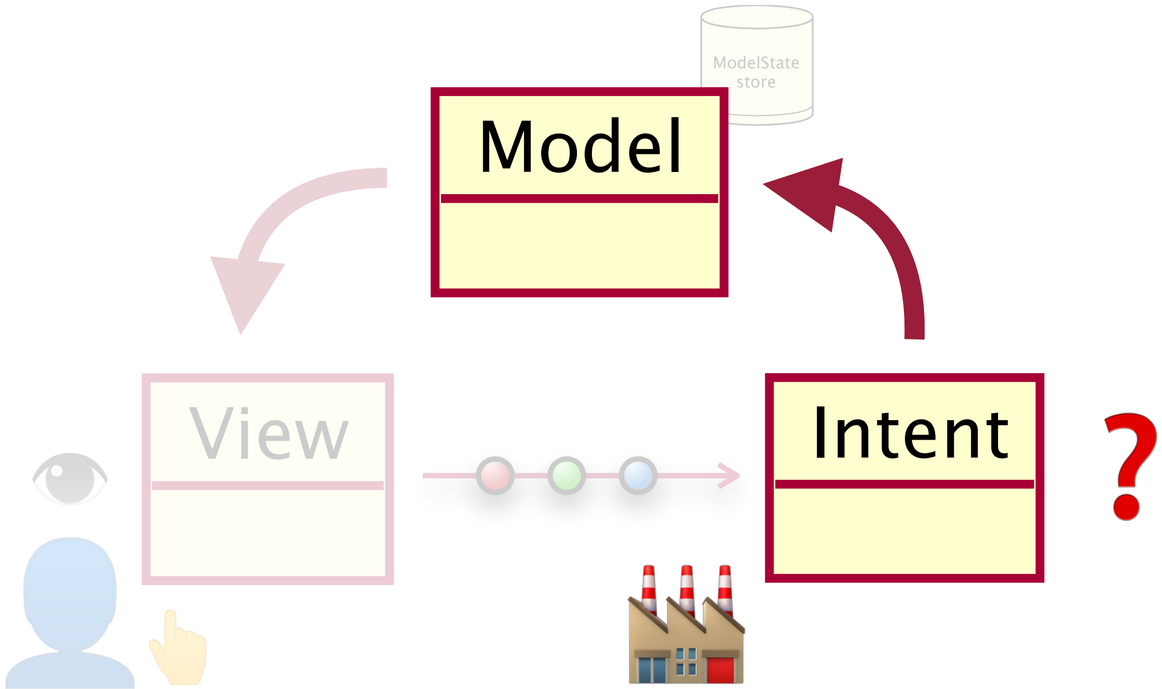
    override fun onPause() {
        super.onPause()
        disposables.clear()
    }

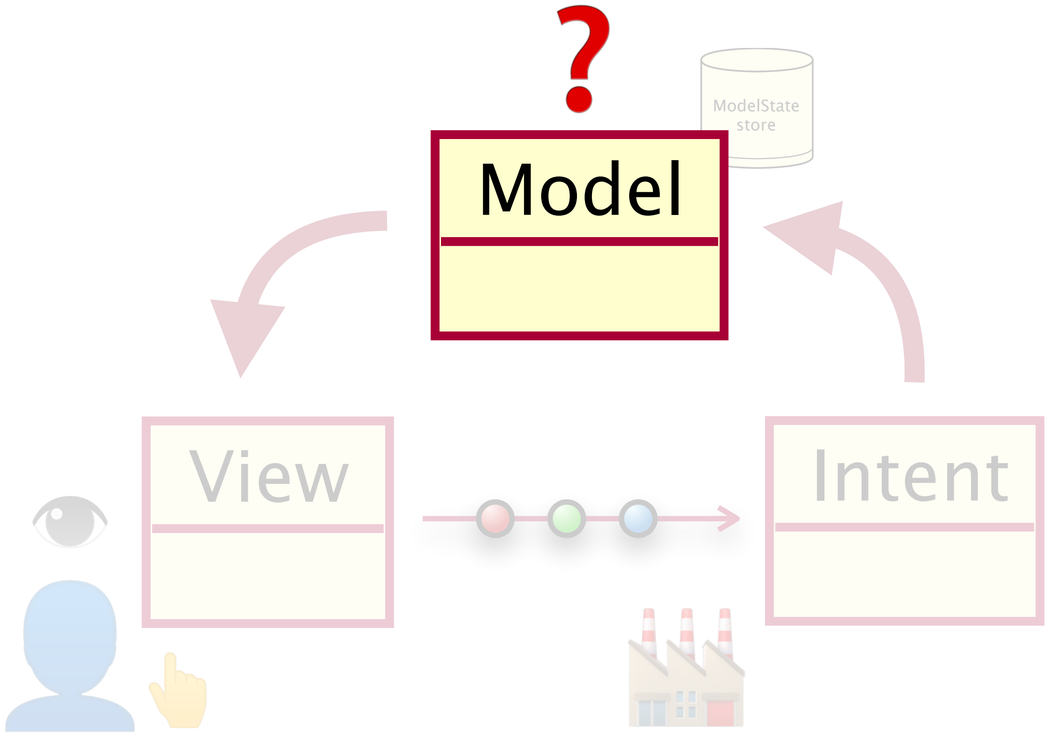
    override fun viewEvents(): Observable<MainViewEvent> {
        return Observable.merge(
                heartButton.clicks().map { LoveItClick },
                thumbButton.clicks().map { ThumbsUpClick }
        )
    }

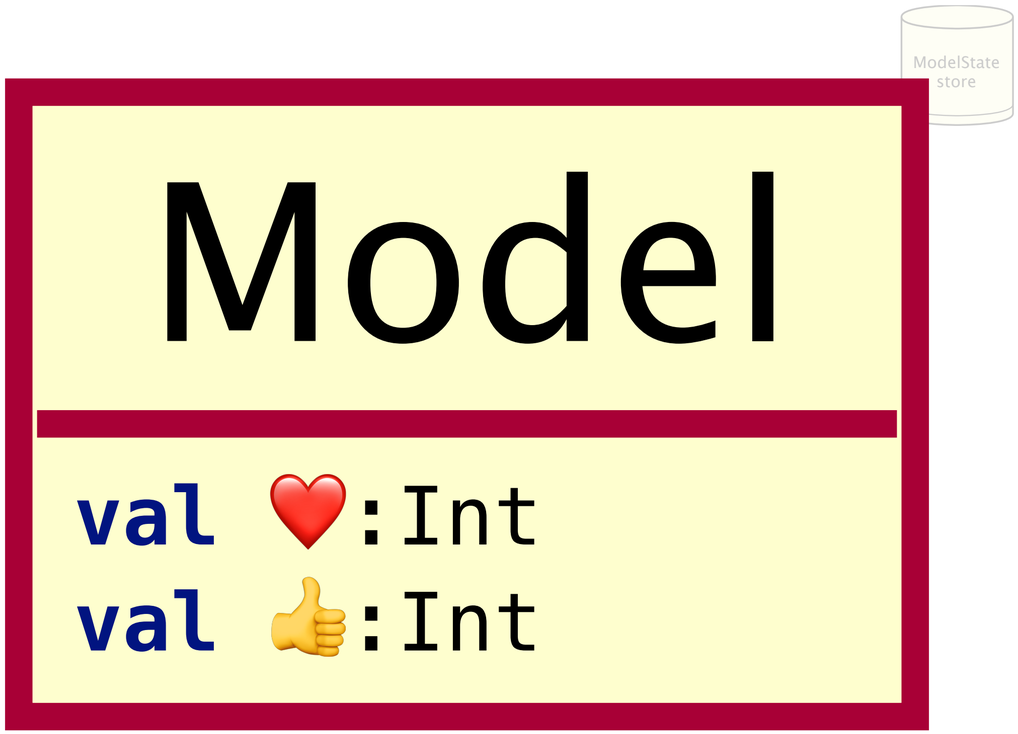
}
```

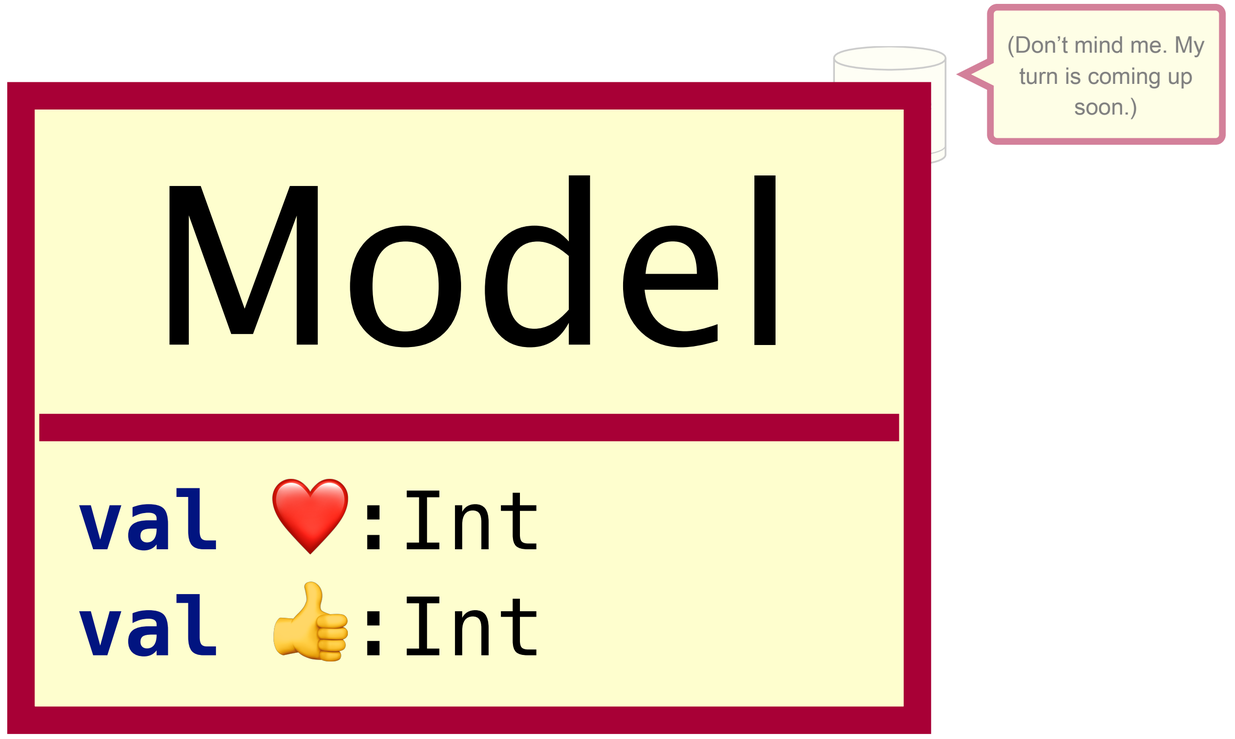



ModelState
store
Model
View
Intent


ModelState
store
Model
View
Intent
?


?
ModelState
store
Model
View
Intent


ModelState
store
Model
val ❤️:Int
val 👍:Int




```
data class UpvoteModel(val hearts:Int, val thumbs:Int)
```

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data class UpvoteModel(val hearts:Int, val thumbs:Int)
```
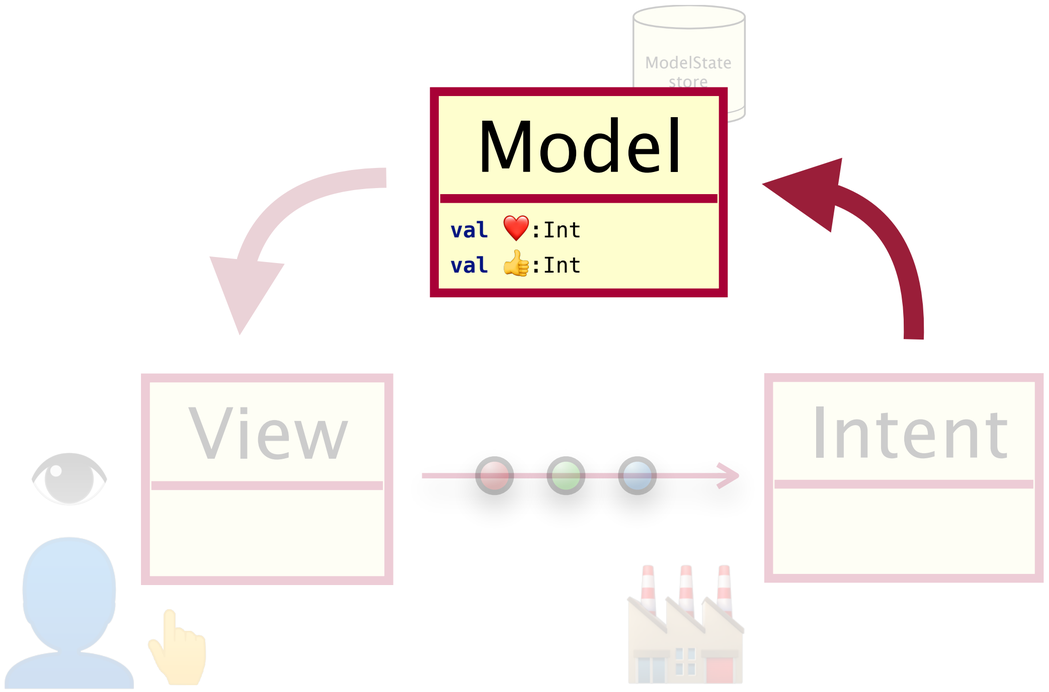
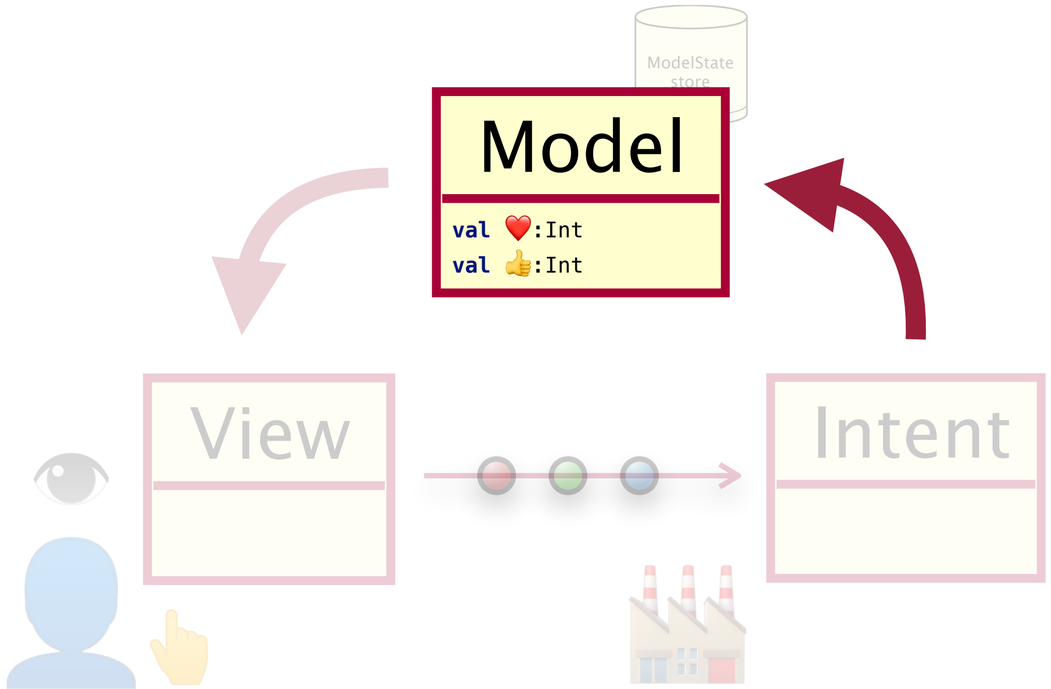
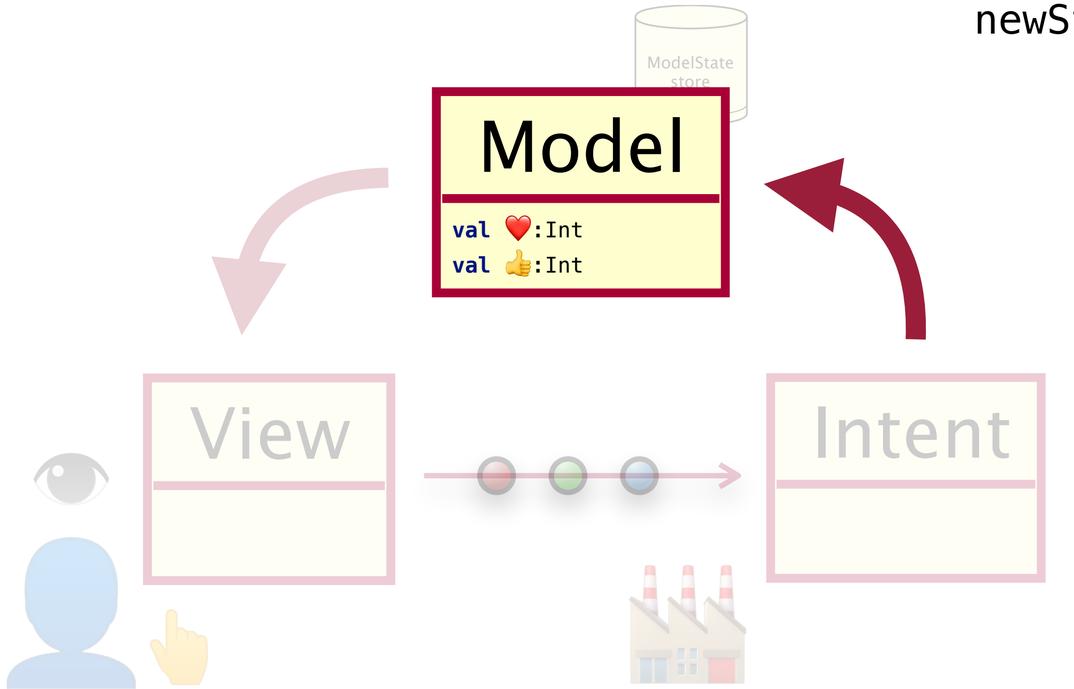



