RxJS

Реактивное программирование

Реактивное программирование — парадигма программирования, ориентированная на потоки данных и распространение изменений

Observer pattern

Iterator pattern

Functional programming

RxJS

Rx - Reactive Extension

.NET

Java Script

Java

https://github.com/Reactive-Extensions/RxJS/tree/master/dist

Arrays

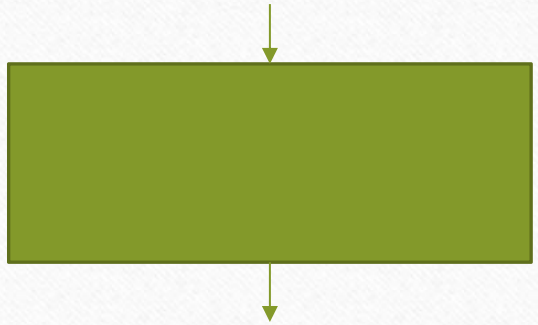
```
let array = [1, 2, 3]
```

```
for (let i = 0; i < array.length; i++) {
   console.log(array[i]);
}
```

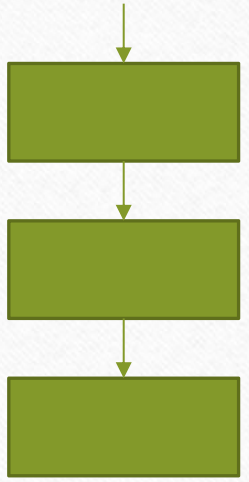
```
array.forEach ( x => console.log(x));
```

JS FLOW

```
for (let i = 0; i < array.length; i++) {
   console.log(array[i]);
}
```

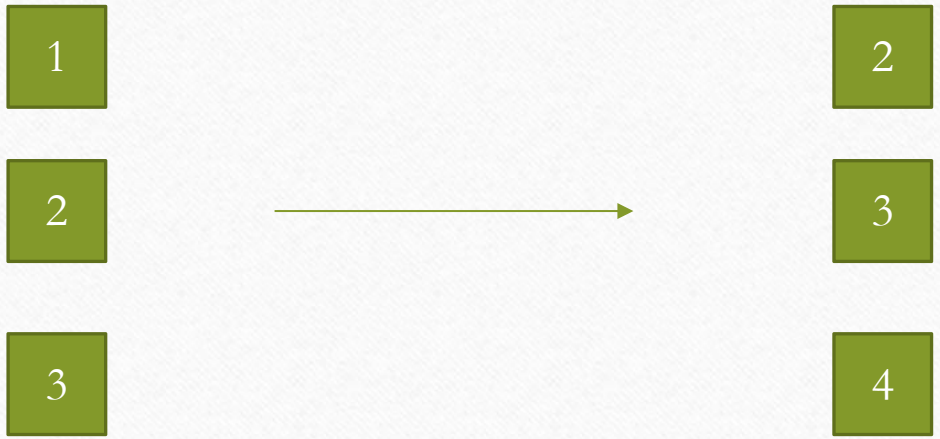


```
array.forEach ( x => console.log(x));
```



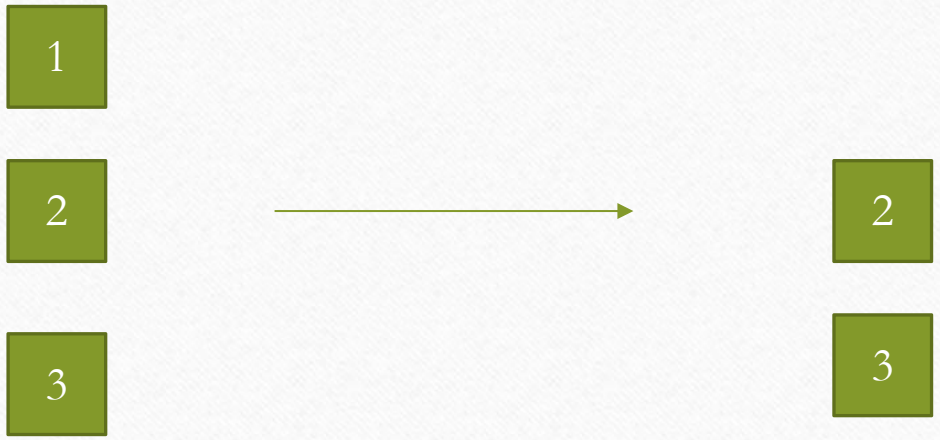
ARRAY METHODS: MAP

let newArr = arr.map(x => x + 1)



