Heimadæmi 5 - Forritunarmál
(Einstaklingsverkefni)

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1.

```
;;Use: (RealPowLoop x y)
;;Pre: x is real, y is int
;;y >= 0
;;Value: x^y
(define (RealPowLoop x y)
  ;;Use: (helper p q r)
  ;;Pre: p and q are real
  ;;and r is an int
  ;;r >=0, x^y = p*q^r
  ;;Value: x^y
  (define (helper p q r)
    (if (= r 0)
        p
        (if (= (remainder r 2) 0)
            (helper p (* q q) (/ r 2))
            (helper (* q p) q (- r 1))
        )
    )
  )
  (helper 1.0 x y)
)
```

```
> (RealPowLoop (+ 1 (RealPowLoop 0.5 30)) (RealPowLoop 2 30))
2.718281808182473
```

2.

```
;; Use: (transpose-list z)
;; Pre: z is a list of lists that are
;; all equal in lengths,
;; z=((x11 x12 ... x1N)
;; (x21 x22 ... x2N)
;; (x31 x32 ... x3N)
;; .
;; .
;; .
;; (xM1 xM2 ... xMN)
;; )
;; Value: The list that is the transpose
;; of z, i.e.
;; ((x11 x21 ... xM1)
;; (x12 x22 ... xM2)
;; (x13 x23 ... xM3)
;; .
;; .
;; .
;; (x1N x2N ... xMN)
;; )
(define (transpose-list z)
  (if (or (null? z) (null? (car z)))
         '()
         (cons (map car z) (transpose-list (map cdr z)))

  )
)
```

```
> (transpose-list '((10 9 8 7 6 5 4 3 2 1)))
((10) (9) (8) (7) (6) (5) (4) (3) (2) (1))
> (transpose-list '((1 2 3) (4 5 6)))
((1 4) (2 5) (3 6))
> (transpose-list '(()))
()
```