CS3L:
Introduction to Symbolic Programming

Lecture 19:
HOF Problems

Summer 2008

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Announcements

- Midterm two Tuesday July 29th
  - This one will probably be harder than the first
- Colleen will be out of town Thurs-Monday
- Homework
  - Miniproject 3 started yesterday!
  - Due Friday July 25th at 11:59 pm
- Today is Gilbert's 7,000th day! And we're having a surprise party for him!

Today

- Problem: **`Successive-concatenations`**
- Which HOFs should I use?
- Work on the mini-project
  - Let me know if you don't have a partner and want one

Successive Concatenations

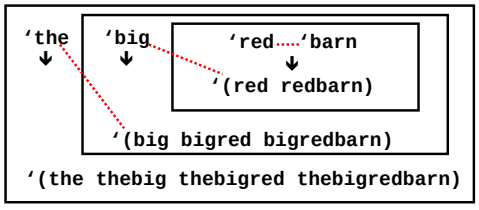
```
(sc '(a b c d e))
➔  (a ab abc abcd abcde)

(sc '(the big red barn))
➔ (the thebig thebigred thebigredbarn)
```

```
(define (sc sent)
   (accumulate
      (lambda ??
         )
      sent))
```

Successive Concatenations

`(accumulate (lambda () …) '(the big red barn)`

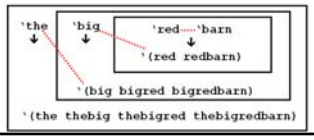


Successive Concatenations

(accumulate (lambda () …) '(the big red barn)

(lambda (new-wd so-far)
(every
(lambda (wd) (word new-wd wd))
(se "" so-far)))

(proc 'big '(red redbarn)) ➔ '(big bigred bigredbarn)



Successive Concatenations

```
(sc '(a b c d e))
➔  (a ab abc abcd abcde)

(sc '(the big red barn))
➔ (the thebig thebigred thebigredbarn)

(define (sc sent)
  (accumulate
    (lambda (new-wd so-far)
          (every
             (lambda (wd) (word new-wd wd))
             (se "" so-far))
    sent))
```

accumulate

(accumulate *procedure sent*)

- *procedure*
  - a procedure that takes in **two arguments**
  - a procedure that combines things together
- *sent*
  - a sentence with 1 or more words
  - a word with 1 or more letters

every

(every *procedure sent*)

- *procedure*
  - a procedure that takes in **one argument**
  - a procedure that returns a word or a sentence
- *sent*
  - a sentence with 0 or more words
  - a word with 0 or more letters

keep

(keep *procedure sent*)

- *procedure*
  - a procedure that takes in **one argument**
  - a procedure that returns #t or #f
- *sent*
  - a sentence with 0 or more words
  - a word with 0 or more letters

Which HOFs would you use?

- Capitalize-proper-names
  `(c-p-n '(mr. smith goes to washington))`
  `➔ (mr. Smith goes to Washington)`

- Every
- Keep
- Accumulate

Which HOFs would you use?

- Longest Word
  `(longest-word '(have a great week))` ➔ `great`

- Every
- Keep
- Accumulate

Which HOFs would you use?

- Count-if odd?

```
(count-if odd? '(1 2 3 4 5)) ➔ 3
(count-if odd? '(1 2 3 4 2)) ➔ 2
```

- Every
- Keep
- Accumulate

Which HOFs would you use?

- Count-vowels-in-each

```
(c-v-i-e '(good luck on tuesday))
    ➔ (2 1 1 3)
```

- Every
- Keep
- Accumulate

Which HOFs would you use?

- Squares-greater-than-100

```
(s-g-t-100 '(2 9 13 16 9 45))
                ➔ (169 256 2025)
```

- Every
- Keep
- Accumulate