FACSL

Fake American Computer Science League

2014-2015 **Contest #1 Practice**

Senior Division
Hashing

PROBLEM: We are preparing to use a hash table to store letters and want to get some statistics on how well our data can be stored in the table. We want to use the single chaining algorithm.

We will use the following table for hashing algorithm our letters: a=0, b=1, c=2, d=3, etc. There will be no duplicates. When a collision occurs, you can build a link from that node.

We will be interested in a few statistics regarding the constructed hash tables:

Collision count is the number of times an item is inserted into a space that is already occupied.

Collision rate is the number of collisions divided by the size of the input

Table mask is a representation of the table where x's are filled and -'s are empty.

Max chain depth is the largest distance in any individual chain in the hash table.

Load percentage is the number of spaces that are filled divided by the total number of spaces in the table.

INPUT:
There will be one line of input, containing a positive integer and a list of letters. The integer represents the initial capacity of the table to be created and the letters are to be put into the hash set.

OUTPUT:
For each input line print the collision count, the collision rate rounded to two decimal places, the table mask, the the max chain depth, and the load percentage rounded to zero decimal places.

SAMPLE INPUT	SAMPLE OUTPUT
1. 12, a, b, c, d, e, f, g, h, i, j	1. 0 2. .00 3. xxxxxxxxxx-- 4. 0 5. 83%
1. 3, a, c, f, i	1. 2 2. .50 3. x-x 4. 2 5. 67%
1. 1, a, b, c, d, e, f	1. 5 2. .83 3. x 4. 5 5. 100%

For the grade of this assignment, you will get:

5 points for the correct sample output (we pick one at random).
5 points for the secret data we never share.
2 points for valid test data you submit in the comments.

Curved at 71 + 2*score

DUE BEFORE CLASS ON TUESDAY, 11/18, NO EXCEPTIONS