CSE 341 — Racket Discussion Questions

1. What do the following Racket expressions evaluate to?

   (a) `(* 2 (+ 4 5))`

   (b) `(= 3 (+ 1 3))`

   (c) `(car '(elmer fudd daffy duck))`

   (d) `(cdr '(elmer fudd daffy duck))`

   (e) `(and (= 1 2) (= 10 (/ 1 0)))`

2. Find the squid! For each of the following variables, write an expression that picks out the symbol `squid`. For example, for this definition: `(define x '(squid clam octopus))` the answer is `(car x)`.

   (a) `(define y '(clam squid octopus))`

   (b) `(define z '(clam starfish (squid octopus) mollusc))`

3. Define a Racket function to find the average of two numbers.

4. Define a Racket function `mymax` to find the maximum of two numbers.

5. Suppose we evaluate the following Racket expressions:

```
(define x '(snail clam))
(define y '(octopus squid scallop))
```

   Draw box-and-arrow diagrams of the result of evaluating the following expressions. What parts of the list are created fresh, and which are shared with the variables `x` and `y`?

   (a) `(cons 'geoduck x))`

   (b) `(cons y y)`

   (c) `(append x y)`

   (d) `(cdr y)`

6. Define a recursive function `sum` to find the sum of the numbers in a list.

7. Define a tail recursive version of `sum`. (Define an auxiliary function if needed.)

8. What is the result of evaluating the following Racket expressions?

   (a)
```
(let ((x (+ 2 4))
      (y 100))
   (+ x y))
```

   (b)
```
(let ((x 100)
      (y 5))
   (let ((x 1))
      (+ x y)))
```

9. Define a function `mylength` to find the length of a list.