Introducción a los Algoritmos
Operadores de Lista

longitud

$$\# : [A] \to Int$$

$$\begin{array}{rcl} \#[\,] & \doteq & 0 \\ \#(x \triangleright xs) & \doteq & 1 + \#xs \end{array}$$

head (cabeza)

$$head : [A] \to A$$

$$head.(x \triangleright xs) \quad \doteq \quad x$$

tail (cola)

$$tail : [A] \to [A]$$

$$tail.(x \triangleright xs) \quad \doteq \quad xs$$

concatenar

$$(+\!\!+) : [A] \to [A] \to [A]$$

$$\begin{array}{rcl} [\,] +\!\!+ ys & \doteq & ys \\ (x \triangleright xs) +\!\!+ ys & \doteq & x \triangleright (xs +\!\!+ ys) \end{array}$$

pegar por la derecha

$$(\triangleleft) : [A] \to A \to [A]$$

$$\begin{array}{rcl} [\,] \triangleleft y & \doteq & y \triangleright [\,] \\ (x \triangleright xs) \triangleleft y & \doteq & x \triangleright (xs \triangleleft y) \end{array}$$

índice

$$(!) : [A] \to Int \to A$$

$$\begin{array}{rcl} (x \triangleright xs) \,!\, 0 & \doteq & x \\ (x \triangleright xs) \,!\, (n+1) & \doteq & xs \,!\, n \end{array}$$

tomar

$$(\uparrow) : [A] \to Int \to [A]$$

$$\begin{array}{rcl} xs \uparrow 0 & \doteq & [\,] \\ [\,] \uparrow n & \doteq & [\,] \\ (x \triangleright xs) \uparrow (n+1) & \doteq & x \triangleright (xs \uparrow n) \end{array}$$

tirar

$$(\downarrow) : [A] \to Int \to [A]$$

$$\begin{array}{rcl} xs \downarrow 0 & \doteq & xs \\ [\,] \downarrow n & \doteq & [\,] \\ (x \triangleright xs) \downarrow (n+1) & \doteq & xs \downarrow n \end{array}$$

suma

$$sum : [Num] \to Num$$

$$\begin{array}{rcl} sum.[\,] & \doteq & 0 \\ sum.(x \triangleright xs) & \doteq & x + sum.xs \end{array}$$

Funciones "tabú"

map

$$map : (A \to B) \to [A] \to [B]$$

$$\begin{array}{rcl} map.f.[\,] & \doteq & [\,] \\ map.f.(x \triangleright xs) & \doteq & f.x \triangleright map.f.xs \end{array}$$

Ejemplo: $duplica = map.((*).2)$

filter

$$filter : (A \to Bool) \to [A] \to [A]$$

$$\begin{array}{rcl} filter.p.[\,] & \doteq & [\,] \\ filter.p.(x \triangleright xs) & \doteq & (\ p.x \longrightarrow x \triangleright filter.p.xs \\ & & \Box\ \neg p.x \longrightarrow filter.p.xs \\ & &) \end{array}$$

Ejemplo: $soloPares = filter.esMultiplo2$

foldl

$$foldl : (A \to B \to A) \to A \to [B] \to A$$

$$\begin{array}{rcl} foldl.f.z.[\,] & \doteq & z \\ foldl.f.z.(x \triangleright xs) & \doteq & foldl.f.(f.z.x).xs \end{array}$$

Ejemplos: $sum = foldl.(+).0$
$rev = foldl.(\triangleleft).[\,]$