Advanced RxSwift – Day 5

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RxSwift Basics

- Day 1 – Observable, Operator (Filter, Transform, Combine)
- Day 2 – Subject (flatMap, flatMapFirst, flatMapLatest)
- Day 3 – Two VCs communications with Subject, RxCocoa (Button)
- Day 4 – Sequential, Merged Observable Calls
- Day 5 – RxCocoa, UI Binding (Button, TextField, Label, TableView)

Advanced RxSwift

- Day 1 – Protocol-Oriented Programming, Protocol Extension, Associatetype
- Day 2 – Network Call, Generic Enum
- Day 3 – Binding Track Activity (show / hide ‘Loading’), Scan Operator
- Day 4 – Adding a Reactive Extension to Custom UI Element,
- 2 Way Binding, Advanced TableView – RxDataSources

- **Day 5 – Schedulers (observeOn, subscribeOn),**

Unit Test (RxTest, RxBlocking)

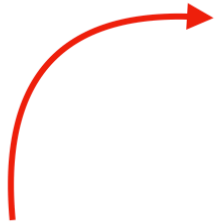
Scheduler – observeOn, subscribeOn

```
Observable<Int>.create { observer in
            print(Thread.isMainThread)
            observer.onNext(1)
            sleep(1)
            observer.onNext(2)
            return Disposables.create()
            }
            .observeOn(MainScheduler.instance)
            .subscribeOn(ConcurrentDispatchQueueScheduler(qos: .background))
            .subscribe(onNext: { el in
                print(Thread.isMainThread)
            }).disposed(by: disposeBag)
```

Scheduler – observeOn, subscribeOn

```
Observable.create { observer in
    subscription code
}
operators (map, filter, etc)
subscribe(
    observing code
)
```

Scheduler – observeOn, subscribeOn



```
Observable.create { observer in
    subscription code
}
operators (map, filter, etc)
subscribe(


)
```

Scheduler – observeOn, subscribeOn

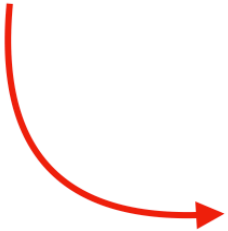
```
Observable.create { observer in



}
```

```
operators (map, filter, etc)
```

```
subscribe(
  onNext: {      observing      }
  onComplete: {  observing      }
)
```



Schedulers

- CurrentThreadScheduler (Serial) – schedules on the current thread, this is also the default scheduler.
- MainScheduler (Serial) – schedules on the main thread.
- SerialDispatchQueueScheduler (Serial) – schedules on a specific queue (dispatch_queue_t).
- ConcurrentDispatchQueueScheduler (Concurrent) – schedules on a specific queue (dispatch_queue_t).
- OperationQueueScheduler (Concurrent) – schedules on a specific queue (NSOperationQueue).

MainScheduler

Abstracts work that needs to be performed on MainThread. In case schedule methods are called from the main thread, it will perform the action immediately without scheduling.This scheduler is usually used to perform UI work.

```
MainScheduler.instance
```

CurrentThreadScheduler

Schedules units of work on the current thread.

This is the default scheduler for operators that generate elements.

SerialDispatchQueueScheduler

Abstracts the work that needs to be performed on a specific dispatch_queue_t.

It will make sure that even if a concurrent dispatch queue is passed, it's transformed into a serial one.Serial schedulers enable certain optimizations for observeOn.

The main scheduler is an instance of SerialDispatchQueueScheduler

```
SerialDispatchQueueScheduler(qos: .default)
```

ConcurrentDispatchQueueScheduler

Abstracts the work that needs to be performed on a specific dispatch_queue_t.

You can also pass a serial dispatch queue, it shouldn't cause any problems.

This scheduler is suitable when some work needs to be performed in the background.

```
ConcurrentDispatchQueueScheduler(qos: .background)

ConcurrentDispatchQueueScheduler(queue: DispatchQueue.global())
```

OperationQueueScheduler

Abstracts the work that needs to be performed on a specific NSOperationQueue.

