



Learn You Some Reactive Programing for Great Good!

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github.com/mattpodwysocki/brooklynjs

PROGRAMMING

YOU'RE DOING IT COMPLETELY WRONG.

OR:

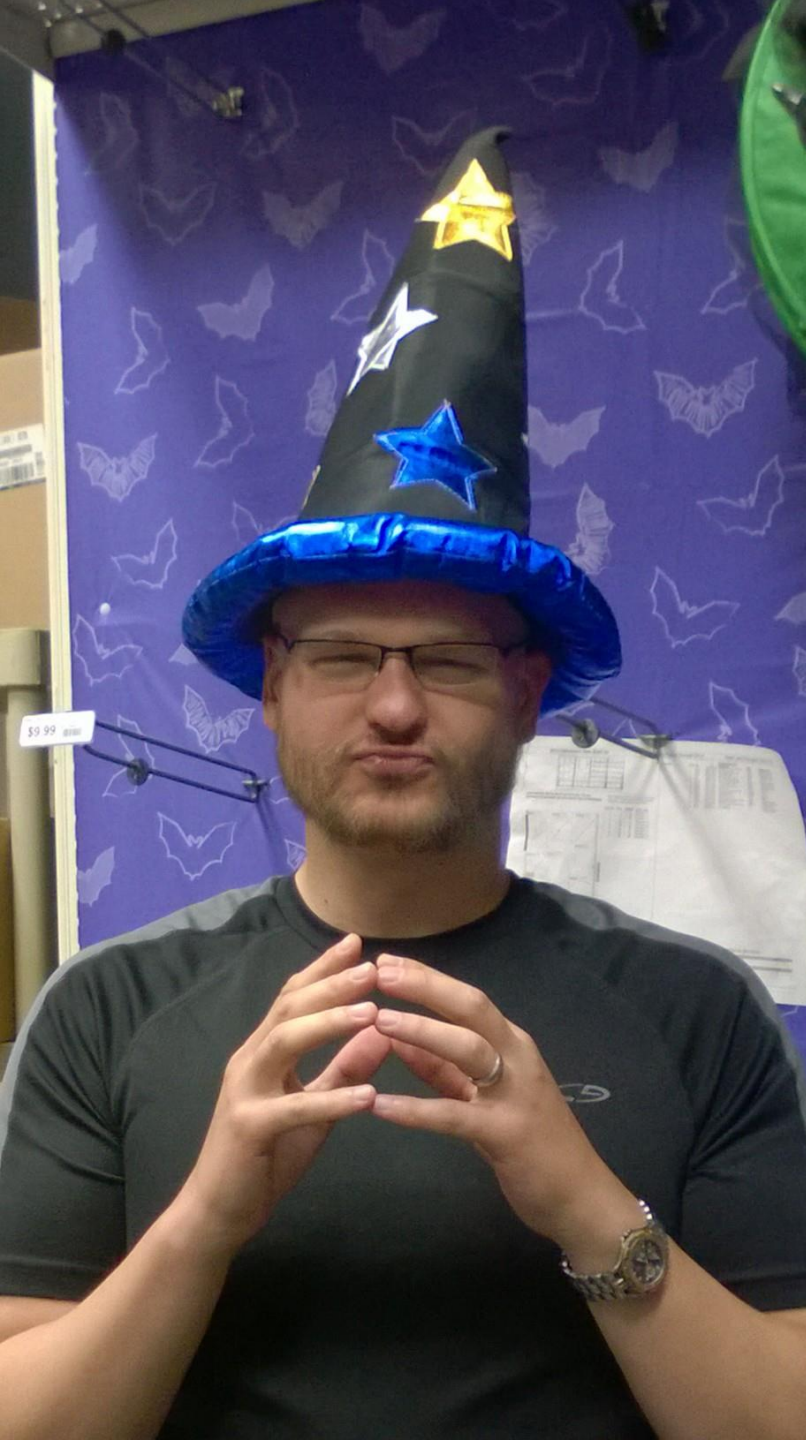
**HOW I LEARNED TO STOP WORRYING ABOUT
ASYNCHRONOUS AND EVENT-BASED
PROGRAMMING AND LOVE THE OBSERVABLE**



**Or "I thought I had a problem. I thought to myself,
"I know, I'll solve it with callbacks and events!".
have Now problems. two I**



**trapd in Monad tutorl
plz help**



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MICRÖSÖFT



Reactive Extensions (Rx)

@ReactiveX

<http://reactivex.io>

A long-haired brown cat is sitting on a concrete ledge next to a stream. The cat is looking down at the water. The stream is surrounded by green grass and reeds. The water is calm and reflects the sky. The cat has a thick, shaggy coat and is looking intently at the water.

stream prosesing

Real-Time is Everywhere...