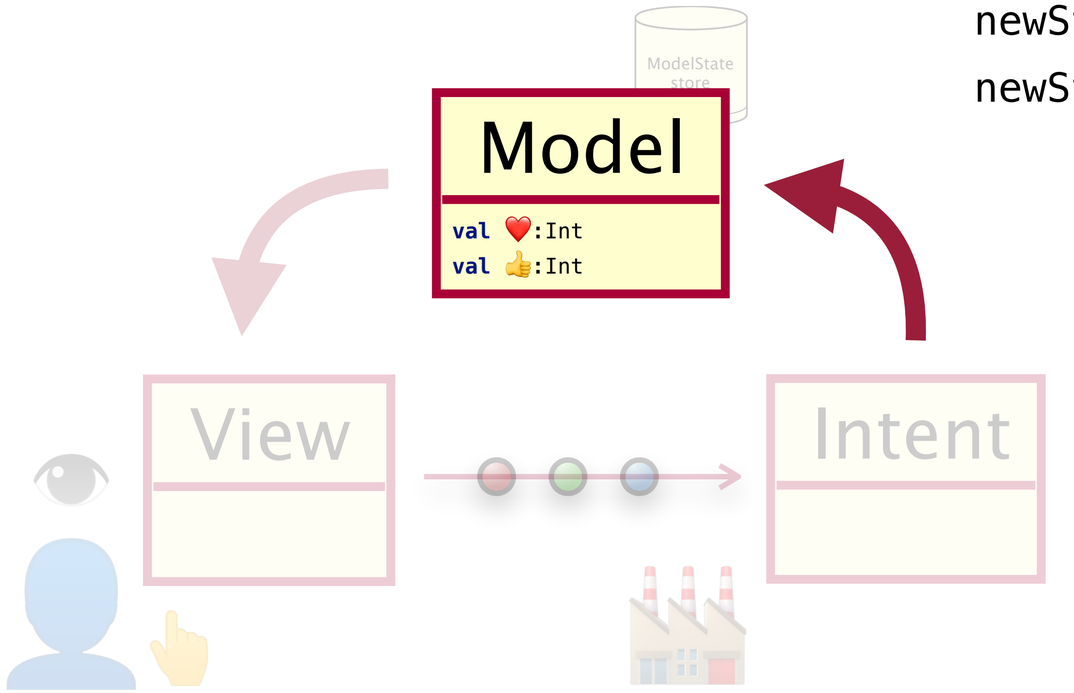
```
data class UpvoteModel(val hearts:Int, val thumbs:Int)

newState = oldState.copy(thumbs = thumbs + 1) // 0, 1
```



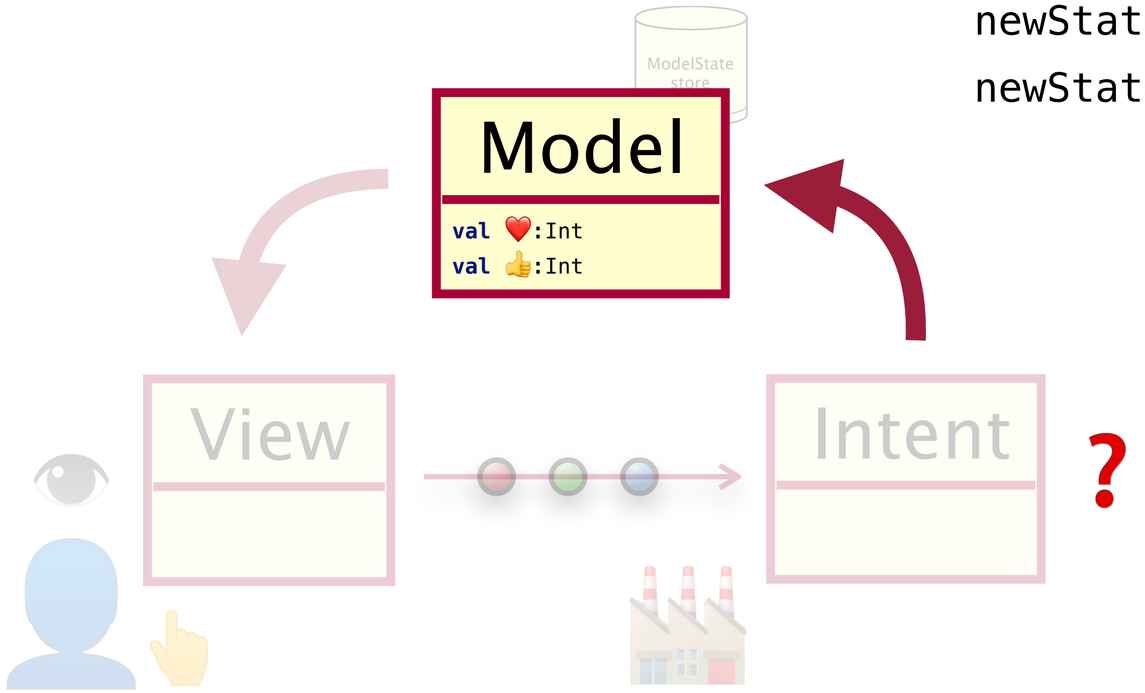
```
data class UpvoteModel(val hearts:Int, val thumbs:Int)

newState = oldState.copy(thumbs = thumbs + 1) // 0, 1
newState = newState.copy(hearts = hearts + 1) // 1, 1
```



```
data class UpvoteModel(val hearts:Int, val thumbs:Int)

newState = oldState.copy(thumbs = thumbs + 1) // 0, 1
newState = newState.copy(hearts = hearts + 1) // 1, 1
newState = newState.copy(hearts = hearts + 1) // 2, 1
```

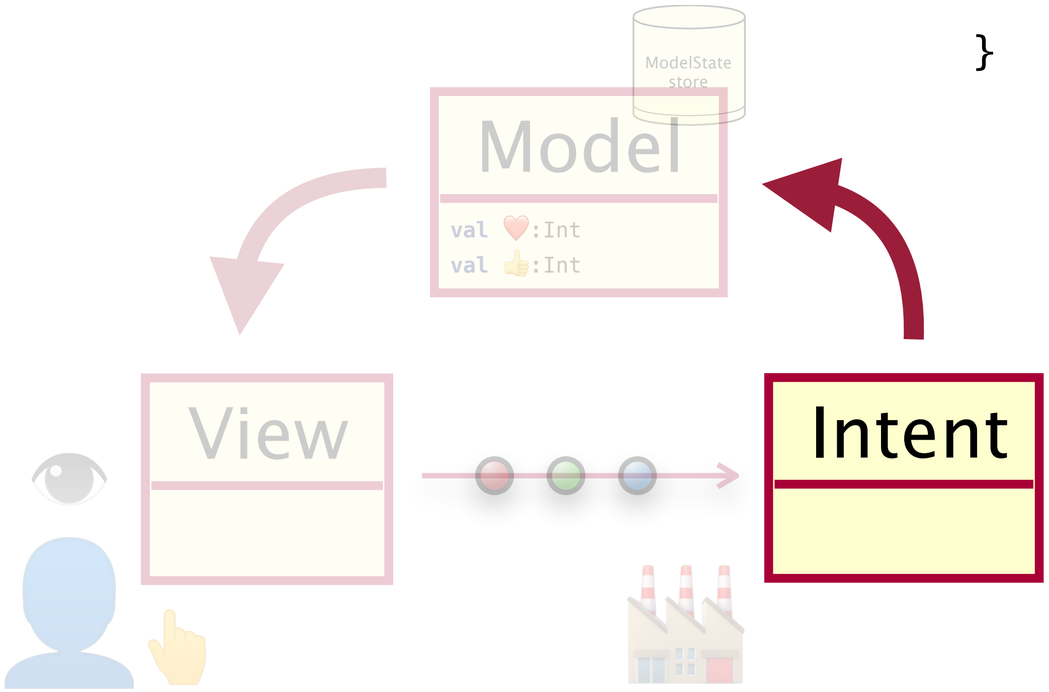


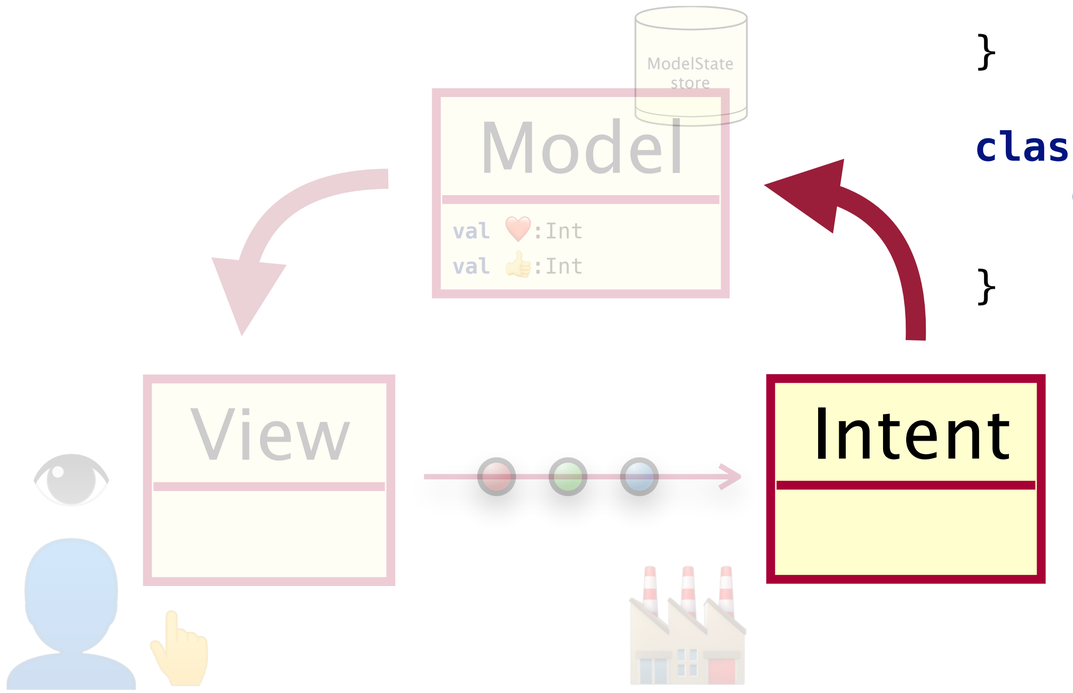
```
data class UpvoteModel(val hearts:Int, val thumbs:Int)

newState = oldState.copy(thumbs = thumbs + 1) // 0, 1
newState = newState.copy(hearts = hearts + 1) // 1, 1
newState = newState.copy(hearts = hearts + 1) // 2, 1
```



```kotlin
data class UpvoteModel(val hearts:Int, val thumbs:Int)

interface Intent<T> {
    fun reduce(oldState: T): T
}
```

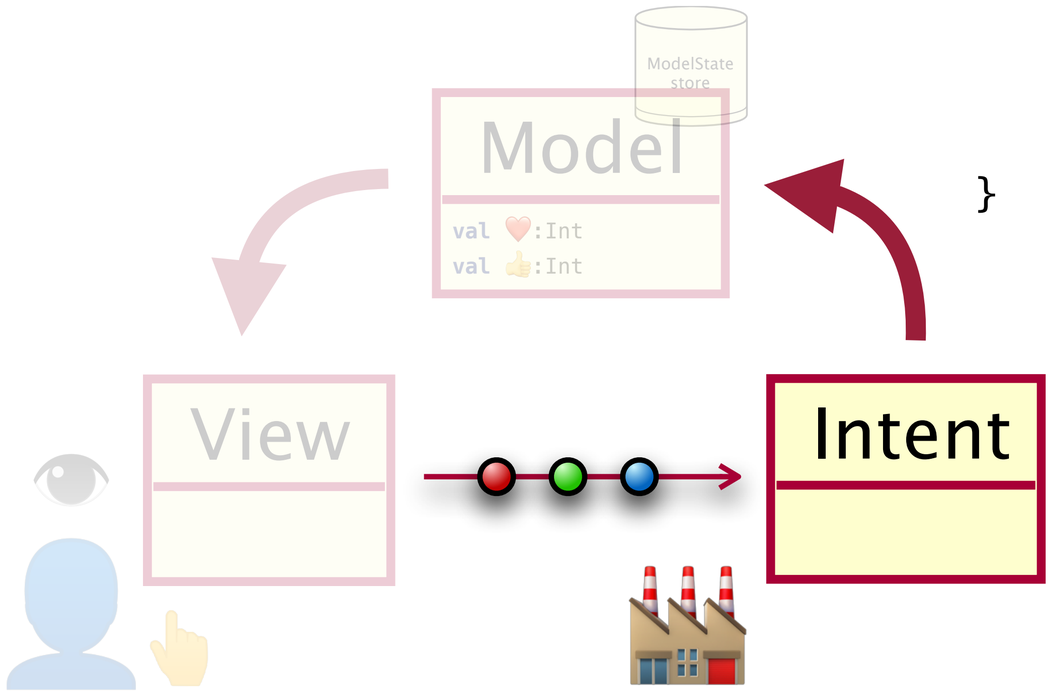





```
data class UpvoteModel(val hearts:Int, val thumbs:Int)

interface Intent<T> {
    fun reduce(oldState: T): T
}

class AddHeart():Intent<UpvoteModel> {
    override fun reduce(oldState: UpvoteModel) =
        oldState.copy(hearts = oldState.hearts + 1)
}
```




```
data class UpvoteModel(val hearts:Int, val thumbs:Int)

fun toIntent(viewEvent: MainViewEvent):Intent<UpvoteModel> {
    return when (viewEvent) {
        MainViewEvent.LoveItClick -> AddHeart()
        MainViewEvent.ThumbsUpClick -> AddThumb()
    }
}
```

