CS 401 - Computer algorithms, Fall 2020, CS, UIC
**Programming assignment 1**
Instructor: Anastasios Sidiropoulos
Due date: September 15, 2020

Problem 1: A day at the beach.   In this problem we will implement the greedy algorithm that
we designed for the homework assignment.

A group of n people are lying on the beach. The beach is represented by the real line $\mathbb{R}$
and the location of the i-th person is some integer $x_i \in \mathbb{Z}$. Your task is to prevent people from
getting sunburned by covering them with umbrellas. Each umbrella corresponds to a closed interval
$I = [a, a + L]$ of length $L \in \mathbb{N}$, and the i-th person is covered by that umbrella if $x_i \in I$. Design a
greedy algorithm for covering all people with the minimum number of umbrellas.

For example, if the input is $x_1 = 1$, $x_2 = 3$, $x_3 = 5$, and $L = 2$, then an optimum solution is the
set of two umbrellas placed at positions 2 and 5, covering intervals $[1, 3]$ and $[4, 6]$.
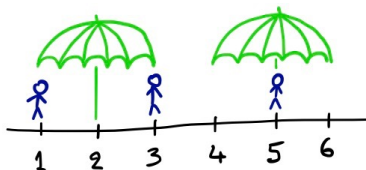
The input consists of a sequence of positive integers. The first number is L, followed by n,
followed by n numbers $x_1, \ldots, x_n$. The output of your algorithm should be the leftmost endpoints
of the umbrellas, sorted in increasing order.

Submission Details   Submit to Gradescope. Your file should be called `beach.py`. Input/Output
is through console (e.g. simply using `input` and `print` functions). Print each sorted endpoint on a
separate line. Please carefully follow these instructions because submissions will be automatically
graded. All test cases will be valid. You don't need to implement checks for invalid inputs.

Example 1:

Input:
2
3
1
5
3

Output:
1
5

Example 2:

Input:
4
4
1
5
6
10

Output:
1
6