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Problem 1

[Interview Question] Devise an O(n) algorithm to accomplish this task: Given a none-empty string S of length n, S consists some words separated by spaces. We want to reverse every word in S. For example, given S = “we test coders”, your algorithm is going to return a string with every word in S reversed and separated by spaces. So the result for the above example would be “ew tset sredoc”.

```
public static String reverseByStack(String s) {
    StringBuilder stringBuilder = new StringBuilder();
    Stack<Character> characters = new Stack<Character>();
    char[] chars = s.toCharArray();
    for(int i=0;i<chars.length;i++) {
      if(' ' != chars[i]) {
        characters.push(chars[i]);
      } else {
        while (!characters.isEmpty()) {
          stringBuilder.append(characters.pop());
        }
        stringBuilder.append(' ');
      }
    }

    while (!characters.isEmpty()) {
      stringBuilder.append(characters.pop());
    }
    return stringBuilder.toString();
  }
```

Problem 2

BSTSort. The BST creation process takes O(nlogn)(?), the output process running time is O(n).

Problem 3

For each integer n = 1, 2, 3,..., 7, determine whether there exists a red-black tree having exactly n nodes, with all of them black. Fill out the chart below to tabulate the results:

Num nodes n	Does there exist a red-black tree with n nodes, all of which a
1	Yes

Num nodes n	Does there exist a red-black tree with n nodes, all of which a
2	No
3	Yes
4	No
5	No
6	No
7	Yes

Problem 4

For each integer n = 1,2,3,..., 7, determine whether there exists a red-black tree having exactly n nodes, where exactly one of the nodes is red. Fill out the chart below to tabulate the results:

Num nodes n	Does there exist a red-black tree with n nodes, where exactly one of th
1	No
2	Yes
3	No
4	Yes
5	Yes
6	No

Num nodes n	Does there exist a red-black tree with n nodes, where exactly one of th
7	No