# Relazione

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## Esercizio 1

### Riscrittura delle funzioni

enumFrom@(Float,Char) = \ z -> case z of

(x, c) -> : a[(\*@Float x 1.1@Float , succ@Char c)] (enumFrom@(Float,Char) a)

f :: Float -> ( any , ( Float , Char )) -> Bool

f = \ x -> \ y' -> case y' of

(\_ , y'') -> case y'' of

( y , \_ ) -> <@Float x y

myMap = \ f -> \ l -> case l of

: x xs -> : (f x) (myMap f xs)

[] -> []

myFilt = \ p -> \ l -> case l of

[] -> []

: x xs -> if (p x) then (: x ys[myFilt p xs]) else ys

myZip = \ l1 -> \ l2 -> case l1 of

[] -> []

: x xs -> case l2 of

[] -> []

: y ys -> : (x,y) (myZip xs ys)

\_ -> error "ouch !!"

\_ -> error "ouch !!"

### Esecuzione

myMap snd (myFilt (f 0@Float) (myZip (error "ERROR":"do") [(2,'a')..]))

myMap snd (myFilt (f 0@Float) (myZip (: (error "ERROR") "do") (enumFrom@(2@Float,'a'@Char))))

{-

prima iterazione

-}

case (myFilt (f 0@Float) (myZip (: (error "ERROR") "do") (enumFrom@(Float,Char) (2@Float,'a'@Char)))) of

: x xs -> : (snd x) (myMap snd xs)

[] -> []

case (case (myZip (: (error "ERROR") "do") (enumFrom@(Float,Char) (2@Float,'a'@Char)))of

[] -> []

: x xs -> if (f'[f 0@Float] x) then (: x ys[myFilt f' xs]) else ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> []

case (case (case (: (error "ERROR") "do") of

[] -> []

: x xs -> case (enumFrom@(Float,Char) (2@Float,'a'@Char)) of

[] -> []

: y ys -> : (x,y) (myZip xs ys)

\_ -> error "ouch !!"

\_ -> error "ouch !!"

) of

[] -> []

: x xs -> if (f'[f 0@Float] x) then (: x ys[myFilt f' xs]) else ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> []

case (case (case (enumFrom@(Float,Char) (2@Float,'a'@Char)) of

[] -> []

: y ys -> : ((error "ERROR"), y) (myZip "do" ys)

\_ -> error "ouch !!"

) of

[] -> []

: x xs -> if (f'[f 0@Float] x) then (: x ys[myFilt f' xs]) else ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> []

case (case (case (case (2@Float,'a'@Char)of

(x, c) -> : a[(\*@Float x 1.1@Float , succ@Char c)] (enumFrom@(Float,Char) a)

) of

[] -> []

: y ys -> : ((error "ERROR"), y) (myZip "do" ys)

\_ -> error "ouch !!"

) of

[] -> []

: x xs -> if (f'[f 0@Float] x) then (: x ys[myFilt f' xs]) else ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> []

case (case (case (: a[(\*@Float 2@Float 1.1@Float , succ@Char 'a'@Char)] (enumFrom@(Float,Char) a)) of

[] -> []

: y ys -> : ((error "ERROR"), y) (myZip "do" ys)

\_ -> error "ouch !!"

) of

[] -> []

: x xs -> if (f'[f 0@Float] x) then (: x ys[myFilt f' xs]) else ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> []

case (case (: ((error "ERROR"), a[(\*@Float 2@Float 1.1@Float , succ@Char 'a'@Char)]) (myZip "do" (enumFrom@(Float,Char) a))) of

[] -> []

: x xs -> if (f'[f 0@Float] x) then (: x ys[myFilt f' xs]) else ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> []

case (if (f'[f 0@Float] x[((error "ERROR"), a[(\*@Float 2@Float 1.1@Float , succ@Char 'a'@Char)])]) then

(: x ys[myFilt f' (myZip "do" (enumFrom@(Float,Char) a))])

else

ys) of

: x xs -> : (snd x) (myMap snd xs)

[] -> []

case (if (f'[(\ y' -> case y' of

(\_ ,y'') -> case y'' of

( y , \_ ) -> <@Float 0@Float y

)] x[((error "ERROR"), a[(\*@Float 2@Float 1.1@Float , succ@Char 'a'@Char)])])

then

(: x ys[myFilt f' (myZip "do" (enumFrom@(Float,Char) a))])

else

ys) of

: x xs -> : (snd x) (myMap snd xs)

