Algebraic Data Types (ADTs)

```
def describeTrafficLight(trafficLight: String) =
  trafficLight match {
    case "red"    => "Stop!"
    case "yellow" => "Slow down..."
    case "green"  => "Safe to go."
    case _        => "Invalid." // shouldn't happen
  }
```

Gotta test the invalid case!

```
assert(describeTrafficLight("abc") == "Invalid.")
```

```
def nextTrafficLight(trafficLight: String) =
  trafficLight match {
    case "red"    => "green"
    case "yellow" => "red"
    case "green"  => "yellow"
    case _        => "Invalid." // shouldn't happen
  }
```

Gotta test the invalid case!

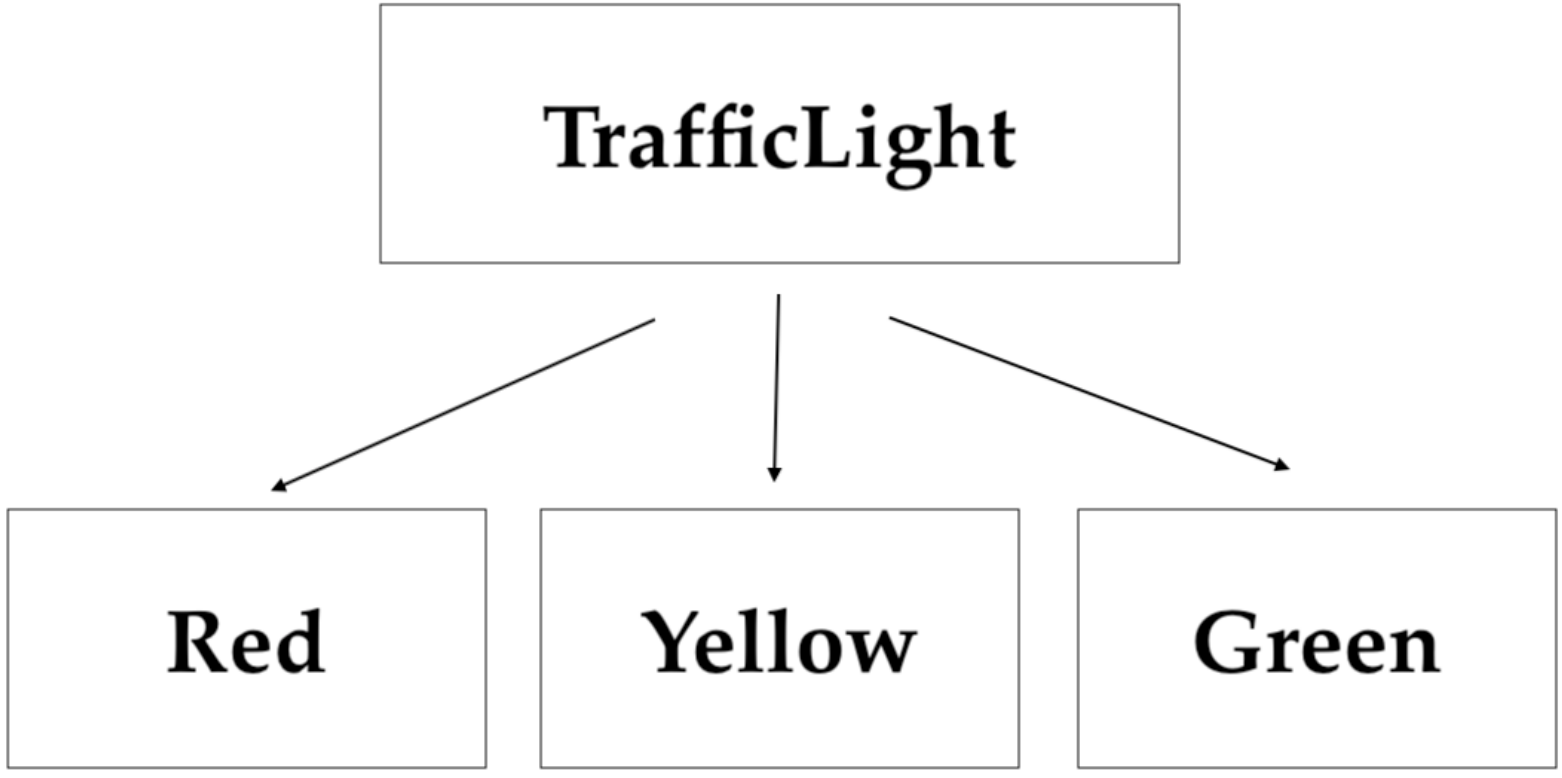
```
assert(describeTrafficLight("abc") == "Invalid.")
```

```
def saveTrafficLight(trafficLight: String)

def logTrafficLight(trafficLight: String)

def trafficLightAsJson(trafficLight: String)

def trafficLightAsCsv(trafficLight: String)
```

`String` implies that the complete works of Shakespeare is valid input.

Including the Chinese translations!

Let's solve this with types!


