Answers to Self-Study Questions

Test Yourself #1

Question 1

```
    (1)            (2)            (3)            (4)
     A              10            cat            15
    / \             /            /   \          /  \
   B   C           5           bat   rat       5    22
                   /            /               \     \
                  -3          ant               20    30
```
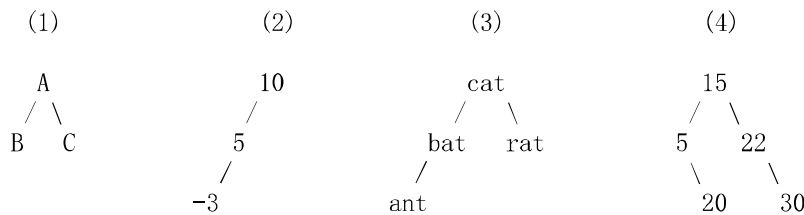
Tree 1 is not a BST because B is greater than A, yet B is in the left subtree of the node with key A (all keys in a node's left subtree should have keys that are **less** than the key in that node).
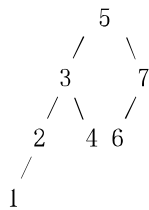Tree 4 is not a BST because 20 is greater than 15, yet 20 is in the left subtree of the node with key 15.
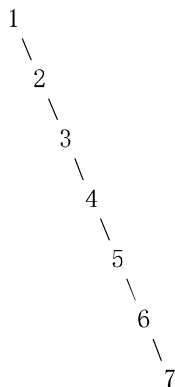
Question 2

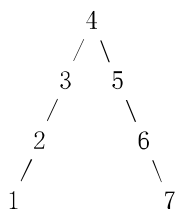An in-order traversal of a BST visits the nodes in sorted order.

Test Yourself #2

The BST that results from inserting the values 5 3 7 6 2 1 4 in that order is:

```
        5
       / \
      3   7
     / \ /
    2  4 6
   /
  1
```

The BST that results from inserting the values 1 2 3 4 5 6 7 in that order is:

```
  1
   \
    2
     \
      3
       \
        4
         \
          5
           \
            6
             \
              7
```

The BST that results from inserting the values 4 3 5 2 6 1 7 in that order is:

```
      4
     / \
    3   5
   /     \
  2       6
 /         \
1           7
```

Test Yourself #3

```
private K smallest(BSTnode<K> n)
// precondition: n is not null
// postcondition: return the smallest value in the subtree rooted at n

{
    if (n.getLeft() == null) {
        return n.getKey();
    } else {
        return smallest(n.getLeft());
    }
}
```

```
private K smallest(BSTnode<K> n)
// precondition: n is not null
// postcondition: return the smallest value in the subtree rooted at n


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