ARRAY METHODS: FILTER

let newArr = arr.filter(x => x > 1)



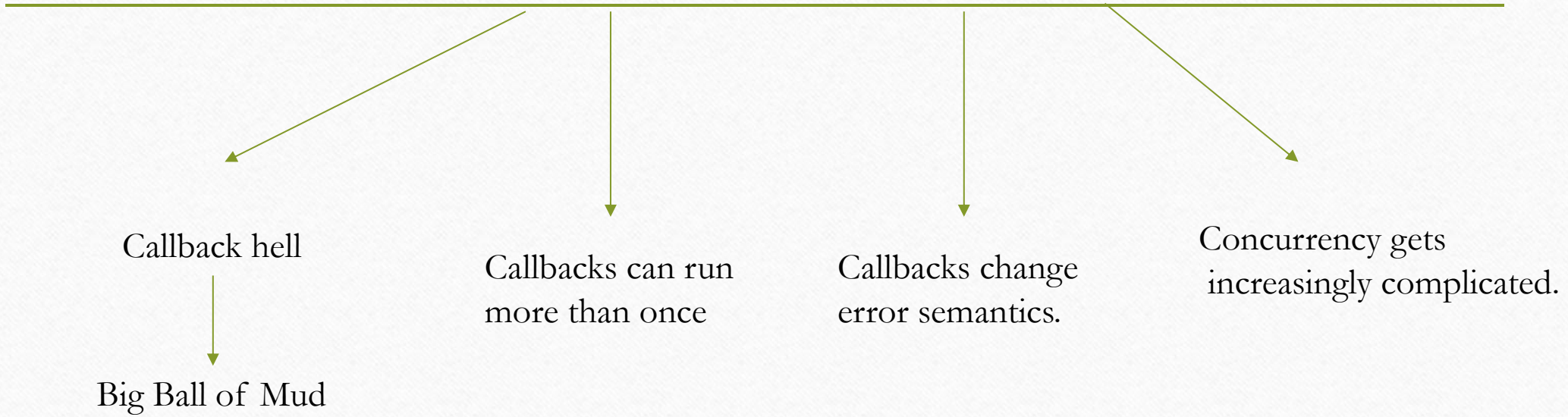
АСИНХРОННОЕ ПРОГРАММИРОВАНИЕ

```
function func2(callback) {
  callback('Done!');
}
```

```
function func1(message) {
  console.log(message);
}
```

```
func2 (func1);
```

АСИНХРОННОЕ ПРОГРАММИРОВАНИЕ



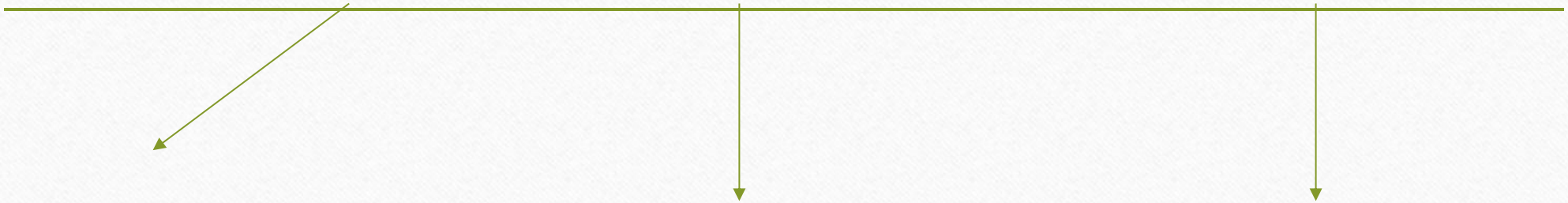
promises

Улучшение над callback

Вырабатывают только одно значение

Необходимо создавать отдельный промис на каждый запрос

Event emitter



Events force
side effects.

Events are not
first-class values.

