**TABLE DATA STRUCTURE**

\[
\text{TABLE} = \{(\text{entry}_1, \text{entry}_2, \ldots)\}
\]

\[
\text{ENTRY} = (\{\text{variable-list}\}, \{\text{value-list}\})
\]

\[
\text{TABLE} = \left(\left(\left(a, b, c\right), \left(1, 2, 3\right)\right), \left(p, q, r\right), \left(a, b\right)\right)
\]

\[
\ldots
\]

\[
\left(a\right), \left(\left(x, y\right)\right)
\]

---

**Block Structure**

1. DECL. a
2. DECL. p, q
3. DECL. a, b, c

**Nested procedure calls**
(define look-up-in-entry
  (lambda (name entry)
      (lookup-in-entry-help name
           (first entry)
           (second entry)
      )
  )
)

(define lookup-in-entry-help
  (lambda (name names values)
      (cond
        ((null? names) 'FAIL)
        (else (lookup-in-entry-help name
                                    (car names)
                                    (car values)))
        (else (lookup-in-entry-help name
                                     (cdr names)
                                     (cdr values))
      ))
  )
)
Examples

name = ab
names = (a b ab)
values = (1 (1 2) (1 2 3))
Result = (1 2 3)

name = P
names = (a b ab)
values = (1 (1 2) (1 2 3))
Result = FAIL

Assume:
- \text{len}(\text{names}) = \text{len}(\text{values})
- No duplication of names or earlier value dominates
(define lookup_in_table
(lambda (name table)
  (if (null? table) 'FAIL
   (let ((temp (lookup_in_entry
                 name
                (car table))
   )
  )
   (if (eq? temp 'FAIL
    (lookup_in_table
      name
      (cdr table)
    )
   )
   temp
  )))
)
)
PROBLEMS

- Normally, action to be performed when the search fails depends on the context of the call. (cf. EXCEPTIONS)
  - Error Message
  - Default Value
  - FAIL itself cannot be a legal result!

After the call returns, we need a TEST to determine whether the search succeeded or failed.
Introducing "Context of the Call" (p 18)

("Continuation")

(define lookup-in-entry-clambda (name entity entry)

  (lookup-in-entry-help
   name (first entry)
   (second entry) entry-f)
)

(define lookup-in-entry-help-clambda (name names values entry-f)

  (and
    (null? names) (entry-f name)
    (eq? (car names) name)
    (car values)
    (else
      (lookup-in-entry-help
       name (cdr names) entry-f)
       (cdr values)
      )
    )
  )
)
Empty Table: ()

Extend Table: \[ \begin{align*}
&\text{entry} \\
&\downarrow \\
&\left(\text{cons entry table}\right)
\end{align*}\]

\[
\text{(define lookup-in-table (lambda (name table table-f))}
\]

\[
\text{(if (null? table)}
\]

\[
\text{(table-f name)}
\]

\[
\left(\text{lookup-in-entry name}}
\]

\[
\text{(car table)}
\]

\[
\text{(lambda (name)}
\]

\[
\left(\text{lookup-in-table name}}
\]

\[
\text{(cdr table)}
\]

\[
\text{table-f}
\]

\[
\text{)}
\]

\[
\text{)}
\]