CS 61A Structure and Interpretation of Computer Programs

Summer 2016

Quiz 7 Solutions

INSTRUCTIONS

- You have 25 minutes to complete this quiz.
- The exam is closed book, closed notes, closed computer, closed calculator.
- Mark your answers **on the quiz itself**. We will *not* grade answers written on scratch paper.

Last name	
First name	
Student ID number	
Instructional account (`cs61a-_`)	
BearFacts email (`_@berkeley.edu`)	
TA	
Name of the person to your left	
Name of the person to your right	
All the work on this exam is my own. **(please sign)**	

1. (5 points) This Factors Into Your Grade

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 only use the lines provided. You may not need to fill all the lines.

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

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

```
(define (factors n)
  (define (factors-helper i n)
    (if (= i n)
        nil
        (if (= (modulo n i) 0)
            (cons i (factors-helper (+ i 1) n))
            (factors-helper (+ i 1) n)
        )
    )
  )
  (factors-helper 1 n)
)

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