



Learn You Some Reactive Programing for Great Good!

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github.com/mattpodwysocki/brooklynjs

PROGRAMMING

YOU'RE DOING IT COMPLETELY WRONG.

OR:

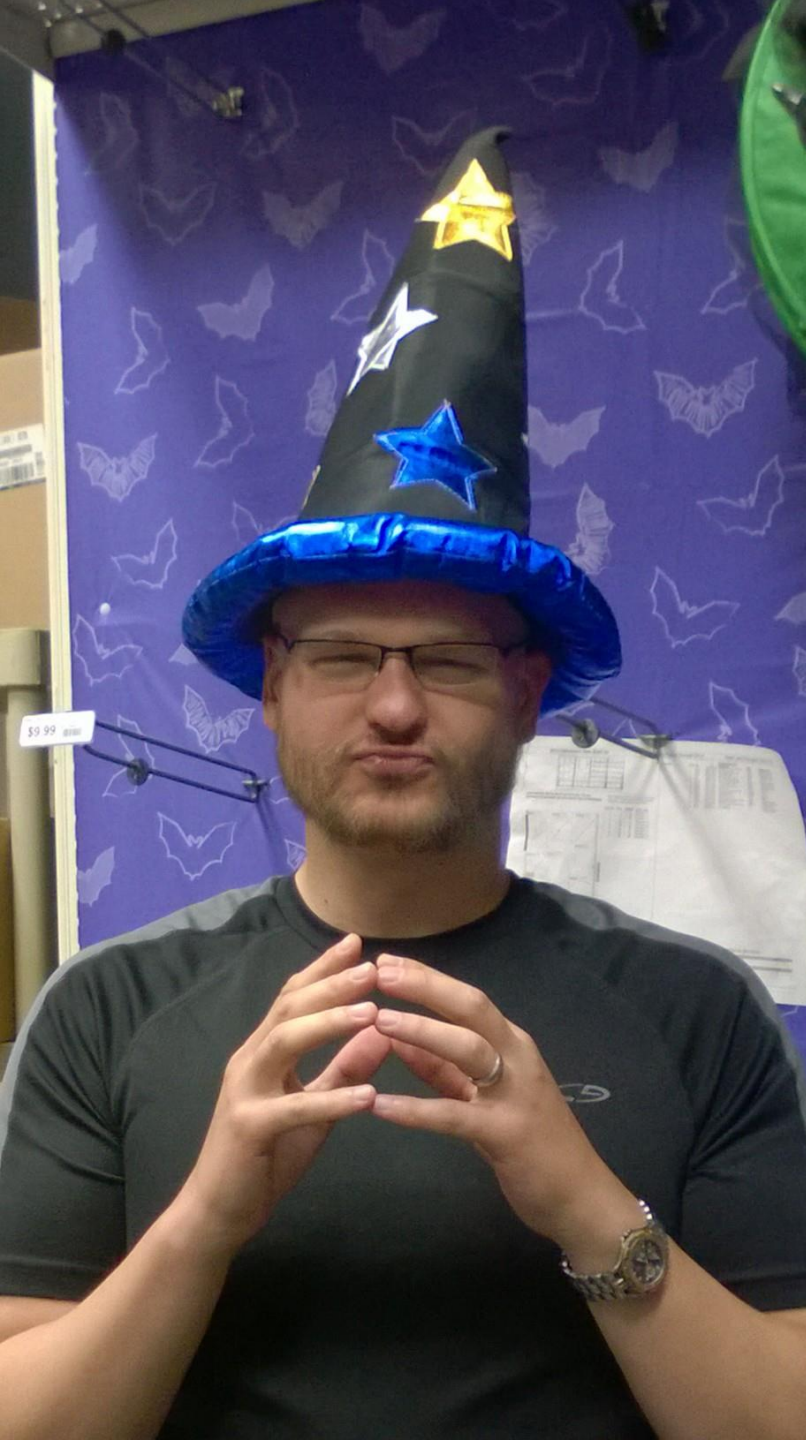
**HOW I LEARNED TO STOP WORRYING ABOUT
ASYNCHRONOUS AND EVENT-BASED
PROGRAMMING AND LOVE THE OBSERVABLE**



