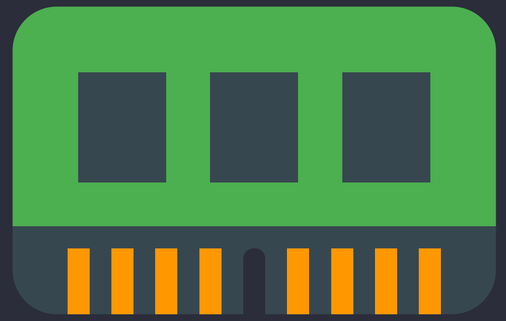
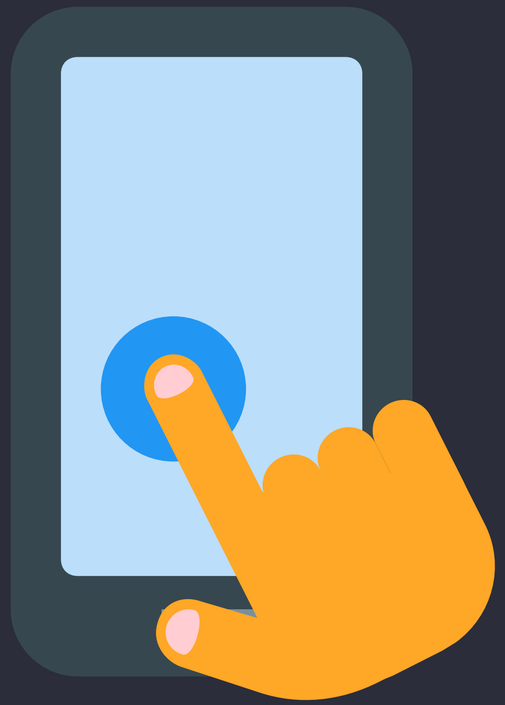
Why you should be building better Mobile Apps with Reactive Programming

Michael Stonis
Eight-Bot
@MichaelStonis

Developing Mobile Apps is Hard





Unreliable Network

Limited Resources

User Interaction

CHOOSE YOUR OWN ADVENTURE • 6

YOU'RE THE HERO OF THE STORY! CHOOSE FROM 40 POSSIBLE ENDINGS.

YOUR CODE NAME IS JONAH

BY EDWARD PACKARD

ILLUSTRATED BY PAUL GRANGER

CHOOSE YOUR OWN ADVENTURE® 6

THE CLASSIC SERIES IS BACK! CHOOSE FROM 20 POSSIBLE ENDINGS.

HOUSE OF DANGER

BY R. A. MONTGOMERY

CHOOSE YOUR OWN ADVENTURE® 22

YOU'RE THE STAR OF THE STORY! CHOOSE FROM 26 POSSIBLE ENDINGS.

SPACE PATROL

BY JULIUS GOODMAN

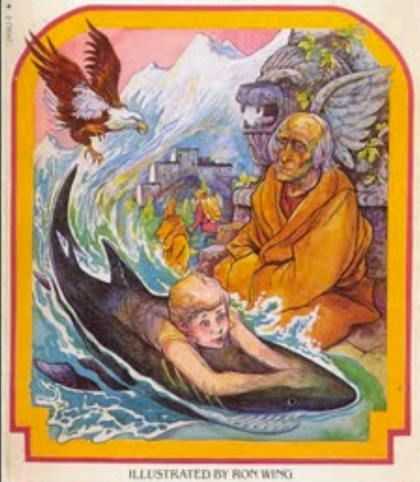
ILLUSTRATED BY RALPH REESE

CHOOSE YOUR OWN ADVENTURE® 45

YOU'RE THE STAR OF THE STORY! CHOOSE FROM 14 POSSIBLE ENDINGS.

YOU ARE A SHARK

BY EDWARD PACKARD



ILLUSTRATED BY RON WING

CHOOSE YOUR OWN ADVENTURE® 40

YOU'RE THE STAR OF THE STORY! CHOOSE FROM 30 POSSIBLE ENDINGS.

THE THRONE OF ZEUS

BY DEBORAH LERME GOODMAN

ILLUSTRATED BY RON WING

CHOOSE YOUR OWN ADVENTURE • 2

YOU'RE THE HERO OF THE STORY! CHOOSE FROM ONE POSSIBLE ENDING.

YOU'RE GOING TO DIE

BY R.A. MONTGOMERY

ILLUSTRATED BY PAUL GRANGER

A BANTAM-SK

CHOOSE YOUR OW

YOU'RE THE STAR

THE HA HOU

BY R.A. MO

CHOOSE YOUR OWN ADVENTURE® 28

YOU'RE THE STAR OF THE STORY! CHOOSE FROM 25 POSSIBLE ENDINGS.