“We choose to go to solve asynchronous programming and do the other things, not because they are easy, but because they are hard”



**Former US President John F. Kennedy - 1962
[citation needed]**

Callback Hell

```
function play(movieId, callback) {  
  var movieTicket, playError,  
      tryFinish = function () {  
    if (playError) {  
      callback(playError);  
    } else if (movieTicket && player.initialized) {  
      callback(null, ticket);  
    }  
  };  
  if (!player.initialized) {  
    player.init(function (error) {  
      playError = error;  
      tryFinish();  
    })  
  }  
  authorizeMovie( function (error, ticket) {  
    playError = error;  
    movieTicket = ticket;  
    tryFinish();  
  });  
});
```





Events and the Enemy of the State

```
var isDown = false, state;

function mousedown (e) {
  isDown = true;
  state = { startX: e.offsetX,
            startY: e.offsetY; }
}

function mousemove (e) {
  if (!isDown) { return; }
  var delta = { endX: e.clientX - state.startX,
                 endY: e.clientY - state.startY };
  // Now do something with it
}

function mouseup (e) {
  isDown = false;
  state = null;
}
```

```
function dispose() {
  elem.removeEventListener('mousedown', mousedown, false);
  elem.removeEventListener('mouseup', mouseup, false);
  doc.removeEventListener('mousemove', mousemove, false);
}

elem.addEventListener('mousedown', mousedown, false);
elem.addEventListener('mouseup', mouseup, false);
doc.addEventListener('mousemove', mousemove, false);
```





Top-rated Movies Collection

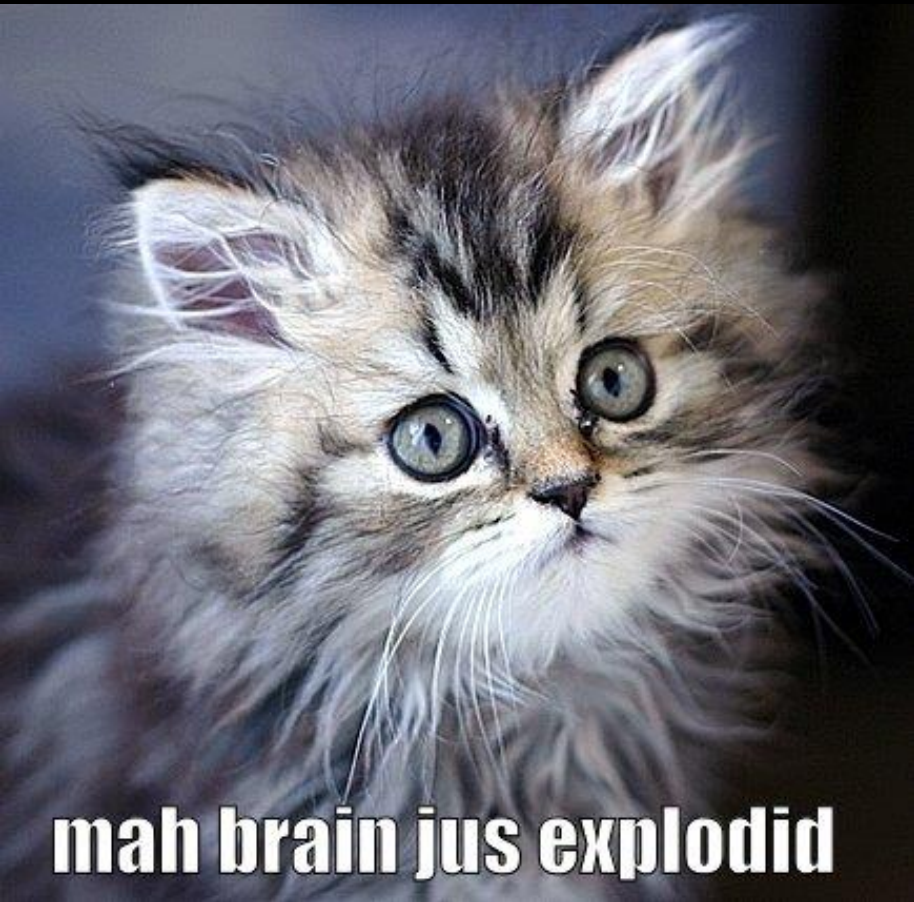
```
var getTopRatedFilms = function (user) {  
  return user.videoLists  
    .flatMap(function (videoList) {  
      return videoList.videos  
        .filter(function (v) { return v.rating === 5; });  
    });  
}
```

```
getTopRatedFilms(me)  
  .forEach(displayMovie);
```



What if I told you...