**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

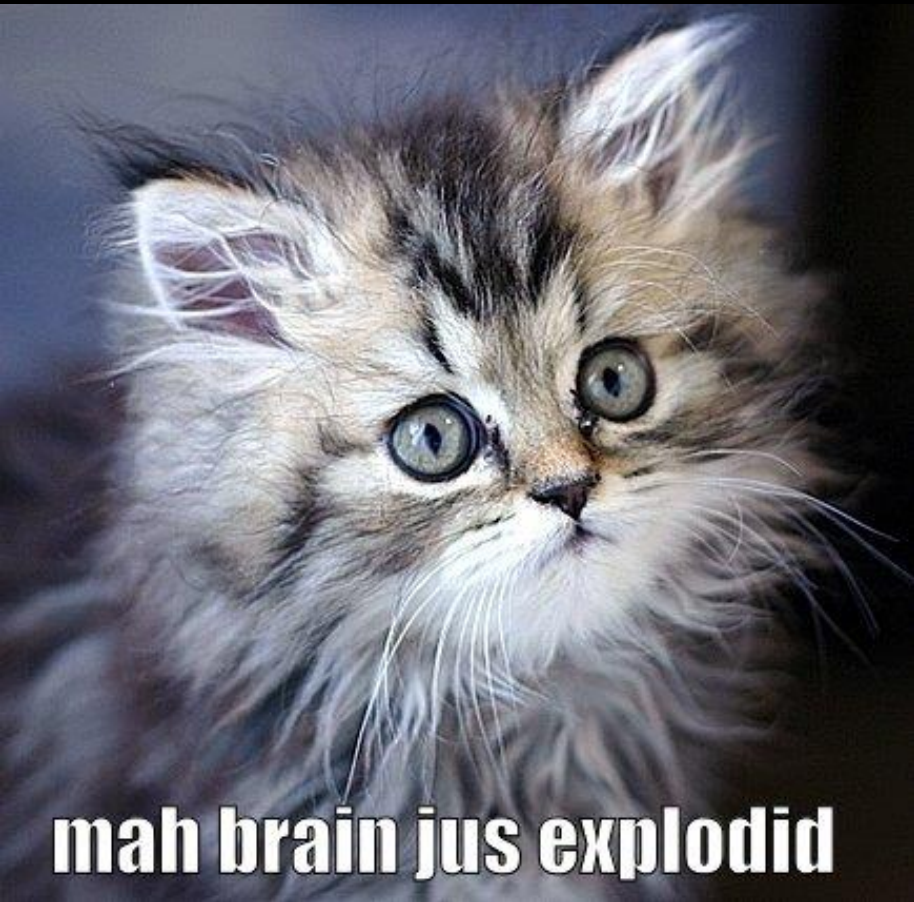
```
var getTopRatedFilms = function (user) {  
  return user.videoLists  
    .flatMap(function (videoList) {  
      return videoList.videos  
        .filter(function (v) { return v.rating === 5; });  
    });  
}
```

```
getTopRatedFilms(me)  
  .subscribe(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));  
    });  
};
```

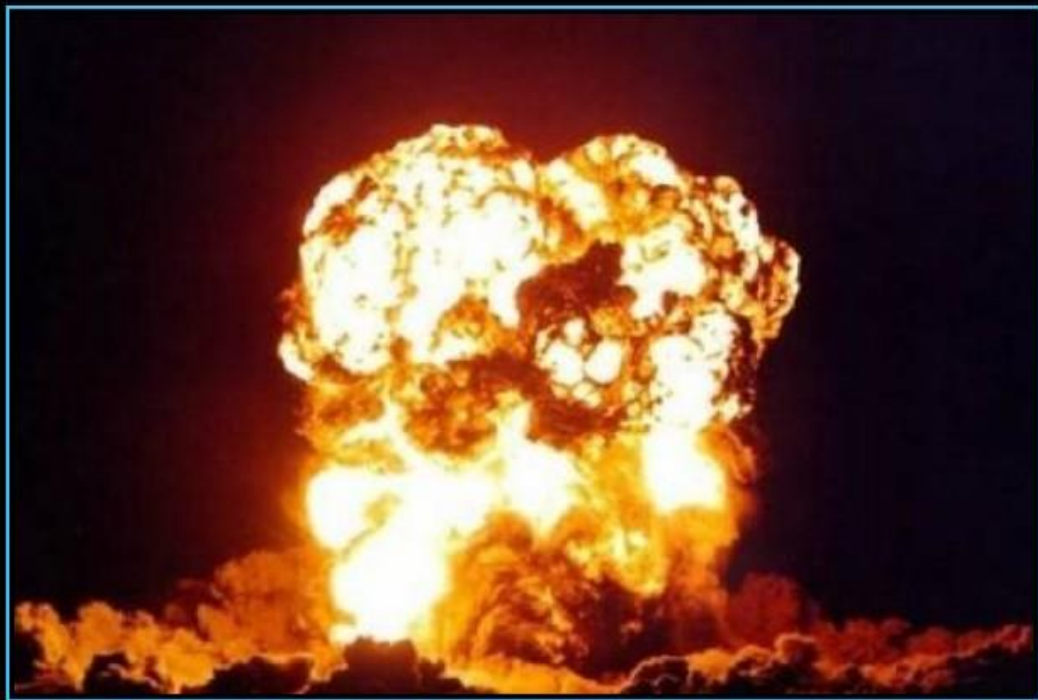
```
getElementDrags(image)  
  .subscribe(moveImage)
```





Everything is a stream

Crossing the streams...



PROTONIC REVERSAL

You crossed the streams, didn't you?

