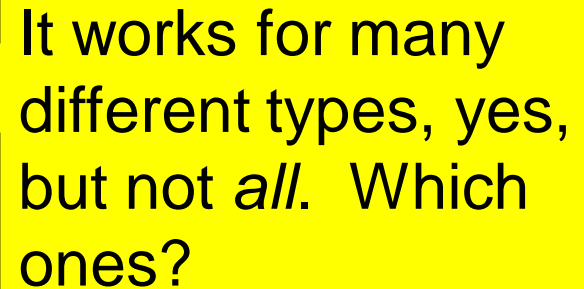# More List Examples
Type Classes
Abstract Datatypes

Efficiency

What is the type of sort?
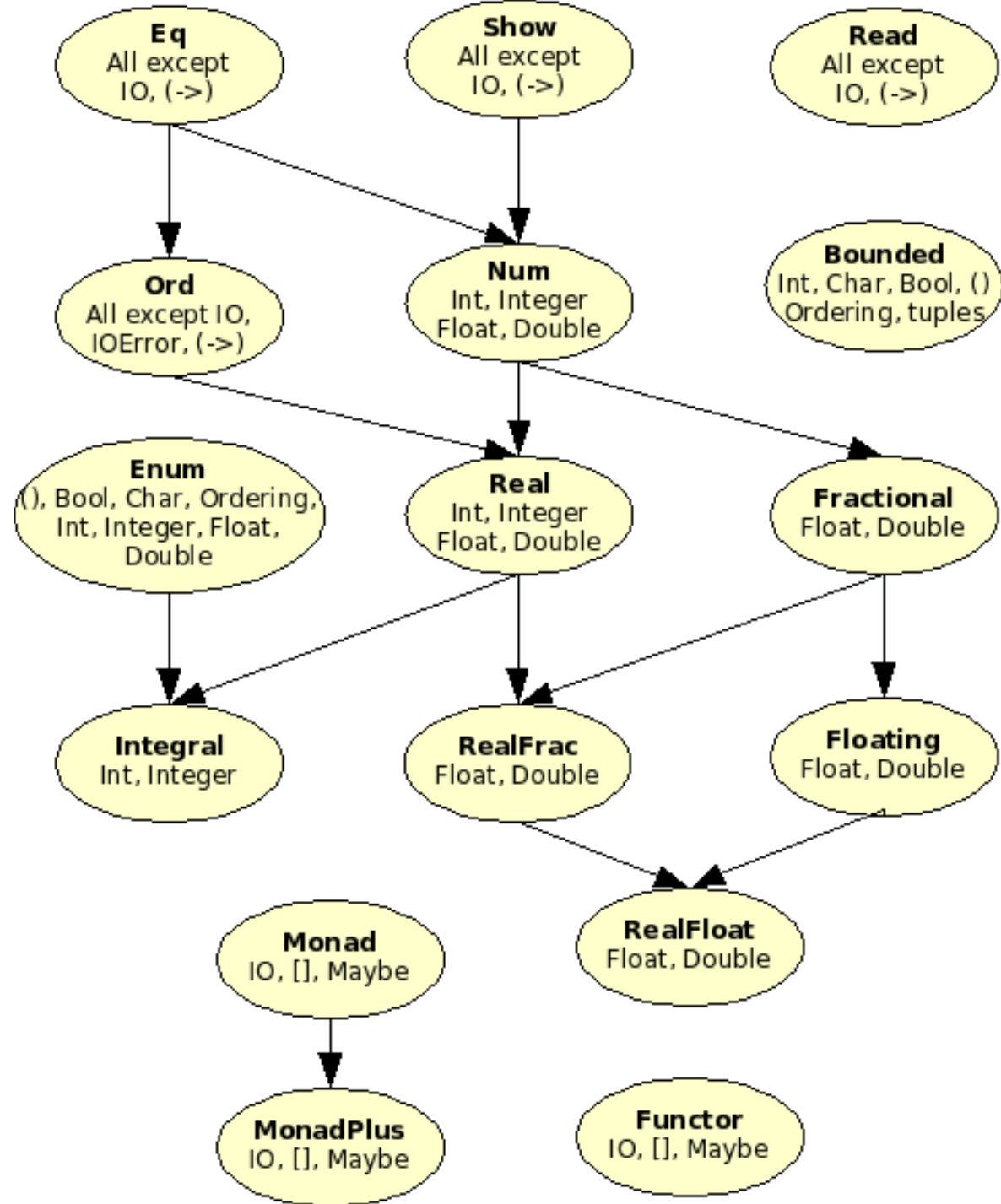
(Incorrect) `sort :: [a] -> [a]`

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

for discussion