

Concepts and Definitions

1. What is mutual recursion?
2. When working with trees, what is (typically) the input to each mutually recursive procedure?
3. What is a binary tree? Which selectors do we use for it?
4. What is car/cdr recursion?

Working with Trees

1. Write a procedure `add-child-lengths` which takes as input a tree, and produces as output a new tree in which each datum is now a list whose first element is the original datum, and whose second element is the number of children it has. (You can find the length of a list using the `length` procedure.) Use mutual recursion here.
2. Write `sum-tree`, which takes as input a tree of numbers and produces as output the sum of all the numbers in the tree. You should use sequence operations (`map`, `filter`, `accumulate`) to implement it. No helper procedures allowed! (This is a hard question to start with, so you may want to first do it with mutual recursion, which is easier.)