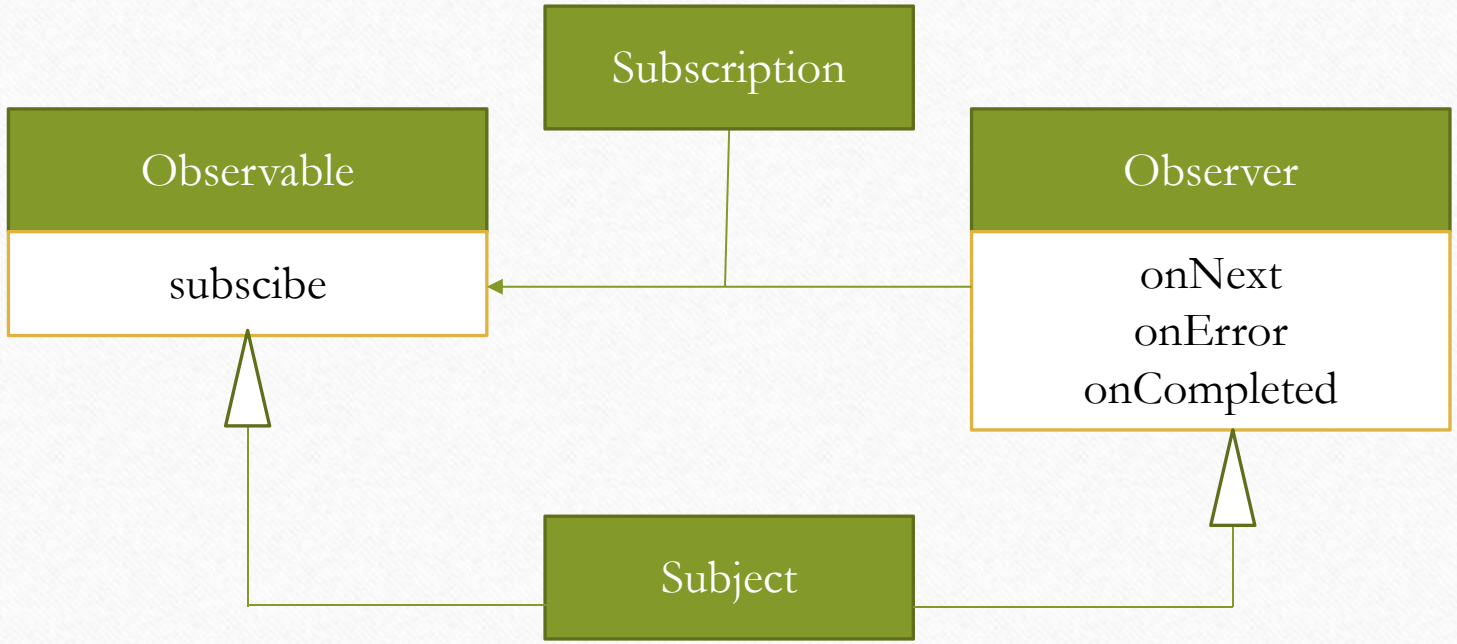
It is easy to miss events
if we start listening too late.

PUSH vs PULL

	PUSH	PULL	IoC
one value	functions	promises	
values	generators, iterators	observables	

RX PATTERN

RX PATTERN = Observer Pattern + Iterator Pattern



Observable

```
Rx.Observable
    .from(['Ivan', 'Petr', 'Sergey'])
    .subscribe(
        x =>{ console.log('Next: ' + x); },
       err => { console.log('Error:', err); }
       ( ) => { console.log('Completed'); }
    );
```

