

List of preparatory/practice questions for the Online Test 1

The Online Test questions are different from the ones on this list.

Read and understand the code provided – it can help you during the Online Test. You may need to create helper/auxiliary methods such as (but not limited to): “find a node”, “the height of the tree”, “traversal algorithms”, etc. Do not limit yourself to this list of questions, create your own variations and practice!

Use the Test files to verify that your solution is working as expected (add other test cases).

Read the comments in the code, they may help you understand the code and develop your solution.

It is important to note that the online test questions are different from the ones on this list.

Q1 – BST

Given a binary search tree, implement a method to find the sum of the values of all the nodes that have an odd number of direct children. You can define additional methods of BST and Node classes to complete the task. The method signature is:

public Integer oddNodeSum()

Read and understand the code.

Q2 – BST

Given a binary search tree, implement a method to find the sum of the values of all the nodes that have an even number of direct children. Note that 0 is also an even number. You can define additional methods of BST and Node classes to complete the task. The method signature is:

public Integer evenNodeSum()

Read and understand the code.

Q3 - Red-Black Tree

Implement a checking function in Red-Black Tree to check if the following properties hold:

1. The root and leaf (NIL) nodes are black
2. If a node is red, then its parent is black

You can define additional methods if you need to implement testProp1 and testProp2 methods. The methods signatures are:

**public boolean testProp1()
public boolean testProp2()**

Read and understand the code.

Q4 - Red-Black Tree

Implement a function in Red-Black Tree to check if the following property hold:

1. All simple paths from any node x to a descendant leaf have the same number of black nodes. You can define additional methods if you need.

The methods signature is:

public boolean testProp3()

Read and understand the code.

Q5 – Software Testing / Branch Completeness

It is recommended that you test some methods for Branch Completeness. Create your own test class and check whether it is branch complete or not.