INSTRUCTIONS

- You have 10 minutes to complete this quiz.
- The exam is closed book, closed notes, closed computer, closed calculator.
- Mark your answers on the exam itself. We will not grade answers written on scratch paper.
- For multiple choice questions, fill in each option or choice completely.
  - □ means mark all options that apply
  - ○ means mark a single choice

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<td>Discussion Section</td>
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All the work on this exam is my own. (please sign)

0. Your thoughts? If Scheme was a character, what would it look like?
1. A Deep Problem

depth-squares, which takes a deep list of numbers and returns a list with each value squared, is given below.

```scheme
(define (deep-squares lol)
  (cond ((null? lol) '())
        ((list? (car lol))
         (cons (map square (car lol))
               (deep-squares (cdr lol)))))
        (else (cons (square (car lol))
                   (deep-squares (cdr lol))))))
```

For which of the following inputs will `deep-squares` not work as intended?

(a) `(deep-squares '())` ○ Works ○ Broken
(b) `(deep-squares '(1 (2 3) 4))` ○ Works ○ Broken
(c) `(deep-squares '(1 (2 3) ((4)) 5))` ○ Works ○ Broken

Which line number contains the bug?  ○ 1  ○ 2  ○ 3  ○ 4  ○ 5  ○ 6  ○ 7

2. ... That Factors Into Your Learning

Implement the `factors` procedure in Scheme, which takes an integer `n` that is greater than 1 and returns a list of all of the factors of `n` from 1 to `n - 1 in increasing order`. You may not need to use all the lines.

Hint: The built-in `modulo` procedure returns the remainder when dividing one number by the other.

```scheme
scm> (modulo 5 3)
2
scm> (modulo 14 2)
0

(define (factors n)
  (define (factors-helper i n)
    (if ________________________________
        nil
        ________________________________
        ________________________________
        ________________________________
        ________________________________
        ________________________________
        ________________________________
        ))
  (factors-helper ___________ ___________)
)
```

```scheme
scm> (factors 6)
(1 2 3)
scm> (factors 7)
(1)
scm> (factors 28)
(1 2 4 7 14)
```