[] -> []

{-

ATTENZIONE!

per leggibilità continuerò ad usare f' come placeholder per:

\ y' -> case y' of

(\_ ,y'') -> case y'' of

( y , \_ ) -> <@Float 0@Float y

sarebbe la valutazione di (f 0)

-}

case (if (case x[((error "ERROR"), a[(\*@Float 2@Float 1.1@Float , succ@Char 'a'@Char)])] of

(\_ ,y'') -> case y'' of

( y , \_ ) -> <@Float 0@Float y

)

then

(: x ys[myFilt f' (myZip "do" (enumFrom@(Float,Char) a))])

else

ys) of

: x xs -> : (snd x) (myMap snd xs)

[] -> []

case (if (case a[(\*@Float 2@Float 1.1@Float , succ@Char 'a'@Char)] of

( y , \_ ) -> <@Float 0@Float y

)

then

(: ((error "ERROR"), a) ys[myFilt f' (myZip "do" (enumFrom@(Float,Char) a))])

else

ys) of

: x xs -> : (snd x) (myMap snd xs)

[] -> []

case (if (<@Float 0@Float t[\*@Float 2@Float 1.1@Float])

then

(: ((error "ERROR"), a[(t, succ@Char 'a'@Char)])

ys[myFilt f' (myZip "do" (enumFrom@(Float,Char) a))])

else

ys) of

: x xs -> : (snd x) (myMap snd xs)

[] -> []

case (if (<@Float 0@Float 2.2@Float)

then

(: ((error "ERROR"), a[(2.2@Float, succ@Char 'a'@Char)])

ys[myFilt f' (myZip "do" (enumFrom@(Float,Char) a))])

else

ys) of

: x xs -> : (snd x) (myMap snd xs)

[] -> []

case (if True

then

(: ((error "ERROR"), a[(2.2@Float, succ@Char 'a'@Char)])

ys[myFilt f' (myZip "do" (enumFrom@(Float,Char) a))])

else

ys) of

: x xs -> : (snd x) (myMap snd xs)

[] -> []

case (: ((error "ERROR"), a[(2.2@Float, succ@Char 'a'@Char)])

ys[myFilt f' (myZip "do" (enumFrom@(Float,Char) a))]

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> []

: (snd ((error "ERROR"), a[(2.2@Float, succ@Char 'a'@Char)]))

(myMap snd (myFilt f' (myZip "do" (enumFrom@(Float,Char) a))))

{-

viene forzata la valutazione completa

-}

: a[(2.2@Float, succ@Char 'a'@Char)]

(myMap snd (myFilt f' (myZip "do" (enumFrom@(Float,Char) a))))

: (2.2@Float, 'b'@Char)

(myMap snd (myFilt f' (myZip "do" (enumFrom@(Float,Char) (2.2@Float, 'b'@Char)))))

{-

seconda iterazione

-}

: (2.2@Float, 'b'@Char)

(case (myFilt f' (myZip "do" (enumFrom@(Float,Char) (2.2@Float, 'b'@Char)))) of

: x xs -> : (snd x) (myMap snd xs))

[] -> []

: (2.2@Float, 'b'@Char)

(case (case (myZip "do" (enumFrom@(Float,Char) (2.2@Float, 'b'@Char))) of

[] -> []

: x xs -> if (f' x) then (: x ys[myFilt f' xs]) else ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> [])

: (2.2@Float, 'b'@Char)

(case (case (case "do" of

[] -> []

: x xs -> case (enumFrom@(Float,Char) (2.2@Float, 'b'@Char)) of

[] -> []

: y ys -> : (x,y) (myZip xs ys)

\_ -> error "ouch !!"

\_ -> error "ouch !!"

) of

[] -> []

: x xs -> if (f' x) then (: x ys[myFilt f' xs]) else ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> [])

: (2.2@Float, 'b'@Char)

(case (case (case (enumFrom@(Float,Char) (2.2@Float, 'b'@Char)) of

[] -> []

: y ys -> : ('d'@Char, y) (myZip "o" ys)

\_ -> error "ouch !!"

