Computer Science 245
Homework 7
Due 4/8/2015

1. The questions below refer to the hash table that was obtained by hashing the following keys using the hash function h(k) = k mod 11:

   92, 49, 15, 17, 48, 14, 3, 12

   (a) Sow the resulting hash table assuming open hashing and that the collisions are handled with separate chaining method. (2 points)

   (b) Show the resulting hash table from the previous exercise assuming closed hashing and that the collisions are handled by linear probing approach. (2 points)

   (c) Show what will happen when the same keys are hashed using the quadratic probing. *Explain your answer.* (3 points)

2. Assume that Disjoint Sets ADT is implemented using an array of parent indices. Consider the following operations:

   - makeSets(10)
   - Union(1,2)
   - Union(3,4)
   - Union(1,3)
   - Union(4,5)
   - Union(5,6)
   - Union(6,7)
   - Union(8,9)

   (a) Show the resulting parent array after the operations above, assuming that no heuristics are used, and we always have the first argument to Union point to the second argument in a Union. (1 point)

   (b) Show the resulting parent array after the operations above, as- suming Union by Rank heuristic is used. (Please note that there is no path compression.) (2 points)