

Introduction to Reactive Extensions

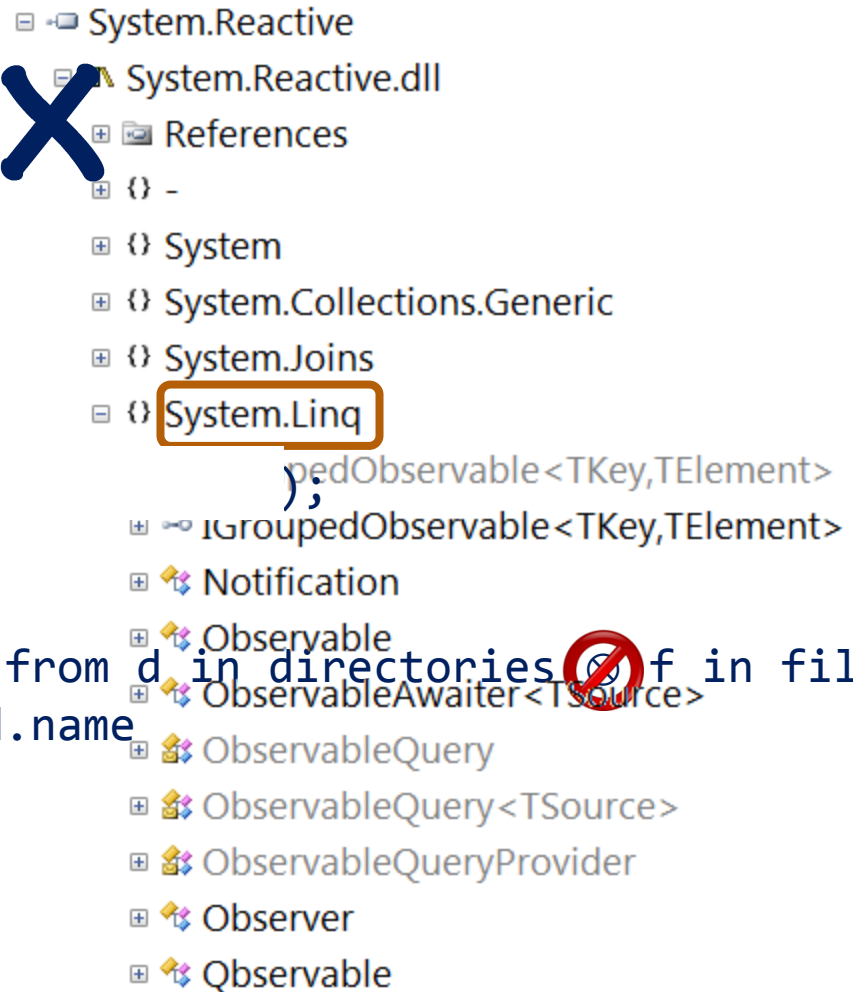
How Miranda reacted the *Young Lady's Illustrated Primer*



Overview

- ➔ Extends LINQ / .NET
- ➔ Observable sequence
- ➔ Observer pattern
- ➔ Concurrency
- ➔ Completion and Errors

Rx



```
observable.Subscribe(
```

```
var nullField = from d in directories of f in file
where f.name = d.name
select f;
```

Observer Pattern

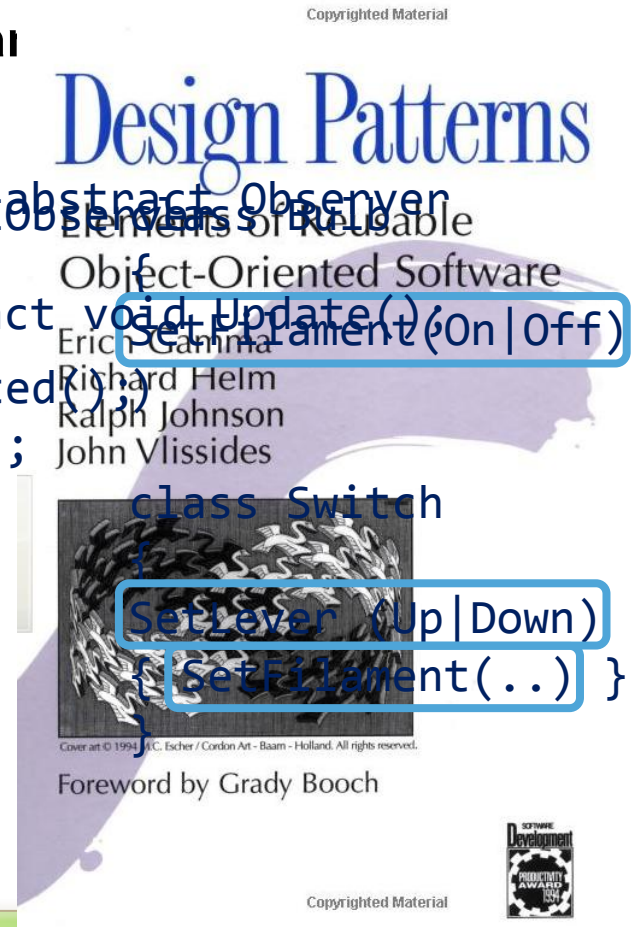
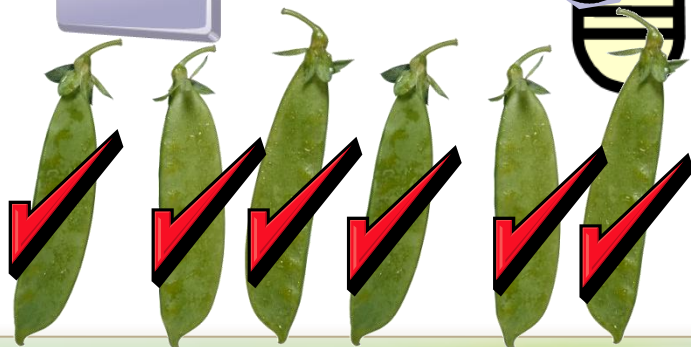
- ➔ GOF
- ➔ General design description with solution at hand
- ➔ Light observes switch

```
interface IObservable {  
    subject  
    Attach(Observer);  
    Subscribe();  
    abstract void Detach(Observer);  
    abstract void Notify();  
}
```

```
interface IObservable {  
    observer  
    Attach(Observer);  
    Subscribe();  
    abstract void Detach(Observer);  
    abstract void Notify();  
}
```