Observer

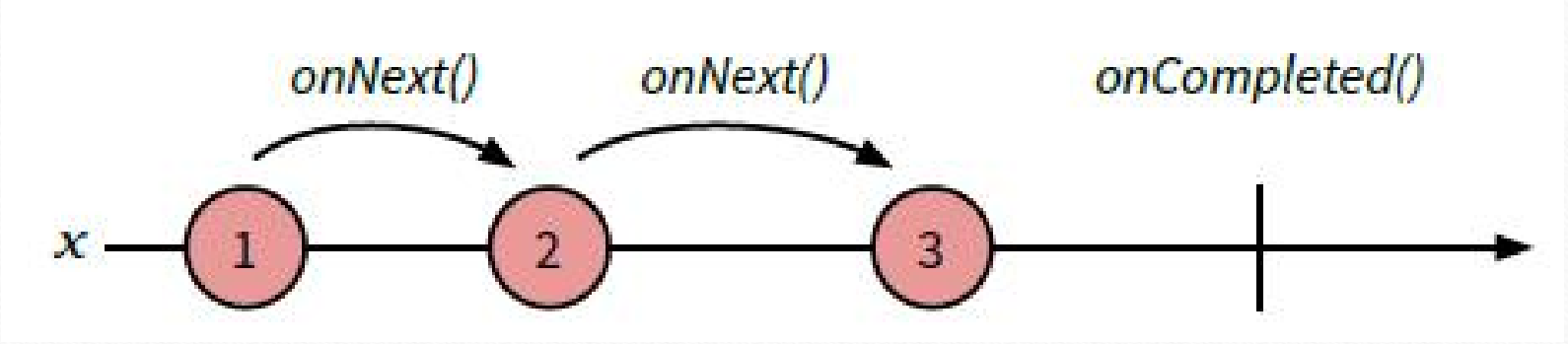
```
var observer = Rx.Observer.create(
            x =>{ console.log('Next: ' + x); },
            err => { console.log('Error: ' + err); },
            ( ) { console.log('Completed'); }
);
```

From Event

```
var allMoves = Rx.Observable.fromEvent(document, 'mousemove');

allMoves.subscribe(e => { console.log(e.clientX, e.clientY); });

allMoves
  .map(e => e.clientX)
  .filter(x => x  < window.innerWidth / 2 )
  .subscribe(e => console.log('mouse on the left');
```

Marbel diagrams

Rx.Observable.range(1, 3);



interval

```
var a = Rx.Observable.interval(200).map(function(i) {
  return 'A' + i;
});

var b = Rx.Observable.interval(100).map(function(i) {
  return 'B' + i;
});
```

subscription

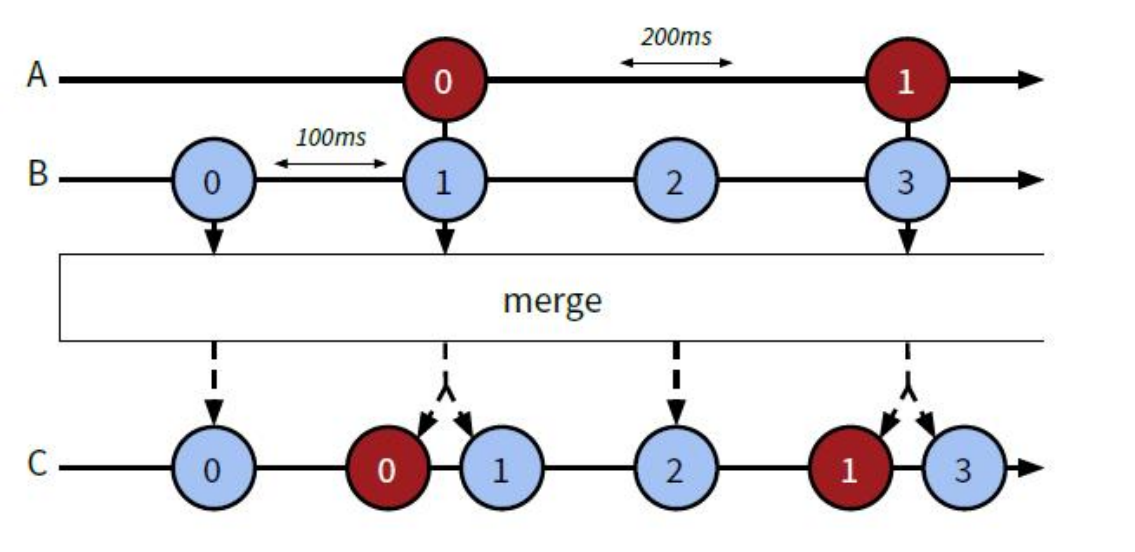
```
let observable = Rx.Observable.interval(1000);
let subscription = observable.subscribe(x => console.log(x));

subscription.dispose( );
```