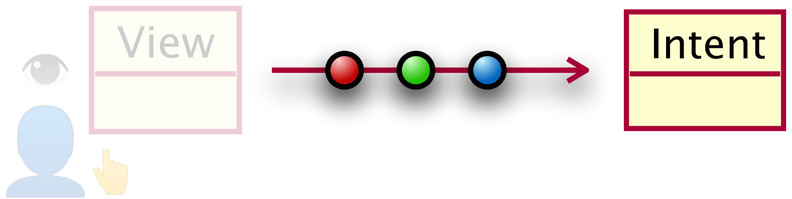
```
interface IntentFactory<E> {
    fun process(viewEvent:E)
}

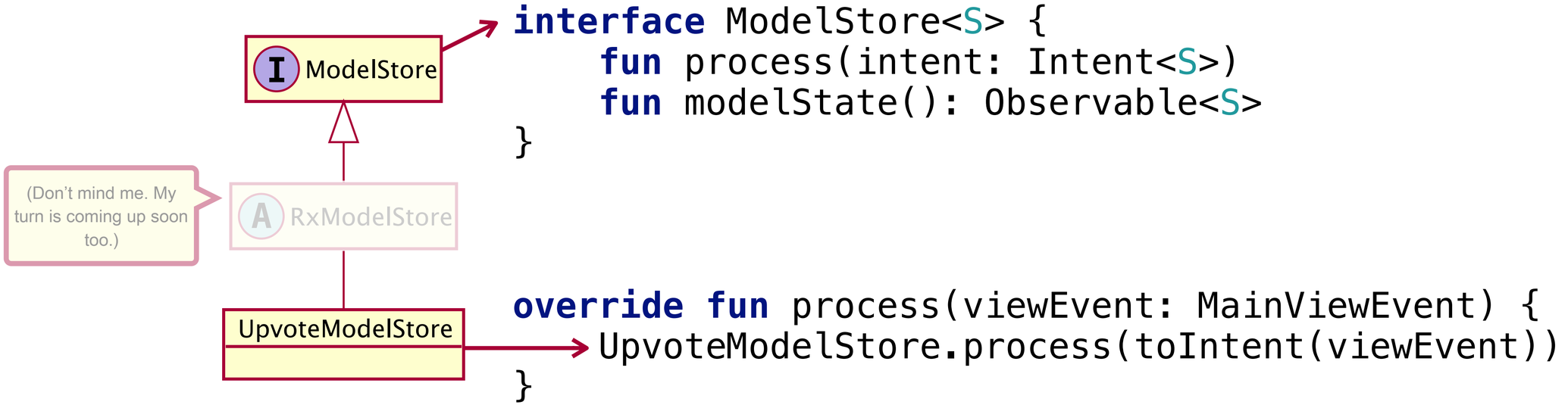
object MainViewIntentFactory : IntentFactory<MainViewEvent> {

    override fun process(viewEvent: MainViewEvent) {
        UpvoteModelStore.process(toIntent(viewEvent))
    }

    private fun toIntent(viewEvent: MainViewEvent):Intent<UpvoteModel> {
        return when (viewEvent) {
            MainViewEvent.LoveItClick -> AddHeart()
            MainViewEvent.ThumbsUpClick -> AddThumb()
        }
    }

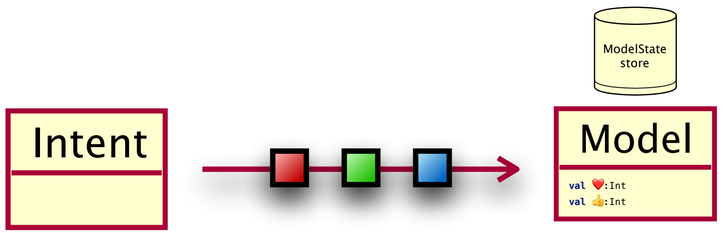
}
```

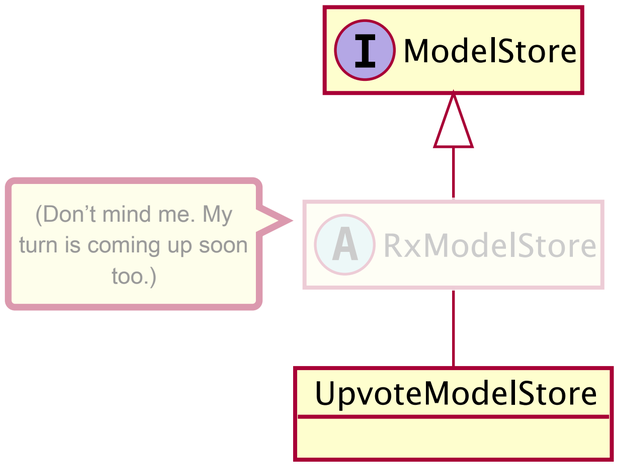





```
interface ModelStore<S> {
    fun process(intent: Intent<S>)
    fun modelState(): Observable<S>
}
```

```
override fun process(viewEvent: MainViewEvent) {
    UpvoteModelStore.process(toIntent(viewEvent))
}
```



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interface ModelStore<S> {
    fun process(intent: Intent<S>)
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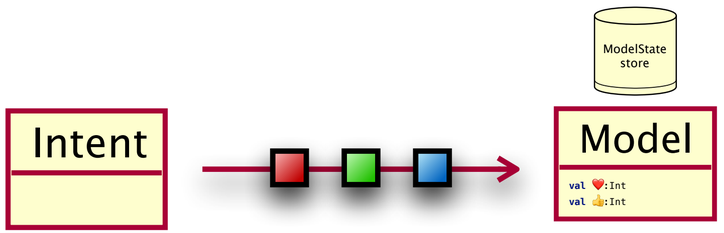
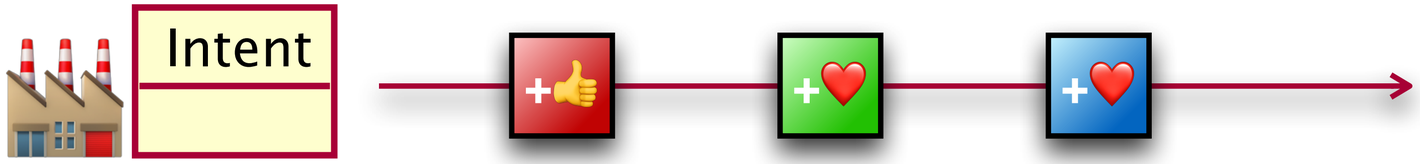
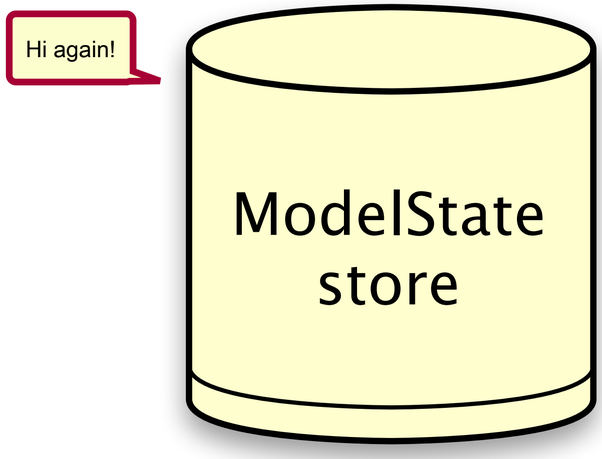
}
```





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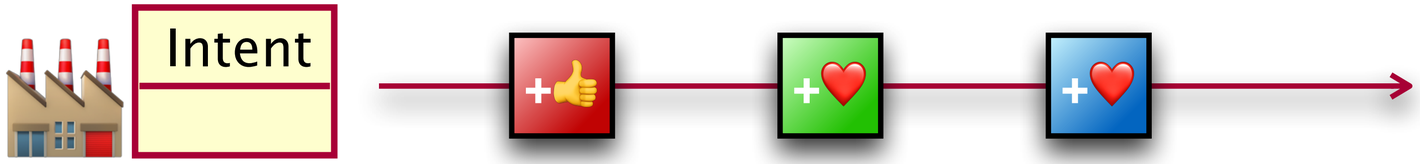
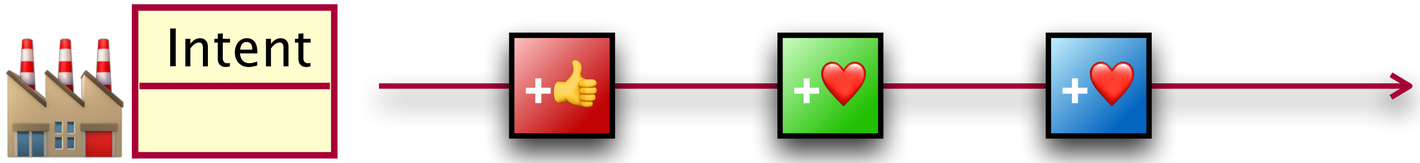
     fun process(intent: Intent<S>)
     fun modelState(): Observable<S>
}
```




```
import com.jakewharton.rxrelay2.PublishRelay
```

```
PublishRelay<Intent>.accept(intent)
```


```
fun process(intent: Intent<S>) = intents.accept(intent)
```

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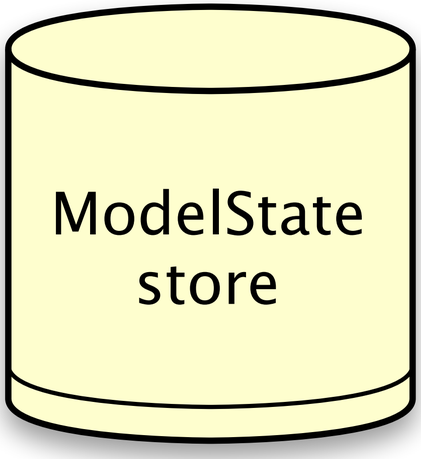

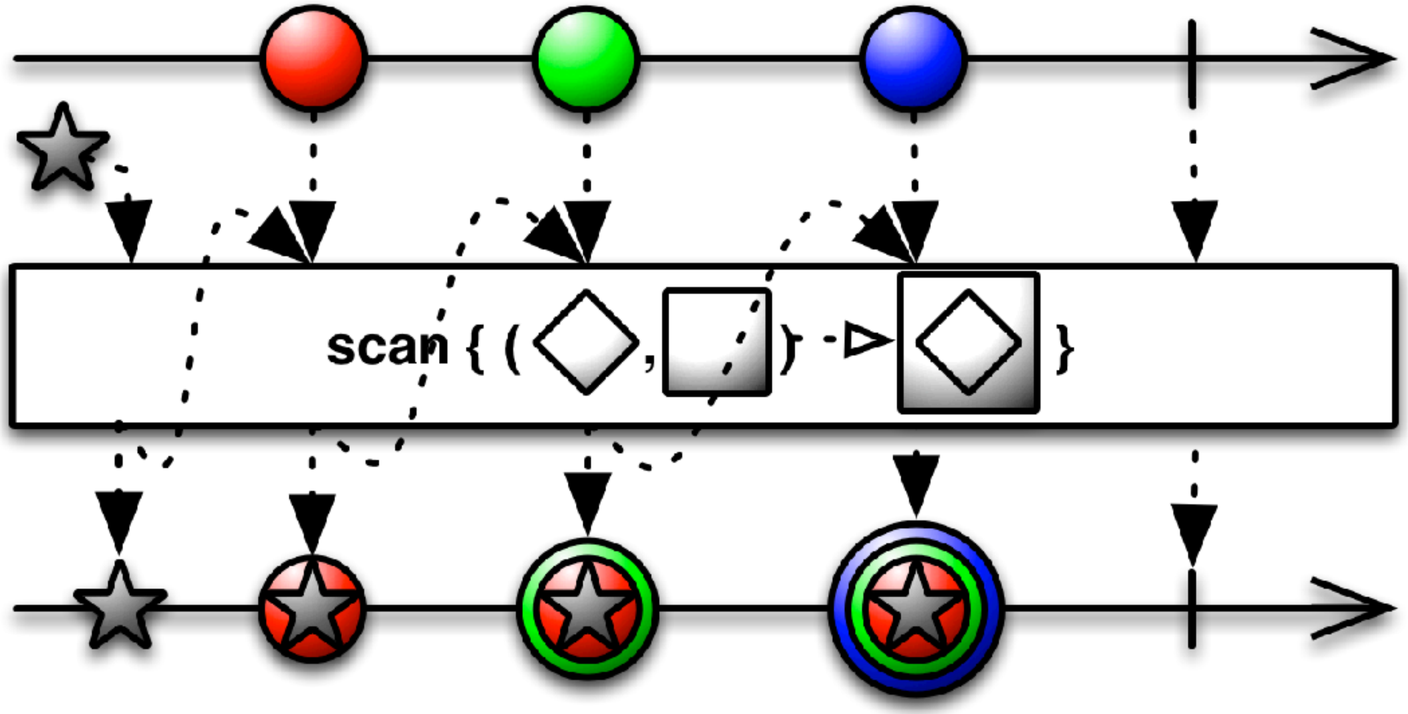

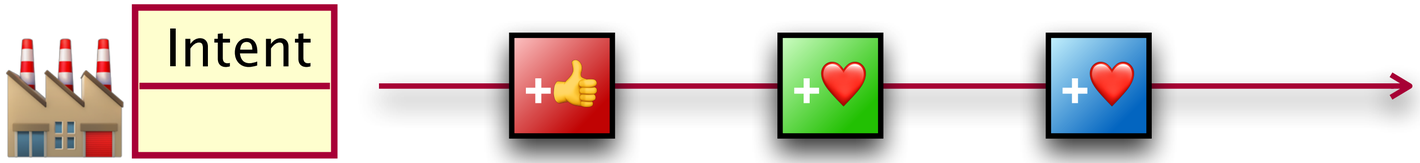


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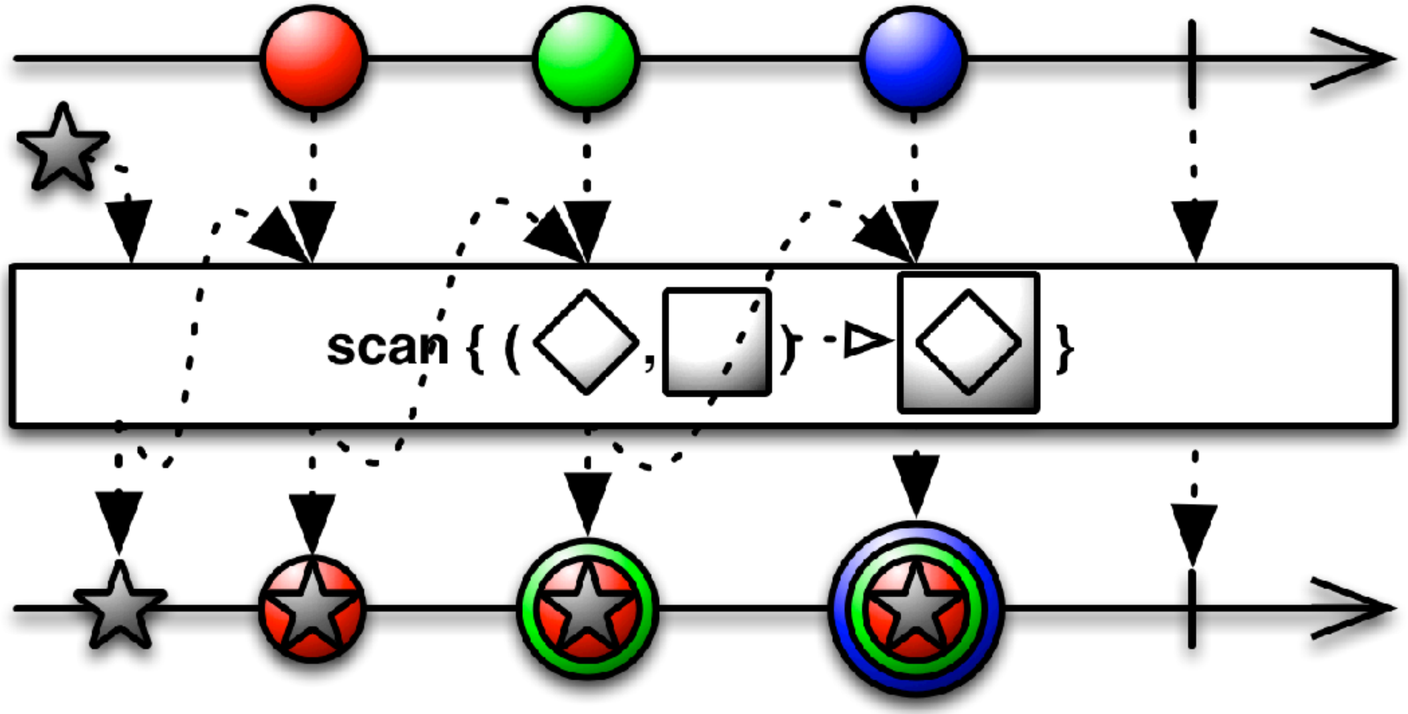