This scheduler is suitable for cases when there is some bigger chunk of work that needs to be performed in the background and you want to fine tune concurrent processing using maxConcurrentOperationCount.

OperationQueueScheduler

```
let operationQueue = NSOperationQueue()
operationQueue.maxConcurrentOperationCount = 3
operationQueue.qualityOfService = NSQualityOfService.UserInitiated

let backgroundWorkScheduler
    = OperationQueueScheduler(operationQueue: operationQueue)

videoUpload
  .observeOn(backgroundWorkScheduler)
  .map({ json in
    return json["videoUrl"].stringValue
  })
  .observeOn(MainScheduler.sharedInstance)
  .subscribe(onNext: { url
    self.urlLabel.text = url
  }).disposed(by disposeBag)
```

TestScheduler

TestScheduler is a special kind of beast. It’s meant only to be used in testing, so try not to use this scheduler in production code.

This special scheduler simplifies operator testing; it’s part of the RxTest library. You will have a look into using this scheduler in the dedicated chapter about testing, but let's have a quick look since you're doing the grand tour of schedulers.

RxTest

- TestableObserver<ElementType> - an observer, which records all emitted events so you can inspect them and run your asserts on those events
- TestScheduler - a scheduler which let’s you control values and time, and let’s you create testable observers
- TestObservable - Observable, where you can pass what events should it send at given schedule
- == (lhs: Event<Element>, rhs: Event<Element>) adds Equatable implementation to Rx events so you can easily check recorded events

RxTest

```
struct CornSorter {
    let barnStream: Observable<String>

    init(tractorStream: Observable<String>) {
        barnStream = tractorStream
            .filter { $0 == "🌽" }
    }
}
```

RxTest

```
func testCornSorter() {
        var scheduler: TestScheduler!
        let disposeBag = DisposeBag()

        scheduler = TestScheduler(initialClock: 0)
        let testObserver = scheduler.createObserver(String.self)
        // Given
        let observableInput = scheduler.createHotObservable([
            // 2
            Recorded.next(100, "🌽"),
            Recorded.next(200, "🐛"),
            Recorded.next(300, "🐭"),
            Recorded.next(400, "🌽"),
            Recorded.next(500, "🐝"),
            Recorded.next(600, "🐞")
            ])
        let cornSorter = CornSorter(tractorStream: observableInput.asObservable())
```

RxTest

```
    // When
    cornSorter.barnStream
        .subscribe(testObserver)
        .disposed(by: disposeBag)

    scheduler.start()

    // Then
    let results = testObserver.events.map {
        $0.value.element!
    }
    _ = XCTAssertEqual(results, ["🌽", "🌽"])
}
```

RxBlocking

- RxBlocking on the other hand is handy in case you need to test some asynchronous functionality where you can’t control the source of asynchronisity. Often times this means you’re stepping up from unit tests to integration test.

- What RxBlocking is great to is to allow you to consume an observable sequence in batches or even wait on a single element to be emitted.

RxBlocking

```
func testElements() {
        let items = Observable.of(1, 5, 10, 15, 20)

        let elements = try! items.toBlocking().toArray()
        XCTAssertEqual([1, 5, 10, 15, 20], elements)

        let results = try! items.skip(3).take(2).toBlocking().toArray()
        XCTAssertEqual([15, 20], results)

    }
```

RxBlocking

```
func testCountryInfoFlow() {
        let scheduler = ConcurrentDispatchQueueScheduler(qos: .default)
        do {
            let myArray = try BordersBusinessLogic.shared.countryInfoFlow(code: "FRA")
            .subscribeOn(scheduler)
            .toBlocking()
            .toArray()
            if let countryInfo = myArray.first {
                switch countryInfo {
                case .success(_):
                    XCTAssert(true)
                    break
                case .failure(_):
                    XCTAssert(false)
                    break
                }
            }
        } catch(let e) { XCTAssert(false, e.localizedDescription)
        }
    }
```