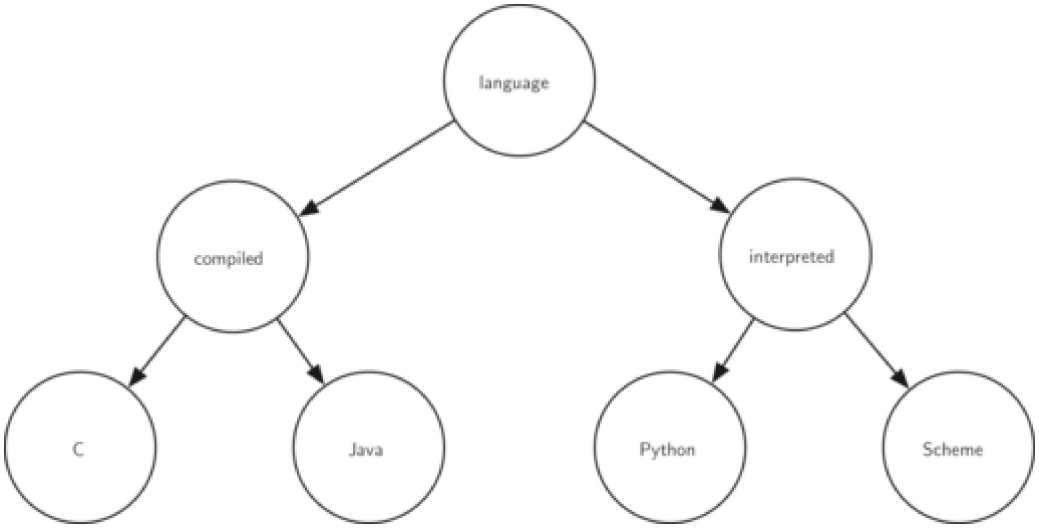
7.21. Discussion Questions

1. Draw the tree structure resulting from the following set of tree function calls:

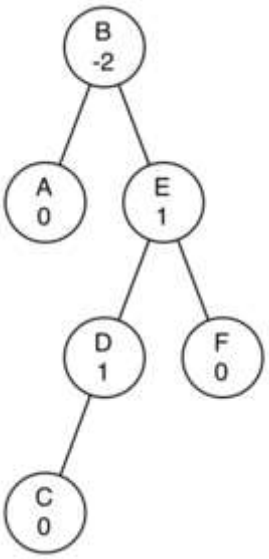
```
>>> r = BinaryTree(3)
>>> insertLeft(r,4)
[3, [4, [], []], []]
>>> insertLeft(r,5)
[3, [5, [4, [], []], []], []]
>>> insertRight(r,6)
[3, [5, [4, [], []], []], [6, [], []]]
>>> insertRight(r,7)
[3, [5, [4, [], []], []], [7, [], [6, [], []]]]
>>> setRootVal(r,9)
>>> insertLeft(r,11)
[9, [11, [5, [4, [], []], []], []], [7, [], [6, [], []]]]
```

2. Trace the algorithm for creating an expression tree for the expression $(4 * 8)/6 - 3$.
3. Consider the following list of integers: [1,2,3,4,5,6,7,8,9,10]. Show the binary search tree resulting from inserting the integers in the list.
4. Consider the following list of integers: [10,9,8,7,6,5,4,3,2,1]. Show the binary search tree resulting from inserting the integers in the list.
5. Generate a random list of integers. Show the binary heap tree resulting from inserting the integers on the list one at a time.
6. Using the list from the previous question, show the binary heap tree resulting from using the list as a parameter to the `buildHeap` method. Show both the tree and list form.
7. Draw the binary search tree that results from inserting the following keys in the order given: 68,88,61,89,94,50,4,76,66, and 82.
8. Generate a random list of integers. Draw the binary search tree resulting from inserting the integers on the list.
9. Consider the following list of integers: [1,2,3,4,5,6,7,8,9,10]. Show the binary heap resulting from inserting the integers one at a time.
10. Consider the following list of integers: [10,9,8,7,6,5,4,3,2,1]. Show the binary heap resulting from inserting the integers one at a time.
11. Consider the two different techniques we used for implementing traversals of a binary tree. Why must we check before the call to `preorder` when implementing as a method, whereas we could check inside the call when implementing as a function?
12. Show the function calls needed to build the following binary tree.

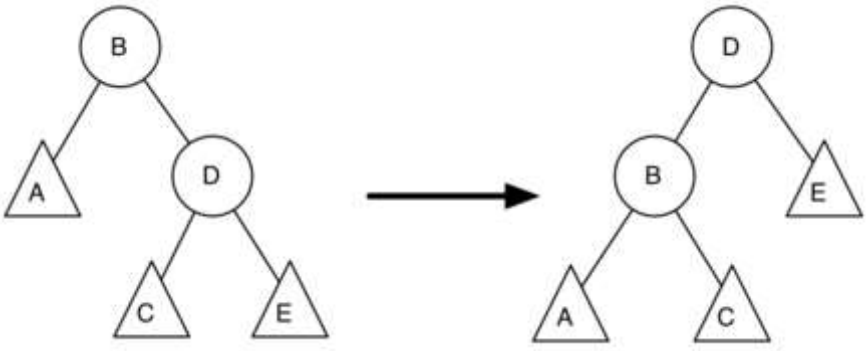
(KeyTerms.html) (Exercises.html)



13. Given the following tree, perform the appropriate rotations to bring it back into balance.



14. Using the following as a starting point, derive the equation that gives the updated balance factor for node D.



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