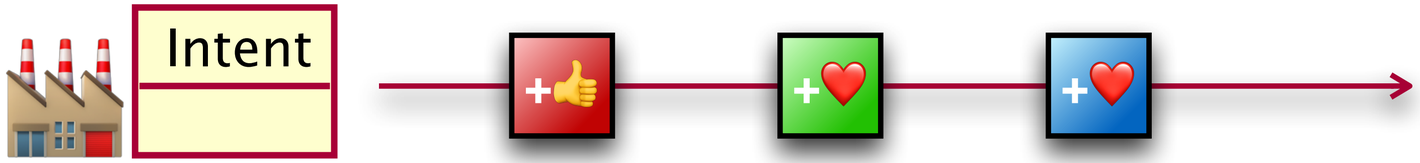


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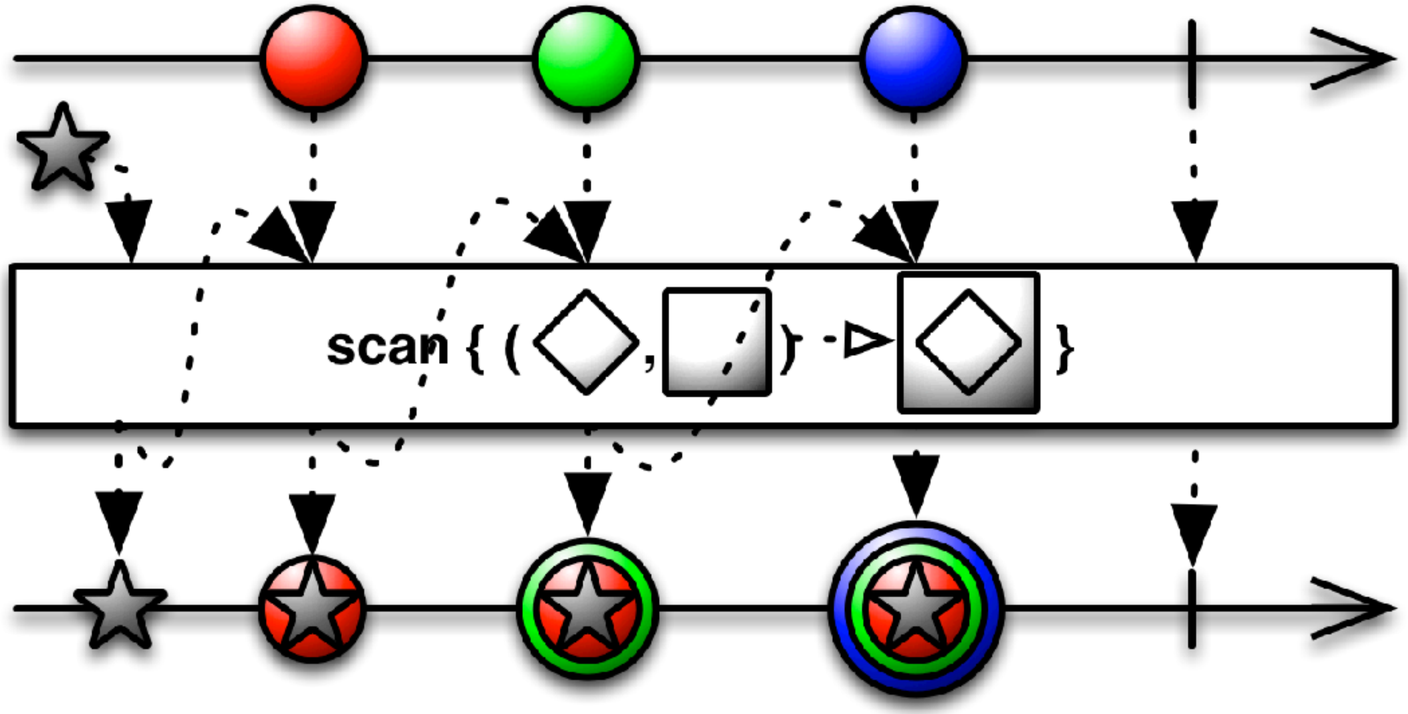
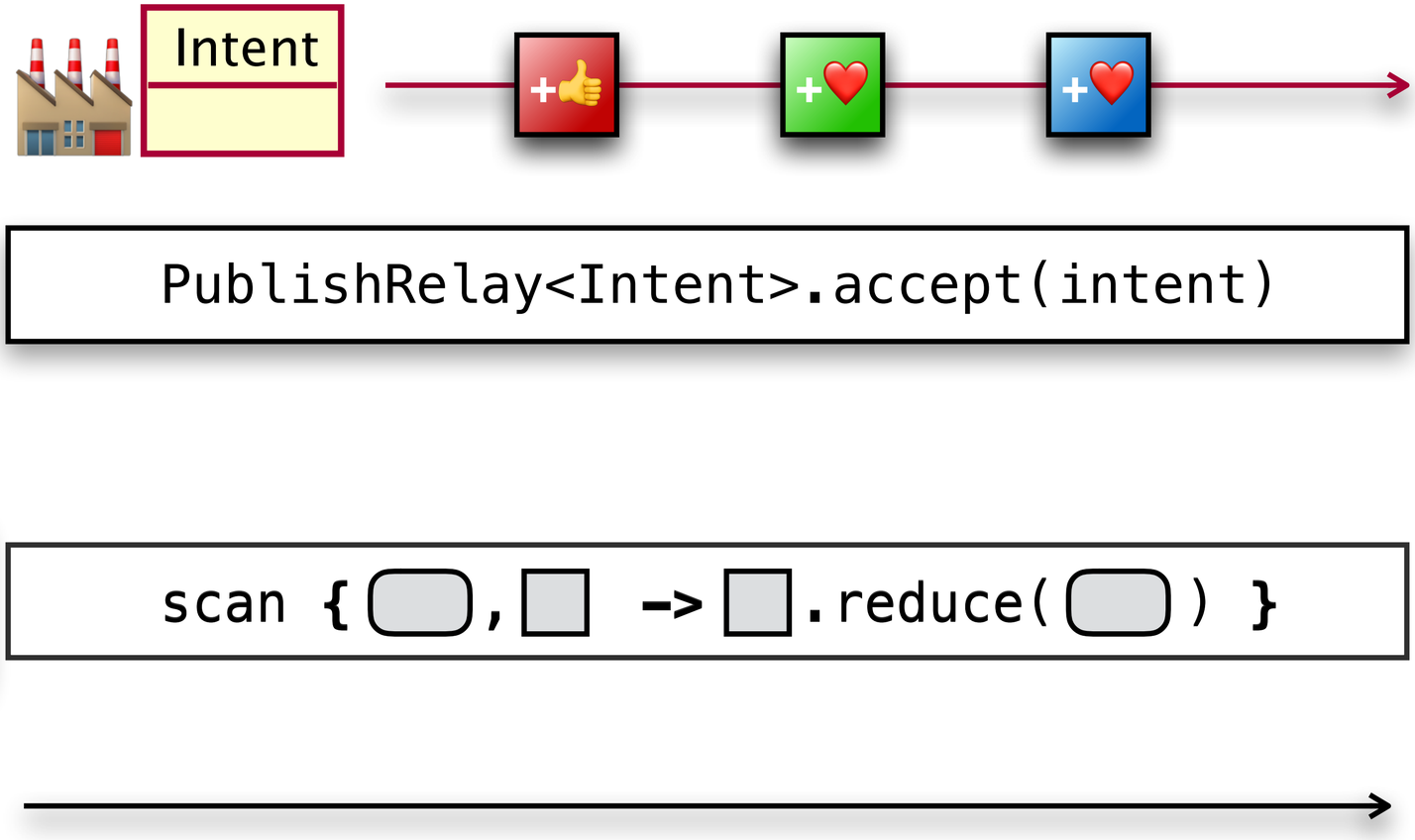
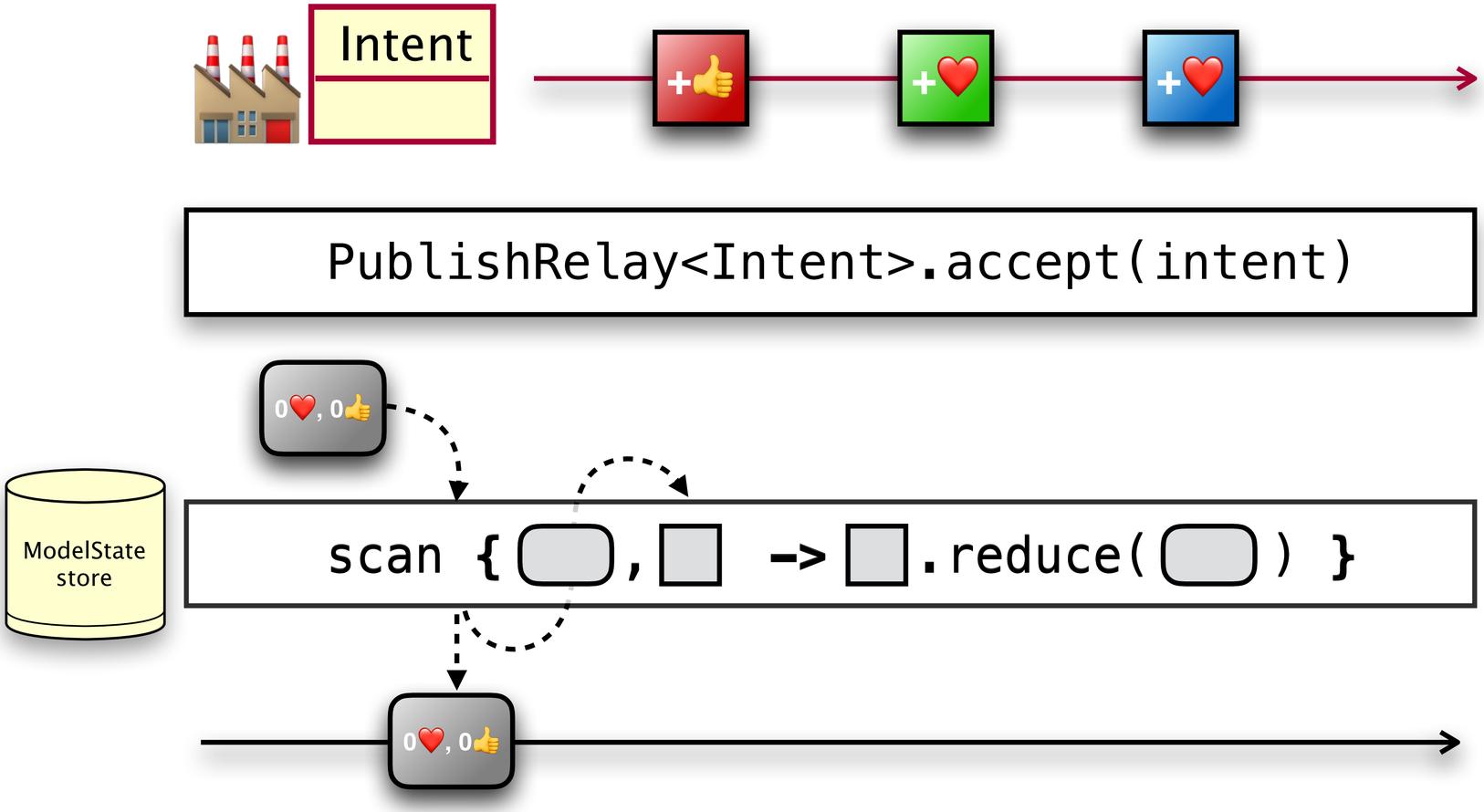
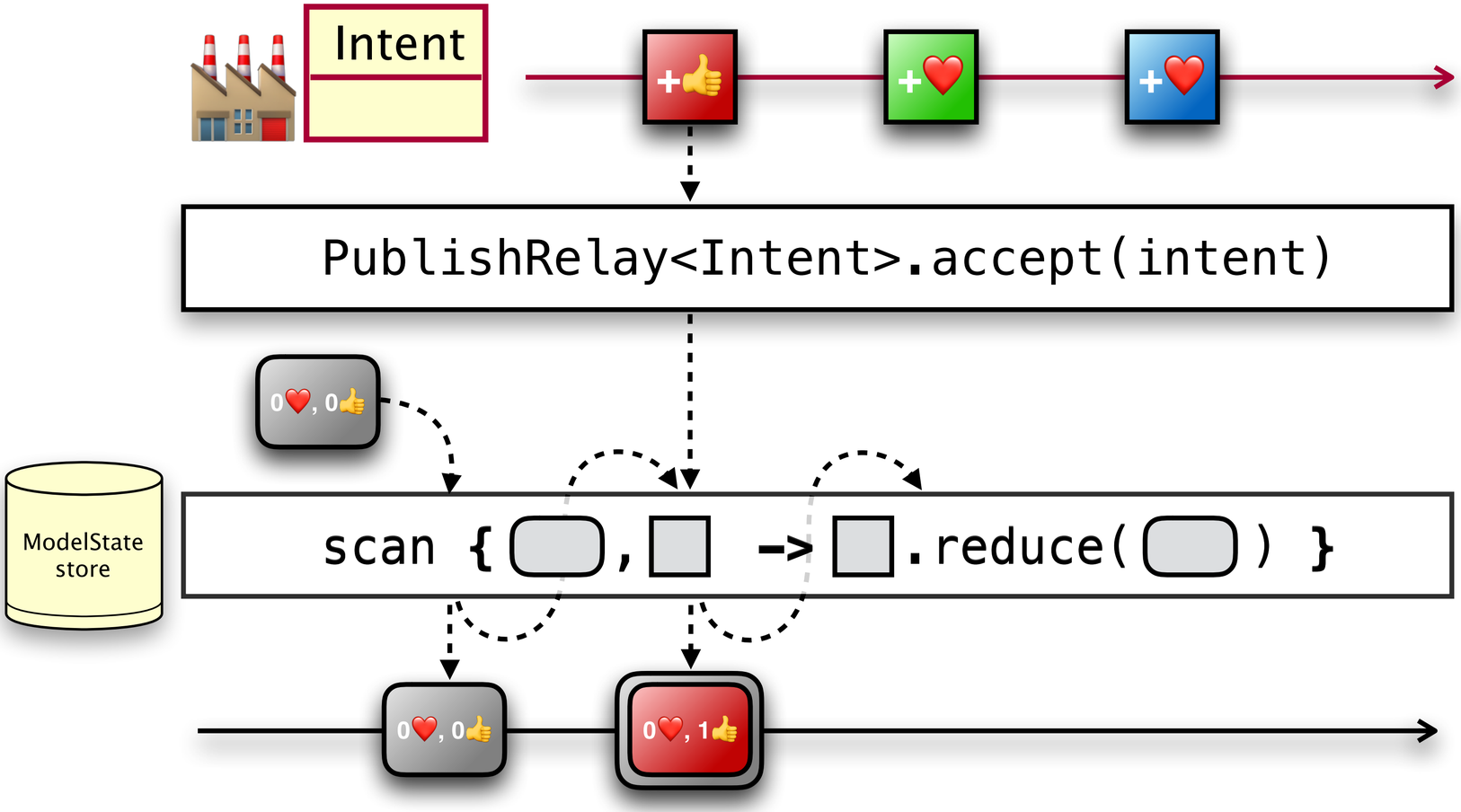
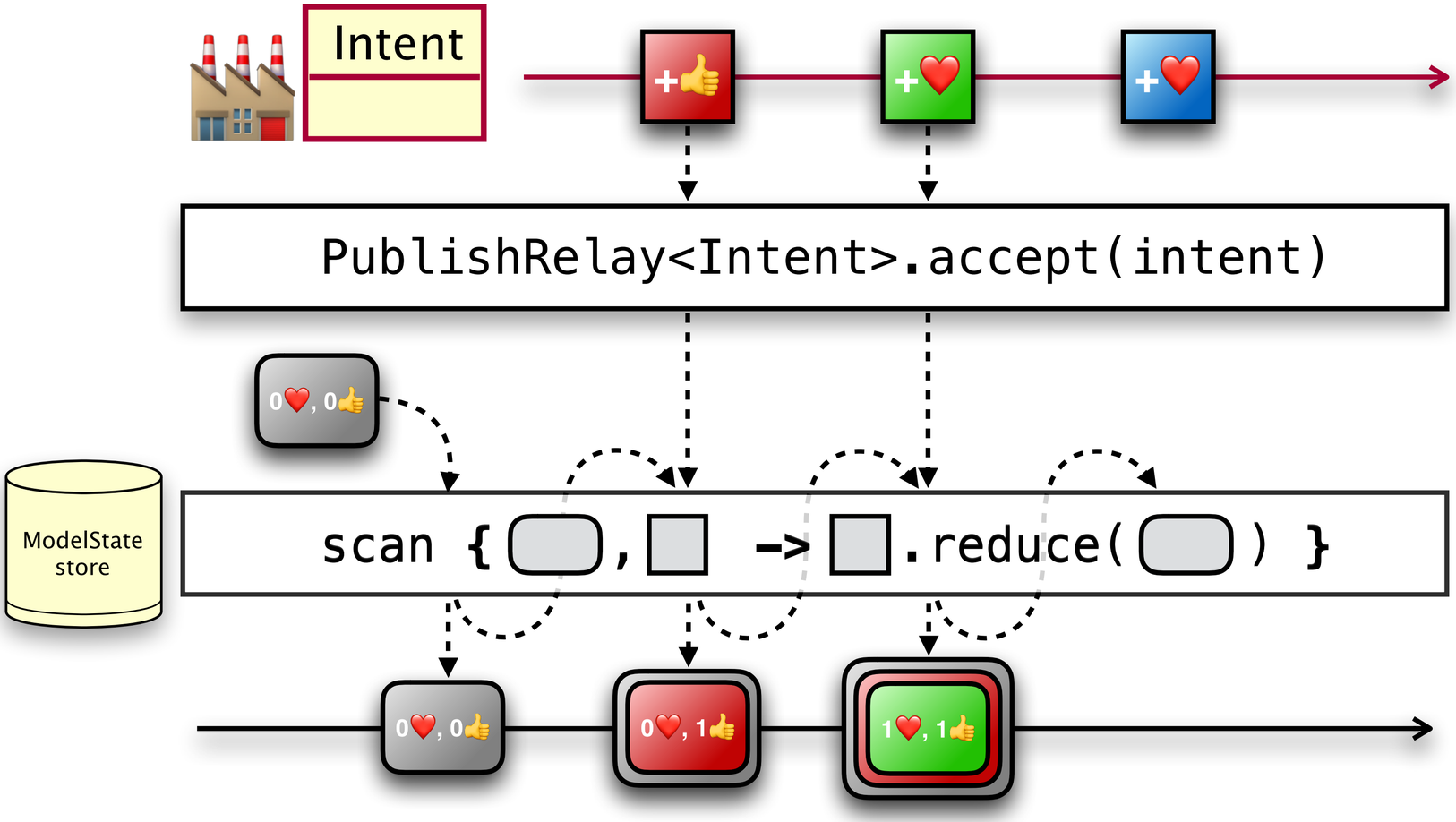
```

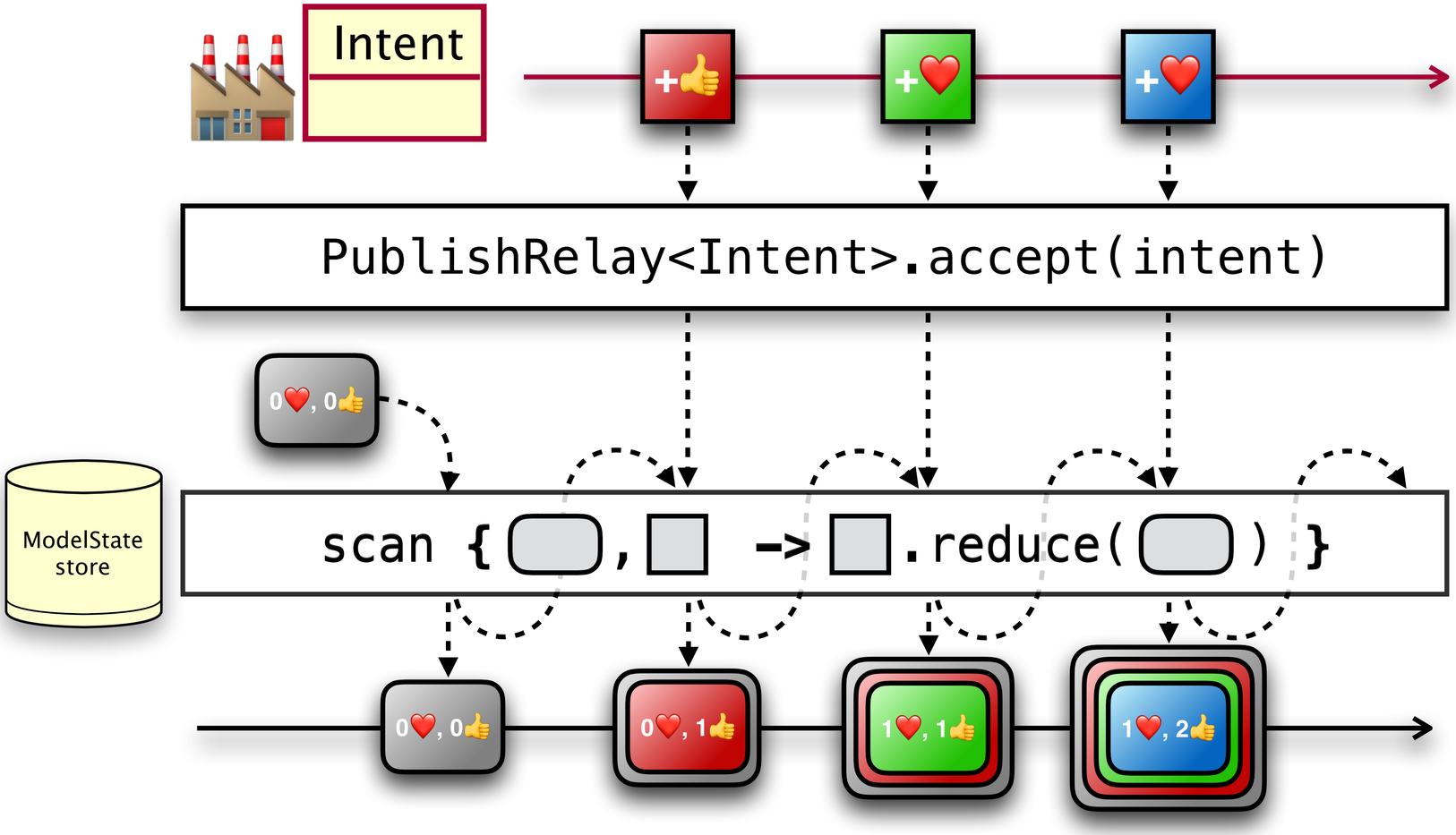


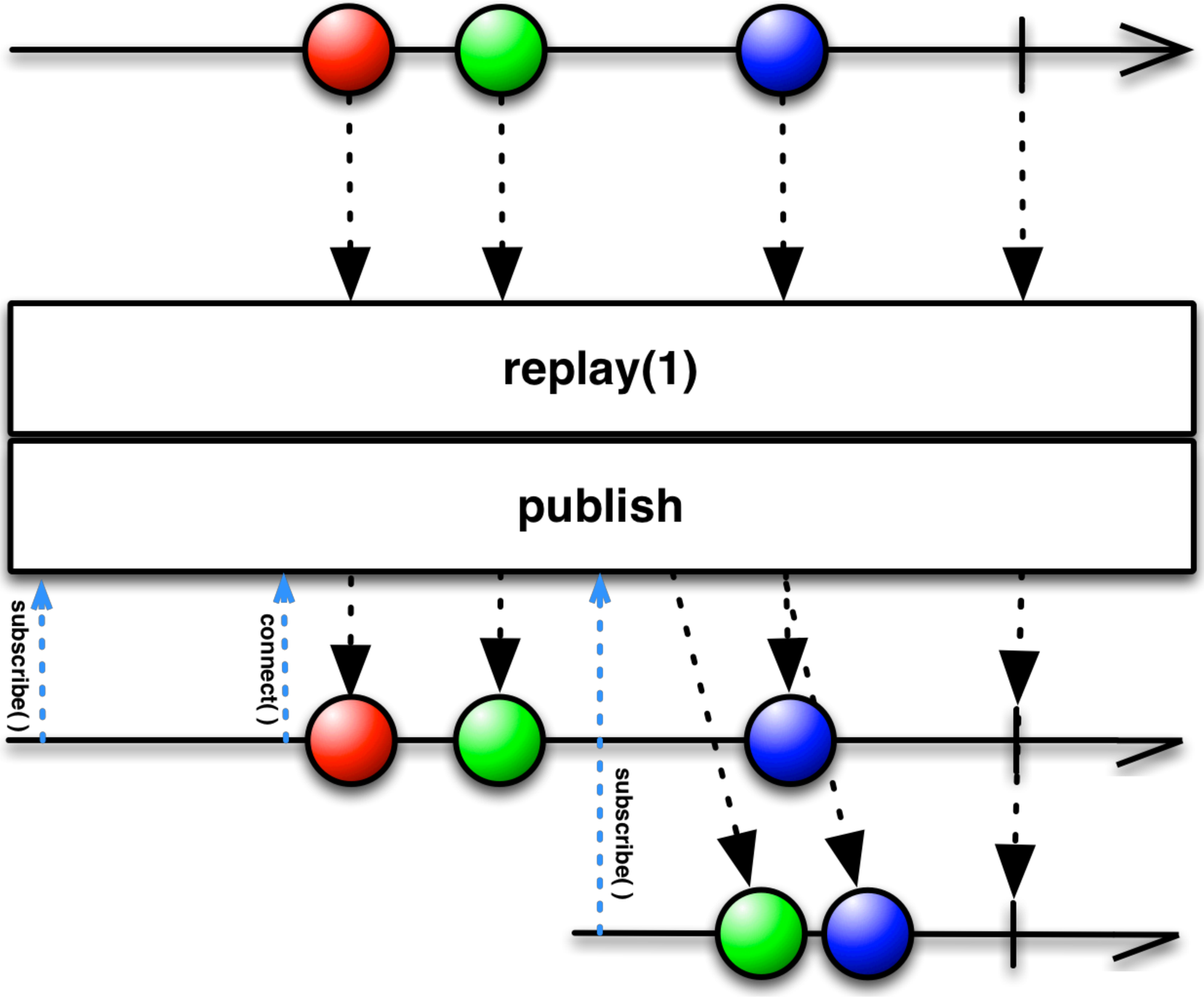

Intent
PublishRelay<Intent>.accept(intent)
ModelState
store
scan { , -> .reduce( ) }

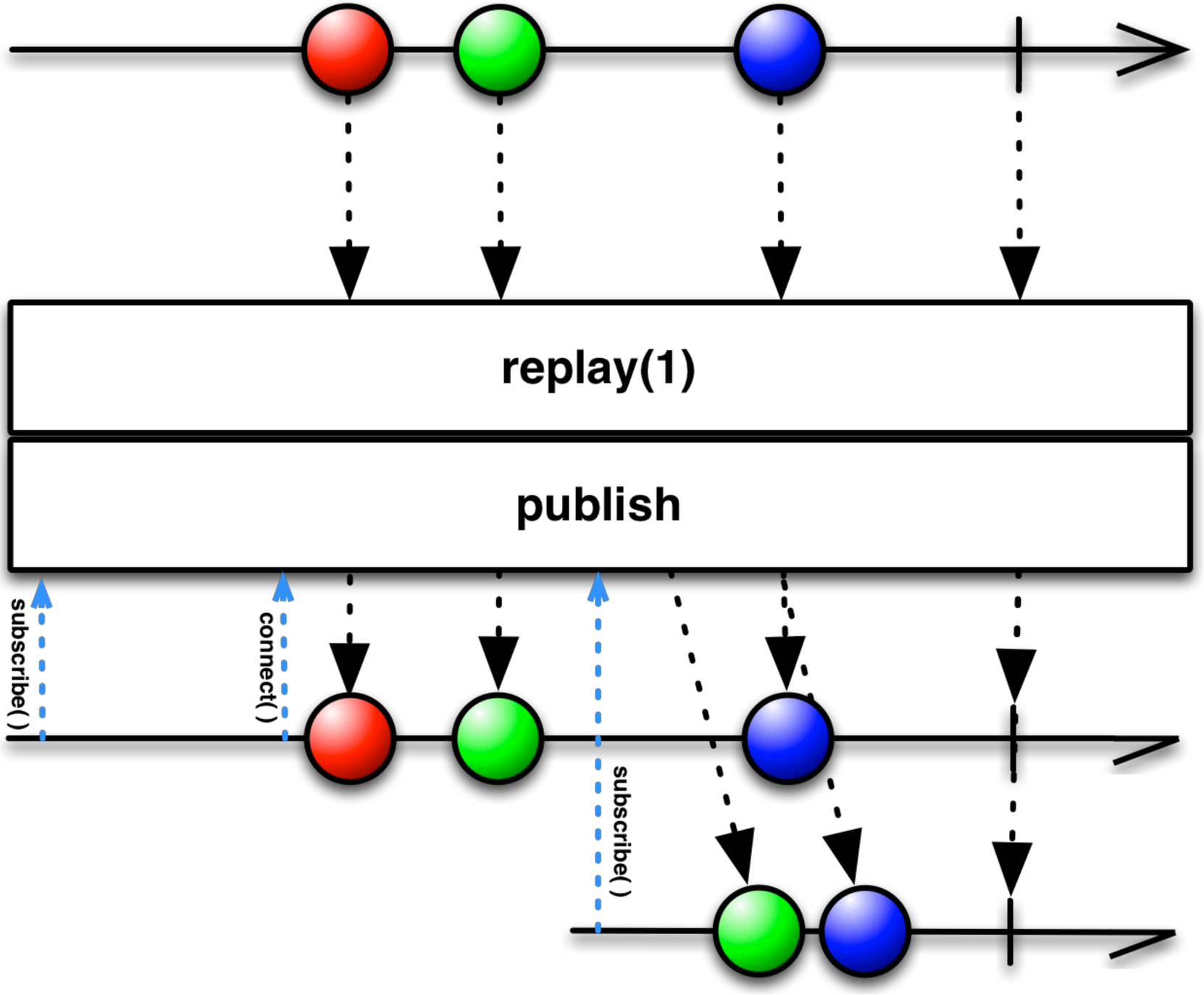

Intent
PublishRelay<Intent>.accept(intent)
0❤️, 0👍
ModelState store
scan { , -> .reduce( ) }
0❤️, 0👍

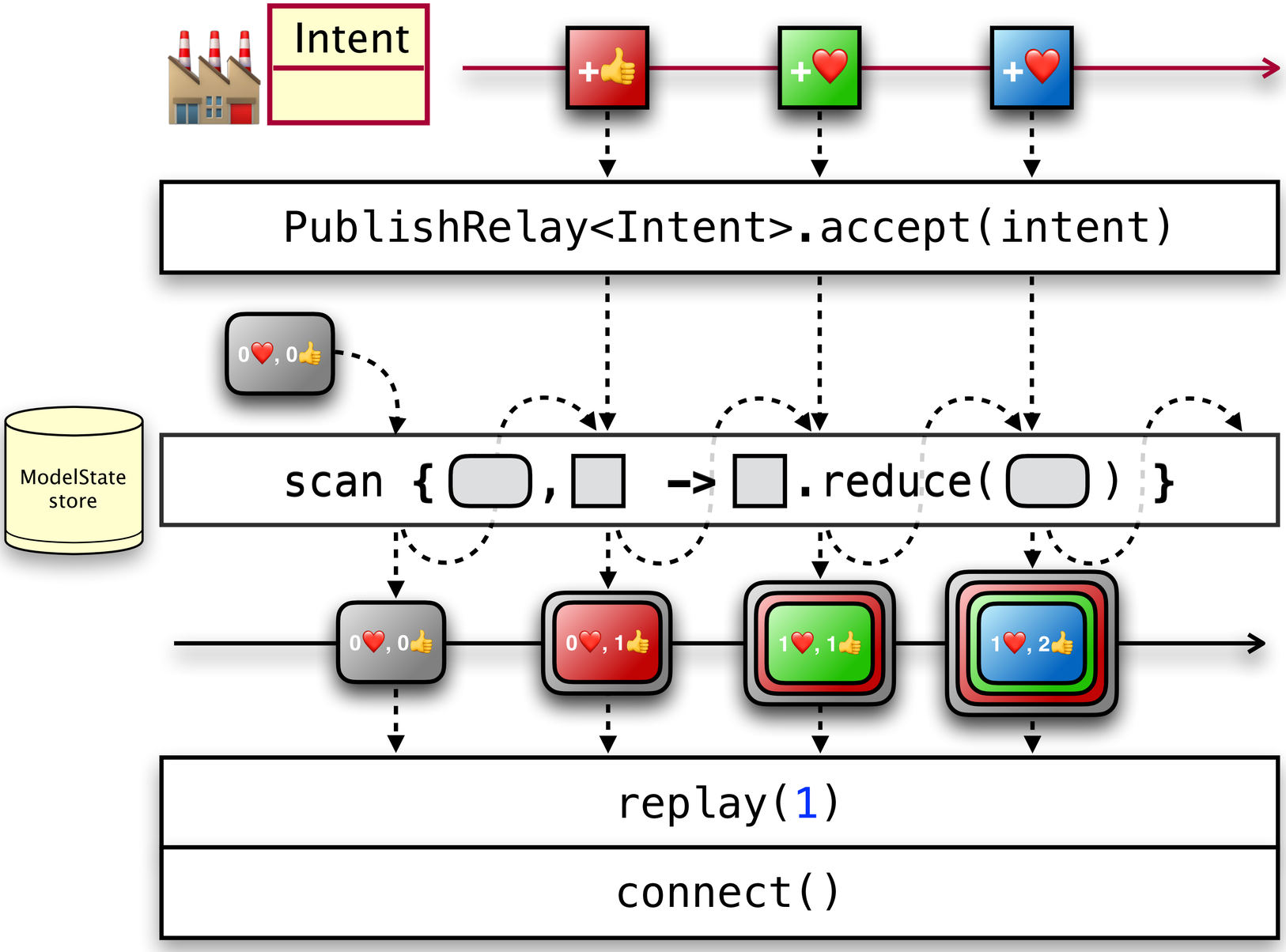

Intent
+👍
+❤️
+❤️
