CS 301-01: Algorithm Design and Analysis

HW 3 (Given November 3, 2017; Due November 17, 2017)

This HW is worth 50 points

1. Implement a hash table with lists chaining. You are given the number of buckets m and hash function.

$$h(S) = \left(\sum_{i=0}^{|S|-1} S[i]x^i \mod p\right) \mod m \tag{1}$$

where S[i] is the ASCII code of the i-th symbol of S, p = 1 000 000 007 and x = 263. Your program should support the following kinds of queries:

• **add** string - insert *string* into the table. If there is already such string in the hash table, then ignore the query.

• **del** string - remove *string* from the table. If there is no such string in the hash table, then ignore the query.

• **find** string - output **yes** or **no** depending on whether the table contains the string or not.

• **check** i - output the content of i-th list in the table. Use spaces to separate the elements of the list. If the i-th list is empty, print a blank line.

When inserting a new string into a hash chain, you must insert in the beginning of the chain.

Input Format: First line contains m - the number of buckets. The next line contains the number of queries N. It's followed by N lines, each of them contains one query in the format described above.

Output Format: For each **find** and **check** query, print one result per line, in the same order as these queries are inputted.