...that you could create a drag event...
...with the almost the *same code*



mah brain jus explodid

Mouse Drags Collection

```
var getElementDrags = function (elmt) {  
  return dom.mousedown(elmt)  
    .flatMap(function (md) {  
      return dom.mousemove(document)  
        .filter .takeUntil(dom.mouseup(elmt));  
    });  
};
```

```
getElementDrags(image)  
  .forEach(moveImage)
```





Everything is a stream

Crossing the streams...



PROTONIC REVERSAL

You crossed the streams, didn't you?

var c

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You already know how to do this....

INTERACTIVE

```
var source = getStockData();

source
  .filter(function (quote) {
    return quote.price > 30;
  })
  .map(function (quote) {
    return quote.price;
  })
  .forEach(function (price) {
    console.log('Higher than $30: $' + price);
  });
```

REACTIVE

```
var source = getStockData();

source
  .filter(function (quote) {
    return quote.price > 30;
  })
  .map(function (quote) {
    return quote.price;
  })
  .forEach(function (price) {
    console.log('Higher than $30: $' + price);
  });
```


100

An object is **first-class** when it:^{[4][5]}

- can be stored in variables and data structures
- can be passed as a parameter to a subroutine
- can be returned as the result of a subroutine
- can be constructed at runtime
- has intrinsic identity (independent of any given name)



WIKIPEDIA
The Free Encyclopedia

What is Reactive Programming Anyhow?

Merriam-Webster defines reactive as “*readily responsive to a stimulus*”, i.e. its components are “active” and always ready to receive events.

Wanna really know what Reactive Programming Is?

Real Time Programming: Special Purpose or General Purpose Languages
Gerard Berry

<http://bit.ly/reactive-paper>

Why Promises Aren't Enough

then

Problems in Promiseland

- How do I handle cancellation?
- What if I don't care about the return value ala Autocomplete?

```
var promise;
```

```
input.addEventListener('keyup', function (e) {
```

```
    if (promise) {
```

```
        // Um, how do I cancel?
```

```
    } else {
```

```
        promise = getData(e.target.value).then(populateUI);
```

```
    }
```

```
}, false);
```

Observables - Composing Events and Promises

```
var words = input.keyup
    .map(function() { return input.value; })
    .throttle(500)
    .distinctUntilChanged()
    .flatMapLatest(
        function(term) { return search(term); }
    );
```

DOM events as a
sequence of strings



Reducing data
traffic / volume

Latest response as
word arrays

```
words.subscribe(function(data) {
    // Bind data to the UI
});
```

Web service call returns
single value sequence

Binding results to the UI

Functional Reactive Programming (FRP) is...

