Congratulations! You passed!
TO PASS 1% or higher

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GRADE
100%

Interview Questions: Elementary Symbol Tables (ungraded)

TOTAL POINTS 4

1. **Java autoboxing and equals()**. Consider two `double` values `a` and `b` and their corresponding `Double` values `x` and `y`. **1 / 1 point**

   - Find values such that $(\texttt{a} == \texttt{b})$ is `true` but $\texttt{x.equals(y)}$ is `false`.
   - Find values such that $(\texttt{a} == \texttt{b})$ is `false` but $\texttt{x.equals(y)}$ is `true`.

   Note: these interview questions are ungraded and purely for your own enrichment. To get a hint, submit a solution.

   Correct
   Hint: IEEE floating point arithmetic has some peculiar rules for `0.0`, `-0.0`, and `NaN`. Java requires that $\texttt{equals()}$ implements an equivalence relation.

2. **Check if a binary tree is a BST.** Given a binary tree where each `Node` contains a key, determine whether it is a binary search tree. Use extra space proportional to the height of the tree. **1 / 1 point**

   Correct
   Hint: design a recursive function $\texttt{isBST(Node x, Key min, Key max)}$ that determines whether `x` is the root of a binary search tree with all keys between `min` and `max`.

3. **Inorder traversal with constant extra space**. Design an algorithm to perform an inorder traversal of a binary search tree using only a constant amount of extra space. **1 / 1 point**

   Correct
   Hint: you may modify the BST during the traversal provided you restore it upon completion.

4. **Web tracking.** Suppose that you are tracking n web sites and m users and you want to support the following API: **1 / 1 point**

   - User visits a website.
   - How many times has a given user visited a given site?

   What data structure or data structures would you use?

   Correct
   Hint: maintain a symbol table of symbol tables.