TrafficLight
Red
Yellow
Green

```
sealed trait TrafficLight

case object Red extends TrafficLight

case object Yellow extends TrafficLight

case object Green extends TrafficLight
```

...and nothing else!

(unlike traditional inheritance)

```scala
def describeTrafficLight(trafficLight: TrafficLight) =
  trafficLight match {
    case Red    => "Stop!"
    case Yellow => "Slow down..."
    case Green  => "Safe to go."
  }
```

vs.

```scala
def describeTrafficLight(trafficLight: String) =
  trafficLight match {
    case "red"    => "Stop!"
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```

Possible inputs: 3 vs. *Infinity*

```
def nextTrafficLight(trafficLight: String) =
  trafficLight match {
    case "red"    => "green"
    case "yellow" => "red"
    case "green"  => "yellow"
    case _        => "Invalid." // shouldn't happen
  }
```

vs.

```
def nextTrafficLight(trafficLight: TrafficLight) =
  trafficLight match {
    case Red    => Green
    case Yellow => Red
    case Green  => Yellow
  }
```

Possible inputs: 3 vs. *Infinity*

New traffic light?

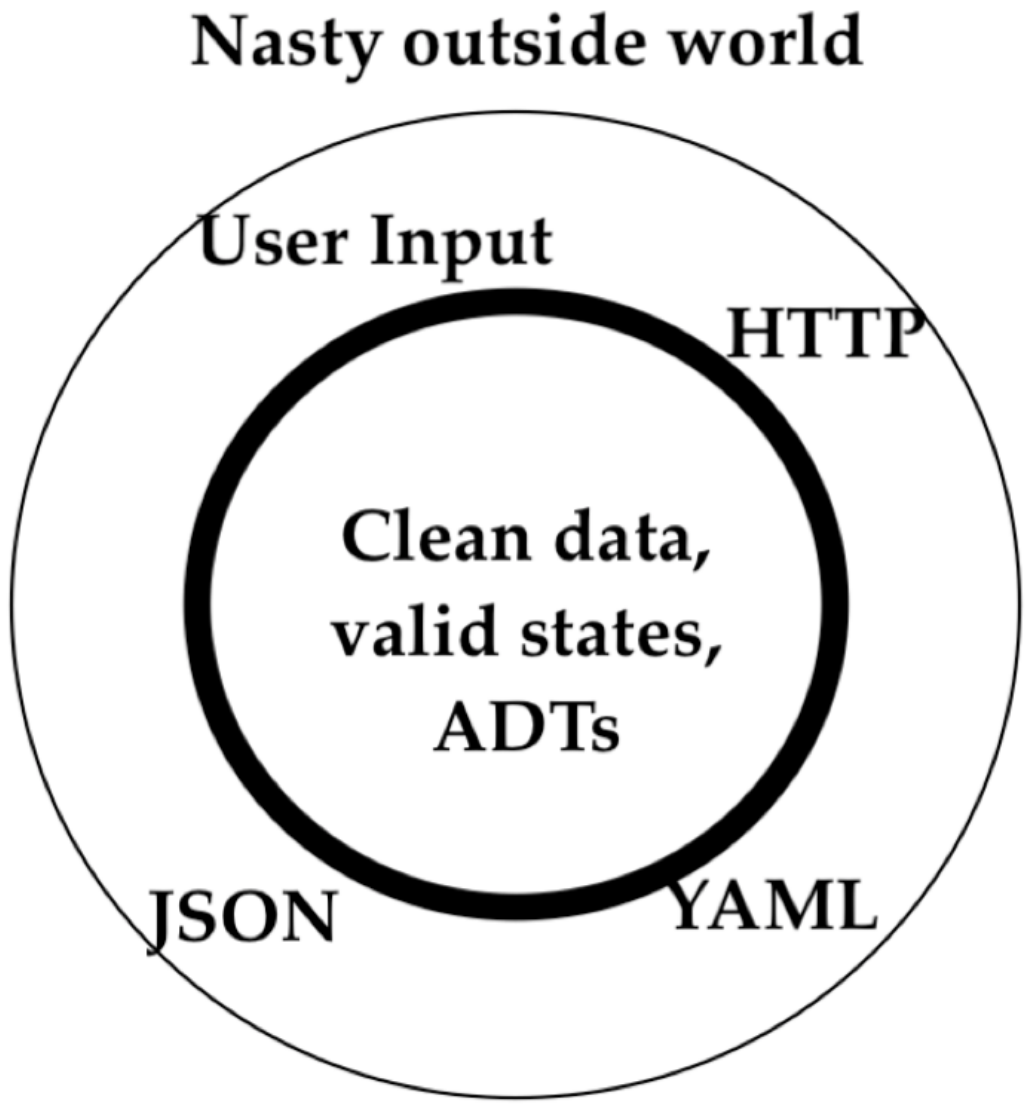
```
sealed trait TrafficLight

case object Red extends TrafficLight

case object Yellow extends TrafficLight

case object Green extends TrafficLight

case object Blue extends TrafficLight
```


Nasty outside world
User Input
HTTP
Clean data,
valid states,
ADTs
JSON
YAML