CS4182 Homework 10

1. Define E-expressions as follows:
    a. 2,3,4,…is an E-expression. These E-expressions are called atomic.
    b. If *x* and *y* are E-expressions, so is (*x*+*y*) and (*x***y*).

   E-expressions can be evaluated in the normal way. Show that the value of every E-expression is at least *2n*, where *n* is the number of atomic expressions.

2. Define strings of the form $a^m b a^m$ recursively. Use the generating rules to prove that all strings generated in this way have an odd number of characters.

3. Show that the minimum number of nodes in a binary tree of height *h* is *h*.

4. An *m*-ary tree is a tree where every node can have up to *m* children. Show that the maximum number of leaves in an *m*-ary tree of height *n* is $m^{(n-1)}$ for n>=1.