

### **Lab 12 - Hash Table**

Implement a hash table of a given size using an array. Use the hashing function  $f(x) = x \bmod n$ , where  $x$  is the input and  $n$  is the size of the hash table.

Implement the following functions.

- 1) Insert a value.
- 2) Delete a value.
- 3) Check if a value is present.
- 4) Print the entire hash table.

#### **Input Format:**

The first line of the input contains a single integer  $N$ , which represents the size of the hash table to be implemented. Each line after that has one of the following operations.

- 0 - Exit the program
- 1  $x$  - Insert the value ' $x$ ' into the hash table. Use the above mentioned hashing function with  $x$  as the input to determine the index. Do not insert if the table is full. In case of collisions, insert the element in the next immediate free slot. Wrap around to check for free slots when you reach the end of the array.
- 2  $x$  - Delete the value ' $x$ ' if present in the hash table.
- 3  $x$  - Check if the value ' $x$ ' is present in the hash table.
- 4 - Print all the elements in the hash table in a space separated manner.

Note: The same element will not be inserted twice.

#### **Output Format:**

Output is required for two operations only.

If the operation is to check if an element is present (operation code 3), print "YES" if the element is present in the hash table. Otherwise print "NO".

If the operation is to print the elements in the hash table, print  $N$  space separated integers denoting the elements in the array. If a slot in the hash table does not contain any element, print -1.