BINARY SEARCH IN SCHEME by MARCEL GOH.

(ON SORTED LIST)

(W/O MEMOS)

3 JULY 2018

START: 18:49

END: 19:33

```
(DEFINE (BINARY ITEM LIST)  ; RETURNS INDEX OF ITEM IN LIST
  (DEFINE (NTH N LIST)  ; RETURNS ELEMENT OF LIST AT INDEX N
    (IF (= N 0) (CAR LIST) (NTH (- N 1) (CDR LIST))))
  (DEFINE (BEFORE N LIST)  ; RETURNS SUBLIST BEFORE INDEX N
    (IF (= N 0) '() (CONS (CAR LIST) (BEFORE (- N 1) (CDR LIST)))))
  (DEFINE (AFTER N LIST)  ; RETURNS SUBLIST AFTER INDEX N
    (IF (= N 0) (CDR LIST) (AFTER (- N 1) (CDR LIST))))
  (DEFINE (SEARCH ITEM LIST ADD)  ; ADD IS OFFSET FROM START OF
    (LET ((MID (FLOOR (/ (LENGTH LIST) 2))))  ; ORIGINAL LIST
      (COND ((NULL? LIST) FALSE)
            ((= ITEM (NTH MID LIST))
             (+ ADD MID))
            ((< ITEM (NTH MID LIST))
             (SEARCH ITEM (BEFORE MID LIST) ADD))
            ((> ITEM (NTH MID LIST))
             (SEARCH ITEM (AFTER MID LIST) (+ ADD MID 1))))))  ; (ONE)
  (SEARCH ITEM LIST 0))
```