CS 61A Structure and Interpretation of Computer Programs

Spring 2017

Discussion Quiz 8

1. (1.5 points) Scheme Primer (Conceptual)

(a) Describe all interpretations of Scheme parentheses that you can think of (in other words, say you see some parentheses... what could their meaning be?).

(b) Do you enjoy counting parentheses? Circle one: Yes

(c) What is a symbol in Scheme?

2. (2 points) WWSP?

```
scm> '((list 2 3))
```

```
scm> (list '(2 3))
```

```
scm> (define x (+))
x
scm> (define y +)
y
scm> (x 3 4)
```

```
scm> (y 3 4)
```

3. (2.5 points) Box and Pointers

Draw box-and-pointer diagrams for each of the following Scheme lists.

```
scm> '(2 . 3 4)
```

```
scm> (cons (list '(two) '((3)) nil) 4)
```

```
scm> (cons 2 '(list nil))
```

```
scm> (list (append '(2) '(3) nil) 4)
```

```
scm> '(2 . (3 . (4)))
```

4. (4 points) Last One

Write a function `take` that takes in a list `s` and a positive number `n`, and returns a list `t` such that `(car t)` is the first `n` elements of `s` and `(cdr t)` is the remaining elements of `s`. If `n` is greater than the length of `s`, `(car t)` should be `s` and `(cdr t)` should be `nil`.

```
(define (take s n)
```

```
)
```

Example usage:

```
scm> (define a (take '(1 2 3) 2))
scm> (car a)
(1 2)
scm> (cdr a)
(3)
scm> (define b (take '(1 2 3) 4)) ; n > (length s)
scm> (car b)
(1 2 3)
scm> (cdr b)
()
```