

# Mousetrap

## Problem

Mousetrap is a simple card game for one player. It is played with a shuffled deck of cards numbered 1 through  $K$ , face down. You play by revealing the top card of the deck and then putting it on the bottom of the deck, keeping count of how many cards you have revealed. If you reveal a card whose number matches the current count, remove it from the deck and reset the count. If the count ever reaches  $K+1$ , you have lost. If the deck runs out of cards, you win.

Suppose you have a deck of 5 cards, in the order 2, 5, 3, 1, 4. You will reveal the 2 on count 1, the 5 on count 2, then the 3 on count 3. Since the value matches the count, you remove the 3 from the deck, and reset the count. You now have 4 cards left in the order 1, 4, 2, 5. You then reveal the 1 on count 1, and remove it as well (you're doing great so far!). Continuing in this way you will remove the 2, then the 4, and then finally the 5 for victory.

You would like to set up a deck of cards in such a way that you will win the game and remove the cards in increasing order. We'll call a deck organized in this way "perfect." For example, with 4 cards you can organize the deck as 1, 4, 2, 3, and you will win by removing the cards in the order 1, 2, 3, 4.

## Input

The first line of input gives the number of cases,  $T$ . Each test case starts with a line containing  $K$ , the number of cards in a deck. The next line starts with an integer  $n$ , which is followed by  $n$  integers ( $d_1, d_2, \dots$ ), indices into the deck.

## Output

For each test case, output one line containing "Case # $x$ : " followed by  $n$  integers ( $k_1, k_2, \dots$ ), where  $k_i$  is the value of the card at index  $d_i$  of a perfect deck of size  $K$ . The numbers in the output should be separated by spaces, and there must be at least one space following the colon in each "Case # $x$ :" line.

## Limits

Memory limit: 1GB.

### Small dataset (Test set 1 - Visible)

Time limit: 60 seconds.

$T = 100$ ,

$1 \leq K \leq 5000$ ,

$1 \leq n \leq 100$ ,

$1 \leq d_i \leq K$ .

### Large dataset (Test set 2 - Hidden)

Time limit: 180 seconds.

$T = 10$ ,

$1 \leq K \leq 1000000$ ,  
 $1 \leq n \leq 100$ ,  
 $1 \leq d_i \leq K$ .

Sample

Sample Input
2
5
5 1 2 3 4 5
15
4 3 4 7 10

Sample Output
Case #1: 1 3 2 5 4
Case #2: 2 8 13 4