

More List Examples
Type Classes
Abstract Datatypes

Efficiency

What is the type of sort?

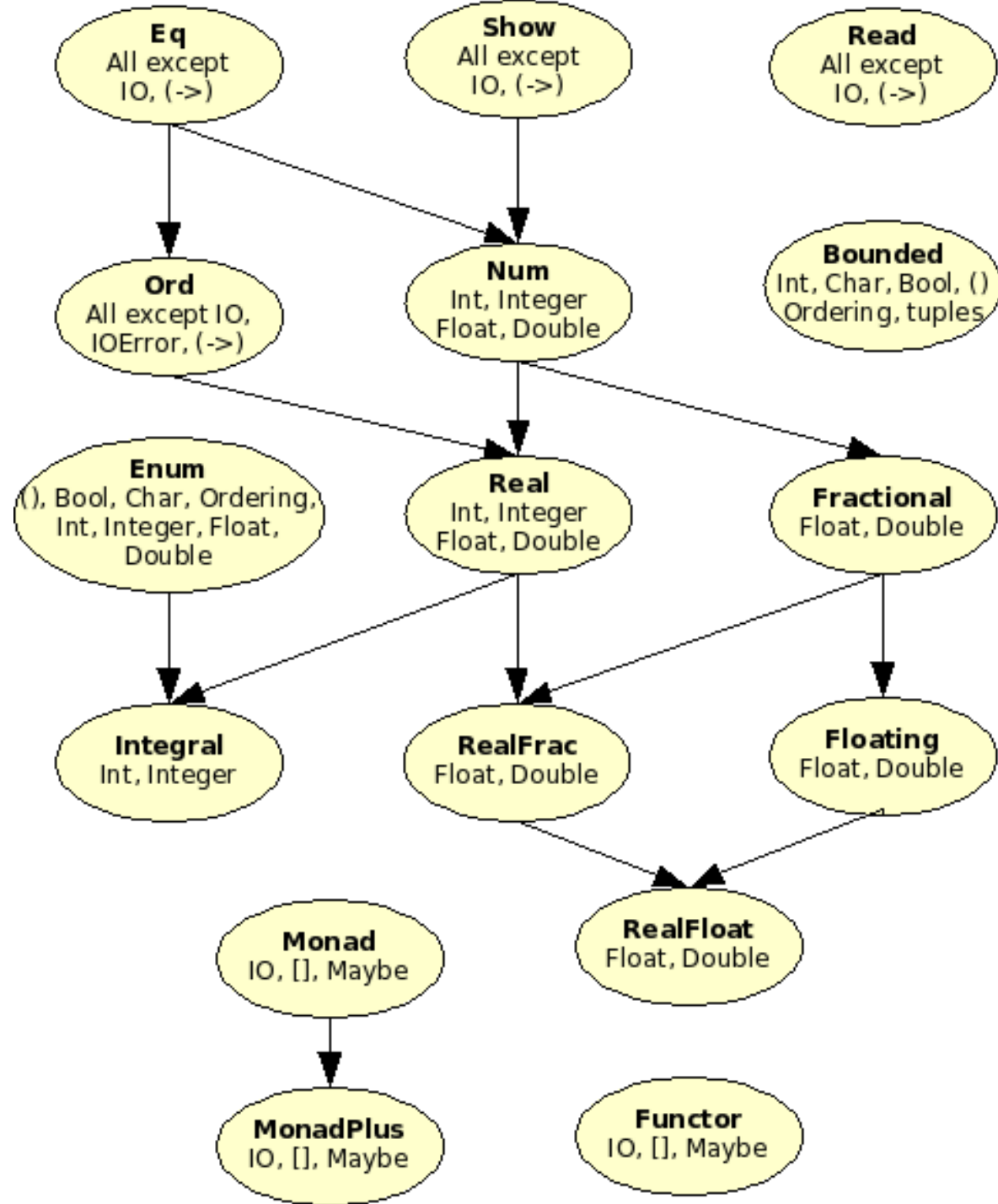
(Incorrect) `sort :: [a] -> [a]`

It works for many different types, yes, but not *all*. Which ones?

Example of sorting function definitions
(demo)

The Predefined Classes and Instances

(from the haskell
report)



Defining Type Classes

```
class Eq a where
```

```
  (==) :: a -> a -> Bool
```

```
  (/=) :: a -> a -> Bool
```

```
class Eq a => Ord a where
```

```
  (<=) :: a -> a -> Bool
```

```
  (>=) :: a -> a -> Bool
```

Defining Type Classes

```
class Eq a where  
  (==) :: a -> a -> Bool  
  (/=) :: a -> a -> Bool  
  
x /= y = not (x == y)
```

Can provide
some default
implementations

```
class Eq a => Ord a where  
  (<=) :: a -> a -> Bool  
  (>=) :: a -> a -> Bool  
  
x >= y = not (x <= y) || x == y
```

Type Classes vs C++/Java...

Haskell type classes not used so often for
e.g. abstract datatypes. Encapsulation
usually handled using **modules**

See [http://www.haskell.org/haskellwiki/
OOP_vs_type_classes](http://www.haskell.org/haskellwiki/OOP_vs_type_classes)
for discussion