Hash table, Binary search tree, Red-black tree

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Questions

0.1 Hash tables

0.1.1 Create a hash table in Python, C, or C++. The hash table should have 4 functions at a minimum: insert(), search(), delete(), and a way to print out the hash table.

0.1.2 What is a hash function and why is it important to a hash table?

0.1.3 In what situations should we consider using a hash table?

0.2 Binary search trees

0.2.1 Create a binary search tree in one of the remaining two languages you did not use. The binary search tree should have 4 functions at a minimum: insert(), search(), delete(), and a way to print out the binary search tree.

0.2.2 What is a key in a binary search tree?

0.2.3 How is a key used to sort data in a binary search tree?

0.3 Red black trees

0.3.1 Modify your binary search tree to a red black tree using the same language you used for the binary search tree. The red black tree should include the same functions as the binary search tree with additional functions to balance the red black tree when a node is inserted or deleted.

0.3.2 What is the main difference between a binary search tree and a red black tree?

0.3.3 Name the properties that are required for to make a red black tree. Include the properties for a binary search tree as well. Also, give a short description of each property.