Haskell & razredi tipov

- Strukture (moduli) & signature — OCaml
- Razredi / paketi & vmesniki — Java
- Razredi tipov — Haskell

Haskell

$$f(x)$$

$$f.apply(x) \qquad f(x)$$

$$\int_0^1 a \cdot dx \qquad kjer \ je \qquad a = \cdots \cdots$$

$$\{ n^2 \mid n \in \mathbb{N} \}$$

```haskell
data Maybe a =
    Nothing
  | Just a
```

Java: null
C : NULL
SQL: NULL
Python: None

- numerični tipi : $+ - *$ min max
- Iterable → Java (iterator)
- ...

type class   razred tipov

Monoid $(M, e, \cdot)$

$e \cdot x = x = x \cdot e$

$x \cdot (y \cdot z) = (x \cdot y) \cdot z$

Primer: $(\mathbb{N}, 0, +)$ $[1,2,3] \xrightarrow{\text{mconcat}} 6$

$(\mathbb{N}, 1, \times)$

$(\mathbb{N}, 0, \max)$

$(\text{List } a, [\,], ++)$
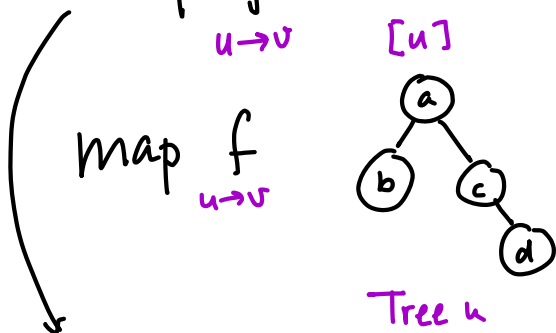$\hookrightarrow$ stikanje seznamov

Grupa $(G, e, \cdot, {}^{-1})$
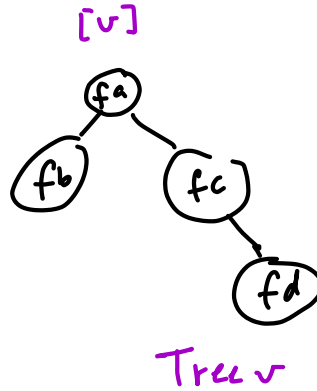
$e \cdot x = x = x \cdot e$

$x \cdot (y \cdot z) = (x \cdot y) \cdot z$

$x \cdot \bar{x}^{-1} = \bar{x}^{-1} \cdot x = e$

$\text{map } f \ [a, b, c, d] = [fa, fb, fc, fd]$
$\quad\quad\ \ u \to v \quad\ [u] \quad\quad\quad\quad\quad\quad\quad [v]$

$\text{map } f$
$\quad u \to v$

Tree u

$=$

Tree v

$\text{map} :: (u \to v) \to t\, u \to t\, v$

$\downarrow$

$[-]$
Tree

Applicative

tip a "čisti podatek"

tip   Maybe $a \to$ Nothing   "nečist podatek"
$\quad\quad\quad\quad\quad\quad\quad$ Just a

$$\text{pure} : \quad a \longrightarrow \text{Maybe } a$$
$$\text{Just} \qquad 5 \longmapsto \text{Just } 5$$

$g' \langle * \rangle x'$

verj. porazd.
funkcij

$$\text{pure } N = \qquad N \text{ z verjetnostjo } 1$$
$$\text{(vsi ostali imajo verjetnost } 0)$$

$f' \langle * \rangle x' = \cdots$

verj. por. input

Seznami

$$[\;]$$
$$[1, 2, 3]$$

"nečisto število"?

$$\text{pure} : \quad k \longmapsto [k]$$