COMP 160 Object-oriented Programming

Lab 10

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Problem: Palindrome Reorder

You are given a string, your task is to find if this string can be reordered as a palindrome and if it is possible, print one of the possible reordered palindromes.

Example:
bbcca -> bcacb
abcd -> NO

Hint: Detect what makes up a palindrome and use a hashmap.

SOLUTION

- A string can be reordered to form a palindrome if and only if the number of letters with odd occurrences is 0 or 1. If there are two or more letters that occur an odd number of times, it is impossible to make it a palindrome.

- If we keep track of the number of letter occurrences in a hashmap, after traversing the string, we can easily detect the possibility of forming a palindrome.

- If it is possible to make it a palindrome, there are two things to consider:
  - Symmetrical letters must be the same.
  - If there is a letter with an odd occurrence, it must be in the middle.

BINARY SEARCH TREE

- A binary search tree (BST) is a structure that makes it easier to search for a number in an array.
- Nodes have two children: left and right.
- If not null, the left child is always smaller than its parent, and the right child is always larger than its parent.
- Since the average depth of a BST is log(n), most operations (search, insert, delete) have a time complexity of O(log n).

BINARY SEARCH TREE

Implement a binary search tree with these operations:

- Insert
- Remove
- Search
- Find minimum value
- Find maximum value