**maRali rigis funqciebi**

**savarjiSoebi**

1. mocemulia siis [f x | x ← xs,p x] konstruqtori. rogor SeiZleba misi xelaxla warmodgena maRali rigis map da filter funqciebis gamoyenebiT?

2. gansazRvreT maRali rigis all, any, takeWhile da dropWhile funqciebi standartul prelude failSi mocemuli maTi aRwerebis gamouyeneblad.

3. xelaxla gansazRvreT map f da filter p funqciebi foldr-is gamoyenebiT.

4. foldl funqciis saSualebiT gansazRvreT dec2int :: [Int] → Int funqcia, romelic gardasaxavs aTobiT ricxvs erT mTel ricxvad. magaliTad:

> dec2int [2, 3, 4, 5] 2345

5. axseniT, ratom aris Semdegi gansazRvreba dauSvebeli:

sumsqreven = compose [sum, map (↑2), filter even ]

6. standartuli prelude failis gamouyeneblad gansazRvreT maRali rigis sabiblioTeko curry funqcia, romelic gardaqmnis funqcias wyvilebze karirebul funqciad da, piriqiT, gansazRvreT uncurry funqcia, romelic orargumentian karirebul funqcias aqcevs funqciad wyvilebze.

rCeva: upirveles yovlisa CawereT orive funqciis tipi.

7. maRali rigis unfold funqcia, romelic siis mosamzadeblad rekursiis martivi Sablonis inkafsulirebas axorcielebs, Semdegi saxiT SeiZleba ganisazRvros:

unfold p h t x | p x = [] | otherwise = h x : unfold p h t (t x)

amrigad, unfold p h t funqcia qmnis cariel sias, Tu p predikati WeSmaritia argumentisaTvis, xolo winaaRmdeg SemTxvevaSi qmnis aracariel sias h funqciis

gamoyenebiT, romelic Tavs (ingl. head) iZleva, da t funqcias meore argumentis Sesaqmnelad, romelic rekursiulad muSavdeba imave gziT siis kudis (ingl. tail) sawarmoeblad. magaliTad, int2bin funqcia SeiZleba ufro kompaqturadac Caiweros unfold funqciis gamoyenebiT Semdegnairad:

int2bin = unfold (== 0) (`mod`2) (`div`2)

gansazRvreT xelaxla chop8, map f da iterate f funqciebi unfold funqciis gamoyenebiT.

8. ganaxorcieleT striqonis gadamcemi programis modificireba gadacemis martivi Secdomebis gamosavlineblad luwobis bitebis gamoyenebiT. luwobis bitebis arsi aseTia. yoveli rvaTanrigiani orobiTi ricxvi kodirebis procesSi grZeldeba luwobis erTi bitiT, sadac Tavsdeba erTiani, Tu ricxvi Seicavs erTianebis kent raodenobas, xolo winaaRmdeg SemTxvevaSi ganuldeba. Tavis mxriv, yoveli cxraTanrigiani orobiTi ricxvi, romelic dekodirebisas gamoiyeneba, mowmdeba. Semowmebis arsi martivia: Tu orobiTi ricxvis pirvel rva TanrigSi (e.w. baitSi ) aRmoCndeba, rom erTeulovani bitebis raodenoba luwia, xolo luwobis damatebiTi mecxre biti Seicavs erTians, es imas niSnavs, rom gaCnda Secdoma.

rCeva: sabiblioTeko error :: String → a funqcia amTavrebs gamoTvlas da gamoaqvs ekranze mocemuli striqoni rogorc Setyobineba Secdomis Sesaxeb.

**maRali rigis funqciebi**

**amoxsnebi**

**savarjiSo 1**

map f (filter p xs)

**savarjiSo 2**

all p = and ◦ map p

any p = or ◦ map p

takeWhile \_ [] = [] takeWhile p (x : xs) | p x = x : takeWhile p xs | otherwise = []

dropWhile \_ [] = [] dropWhile p (x : xs) | p x = dropWhile p xs | otherwise = x : xs

**savarjiSo 3**

map f = foldr (λx xs → f x : xs) []

filter p = foldr (λx xs → if p x then x : xs else xs) []

**savarjiSo 4**

dec2nat = foldl (λx y → 10 ∗ x + y) 0

**savarjiSo 5**

yvela Semadgenel funqcias erTi da igive tipi ar aqvs. magaliTad:

sum :: [Int] → Int

map (↑2) :: [Int] → [Int]

filter even :: [Int ] → [Int]

**savarjiSo 6**

curry :: ((a, b) → c) → (a → b → c) curry f = λx y → f (x , y)

uncurry :: (a → b → c) → ((a, b) → c) uncurry f = λ(x , y) → f x y

**savarjiSo 7**

chop8 = unfold null (take 8) (drop 8)

map f = unfold null (f ◦ head) tail

iterate f = unfold (const False) id f

**savarjiSo 8**

encode :: String → [Bit] encode = concat ◦ map (addparity ◦ make8 ◦ int2bin ◦ ord)

decode :: [Bit] → String decode = map (chr ◦ bin2int ◦ checkparity) ◦ chop9

addparity :: [Bit] → [Bit] addparity bs = (parity bs) : bs

parity :: [Bit] → Bit parity bs | odd (sum bs) = 1 | otherwise = 0 chop9 :: [Bit] → [[Bit]] chop9 [] = [] chop9 bits = take 9 bits : chop9 (drop 9 bits)

checkparity :: [Bit] → [Bit] checkparity (b : bs) | b == parity bs = bs | otherwise = error "parity mismatch"21

ingl. parity mismatch \_ luwobis Seusabamoba