

Introducción a los Algoritmos Operadores de Lista

longitud

$$\begin{aligned} \# : [A] &\rightarrow \text{Int} \\ \#[] &\doteq 0 \\ \#(x \triangleright xs) &\doteq 1 + \#xs \end{aligned}$$

head (cabeza)

$$\begin{aligned} \text{head} : [A] &\rightarrow A \\ \text{head}.(x \triangleright xs) &\doteq x \end{aligned}$$

tail (cola)

$$\begin{aligned} \text{tail} : [A] &\rightarrow [A] \\ \text{tail}.[] &\doteq [] \\ \text{tail}.(x \triangleright xs) &\doteq xs \end{aligned}$$

concatenar

$$\begin{aligned} (++) : [A] &\rightarrow [A] \rightarrow [A] \\ [] ++ ys &\doteq ys \\ (x \triangleright xs) ++ ys &\doteq x \triangleright (xs ++ ys) \end{aligned}$$

pegar por la derecha

$$\begin{aligned} (\triangleleft) : [A] &\rightarrow A \rightarrow [A] \\ [] \triangleleft y &\doteq y \triangleright [] \\ (x \triangleright xs) \triangleleft y &\doteq x \triangleright (xs \triangleleft y) \end{aligned}$$

indexar

$$\begin{aligned} (!!) : [A] &\rightarrow \text{Int} \rightarrow A \\ (x \triangleright xs) !! 0 &\doteq x \\ (x \triangleright xs) !! (n + 1) &\doteq xs !! n \end{aligned}$$

tomar

$$\begin{aligned} (\uparrow) : [A] &\rightarrow \text{Int} \rightarrow [A] \\ xs \uparrow 0 &\doteq [] \\ [] \uparrow n &\doteq [] \\ (x \triangleright xs) \uparrow (n + 1) &\doteq x \triangleright (xs \uparrow n) \end{aligned}$$

tirar

$$\begin{aligned} (\downarrow) : [A] &\rightarrow \text{Int} \rightarrow [A] \\ xs \downarrow 0 &\doteq xs \\ [] \downarrow n &\doteq [] \\ (x \triangleright xs) \downarrow (n + 1) &\doteq xs \downarrow n \end{aligned}$$

suma

$$\begin{aligned} \text{sum} : [\text{Num}] &\rightarrow \text{Num} \\ \text{sum}.[] &\doteq 0 \\ \text{sum}.(x \triangleright xs) &\doteq x + \text{sum}.xs \end{aligned}$$

Funciones “tabú”

map

$$\begin{aligned} \text{map} : (A \rightarrow B) &\rightarrow [A] \rightarrow [B] \\ \text{map}.f.[] &\doteq [] \\ \text{map}.f.(x \triangleright xs) &\doteq f.x \triangleright \text{map}.f.xs \end{aligned}$$

Ejemplo: $\text{duplica} = \text{map}.(*) . 2$

filter

$$\begin{aligned} \text{filter} : (A \rightarrow \text{Bool}) &\rightarrow [A] \rightarrow [A] \\ \text{filter}.p.[] &\doteq [] \\ \text{filter}.p.(x \triangleright xs) &\doteq (p.x \longrightarrow x \triangleright \text{filter}.p.xs \\ &\quad \square \neg p.x \longrightarrow \text{filter}.p.xs \\ &\quad) \end{aligned}$$

Ejemplo: $\text{soloPares} = \text{filter}.\text{esMultiplo}2$

foldl

$$\begin{aligned} \text{foldl} : (A \rightarrow B \rightarrow A) &\rightarrow A \rightarrow [B] \rightarrow A \\ \text{foldl}.f.z.[] &\doteq z \\ \text{foldl}.f.z.(x \triangleright xs) &\doteq \text{foldl}.f.(f.z.x).xs \end{aligned}$$

Ejemplos: $\text{sum} = \text{foldl}.(+).0$
 $\text{rev} = \text{foldl}.(<).[]$