) of

[] -> []

: x xs -> if (f' x) then (: x ys[myFilt f' xs]) else ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> [])

: (2.2@Float, 'b'@Char)

(case (case (case (case (2.2@Float, 'b'@Char) of

(x, c) -> : a[(\*@Float x 1.1@Float , succ@Char c)] (enumFrom@(Float,Char) a)

) of

[] -> []

: y ys -> : ('d'@Char, y) (myZip "o" ys)

\_ -> error "ouch !!"

) of

[] -> []

: x xs -> if (f' x) then (: x ys[myFilt f' xs]) else ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> [])

: (2.2@Float, 'b'@Char)

(case (case (case (: a[(\*@Float 2.2@Float 1.1@Float , succ@Char 'b'@Char)] (enumFrom@(Float,Char) a)) of

[] -> []

: y ys -> : ('d'@Char, y) (myZip "o" ys)

\_ -> error "ouch !!"

) of

[] -> []

: x xs -> if (f' x) then (: x ys[myFilt f' xs]) else ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> [])

: (2.2@Float, 'b'@Char)

(case (case (: ('d'@Char, a[(\*@Float 2.2@Float 1.1@Float , succ@Char 'b'@Char)]) (myZip "o" (enumFrom@(Float,Char) a))) of

[] -> []

: x xs -> if (f' x) then (: x ys[myFilt f' xs]) else ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> [])

: (2.2@Float, 'b'@Char)

(case (if (f' x[('d'@Char, a[(\*@Float 2.2@Float 1.1@Float , succ@Char 'b'@Char)])]) then

(: x ys[myFilt f' (myZip "o" (enumFrom@(Float,Char) a))])

else

ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> [])

: (2.2@Float, 'b'@Char)

(case (if (case (x[('d'@Char, a[(\*@Float 2.2@Float 1.1@Float , succ@Char 'b'@Char)])]) of

(\_, y'') -> case y'' of

(y, \_) -> <@Float 0@Float y)

then

(: x ys[myFilt f' (myZip "o" (enumFrom@(Float,Char) a))])

else

ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> [])

: (2.2@Float, 'b'@Char)

(case (if (case a[(\*@Float 2.2@Float 1.1@Float , succ@Char 'b'@Char)] of

(y, \_) -> <@Float 0@Float y)

then

(: ('d'@Char, a) ys[myFilt f' (myZip "o" (enumFrom@(Float,Char) a))])

else

ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> [])

: (2.2@Float, 'b'@Char)

(case (if (<@Float 0@Float y[\*@Float 2.2@Float 1.1@Float])

then

(: ('d'@Char, a[(y, succ@char 'b'@char)]) ys[myFilt f' (myZip "o" (enumFrom@(Float,Char) a))])

else

ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> [])

: (2.2@Float, 'b'@Char)

(case (if (<@Float 0@Float 2.4200000000000004@Float)

then

(: ('d'@Char, a[(2.4200000000000004@Float, succ@char 'b'@char)])

ys[myFilt f' (myZip "o" (enumFrom@(Float,Char) a))])

else

ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> [])

{-

da qui in poi abbrevio `2.4200000000000004` con `2.42`

-}

: (2.2@Float, 'b'@Char)

(case (if True

then

(: ('d'@Char, a[(2.42@Float, succ@char 'b'@char)])

ys[myFilt f' (myZip "o" (enumFrom@(Float,Char) a))])

else

ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> [])

: (2.2@Float, 'b'@Char)

(case (: ('d'@Char, a[(2.42@Float, succ@char 'b'@char)])

ys[myFilt f' (myZip "o" (enumFrom@(Float,Char) a))]) of

: x xs -> : (snd x) (myMap snd xs)

[] -> [])

: (2.2@Float, 'b'@Char)

(: (snd (: ('d'@Char, a[(2.42@Float, succ@char 'b'@char)])))

(myMap snd (myFilt f' (myZip "o" (enumFrom@(Float,Char) a)))))

{-

viene forzata la valutazione completa

-}

: (2.2@Float, 'b'@Char)

(: a[(2.42@Float, succ@char 'b'@char)]

(myMap snd (myFilt f' (myZip "o" (enumFrom@(Float,Char) a)))))

: (2.2@Float, 'b'@Char)

(: (2.42@Float, 'c'@char)