take

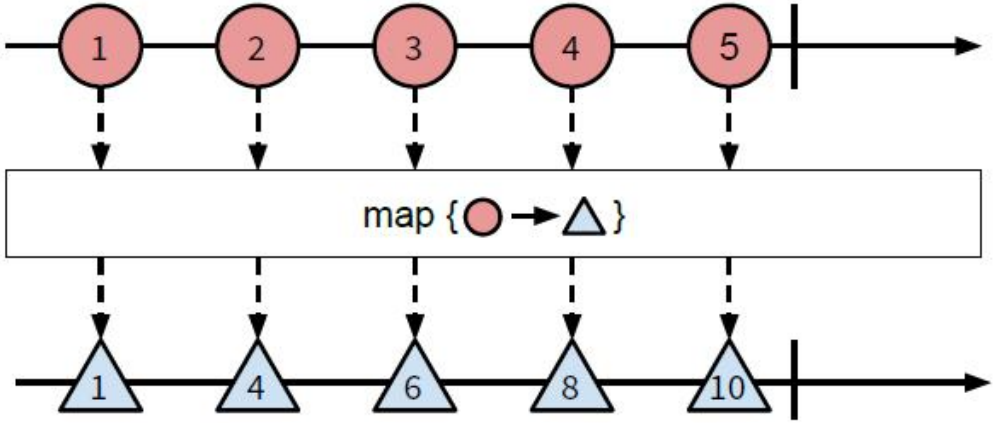
```
let observable = Rx.Observable.interval(1000)
                 .take(5);

observable.subscribe(x => console.log(x));
```

merge

```
var a = Rx.Observable.interval(200).map(i => 'A' + i);
var b = Rx.Observable.interval(100).map(i => 'B' + i);
Rx.Observable.merge(a, b).subscribe(x => console.log(x));
```



map



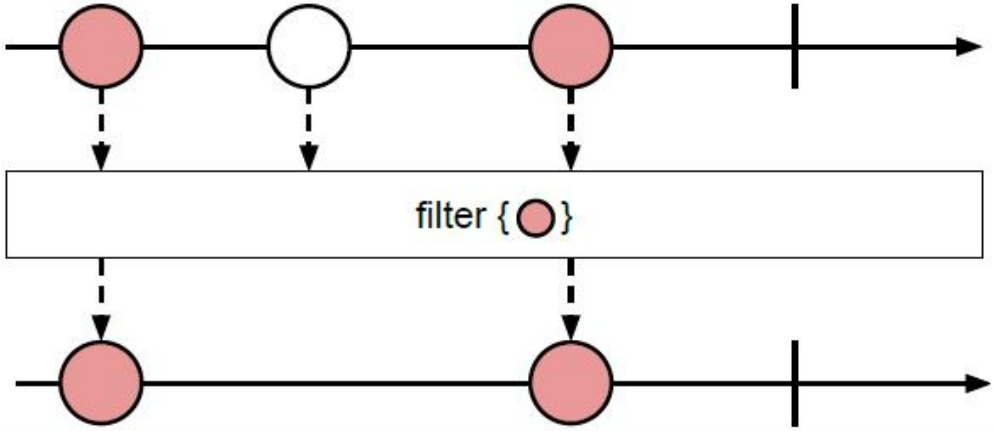
JS Arrays

```
var src = [1, 2, 3, 4, 5];
var upper = src.map(function(name) {
  return name * 2;
});

upper.forEach(logValue);
```

Observables

```
var src = Rx.Observable.range(1, 5);
var upper = src.map(function(name) {
  return name * 2;
});

upper.subscribe(logValue);
```

