

CSE 341 — More Scheme Discussion Questions

1. What is the value of x and y after evaluating the following expressions?

```
(a) (define x '(1 2 3 4))
     (define y x)
     (set-car! (cdr x) 100)

(b) (define x '(1 2 3 4))
     (define y x)
     (set! x '(100 200))
```

2. Draw a box-and-arrow diagram of the value of x after evaluating the following:

```
(define x '(1 2 3 4))
(set-car! x x)
(set-cdr! x ())
```

3. Suppose that we define our own version of the map function in Scheme:

```
(define (mymap f x)
  (if (null? x) ()
      (cons (apply f (list (car x))) (mymap f (cdr x)))))
```

Now consider the following use of mymap:

```
(let ((x 100))
  (mymap (lambda (y) (+ x y)) '(1 2 3 4)))
```

Do we get an error, because x in the lambda is bound to the list (1 2 3 4) and then to its cdrs? Or does this work somehow? Why? If it evaluates without an error, what is the result?

4. What is the value of the final Scheme expression?

```
(define (test n)
  (if (> n 10)
      (lambda (i) (+ i n))
      (test (+ n 4))))

((test 0) 1000)
```