Data Types

Defining New Data Types

Three ways: `type`, `data`, `newtype`

type

`type String = [Char]`
Shorthand for a type.
`String` is now indistinguishable from `[Char]`, so we can write `String` instead of `[Char]`.

data

Used to distinguish inputs by their type.

`data USD = USD Int`
Now, `5 :: Int`, but `USD 5 :: USD`, so we can write functions that only accept USD. Therefore, the type system will protect us from using the wrong unit.

However, data introduces an extra value: `USD Undefined`.
To avoid this...

newtype

`newtype USD = USD Int`
This removes the extra value.

General

A new type is different to what it wraps: `USD` != `Int`
The constructors exist at compile time, but not at runtime: a `USD` is just as efficient as an `Int`

Parametrised Data Types

```
data Maybe a = Nothing | Just a
data Either a b = Left a | Right b
```