(myMap snd (myFilt f' (myZip "o" (enumFrom@(Float,Char) (2.42@Float, 'c'@char))))))

{-

terza iterazione

-}

: (2.2@Float, 'b'@Char)

(: (2.42@Float, 'c'@char)

(case (myFilt f' (myZip "o" (enumFrom@(Float,Char) (2.42@Float, 'c'@char)))) of

: x xs -> : (snd x) (myMap snd xs)

[] -> []))

: (2.2@Float, 'b'@Char)

(: (2.42@Float, 'c'@char)

(case (case (myZip "o" (enumFrom@(Float,Char) (2.42@Float, 'c'@char))) of

[] -> []

: x xs -> if (f' x) then (: x ys[myFilt f' xs]) else ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> []))

: (2.2@Float, 'b'@Char)

(: (2.42@Float, 'c'@char)

(case (case (case "o" of

[] -> []

: x xs -> case (enumFrom@(Float,Char) (2.42@Float, 'c'@char)) of

[] -> []

: y ys -> : (x,y) (myZip xs ys)

\_ -> error "ouch !!"

\_ -> error "ouch !!"

) of

[] -> []

: x xs -> if (f' x) then (: x ys[myFilt f' xs]) else ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> []))

: (2.2@Float, 'b'@Char)

(: (2.42@Float, 'c'@char)

(case (case (case (enumFrom@(Float,Char) (2.42@Float, 'c'@char)) of

[] -> []

: y ys -> : ('o'@Char, y) (myZip [] ys)

\_ -> error "ouch !!"

) of

[] -> []

: x xs -> if (f' x) then (: x ys[myFilt f' xs]) else ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> []))

: (2.2@Float, 'b'@Char)

(: (2.42@Float, 'c'@char)

(case (case (case (case (2.42@Float, 'c'@char) of

(x, c) -> : a[(\*@Float x 1.1@Float , succ@Char c)] (enumFrom@(Float,Char) a)

) of

[] -> []

: y ys -> : ('o'@Char, y) (myZip [] ys)

\_ -> error "ouch !!"

) of

[] -> []

: x xs -> if (f' x) then (: x ys[myFilt f' xs]) else ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> []))

: (2.2@Float, 'b'@Char)

(: (2.42@Float, 'c'@char)

(case (case (case (: a[(\*@Float 2.42@Float 1.1@Float , succ@Char 'c'@char)] (enumFrom@(Float,Char) a)) of

[] -> []

: y ys -> : ('o'@Char, y) (myZip [] ys)

\_ -> error "ouch !!"

) of

[] -> []

: x xs -> if (f' x) then (: x ys[myFilt f' xs]) else ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> []))

: (2.2@Float, 'b'@Char)

(: (2.42@Float, 'c'@char)

(case (case (: ('o'@Char, a[(\*@Float 2.42@Float 1.1@Float , succ@Char 'c'@char)])

(myZip [] (enumFrom@(Float,Char) a))) of

[] -> []

: x xs -> if (f' x) then (: x ys[myFilt f' xs]) else ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> []))

: (2.2@Float, 'b'@Char)

(: (2.42@Float, 'c'@char)

(case (if (f' x[('o'@Char, a[(\*@Float 2.42@Float 1.1@Float , succ@Char 'c'@char)])]) then

(: x ys[myFilt f' (myZip [] ys[(enumFrom@(Float,Char) a)])])

else

ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> []))

: (2.2@Float, 'b'@Char)

(: (2.42@Float, 'c'@char)

(case (if (case x[('o'@Char, a[(\*@Float 2.42@Float 1.1@Float , succ@Char 'c'@char)])] of

(\_ , y'') -> case y'' of

( y , \_ ) -> <@Float 0@Float y)

then

(: x ys[myFilt f' (myZip [] (enumFrom@(Float,Char) a))])

else

ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> []))

: (2.2@Float, 'b'@Char)

(: (2.42@Float, 'c'@char)

(case (if (case a[(\*@Float 2.42@Float 1.1@Float , succ@Char 'c'@char)] of

( y , \_ ) -> <@Float 0@Float y)

then

(: ('o'@char, a) ys[myFilt f' (myZip [] (enumFrom@(Float,Char) a))])

else

ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> []))

: (2.2@Float, 'b'@Char)