PublishRelay<Intent>.accept(intent)
0❤️, 0👍
ModelState store
scan { , -> .reduce( ) }
0❤️, 0👍
0❤️, 1👍

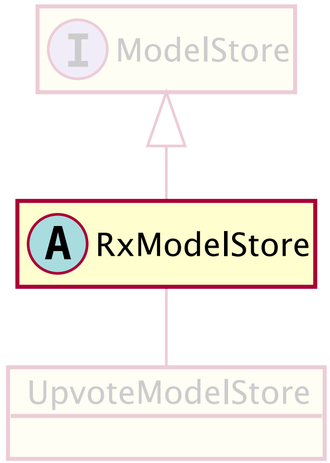

Intent
+👍
+❤️
+❤️
PublishRelay<Intent>.accept(intent)
0❤️, 0👍
ModelState store
scan { , -> .reduce( ) }
0❤️, 0👍
0❤️, 1👍
1❤️, 1👍


Intent
PublishRelay<Intent>.accept(intent)
0❤️, 0👍
ModelState store
scan { , -> .reduce( ) }
0❤️, 0👍
0❤️, 1👍
1❤️, 1👍
1❤️, 2👍


replay(1)
publish
subscribe( )
connect( )
subscribe( )


replay(1)
publish
subscribe( )
connect( )
subscribe( )


Intent
+👍
+❤️
+❤️
PublishRelay<Intent>.accept(intent)
0❤️, 0👍
ModelState store
scan { , -> .reduce( ) }
0❤️, 0👍
0❤️, 1👍
1❤️, 1👍
1❤️, 2👍
replay(1)
connect()



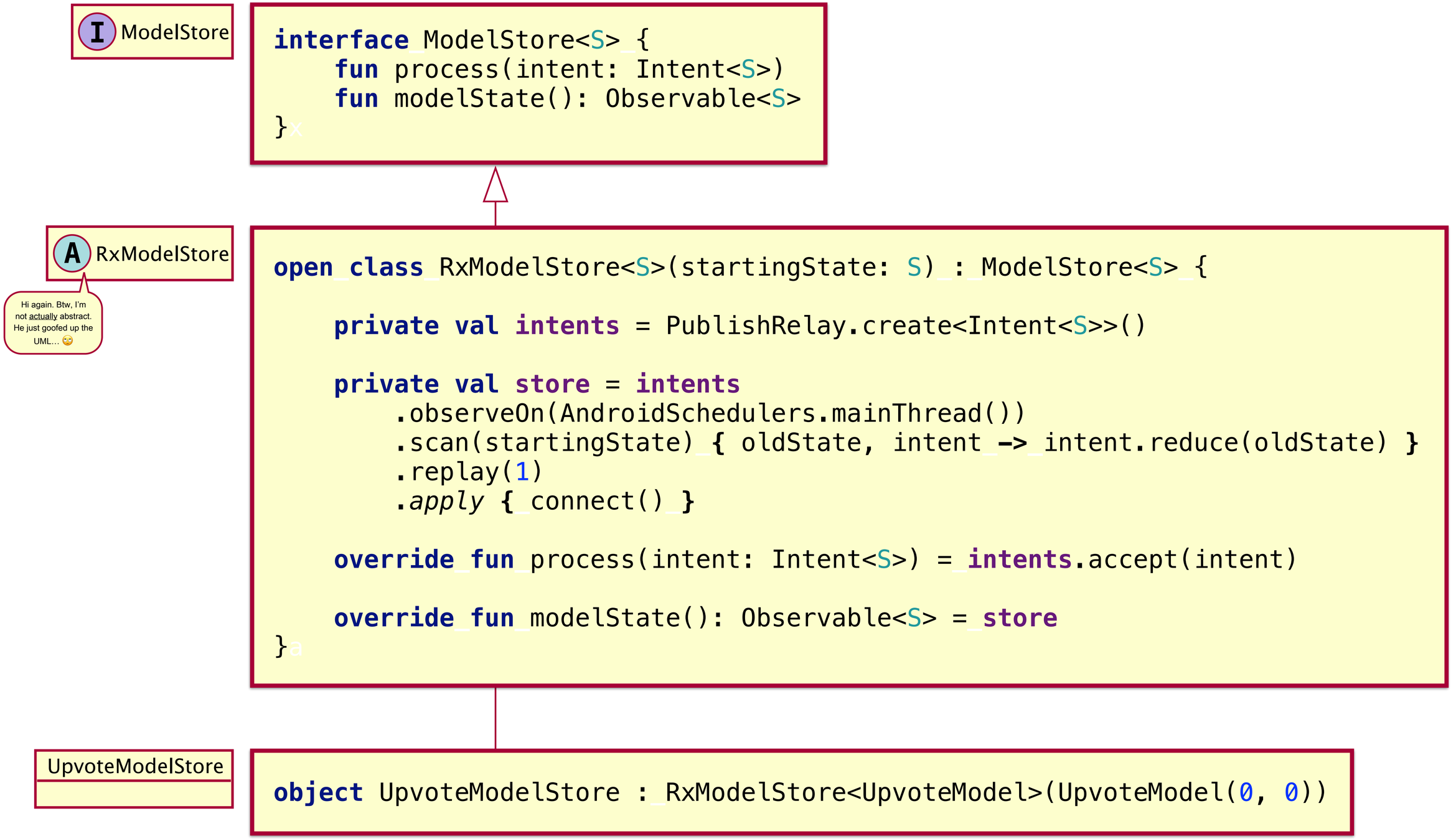