filter



JS Arrays

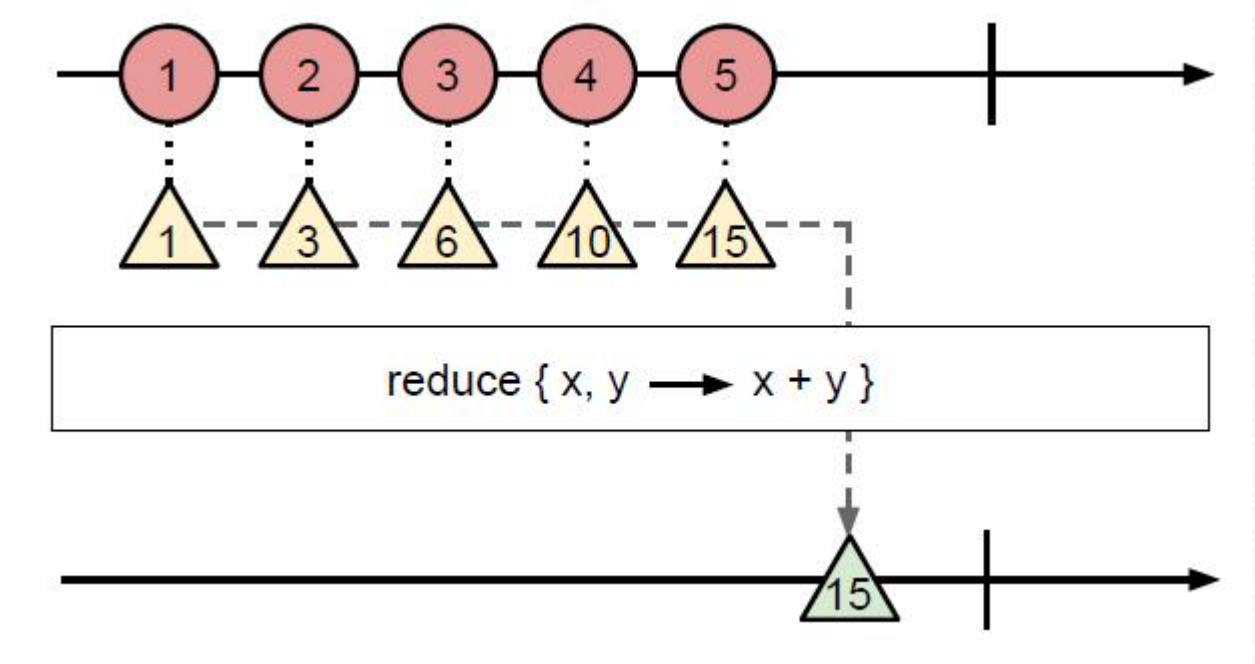
```
var isEven = (function(val) { return val % 2 !== 0; });
var src = [1, 2, 3, 4, 5];
var even = src.filter(isEven);

even.forEach(logValue);
```

Observables

```
var src = Rx.Observable.range(1, 5);
var even = src.filter(isEven);

even.subscribe(logValue);
```

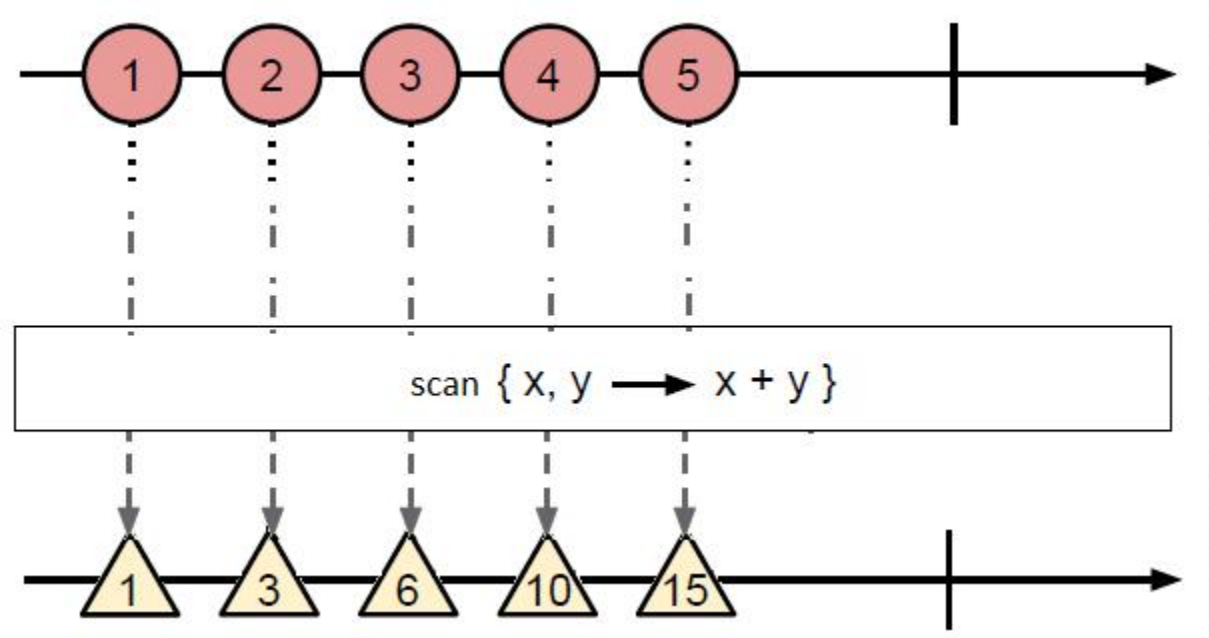
reduce

```
var src = Rx.Observable.range(1, 5);
var sum = src.reduce( (acc, x) => acc + x);
sum.subscribe(logValue);
```



scan

```
var src = Rx.Observable.range(1, 5);
var sum = src.scan( (acc, x) => acc + x);
sum.subscribe(logValue);
```