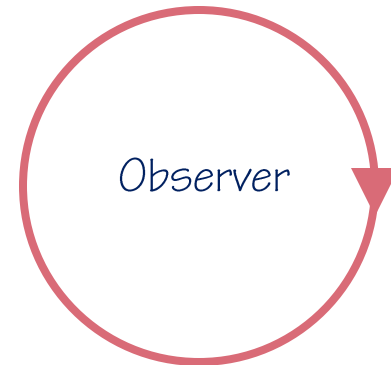
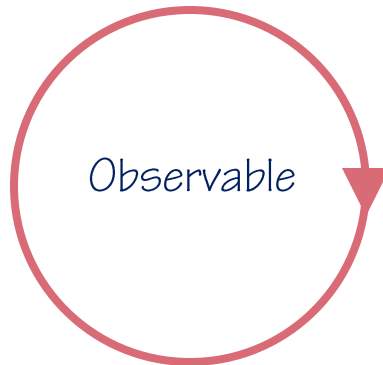
```
interface IObservable {  
    abstract void Update();  
    abstract void OnNext();  
    abstract void OnCompleted();  
    abstract void OnError();  
}
```

```
class Switch {  
    SetLever (Up|Down)  
    SetFilament(..)  
}
```



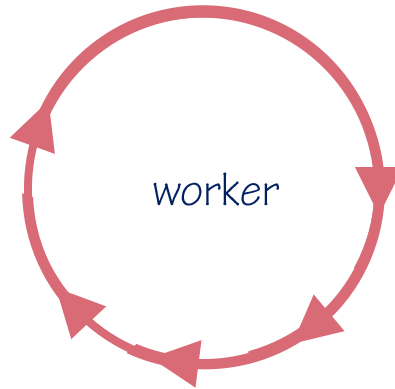
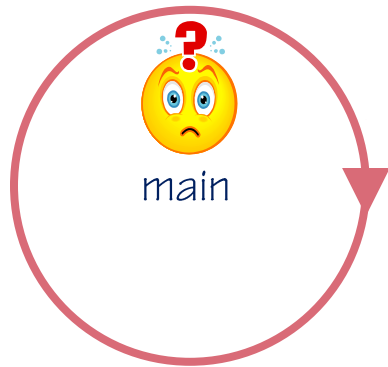
Concurrency

- Observable thread controlled by SubscribeOn
- Observer thread controlled by ObserveOn
- Number of thread choices including Dispatcher



Completion and Errors

- ➔ **Concurrency introduces two issues**
 - Are we there yet?
 - Oops!
- ➔ **Completion/Error is on "other" thread**



Summary

- ➔ **Reactive Extensions implement the Observer Pattern**
- ➔ **Convert LINQ queries into observable sequences**
 - IObservable
 - IObservable
- ➔ **Manages concurrency**
 - query
 - observer

References

- **Reactive Extensions Home**
 - <http://msdn.microsoft.com/en-us/data/gg577609>
- ***The Diamond Age***
 - Neal Stephenson ISBN 0553380966
- **Design Patterns: Elements of Reusable Object-Oriented Software**
 - *Gamma et al.* ISBN 0201633612
- **Pluralsight Design Pattern Library**
 - <http://www.pluralsight-training.net/microsoft/olt/Course/Toc.aspx?n=patterns-library>
- **ReSharper**
 - <http://www.jetbrains.com/resharper/>