Quiz 1

This is the first of several Google Quiz to replace Midterm Exam by google multiple choice quizzes in combination with a take home exercise on November 5-6.

   True and Flase questions: Answer True or False to each question below. Answer true only if it is true as stated with no additional assumptions. Adding a short explanation will give you partial credit even if your answer is wrong. All questions have equal points.

First provide your Name and ID *

Rich Brower 007

The sum total height TH(N) and total depth TD(N) of N nodes in a binary tree is HN only if the tree is perfect.

False (I will accept True but there are few cases where it is false). Start with a perfect tree. Each node has a depth and height adding to H. The total. In general if you take out a node you N-1 nodes and you loose. The exceptionalities is a child exactly balance to H (N-1). This is the exception of a less than perfect tree that still satisfies HM.   If you take out the second child however then the parent also loose height and the total is reduce by H for the child and -1 for the parent so TH + TD is not equal to HN.

Given an array of N integers, the best algorithm has a worst case time to build the heap $\Theta(N\log(N))$.

False: As explained in class, putting all the nodes into the heap and then implementing heap order form the bottom is O(N).

It is possible to formulate Quick Sort to be worst case O(N log N) including the costof picking a suitable pivot.

True. The use of 5 row of N/5 recursively gives the exact median in O(N) so then worst case is O(N log N).

For the master equation T(n)=aT(n/b)+n^k with γ=log(a)/log(b) the solution is always a sum of terms powers n^γ and n^k.

False. If gamma = k, the master equation give T(n) = O(n log n).

Consider a binary search tree with n keys. Finding whether a key value is already in the tree can be done in O(log(n)).

False. The tree can be very imbalances so the search needs to go much farther down than O(log(n)). For example insert a sorted list will give a tree with only right or left children with total height O(N).

This form was created inside of Boston University.

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