

## Submissions

## Oversized Pancake Flipper

5pt	Correct 17785/21547 users correct (83%)
10pt	Time expired 17135 users attempted

## Tidy Numbers

5pt	Correct 22009/23716 users correct (93%)
15pt	Not attempted 19708 users attempted

## Bathroom Stalls

5pt	Not attempted 11517/13195 users correct (87%)
10pt	Not attempted 9050/10865 users correct (83%)
15pt	Not attempted 7286 users attempted

## Fashion Show

10pt	Not attempted 790/1915 users correct (41%)
25pt	Not attempted 661 users attempted

## Top Scores

FatalEagle	100
ACMonster	100
y0105w49	100
johngs	100
HellKitsune123	100
kyc	100
SergeyRogulenko	100
spnautilus	100
BudAlNik	100
mjy0724	100

## Problem C. Bathroom Stalls

Confused? Read the [quick-start guide](#).

Small input 1 5 points	<div>Solve C-small-1</div> <div>You may try multiple times, with penalties for wrong submissions.</div>
Small input 2 10 points	<div>You must solve small input 1 first.</div> <div>You may try multiple times, with penalties for wrong submissions.</div>
Large input 15 points	<div>You must solve all small inputs first.</div> <div>You have 8 minutes to solve 1 input file. (Judged after contest.)</div>

## Problem

A certain bathroom has  $N + 2$  stalls in a single row; the stalls on the left and right ends are permanently occupied by the bathroom guards. The other  $N$  stalls are for users.

Whenever someone enters the bathroom, they try to choose a stall that is as far from other people as possible. To avoid confusion, they follow deterministic rules: For each empty stall  $S$ , they compute two values  $L_S$  and  $R_S$ , each of which is the number of empty stalls between  $S$  and the closest occupied stall to the left or right, respectively. Then they consider the set of stalls with the farthest closest neighbor, that is, those  $S$  for which  $\min(L_S, R_S)$  is maximal. If there is only one such stall, they choose it; otherwise, they choose the one among those where  $\max(L_S, R_S)$  is maximal. If there are still multiple tied stalls, they choose the leftmost stall among those.

$K$  people are about to enter the bathroom; each one will choose their stall before the next arrives. Nobody will ever leave.

When the last person chooses their stall  $S$ , what will the values of  $\max(L_S, R_S)$  and  $\min(L_S, R_S)$  be?

## Solving this problem

This problem has 2 Small datasets and 1 Large dataset. You must solve the first Small dataset before you can attempt the second Small dataset. You will be able to retry either of the Small datasets (with a time penalty). You will be able to make a single attempt at the Large, as usual, only after solving both Small datasets.

## Input

The first line of the input gives the number of test cases,  $T$ .  $T$  lines follow. Each line describes a test case with two integers  $N$  and  $K$ , as described above.

## Output

For each test case, output one line containing Case # $x$ :  $y$   $z$ , where  $x$  is the test case number (starting from 1),  $y$  is  $\max(L_S, R_S)$ , and  $z$  is  $\min(L_S, R_S)$  as calculated by the last person to enter the bathroom for their chosen stall  $S$ .

## Limits

$1 \leq T \leq 100$ .  
 $1 \leq K \leq N$ .

## Small dataset 1

$1 \leq N \leq 1000$ .

## Small dataset 2

$1 \leq N \leq 10^6$ .

## Large dataset

$1 \leq N \leq 10^{18}$ .

## Sample

Input	Output
5	Case #1: 1 0
4 2	Case #2: 1 0

5 2	Case #3: 1 1
6 2	Case #4: 0 0
1000 1000	Case #5: 500 499
1000 1	

In Case #1, the first person occupies the leftmost of the middle two stalls, leaving the following configuration (0 stands for an occupied stall and . for an empty one): 0.0..0. Then, the second and last person occupies the stall immediately to the right, leaving 1 empty stall on one side and none on the other.

In Case #2, the first person occupies the middle stall, getting to 0..0..0. Then, the second and last person occupies the leftmost stall.

In Case #3, the first person occupies the leftmost of the two middle stalls, leaving 0..0..0. The second person then occupies the middle of the three consecutive empty stalls.

In Case #4, every stall is occupied at the end, no matter what the stall choices are.

In Case #5, the first and only person chooses the leftmost middle stall.

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