

EL9343 Homework 6

Due: Oct. 20th 11:00 a.m.

1. Let the table have 9 slots, and let the hash function be $h(k) = k \bmod 9$. Demonstrate what happens when we insert the keys 10, 22, 35, 12, 1, 21, 6, 15, 36, 33 into a hash table with collisions resolved by chaining.
2. Suppose we use a hash function h to hash n distinct keys into an array T of length m . Assuming simple uniform hashing, what is the expected number of collisions?
3.
 - (a) Suppose you have two sequences, $\{24, 19, 12, 6, 24, 36, 40, 39\}$ and $\{6, 12, 24, 19, 39, 40, 36, 24\}$. You know the first one is generated from some BST A by pre-order tree walk, and the second one is generated from some BST B by post-order tree walk. Please draw all the possible BST A that can generate the sequence. Repeat that for BST B.
 - (b) If all the keys in a BST are distinct, can you draw a unique BST when only given its pre-order tree walk? If yes, please describe why; if no, find a counter-case.
4. For the binary search tree (BST) in pre-order as $\{8, 4, 16, 9, 19, 17, 22\}$. **Please first draw the BST**, then show the result of following operations (each operation is carried out on the result of the previous operation):
 - (a) Insert key 20;
 - (b) Then, delete key 8;
 - (c) Then, delete key 19;
 - (d) Finally, delete key 16.