CS 61AS 2011

Quiz 0.3b

1. (4 points) Write a predicate is-balanced? that takes in a word of ones and zeros and returns true if the number of zeros equals the number of ones. For example:

> (is-balanced?‘100)

#f

> (is-balanced?‘1010)

#t

Hint: Use a helper procedure.

(define (count-one wd)

(cond ((empty? wd) 0)

((= (first wd) 1) (+ 1 (count-one (bf wd))))

(else (count-one (bf wd)))))

(define (is-balanced? wd)

(= (count-one wd) (- (count wd) (count-one wd))))

2. (4 points) Write a procedure position that given a sentence and a word returns the spot in the sentence that the word occurs (starting at 0) or false if the word is not found. For example:

> (position ‘recursion ‘(recursion is fun))

0

> (position ‘two ‘(one two three))

1

>(position ‘d ‘(a b c))

#f

(define (position wd sent)

(cond ((not (member? wd sent)) #f)

((equal? (first sent) wd) 0)

(else (+ 1 (position wd (bf sent))))))

3. (2 points) You are writing a function to compute the nth fibonacci number and have found the recursive step:

(+ (fibonacci (- n 1)) (fibonacci (- n 2)))

Now for what values of n should you evaluate to your base case instead of the recursion?

Hint: fibonacci of a negative number does not exist.

You should have a base case for when n=0 and n=1.