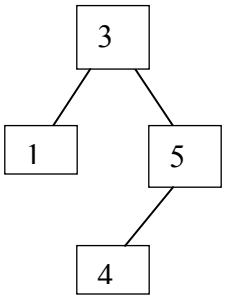
# COP4020 Homework Assignment 2

**For all assignments submitted via Blackboard:**

I. **Put your name and both usernames (FSU/Blackboard and CS) on the paper.**
II. **Write the question/problem verbatim in your paper, then give your answer/solution.**
III. **After completing the paper, save as a pdf file.**
IV. **Submit the pdf file to Blackboard using the Assignments tab.**
V. **There is no need to name the file anything other than "hw?.pdf" [? = assignment number], the submission will be associated with your username automatically.**

1. Which Scheme construct(s) will cause a Scheme program to depart from a purely functional programming model?
2. Explain the difference between a *functional* and a *special form* in Scheme.
3. We can implement a binary tree data structure by using lists with three elements: (value left-tree right-tree). For example, a tree with one node `R` (the root) is represented by `(R () ())`. (The empty lists represent the (empty) left and right child trees.) Given the tree:




   What is the list representation for this tree? Show the internal Scheme list nodes for this list, i.e. what is Scheme's internal data structure?
4. Why is Scheme called homoiconic?
5. Function pointers in C allow functions to be passed to other functions (also sometimes referred to as "callbacks"). In Scheme however, functions are simply passed as lambda abstractions. Is there an equivalent mechanism in C++? Lambda abstractions can be constructed at run time. What would be needed to support this in the C++ language?