

# Haskell



**safety first**

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# Übersicht



- rein funktional
- lazy
- sicher

# Funktionen



```
sortLines t = unlines (sort (lines t))
```

```
sortLines' t = (unlines . sort . lines) t
```

```
sortLines'' = unlines . sort . lines
```

# mehr Funktionen



```
reverseLines = unlines . reverse . lines
```

```
first2Lines = unlines . take 2 . lines
```

```
...
```

```
byLines f = unlines . f . lines
```

# Currying



```
add :: Num a => a -> a -> a
add x y = x + y
```

```
Main> add 3 4
7
```

```
Main> (add 3) 4
7
```

# Currying



```
add :: Num a => a -> (a -> a)
```

```
add x y = x + y
```

```
Main> add 3 4
```

```
7
```

```
Main> (add 3) 4
```

```
7
```

# PFA & Lifting



`add3 y = 3 + y`

`add3' = (+) 3`

`add3onLists l = (map add3) l`

`add3onLists' = map add3`

# Daten



```
data MyList  $\alpha$  = NIL
               | Cons  $\alpha$  (MyList  $\alpha$ )
               deriving Show
```

```
list1 = NIL
list2 = Cons "a" list1
list3 = Cons "b" list2
list4 = Cons "a" list4
```



# Listenfunktionen



```
car :: MyList a -> a  
car (Cons x xs) = x  
car NIL = undefined
```

```
cdr :: MyList a -> MyList a  
cdr (Cons x xs) = xs  
cdr NIL = NIL
```

# Listenfunktionen



```
car :: MyList a -> a
car (Cons x xs) = x
car NIL = error "Damn it!"
```

```
cdr :: MyList a -> MyList a
cdr (Cons x xs) = xs
cdr NIL = NIL
```

# Maybe



```
data Maybe  $\alpha$  = Just  $\alpha$   
              | Nothing
```

```
car (Cons x xs) = Just x  
car NIL = Nothing
```

```
cdr (Cons x xs) = Just xs  
cdr NIL = Nothing
```

# Maybe



```
car :: MyList a -> Maybe a
cdr :: MyList a -> Maybe (MyList a)
```

```
cadr x = (car . cdr) x
```

```
TypeError: Couldn't match type Maybe (MyList a)
           with expected MyList a
```

# Monaden

$(\gg=) :: m\ a \rightarrow (a \rightarrow m\ b) \rightarrow m\ b$

`cadr :: MyList a -> Maybe a`

`cadr x = car x >>= cdr`

# mehr Haskell



- Learn you a Haskell for great good
- Real World Haskell
- [tryhaskell.org](http://tryhaskell.org)
- Mehr zu Monaden
  - [nondeterminism.de](http://nondeterminism.de)