MOUNTAIN SURVIVAL

BY EDWARD PACKARD

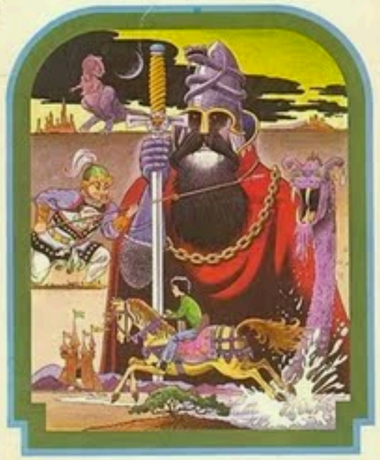
ILLUSTRATED BY LESLIE MORRILL

CHOOSE YOUR OWN ADVENTURE™ 1

YOU'RE THE STAR OF THE STORY! CHOOSE FROM 40 POSSIBLE ENDINGS.

THE CAVE OF TIME

BY EDWARD PACKARD



ILLUSTRATED BY PAUL GRANGER

CHOOSE YOUR OWN ADVENTURE™ 10

YOU'RE THE STAR OF THE STORY! CHOOSE FROM 36 POSSIBLE ENDINGS.

THE LOST JEWELS OF NABOOTI

BY R.A. MONTGOMERY

ILLUSTRATED BY PAUL GRANGER

CHOOSE YOUR OWN ADVENTURE® 22

YOU'RE THE STAR OF THE STORY! CHOOSE FROM 26 POSSIBLE ENDINGS.

SPACE PATROL

BY JULIUS GOODMAN

ILLUSTRATED BY RALPH REESE

CHOOSE YOUR OWN ADVENTURE™ 12

YOU'RE THE STAR OF THE STORY! CHOOSE FROM 30 POSSIBLE ENDINGS.

INSIDE UFO 54-40

BY EDWARD PACKARD

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Reactive Extensions

Created by Microsoft

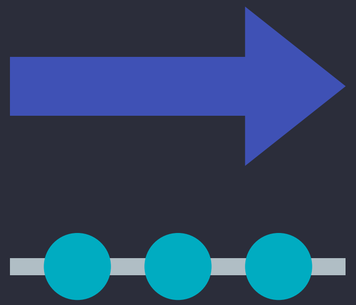
Released in 2009

As set of libraries designed to aid with the creation of *Asynchronous and Event-Based* applications

Who uses it?

When would I use this?

Real-time Data



Streams

User Interfaces

Core Concepts

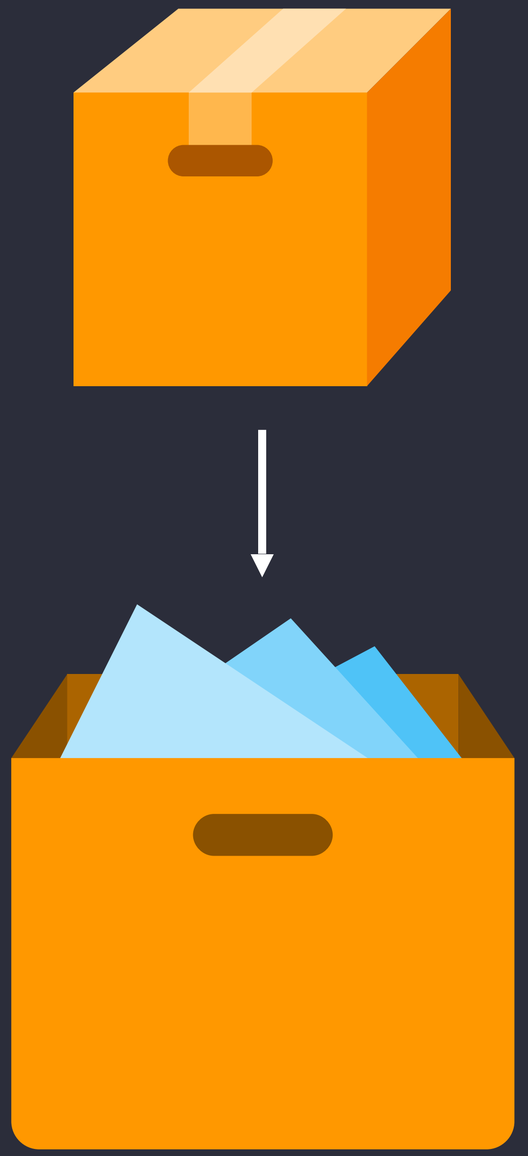
IEnumerable<T>

Core interface for objects like List<T>

Provides as way to iterate through items

Generally comes as *prepackaged data* that we open up and comb through

We *PULL* data from it



Typical IEnumerable<T> Usage

```
var people = await PersonRepository.GetAllPeopleAsync();

foreach (var person in people) {
  Debug.WriteLine ($"{person.LastName}, {person.FirstName}");
}
```