Oh yes we did!

```
var connectEvent = fromEvent(e, 'connect'),  
    dataEvent = fromEvent(e, 'data'),  
    errorEvent = fromEvent(e, 'error'),  
    endEvent = fromEvent(e, 'end');
```

```
var stream = dataEvent  
    .merge(errorEvent.flatMap(throwError))  
    .skipUntil(connectEvent.amb(errorEvent))  
    .takeUntil(endEvent.amb(errorEvent));
```

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

Reactive Manifesto

<http://www.reactivemanifesto.org>

Merriam-Webster defines reactive as “*readily responsive to a stimulus*”, i.e. its components are “active” and always ready to receive events. This definition captures the essence of reactive applications, focusing on systems that:

react to events

the event-driven nature enables the following qualities

react to load

focus on scalability by avoiding contention on shared resources

react to failure

build resilient systems with the ability to recover at all levels

react to users

honor response time guarantees regardless of load

Wanna really know what Reactive Programming Is?

Real Time Programming: Special Purpose or General Purpose Languages

Gerard Berry

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

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

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);
```

Functional Reactive Programming (FRP) is...

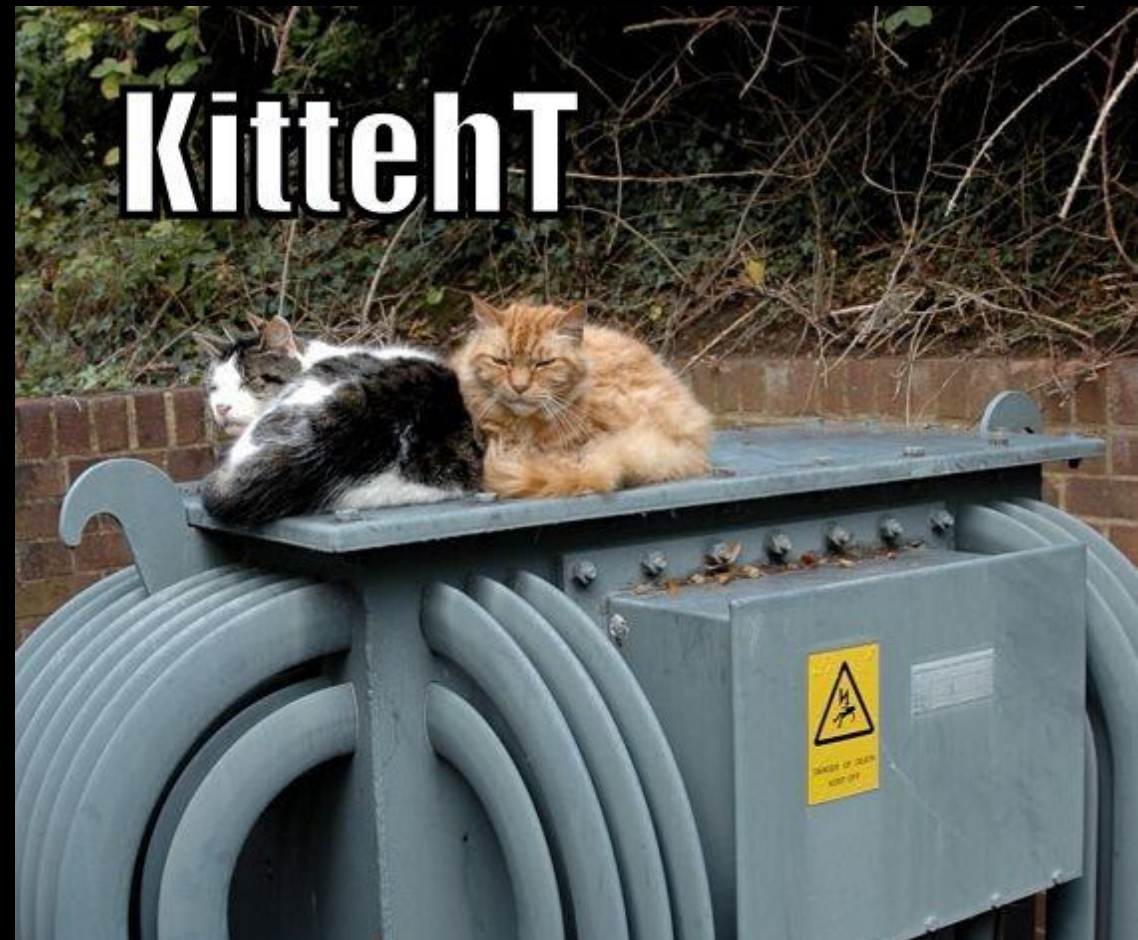
A concept consisting of

- 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);  
}());
```




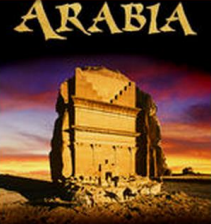

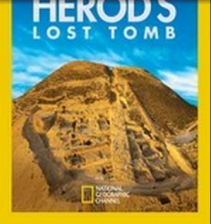



Your Netflix Video Lists







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();  
};
```

