Assignment #5

Due Dates: Saturday, Oct 3 at 11:59pm

Submit: eLearning

Late Policy: -10 points per hour late

Instructions: This is an individual assignment. Answers should be your own work.

Chapter 4, 5

10 points
1) Draw a red-black tree for the following values inserted in this order. Illustrate
    each operation that occurs:

        k w o s y t p r

10 points
2) Draw a red-black tree for the following values inserted in this order. Illustrate
    each operation that occurs:

        30 20 11 28 16 13 55 52 26 50 87

10 points
3) Draw a 2-3-4 B-tree that corresponds to your red-black tree in problem #2.

Use a tablesize of 13 for these hashing questions:

10 points
4) Given the input {3823, 8806, 8783, 2850, 3593, 8479, 1941, 4290, 8818, 7413}

   and a hash function h(x) = x mod 13, show the resulting separate chaining table.

10 points
5) Repeat #4 using open addressing with linear probing.

10 points
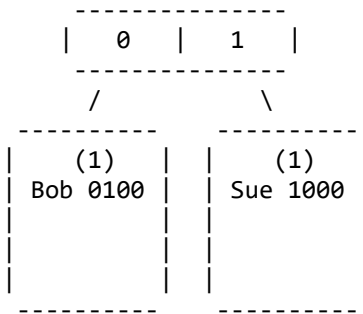6) Repeat #4 using open addressing with quadratic probing.

10 points
7) Repeat #4 using open addressing with double hashing where the second hash function
   is 11 - (x mod 11).

10 points
8) Suppose these names have the following hash values. Insert them into the extendible hash
   table shown below. Each leaf can only hold 4 entries. Note that the first two names
   have already been inserted. Illustrate each operation that occurs.

        Bob   0100
        Sue   1000
        Tim   1110
        Ron   0010
        Ann   1010
        Jan   1101
        Ben   0001
        Don   0101

```
    Tom    1111
    Sam    1011


            ----------------
           |   0   |   1   |
            ---------------
              /           \
        ----------     ----------
       |   (1)    |   |   (1)    |
       | Bob 0100 |   | Sue 1000 |
       |          |   |          |
       |          |   |          |
       |          |   |          |
        ----------     ----------
```

10 points
9) Using Cuckoo hashing, hash the following keys using the (h1,h2) pairs shown.

      A: 2,0
      B: 0,0
      C: 4,1
      D: 0,1
      E: 2,3

10 points
10) Using Hopscotch hashing with a max hop of 4, hash the following keys.

      A: 6
      B: 7
      C: 9
      D: 7
      E: 6
      F: 7
      G: 8

Submit to eLearning:
      hw5.doc (.doc can be .txt, .jpg, etc.)