```
open class RxModelStore<S>(startingState: S) : ModelStore<S> {

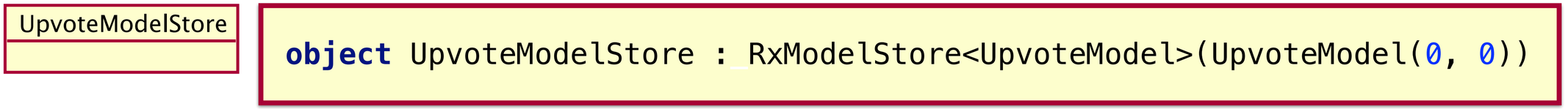
    private val intents = PublishRelay.create<Intent<S>>()

    private val store = intents
        .observeOn(AndroidSchedulers.mainThread())
        .scan(startingState) { oldState, intent -> intent.reduce(oldState) }
        .replay(1)
        .apply { connect() }

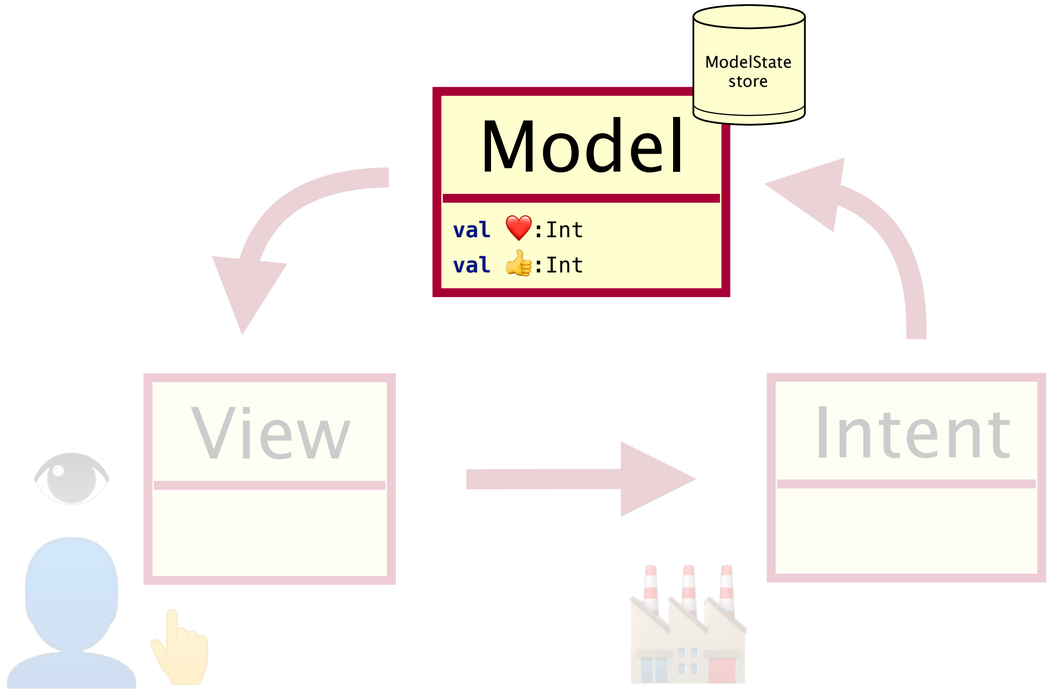
    override fun process(intent: Intent<S>) = intents.accept(intent)

    override fun modelState(): Observable<S> = store
}
```

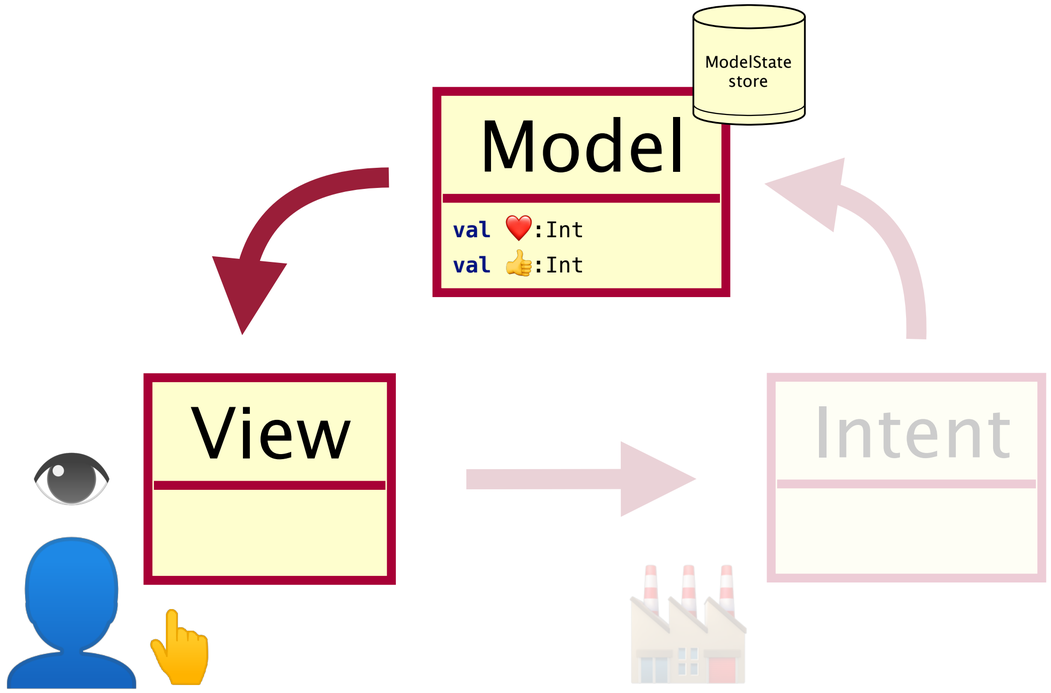

I ModelStore
interface ModelStore<S> {
fun process(intent: Intent<S>)
fun modelState(): Observable<S>
}x
A RxModelStore
Hi again. Btw, I'm not actually abstract. He just goofed up the UML… 😁
open class RxModelStore<S>(startingState: S) : ModelStore<S> {
private val intents = PublishRelay.create<Intent<S>>()
private val store = intents
.observeOn(AndroidSchedulers.mainThread())
.scan(startingState) { oldState, intent -> intent.reduce(oldState) }
.replay(1)
.apply { connect() }
override fun process(intent: Intent<S>) = intents.accept(intent)
override fun modelState(): Observable<S> = store
}a
UpvoteModelStore
object UpvoteModelStore : RxModelStore<UpvoteModel>(UpvoteModel(0, 0))


UpvoteModelStore
object UpvoteModelStore : RxModelStore<UpvoteModel>(UpvoteModel(0, 0))

