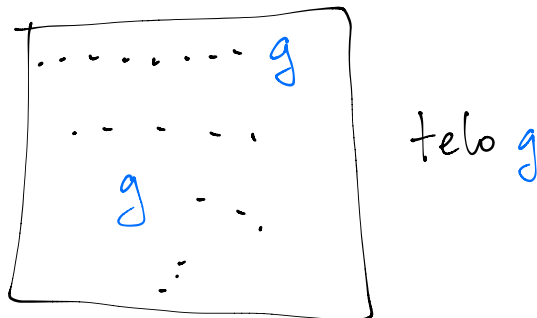
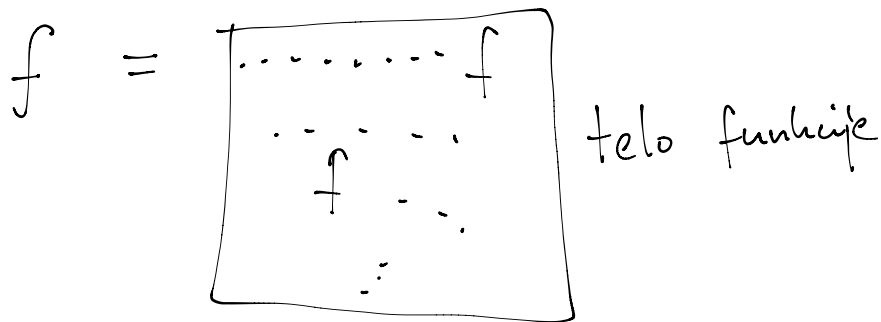


Rekurzija

Rekurzivne funkcije



$$f = \text{telo } f$$

$$\text{rek } t = \lambda x. t (\text{rek } t) x$$

$$\text{rek } \underline{t} = t (\text{rek } t)$$

$$\begin{aligned} \text{rek } t &= t (\text{rek } t) = t (t (\text{rek } t)) \\ &= t (t (t (\text{rek } t))) = \dots \end{aligned}$$

$$\text{rek} : \underbrace{\left(\overbrace{(\alpha \rightarrow \beta)}^{\text{self}} \rightarrow \overbrace{(\alpha \rightarrow \beta)}^{\text{telo}} \right)}_{\substack{\text{sprejme funkcijo:} \\ \text{telo definicije, v odvisnosti} \\ \text{od argumenta "self"}}} \rightarrow \underbrace{(\alpha \rightarrow \beta)}_{\substack{\text{vrne funkcijo:} \\ \text{rekurzivna funkcija}}$$

Bolj splošno:

$$\text{rek} : (\gamma \rightarrow \gamma) \rightarrow \gamma$$

$$f = \text{telo } f$$

$$x = h(x)$$

x je negibna točka funkcije h

Ideja, kako poiščemo negibno točko:

$$x_0, h(x_0), h(h(x_0)), h(h(h(x_0))), \dots$$

$$x = \lim_{n \rightarrow \infty} \underbrace{h(h(\dots h(x_0)\dots))}_n$$

$$= \lim_{n \rightarrow \infty} h^n(x)$$

$$\begin{aligned} x = \lim_{n \rightarrow \infty} h^n(x) &= \lim_{n \rightarrow \infty} h(h^{n-1}(x)) = h\left(\lim_{n \rightarrow \infty} h^{n-1}(x)\right) \\ &= h(x) \end{aligned}$$

$$\frac{\eta \mid b \rightarrow \text{false}}{\eta \mid \text{while } b \text{ do } c \text{ done} \mapsto \eta}$$

$$\frac{\eta \mid b \rightarrow \text{true}}{\eta \mid \text{while } b \text{ do } c \text{ done} \mapsto (\eta_1, (c; \text{while } b \text{ do } c))}$$

Rekurzivni tipi

Seznam:

- prazen $[]$
- sestavljen $x :: l$
 - glava \nearrow
 - rep (spet seznam) \nwarrow

$[x_1; x_2; \dots; x_n]$ je okrajšana za

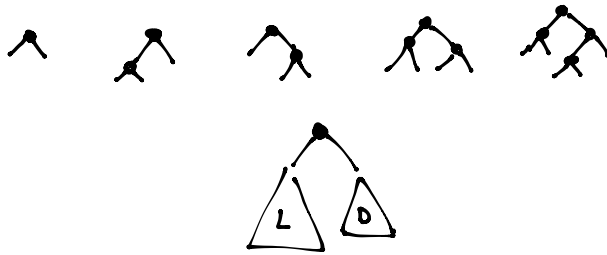
$$x_1 :: (x_2 :: (\dots :: (x_n :: []) \dots))$$

Dvojštevno drevo:

- Prazno
- Sestavljeno iz dveh poddreves (levega in desnega)

Pravno drevo:

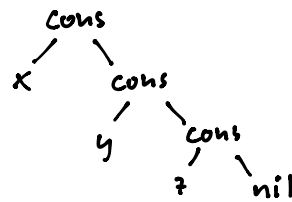
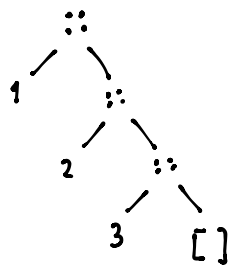
Sestavljena



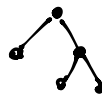
LISP:

prazen seznam : nil

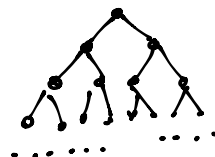
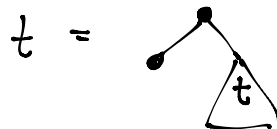
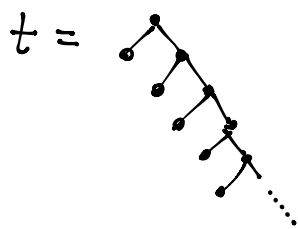
sestavljen :: (cons x l)



• Leaf



Tree(Leaf, Tree(Leaf, Leaf))



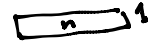
polno neshkivno drevo

3:

- NASLEDNIK
- |
- NASL...
- |
- NASL
- |
- Nič

Število:

- nič
-



$$6 = 0110_2$$



1101_2

$\text{shl}(\text{shl}(\text{shl}(\text{shl}(\text{zero}))))$

Ishalno drevo:

