

Algorithms: Solutions 8

Problem 1

Give a nonrecursive algorithm that prints all elements of a binary search tree in sorted order.

```
ITERATIVE-TREE-WALK( $T$ )  
 $x \leftarrow$  TREE-MINIMUM( $root[T]$ )  
while  $x \neq$  NIL  
    do print  $key[x]$   
     $x \leftarrow$  TREE-SUCCESSOR( $x$ )
```

The running time is $\Theta(n)$, where n is the number of nodes in the tree.

Problem 2

Consider a binary search tree, and give an algorithm that prints all nodes whose keys are between two given values.

```
INORDER-RANGE-WALK( $x, min, max$ )  
if  $x \neq$  NIL  
    then if  $min \leq key[x]$   
        then INORDER-RANGE-WALK( $left-child[x], min, max$ )  
    if  $min \leq key[x] \leq max$   
        then print  $key[x]$   
    if  $key[x] \leq max$   
        then INORDER-RANGE-WALK( $right-child[x], min, max$ )
```

The running time is $O(h + k)$, where h is the height of the tree, and k is the number of nodes whose keys are between the two given values.