```
object UpvoteModelStore
```

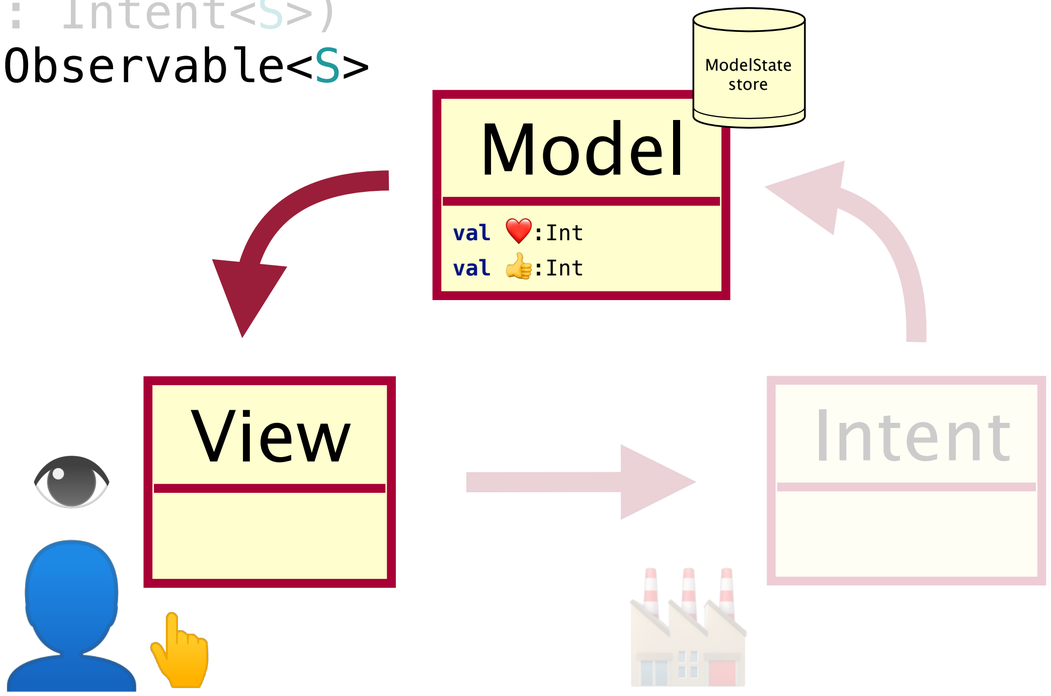


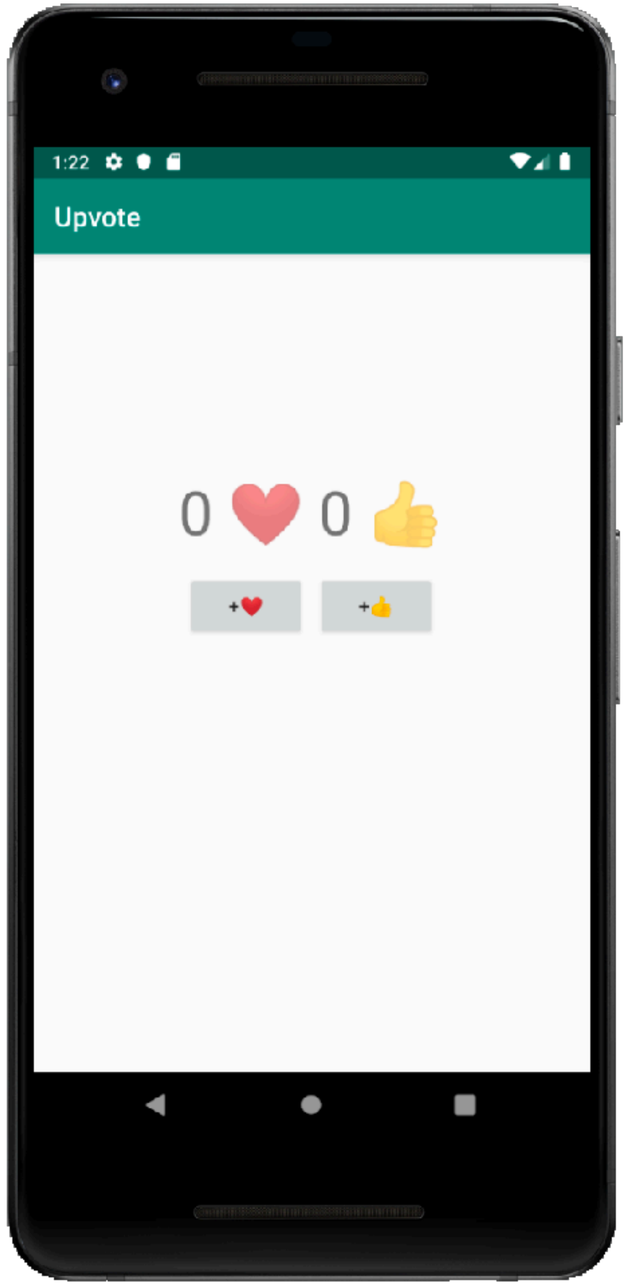
```
object UpvoteModelStore
```

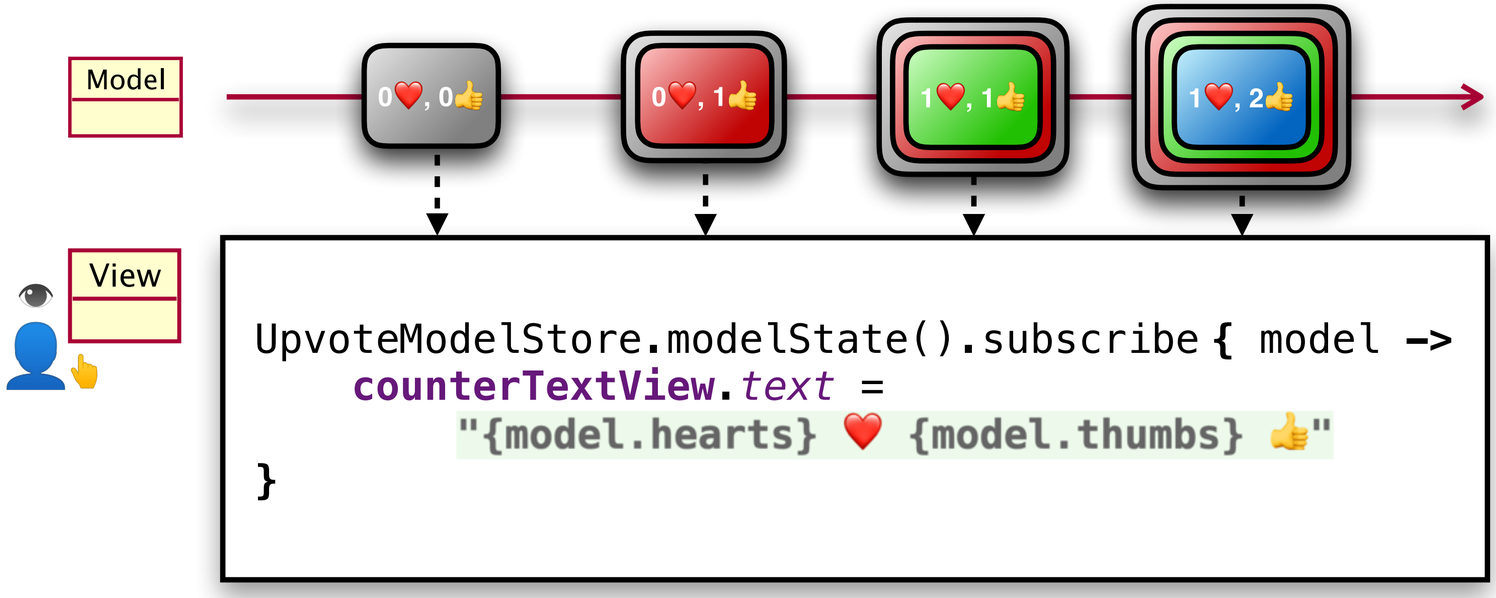


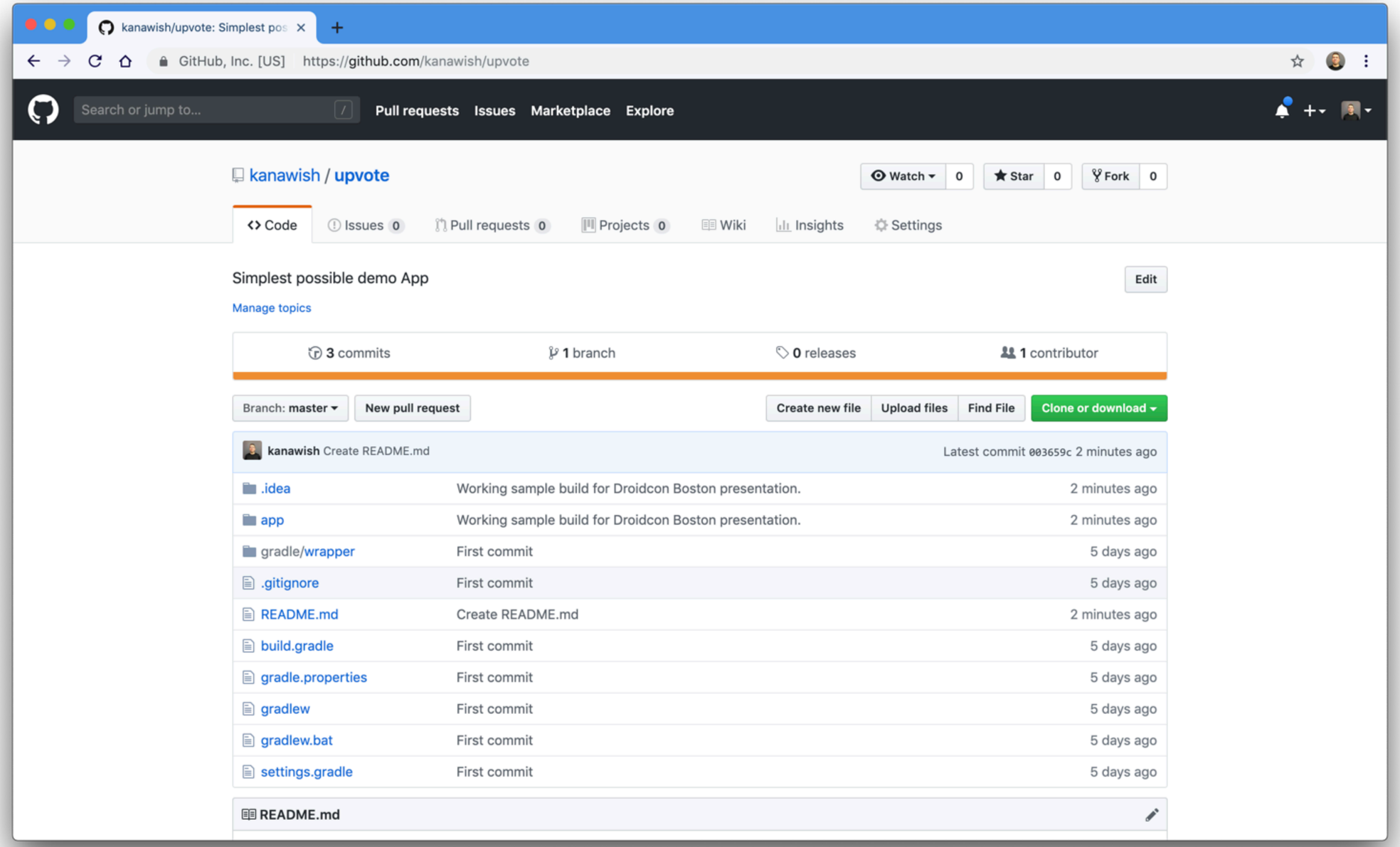
```
object UpvoteModelStore