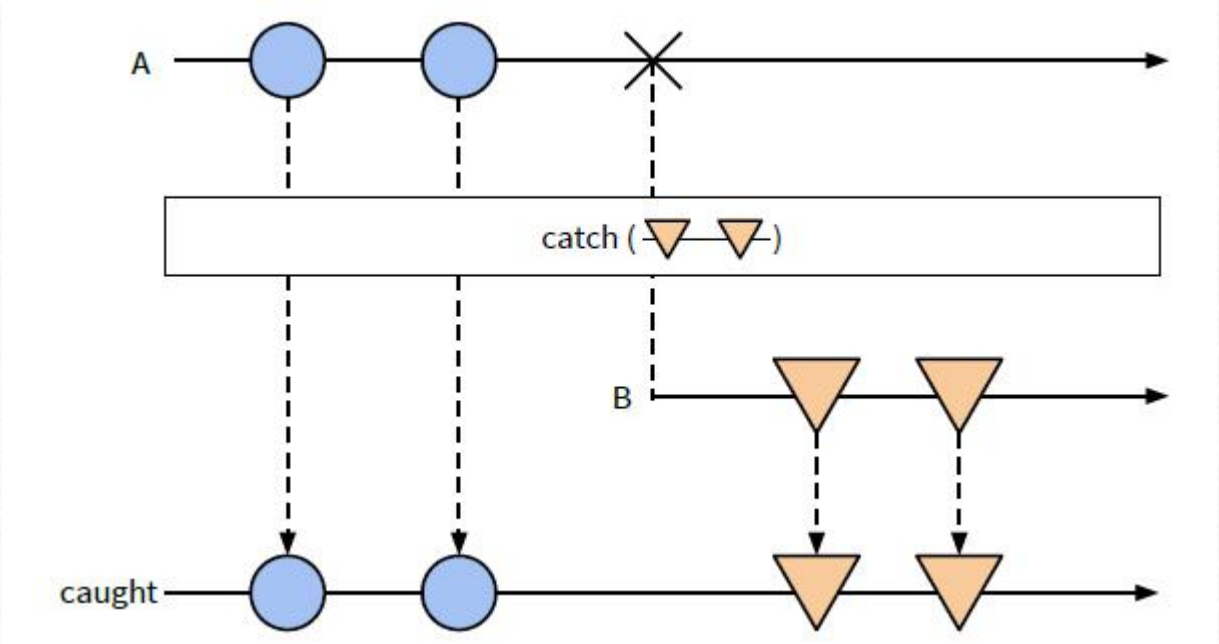


Custom Observable

```
Rx.Observable.create( (observer) => {
    observer.onNext (someValue);
    …
    observer.onError(new Error('some error'));
    …
     observer.onCompleted( );
});
```

Handling Error

```
let caught = observable.catch(
   Rx.Observable.return({
      error: "Some details"
    })
);
```



Handling Error

```
Rx.DOM
   .get('/products')
   .retry(5)
   .map(xhr => xhr.result)
   .subscribe(
         result => console.log(result),
         err => console.error('ERROR: ', err)
    );
```

Handling Error

```
var observable = Rx.Observable
   .fromEvent (button, ‘click’)
   .throttle(500)
   .flatMap( ( ) => Rx.DOM.get(‘products’))
   .retry(5)
   .map(xhr => xhr.result);

observable.subscribe(
         result => console.log(result),
         err => console.error('ERROR: ', err)
    );
```

Hot and Cold Observables

Работают сразу же

Нужен подписчик

Для каждого подписчика – своя последовательность

Cold -> Hot

```
var hotObservable = coldObservable.publish( );

// код

hotObservable.connect( );
```

The Game