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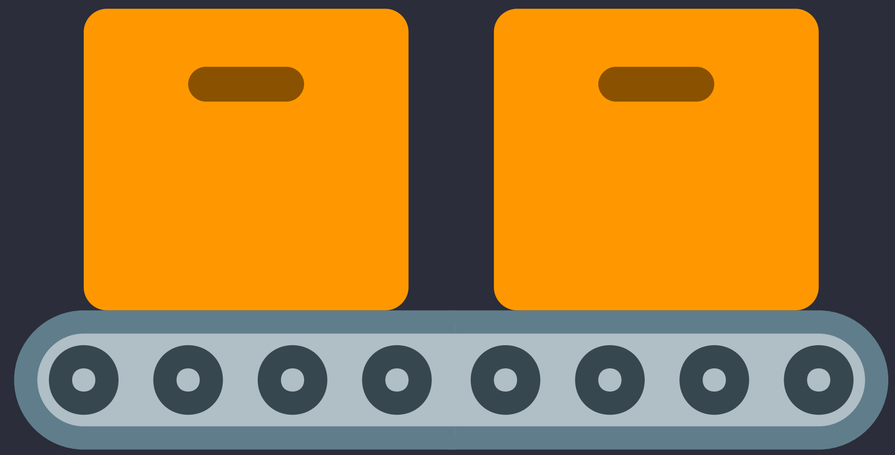
IObservable<T>

Pushes data to subscribers

Like a conveyor belt or a stream

May or may not have an end

Values can be processed with LINQ



Example Observables

```
Observable.Range (1, 100);
```

```
Observable.Timer (TimeSpan.FromSeconds (3));
```

```
Observable
  .FromEventPattern<EventHandler<TextChangedEventArgs>, TextChangedEventArgs> (
    x => textEntry.TextChanged += x,
    x => textEntry.TextChanged -= x
  );
```

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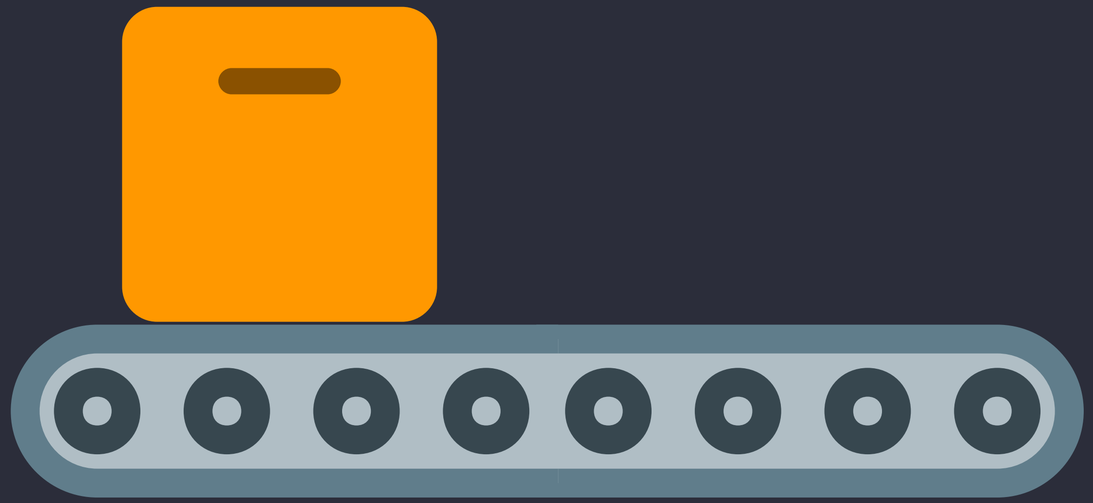
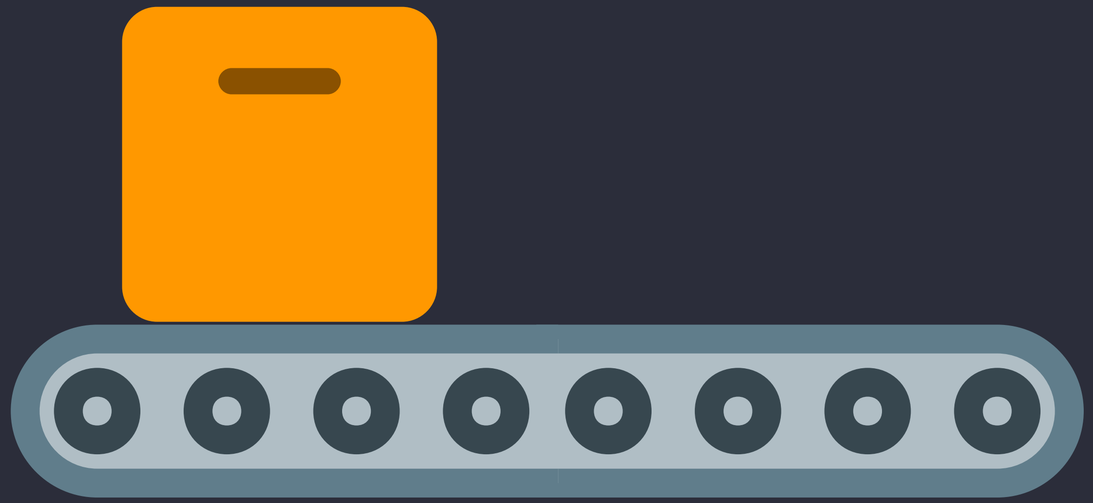




