**CS 3050 Homework # 3. Name :**

**Submitted to Blackboard, due at 11:59pm on Feb. 28, 2017.**

1. Demonstrate what happens when we insert the keys 3, 11, 80, 74, 92, 1024, 32, 59, 503, 293, 2010, 22, 104 into a hash table with collisions resolved by chaining. Let the table have 11 slots, and let the hash function be h(k) = k mod 11.

2. Consider a hash table of size m = 128 and a corresponding hash function h(k) = floor( m (kA mod 1) ) for A = (sqrt(5)-1)/2. Compute the locations to which the keys 1000, 1001, 1002, 1003, and 1004 are mapped..

3. Write pseudocode for HASH-DELETE as outlined in the textbook, and modify HASH-INSERT to handle the special value DELETED.

4. For the set A = {1, 2, 3, 5, 8, 13, 21} of keys, draw three binary search trees of different heights.

5. For a binary search tree T of n nodes, determine the number of internal nodes in O(n) running time.

(1) Give a recursive algorithm.

(2) Give a non-recursive algorithm.