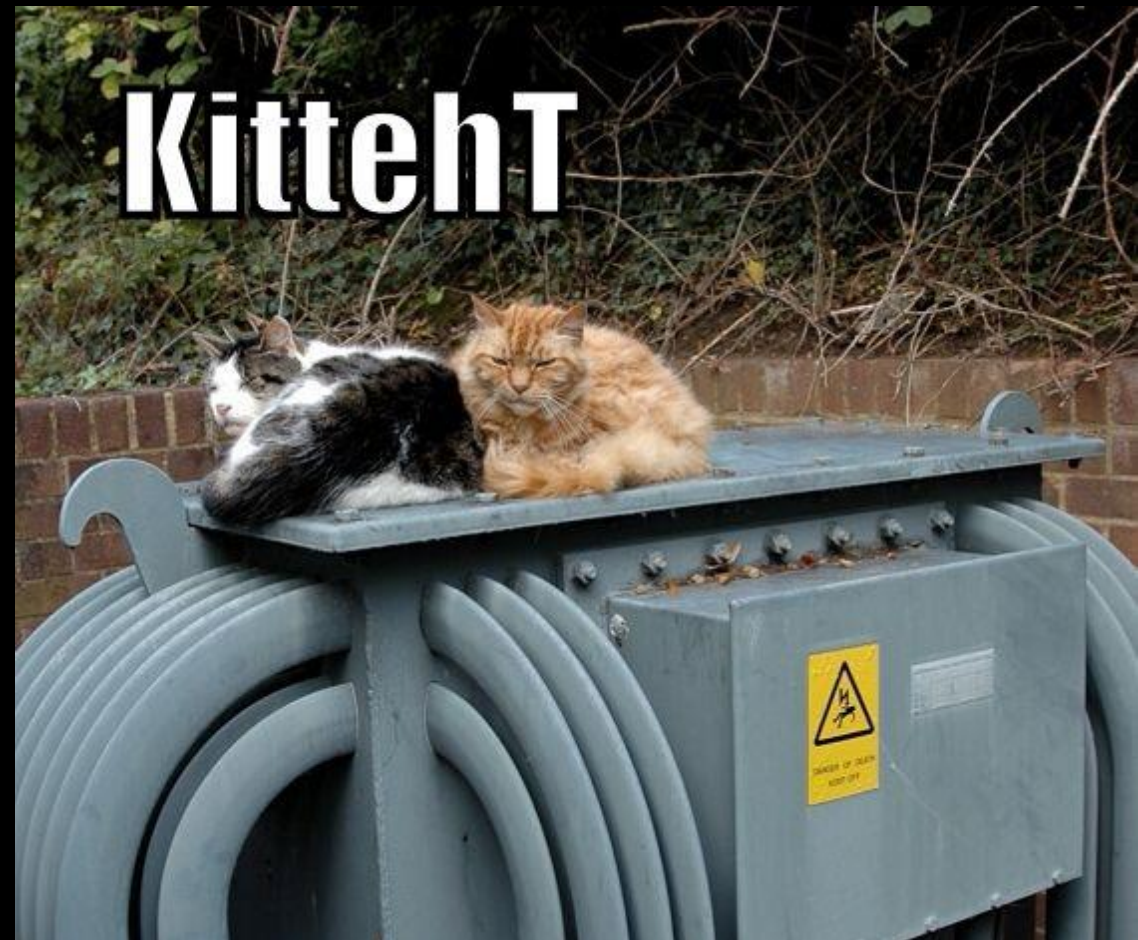
A concept consisting of

- Continuous Time
- Behaviors: Values over time
- Events: Discrete phenomena with a value and a time
- Compositional behavior for behavior and events

What it is not

- High order functions on events like map, filter, reduce
- Most so-called FRP libraries out there...

```
Rx.spawn(function* () {  
  var result = yield get('brooklynjs.com')  
    .retry(3)  
    .catch(cachedVersion);  
  
  console.log(result);  
}());
```



Oh, and one more thing...

We have jortSort!


<http://jort.technology/>


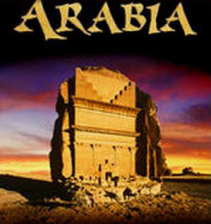
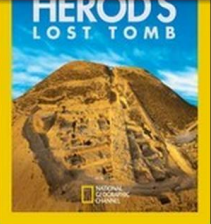



```
20 lines (19 sloc) | 0.71 kb  Raw Blame History
1  /**
2   * jortSort checks if your inputs are sorted until another Observable sequence fires.
3   * See http://jort.technology/ for full details.
4   * @returns {Observable} An observable which has a single value of true if sorted, else false.
5   */
6  observableProto.jortSortUntil = function (other) {
7    var source = this;
8    return new AnonymousObservable(function (observer) {
9      var arr = [];
10     return source.takeUntil(other).subscribe(
11       arr.push.bind(arr),
12       observer.onError.bind(observer),
13       function () {
14         var sorted = arr.slice(0).sort(defaultSubComparer);
15         observer.onNext(isEqual(arr, sorted));
16         observer.onCompleted();
17       });
18   });
19   };
```





Your Netflix Video Lists

Netflix Row Update Polling


2 / 10



Top 10 for tester_jhusain_control



Popular on Netflix



Band Baaja Baaraat

2010 NR 2h 19m

★★★★★

Shruti and Bittoo decide to start a wedding planning company together after they graduate from university, but romance gets in the way of business.

Ranveer Singh, Anushka Sharma

Comedies, Foreign Movies

Director: Maneesh Sharma

Client: Polling for Row Updates

```
function getRowUpdates(row) {  
    var scrolls = Rx.Observable.fromEvent(document, "scroll");  
    var rowVisibilities =  
        scrolls.throttle(50)  
            .map(function (scrollEvent) { return row.isVisible(scrollEvent.offset); })  
            .distinctUntilChanged()  
            .publish().refCount();  
    var rowShows = rowVisibilities.filter(function (v) { return v; });  
    var rowHides = rowVisibilities.filter(function (v) { return !v; });  
  
    return rowShows  
        .flatMap(Rx.Observable.interval(10))  
        .flatMap(function () { return row.getRowData().takeUntil(rowHides); })  
        .toArray();  
};
```



