CSC 212 Tutorial Solution

Hash

Problem 1

Linear Rehashing

	Hash	Probs
0	28	1
1	71	1
2	43	2
3	56	4
4	11	1
5	17	3
6	63	7

(No space for 6 and 7)

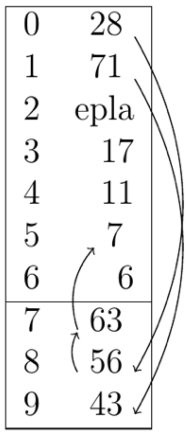
Key	28	71	43	11	56	17	63
Position	0	1	2	4	3	5	6
Number of probes	1	1	2	1	4	3	7

External Rehashing

0	$\rightarrow 28 \rightarrow 56 \rightarrow 63 \rightarrow 7$
1	$\rightarrow 71 \rightarrow 43$
2	
3	$\rightarrow 17$
4	$\rightarrow 11$
5	
6	$\rightarrow 6$

Key	28	71	43	11	56	17	63	6	7
Key position in the list (from 1)	1	1	2	1	2	1	3	1	4
Index of the list	0	1	1	4	0	3	0	6	0

Coalesced chaining



Key	28	71	43	11	56	17	63	6	7
Position	0	1	9	4	8	3	7	6	5
Index of next element	8	9	-1	-1	7	-1	5	-1	-1

Problem 2

H(1234) = (43 + 21 + 3) % 11 = 67 % 11 = 1

H(519) = (91 + 15 + 1) % 11 = 107 % 11 = 8

H(911) = (11 + 19 + 1) % 11 = 31 % 11 = 9

H(7346) = (64 + 37 + 4) % 11 = 105 % 11 = 6

H(0) = (0 + 0 + 0) % 11 = 0 % 11 = 0

H(999) = (99 + 99 + 9) % 11 = 207 % 11 = 9

H(99834) = (43 + 99 + 8) % 11 = 150 % 11 = 7

H(54) = (45 + 45 + 4) % 11 = 94 % 11 = 6

H(40015) = (51 + 04 + 0) % 11 = 55 % 11 = 0

0	**0**	**1**
1	1234	1
2	54	8
3	40015	4
4	empty	0
5	empty	0
6	7346	1
7	99834	1
8	519	1
9	911	1
10	999	2

Number of probes to search for 11 is 4.

Problem 3

```
public static int charHash(char[] k) {
    int hash = 0;
    for (char c : k) hash += c;
    return hash % 1000;
}
```