interface ModelStore<S> {
    fun process(intent: Intent<S>)
    fun modelState(): Observable<S>
}
```




1:22
Upvote
0 ❤️ 0 👍
+❤️
+👍

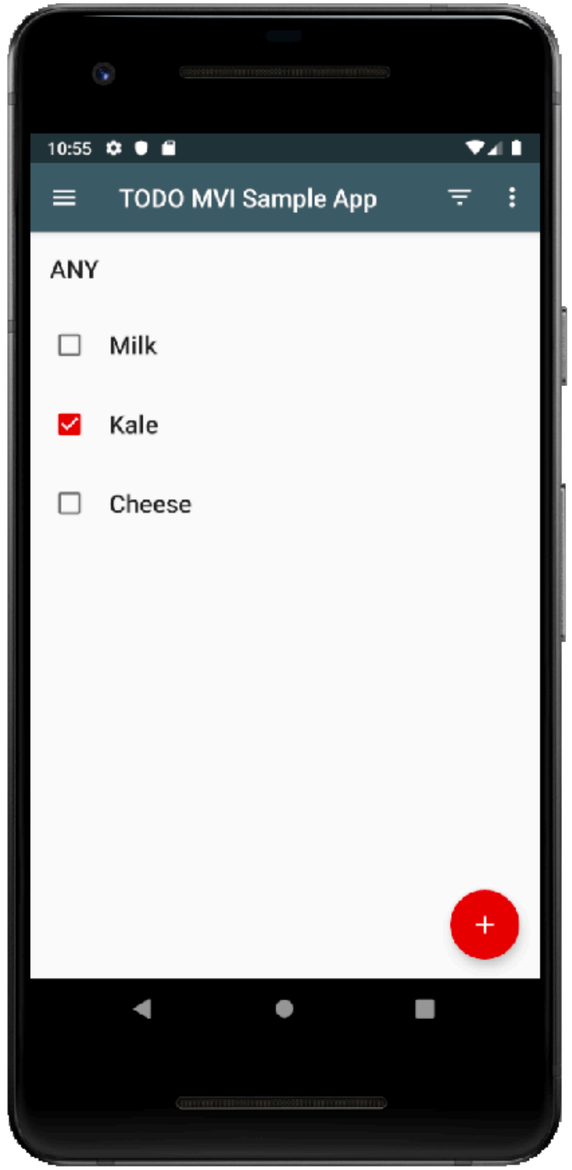

Model
0❤️, 0👍
0❤️, 1👍
1❤️, 1👍
1❤️, 2👍
View
UpvoteModelStore.modelState().subscribe { model ->
counterTextView.text =
"{model.hearts} ❤️ {model.thumbs} 👍"
}



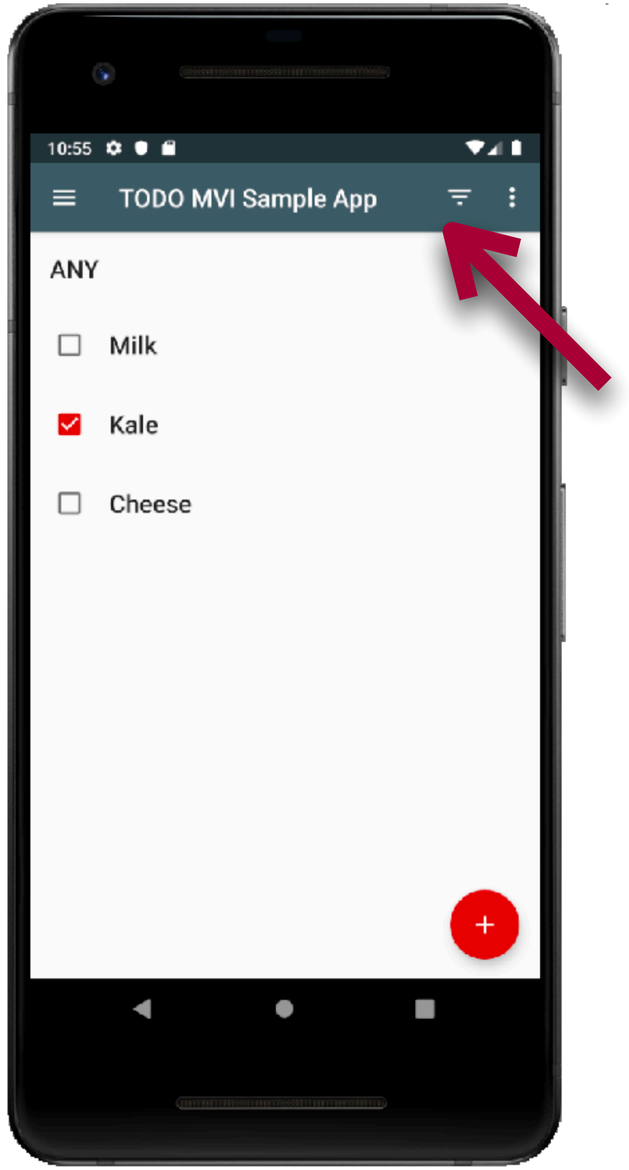
https://github.com/kanawish/upvote

Live demo

Live demo



https://github.com/kanawish/android-mvi-sample



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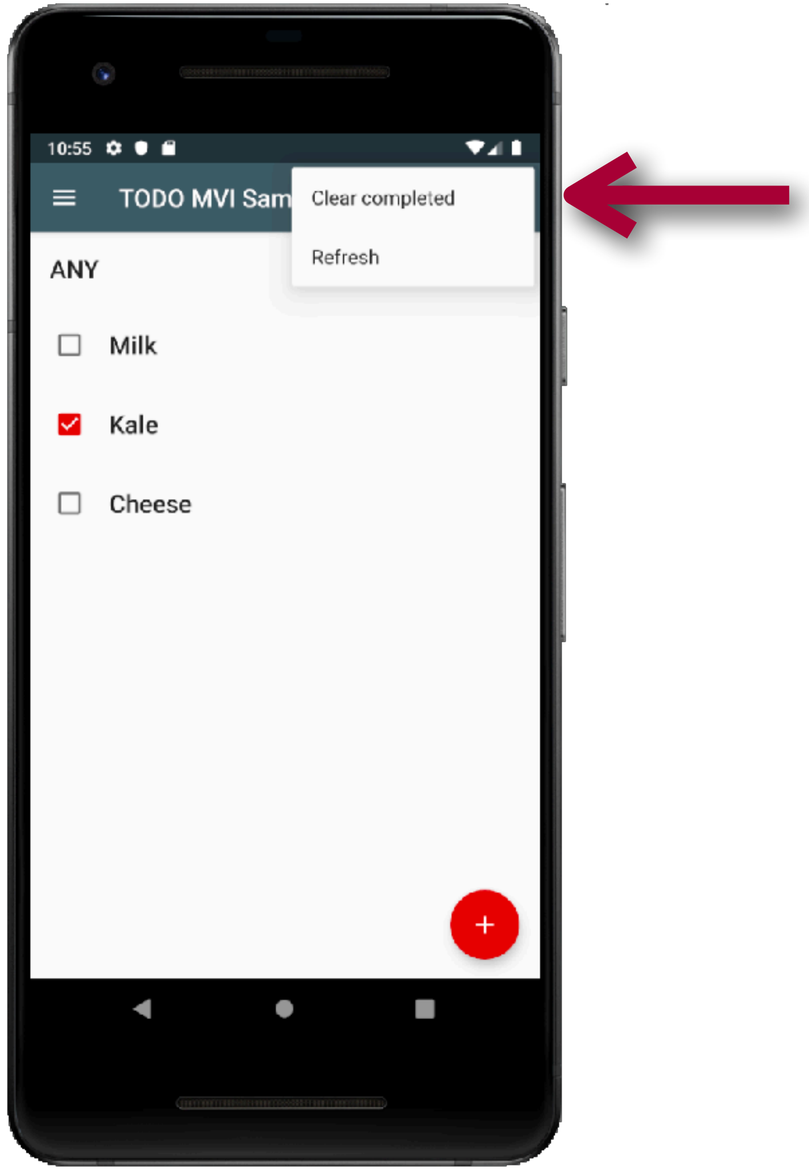

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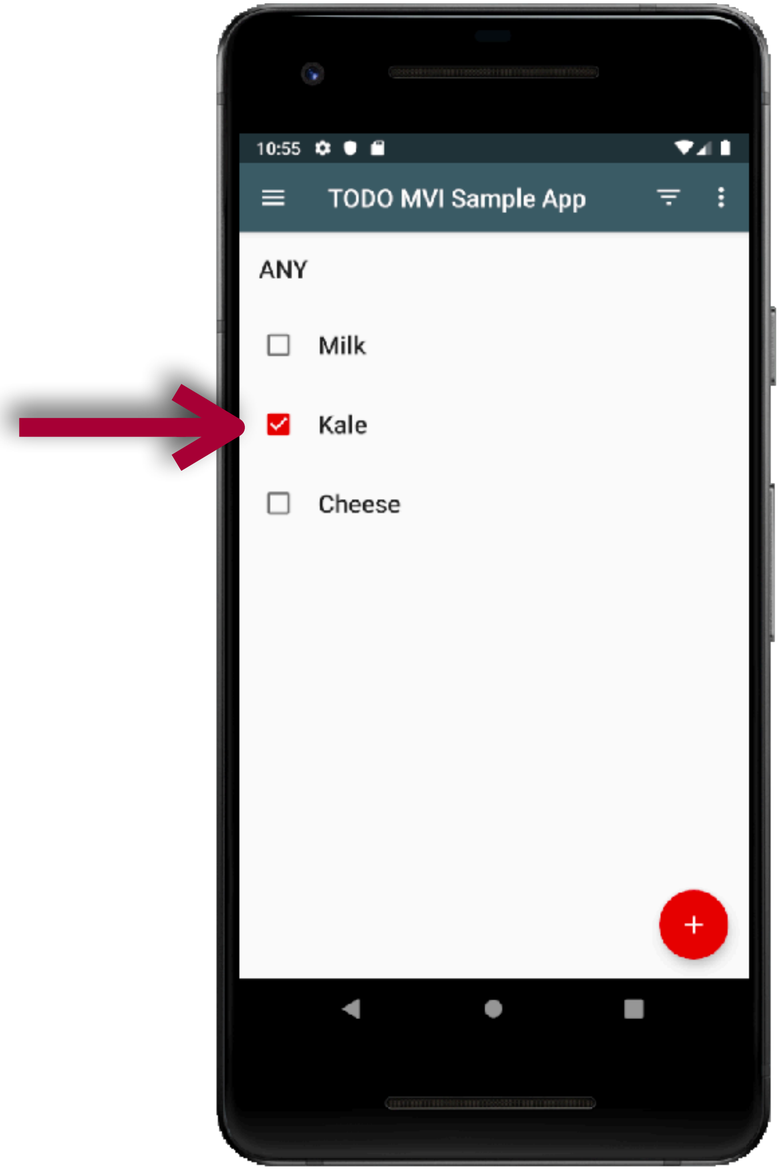

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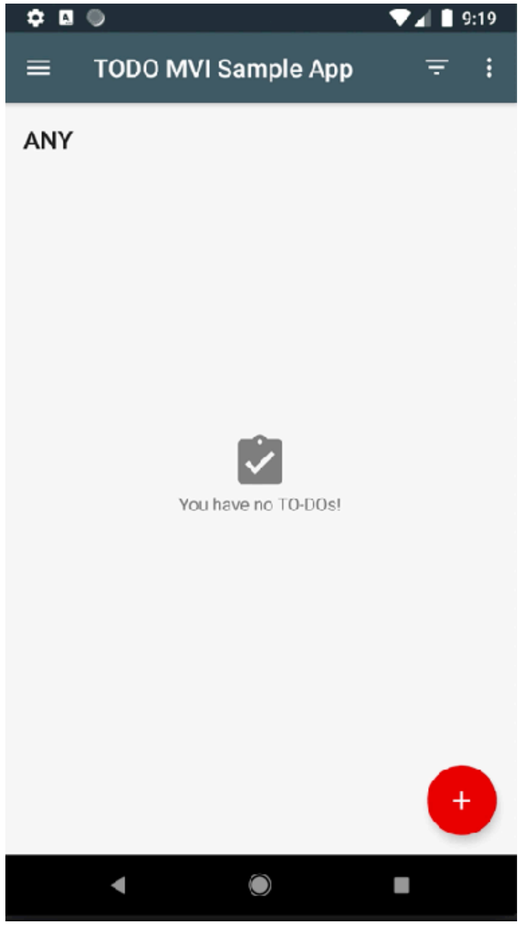

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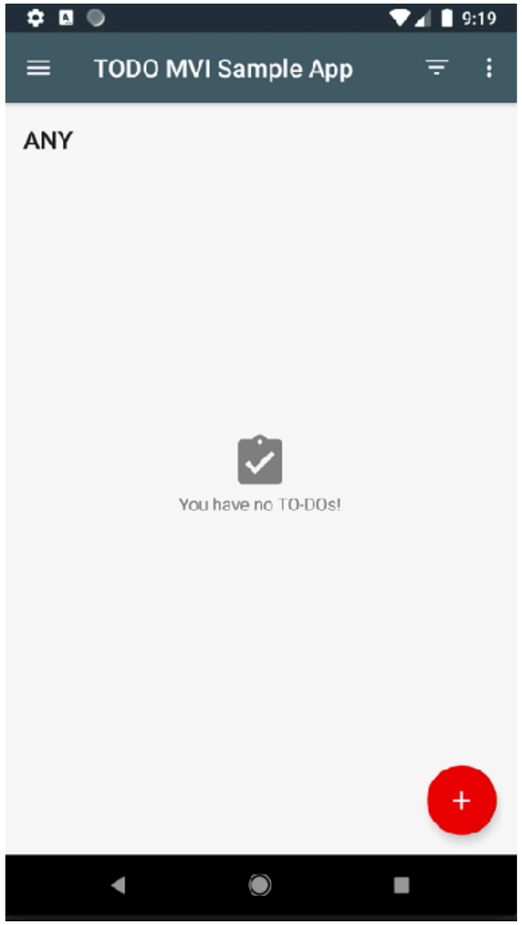
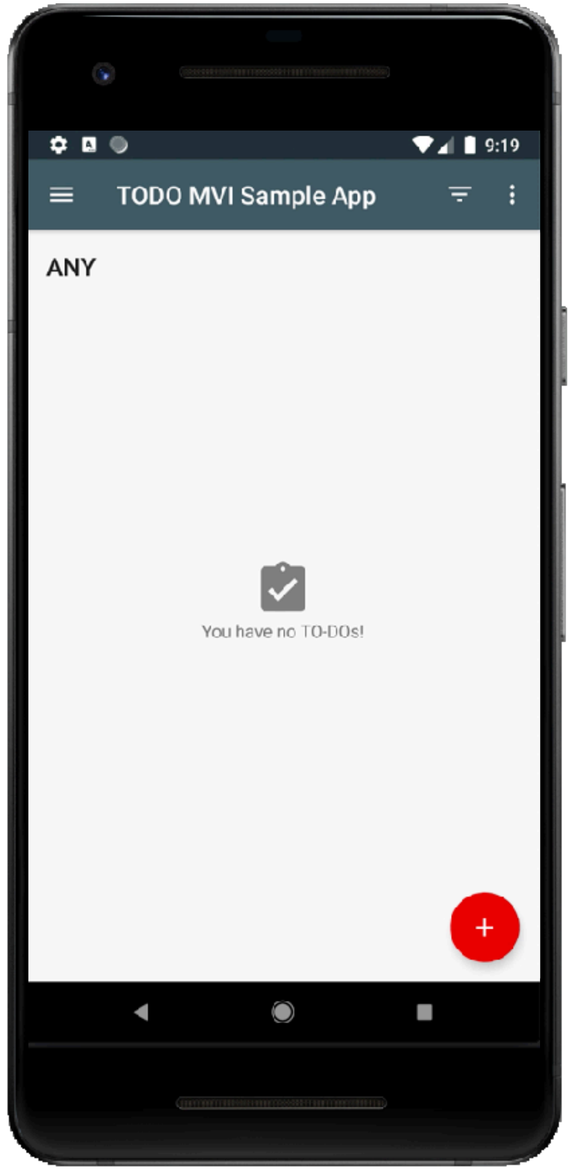


https://github.com/kanawish/android-mvi-sample



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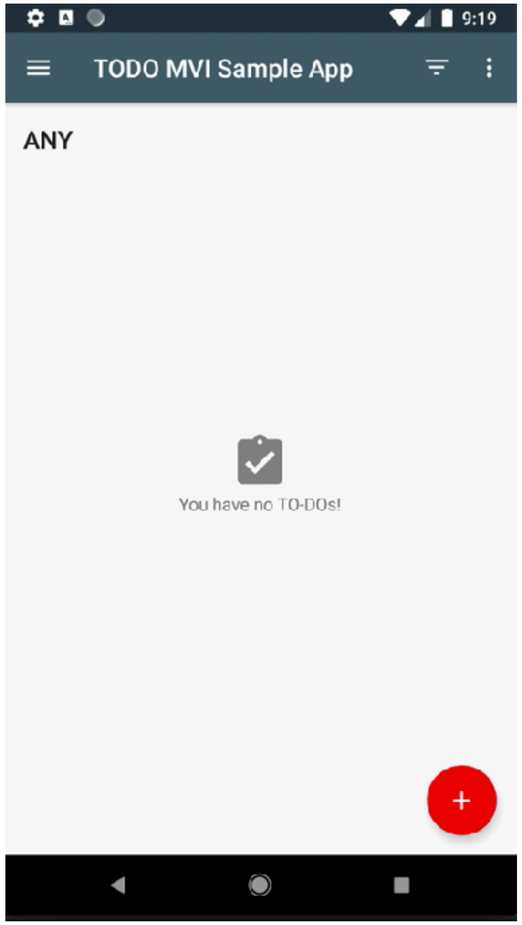

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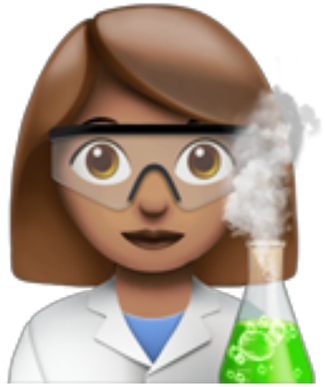
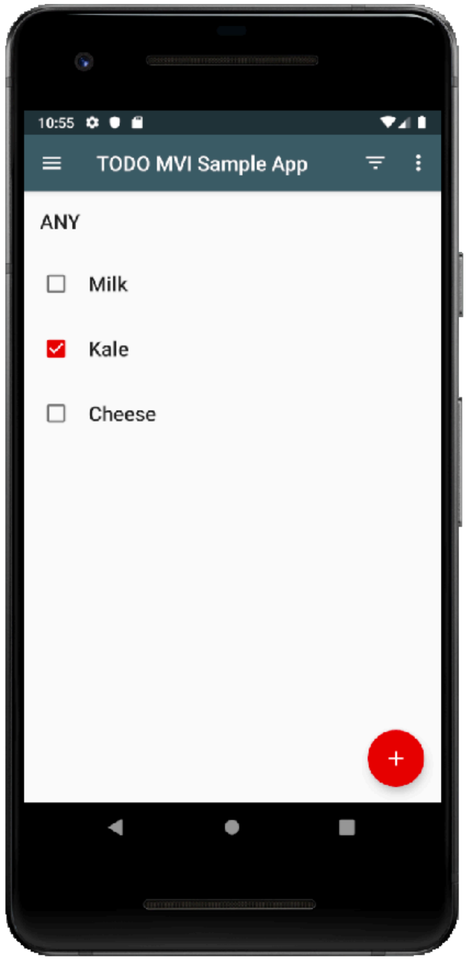
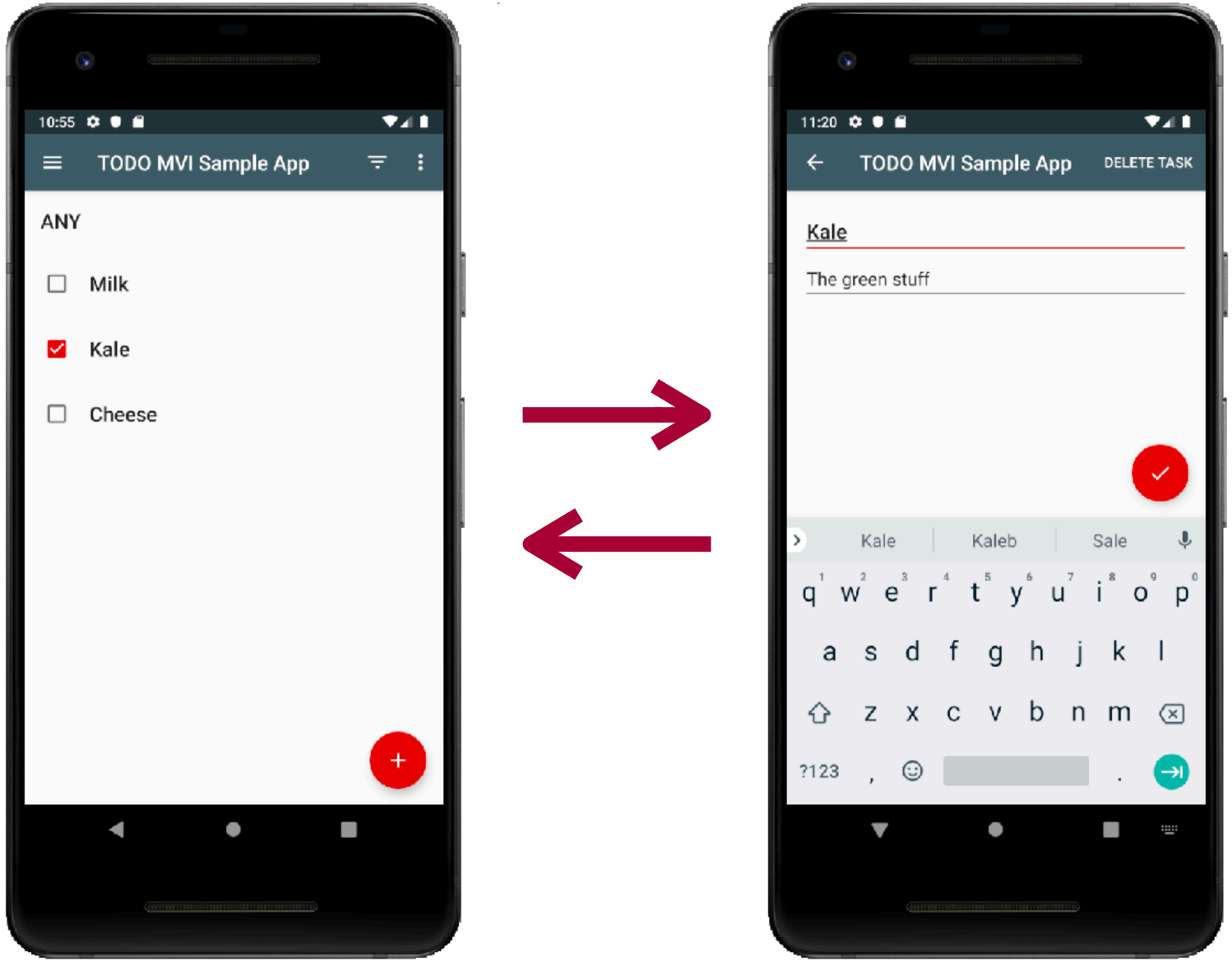
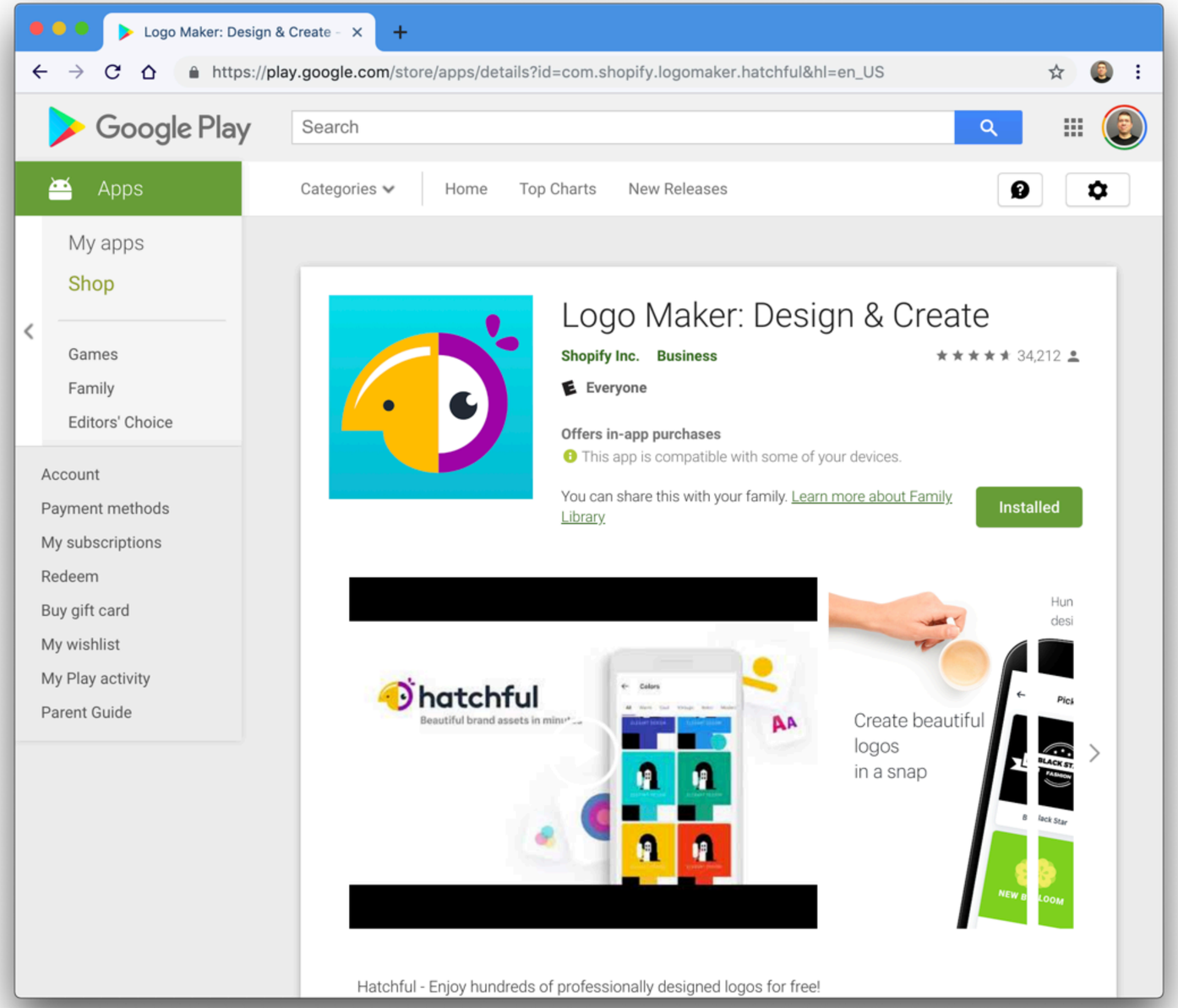




https://github.com/kanawish/android-mvi-sample



https://github.com/kanawish/android-mvi-sample



https://play.google.com/store/apps/details?id=com.shopify.logomaker.hatchful

Thank you!

https://github.com/kanawish/upvote
https://github.com/kanawish/android-mvi-sample