Review Questions

1. Remember that **and** in Scheme is a kind of expression. Write a *procedure* myAnd that takes any number of arguments and returns #t if all of those arguments evaluate to #t.

2. Remember apply-proc in our Minisheme interpreter. This took a procedure and zero or more literal arguments (such as numbers; not parse trees) and returned the result of applying the procedure to the arguments. Here is my code for this procedure:

```
(define apply-proc (lambda (p args)
        (cond
        [(prim-proc? p)
                   (apply-prim-proc p args)]
        [(closure? p)
                   (eval-exp (Body p)
                        (extended-env Params(p)
                                 (map box args)
                                 (Env p)))])))
```

How would this procedure change if we used dynamic binding rather than static binding?

3. Use foldl or foldr to write alternating-sum, a procedure that takes vector (a b c ... e) and produces

   a-b+c-d+e

Use foldl or foldr to write (rember-all a lat)

Use foldl or foldr to write (count a lat)

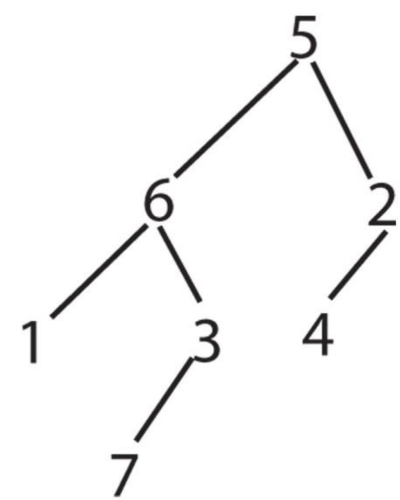
Or to write (index a lat)

4. Here is a binarya tree definition.

```
(define new-tree (lambda (value leftChild rightChild)
        (list 'tree value leftChild rightChild)))
```

You can make up getters for the three fields.

Write a procedure that returns a list of the values stored in the tree in a pre-order traversal (root, then everything in its left-most subtree, etc.) For example, with this tree:



you should return (5 6 1 3 7 2 4)

Write procedure (SameElts lat1 lat2) that returns #t if lat1 and lat2 have the same elements in the same multiplicities but not necessarily the same order.

7. Give a CPS version of (rember a lat). Remember that (rember a lat) removes the first instance of a from lat.

8. Give a Scheme expression that creates the stream Power$ that has powers of 2 and powers of 3, in increasing numerical order starting with 1. If you use print$ on your stream you should get the values (1, 2, 3, 4, 8, 9, 16, 27, 32...)

9. Here are some practice problems for Continuation-Passing Style :

A. Give a tail-recursive continuation-passing-style function **(rember-k a lat k)** that removes the first occurrence (only the first) of atom a from lat and then applies k to the result. So
(rember-k 'b '(a b a b a b b) (lambda (x) x)) returns '(a a b a b b)

B. Give a tail-recursive continuation-passing style function **(index-k a lat k)** that returns the 0-based index of the first occurrence of atom a in lat. So
(index-k 'b '(a b a b b)top) returns 1.

C. Give a tail-recursive continuation-passing-style function **(max-k L k)** that returns the largest element of the not-necessarily-flat list L of numbers. For example,
(max-k '(5 3 (4 7 2 (5) 1)) top) returns 7

D. Give a tail-recursive continuation-passing style function (**replace-k old new L k)** that replaces each instance of atom ***old*** with atom ***new*** in the general list L. For example,
(replace-k 'a 'x '(a b c (b c (a))) (lambda (x) x)) produces (x b c (b c (x)))