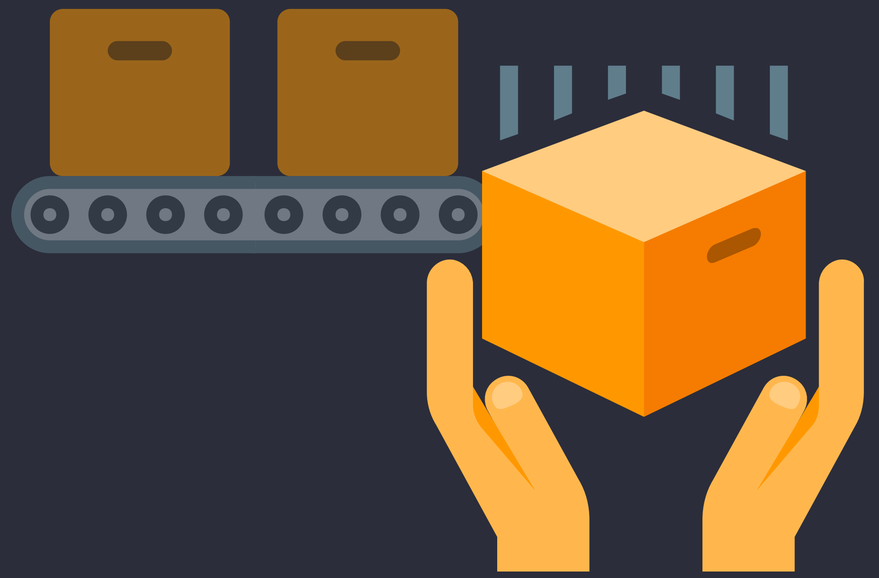
Subscribing

Gets values from IObservable<T>

Each value processed using Action<T>

Can have multiple subscriptions

Unsubscribe using IDisposable



Subscriber<Fish> Observable<Fish>

Example Subscriptions

```
var fishSubscription =
  fishObservable
    .Subscribe (fish => Debug.WriteLine($”{fish.Name}”));

fishSubscription.Dispose ();
```

```
var fishSubscription =
  fishObservable
    .Where(fish => !fish.IsCrustacean)
    .Select(fish => fish.Name)
    .Subscribe (name => Debug.WriteLine($”{name}”));

fishSubscription.Dispose ();
```

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    .Subscribe (name => Debug.WriteLine($”{name}”));

fishSubscription.Dispose ();
```

Real-World Examples

CompositeDisposable

A container for multiple disposable objects

Allows you to dispose of many objects in one call

Awesome for disposing of UI components

CompositeDisposable

```
var disposables = new CompositeDisposable();

disposables.Add(subscription1);

disposables.Add(subscription2);

disposables.Add(subscription3);

disposables.Clear();
```

ReactiveUI

Extends Reactive Extensions for making *elegant* and *testable* MVVM User Interfaces

Supports all major .Net UI platforms

Works with other MVVM Frameworks like MvvmCross or Xamarin.Forms

http://reactiveui.net

Where Do I Find Out More?

More Resources

- reactivex.io
- introtorx.com
- rxmarbles.com
- github.com/ReactiveX
- reactiveui.net
- github.com/TheEightBot/Reactive-Examples

Questions?

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