

Forritunarmál Einstaklingsverkefni 5

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```
;; Notkun: (realpowrecursive x y)
;; Fyrir: x er tala, y er heiltala, y >= 0
;; Gildi:  $x^y$ 
;;
;; Við nýtum okkur hér að ef y er slétt,
;; þá getum við skrifað  $(x^2)^{\{y/2\}}$  en ef
;; y er oddatala, þá getum við einnig skrifað
;;  $x(x^2)^{\{(y-1)/2\}}$ .
(define (realpowrecursive x y)
  (if (= y 0)
      1.0
      (if (= (remainder y 2) 0)
          (realpowrecursive (* x x) (/ y 2))
          (* x (realpowrecursive (* x x) (/ (- y 1) 2)))
      )
  )
)
```

```
> (define (realpowrecursive x y)
  (if (= y 0)
      1.0
      (if (= (remainder y 2) 0)
          (realpowrecursive (* x x) (/ y 2))
          (* x (realpowrecursive (* x x) (/ (- y 1) 2)))
      )
  )
)
(realpowrecursive 1.2 5)
(realpowrecursive 1.0000000001 10000000000)
2.48832
2.7182820434752477
```

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```
;; Notkun: (transpose-list z)
;; Fyrir: z er listi jafnlangra lista,
;; z=((x11 x12 ... x1N)
;; (x21 x22 ... x2N)
;; (x31 x32 ... x3N)
;; ...
;; (xM1 xM2 ... xMN)
;; )
;; Gildi: Listinn sem er byltingin
;; (transpose) af z, þ.e.
;; ((x11 x21 ... xM1)
;; (x12 x22 ... xM2)
;; (x13 x23 ... xM3)
;; ...
;; (x1N x2N ... xMN)
;; )
(define (transpose-list z)
  ;; Notkun: (head u)
  ;; Fyrir: u er listi (u1 u2 ... uN), N >= 0
  ;; Gildi: Ef N = 0 þá z[0][0], þ.e. x11,
  ;; annars u1
  (define (head u)
    (if (null? (car u))
        (car (car z))
        (car u)
    )
  )
  ;; Notkun: (tail u)
  ;; Fyrir: u er listi (u1 u2 ... uN), N >= 0
  ;; Gildi: (u2 u3 ... uN)
  (define (tail u)
    (if (null? (car u))
        u
        (cdr u)
    )
  )
  (if (or (null? z) (null? (car z)))
      '()
      (cons (map head z) (transpose-list (map tail z)))
  )
)
```

```

> (define (transpose-list z)
  (define (head u)
    (if (null? (car u))
        (car (car z))
        (car u))
    )
  (define (tail u)
    (if (null? (car u))
        u
        (cdr u))
    )
  (if (or (null? z) (null? (car z)))
      '()
      (cons (map head z) (transpose-list (map tail z)))
  )
)
(transpose-list '((1 2 3) (4 5 6)))
(transpose-list '(() ()))
(transpose-list '())
((1 4) (2 5) (3 6))
()
()
```