

## CS314 Fall 2018

### Assignment 6

#### Problem I – Scheme

Write Scheme programs that generate the following lists as output using only `cons` as the list building operator:

1. `'((c (e f (b))) g b)`
2. `'((g) (((h) i)) (a f)) d)`
3. A list `l` that contains three items: the atom `'g'`, the division operator `/`, and the atom `'6'` such that `((cadr l) 18 9)` evaluates to 2.

Note that `cadr` is composed of `car` and `cdr` such that `(cadr l) = (car (cdr l))`

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#### Problem II – Scheme

Write the following functions on lists in Scheme. The semantics of the functions is described through examples.

1. Get *n*th digit of an integer

```
(define getnthdigit
  (lambda (m n)
    ...))

...

(getnthdigit 32145 1) --> 5
(getnthdigit 32145 2) --> 4
```

Note: You can use Scheme build-in function `"modulo"` and `"floor"`.

```

2. (define rev
    (lambda (l)
      ...))
...
(rev '(e((b)(c d)((f)))))) --> '((((f))(d c)(b))e)

```

Note: Do not use the Scheme build-in function "reverse".

3. Position of first occurrence of  $k$  in list

```

(define positionof
  (lambda (k lst)
    ...))
...
(positionof 'e '(e f d c e f)) --> 1

```

Note: You may want to define a helper function

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