(: (2.42@Float, 'c'@char)

(case (if (<@Float 0@Float t[\*@Float 2.42@Float 1.1@Float])

then

(: ('o'@char, a[(t , succ@Char 'c'@char)])

ys[myFilt f' (myZip [] (enumFrom@(Float,Char) a))])

else

ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> []))

: (2.2@Float, 'b'@Char)

(: (2.42@Float, 'c'@char)

(case (if (<@Float 0@Float 2.6620002@Float)

then

(: ('o'@char, a[(2.6620002@Float , succ@Char 'c'@char)])

ys[myFilt f' (myZip [] (enumFrom@(Float,Char) a))])

else

ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> []))

{-

da qui in poi abbrevio `2.6620002` con `2.662`

-}

: (2.2@Float, 'b'@Char)

(: (2.42@Float, 'c'@char)

(case (if True

then

(: ('o'@char, a[(2.662@Float , succ@Char 'c'@char)])

ys[myFilt f' (myZip [] (enumFrom@(Float,Char) a))])

else

ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> []))

: (2.2@Float, 'b'@Char)

(: (2.42@Float, 'c'@char)

(case (: ('o'@char, a[(2.662@Float , succ@Char 'c'@char)])

ys[myFilt f' (myZip [] (enumFrom@(Float,Char) a))]) of

: x xs -> : (snd x) (myMap snd xs)

[] -> []))

: (2.2@Float, 'b'@Char)

(: (2.42@Float, 'c'@char)

(: (snd ('o'@char, a[(2.662@Float , succ@Char 'c'@char)]))

(myMap snd (myFilt f' (myZip [] (enumFrom@(Float,Char) a))))))

{-

viene forzata la valutazione completa

-}

: (2.2@Float, 'b'@Char)

(: (2.42@Float, 'c'@char)

(: a[(2.662@Float , succ@Char 'c'@char)]

(myMap snd (myFilt f' (myZip [] (enumFrom@(Float,Char) a))))))

: (2.2@Float, 'b'@Char)

(: (2.42@Float, 'c'@char)

(: (2.662@Float, 'd'@char)

(myMap snd (myFilt f' (myZip [] (enumFrom@(Float,Char) (2.662@Float, 'd'@char)))))))

{-

quarta iterazione

-}

: (2.2@Float, 'b'@Char)

(: (2.42@Float, 'c'@char)

(: (2.662@Float, 'd'@char)

(case (myFilt f' (myZip [] (enumFrom@(Float,Char) (2.662@Float, 'd'@char)))) of

: x xs -> : (snd x) (myMap snd xs)

[] -> [])))

: (2.2@Float, 'b'@Char)

(: (2.42@Float, 'c'@char)

(: (2.662@Float, 'd'@char)

(case (case (myZip [] (enumFrom@(Float,Char) (2.662@Float, 'd'@char))) of

[] -> []

: x xs -> if (f' x) then (: x ys[myFilt p xs]) else ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> [])))

: (2.2@Float, 'b'@Char)

(: (2.42@Float, 'c'@char)

(: (2.662@Float, 'd'@char)

(case (case (case [] of

[] -> []

: x xs -> case (enumFrom@(Float,Char) (2.662@Float, 'd'@char)) of

[] -> []

: y ys -> : (x,y) (myZip xs ys)

\_ -> error "ouch !!"

\_ -> error "ouch !!"

) of

[] -> []

: x xs -> if (f' x) then (: x ys[myFilt p xs]) else ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> [])))

: (2.2@Float, 'b'@Char)

(: (2.42@Float, 'c'@char)

(: (2.662@Float, 'd'@char)

(case (case [] of

[] -> []

: x xs -> if (f' x) then (: x ys[myFilt p xs]) else ys

) of

: x xs -> : (snd x) (myMap snd xs)

[] -> [])))

: (2.2@Float, 'b'@Char)

(: (2.42@Float, 'c'@char)

(: (2.662@Float, 'd'@char)

(case [] of

: x xs -> : (snd x) (myMap snd xs)

[] -> [])))

: (2.2@Float, 'b'@Char)

(: (2.42@Float, 'c'@char)

(: (2.662@Float, 'd'@char)

[]))

[(2.2,'b'),(2.42,'c'),(2.662,'d')]