Universität Erlangen-Nürnberg
Department of Computer Science 7
Dr.-Ing. U. Klehmet
Introduction to Data Structures and Algorithms

Exercise sheet 9

Exercise 26:

The keys 89, 4, 36, 42, 51, 77, 5, 19 are inserted in that order into a hash table with 7 slots. The hash function used is *h(k) = k* mod *7*.
Show the final picture ! Are there collisions and if so, where?

Exercise 27:

Take letters of Latin alphabet as keys with subscripts such as A_1, B_2, C_3, R_{18} and Z_{26} where the subscripts mark

- the letter's position in alphabetical order, e.g. S_{19} for letter 'S' as the 19^{th} letter in the Latin alphabet
- hash-table T contains space for 7 entries, numbered from 0 to 6
- in the table the keys B_2, J_{10} and S_{19} are already inserted

Insert N_{14}, X_{24}, and W_{23} into the table T by algorithm HASH-INSERT with **Linear probing**. The auxiliary hash function $h' : U \rightarrow \{0,1,\ldots,m-1\}$ is defined by the Division method, where k in $h'(k)$ should be the subscript number of the letter.

	T
0	14777
1	
2	B_2
3	J_{10}
4	
5	S_{19}
6	

Exercise 28:

We have a hash table T of size m = 13 with the keys 79, 13, 69, 98, 72, and 50 already present in the corresponding table positions T[1], T[2] etc.

Insert the key 14 and then key 15 into the table T by use of algorithm HASH-INSERT with the open addressing method **Double hashing**. The auxiliary hash functions h_1 and h_2 are defined

as follows: $h_1(k) = k \bmod 13$ and $h_2(k) = 1 + (k \bmod 11)$

	T
0	
1	79
2	13
3	
4	69
5	98
6	
7	72
8	
9	
10	
11	50
12	