code jam
cout << "hello, world!" << endl;

Time Remaining: 1 hour 37min Rank: 10800 Score: 40



Qualification Round 2017



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Submissions

Oversized Pancake Flipper
5pt Correct **18986/22860 users** correct (83%)
10pt Submitted **18377 users** attempted

Tidy Numbers
5pt Correct **23473/25219 users** correct (93%)
15pt Submitted **21245 users** attempted

Bathroom Stalls
5pt Correct **13011/14854 users** correct (88%)
10pt 1 incorrect attempt **10105/12259 users** correct (82%)
15pt Not attempted **8219 users** attempted

Fashion Show
10pt Not attempted **910/2223 users** correct (41%)
25pt Not attempted **767 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<br>5 points | You have solved this input set. |
| Small input 2<br>10 points | Solve C-small-2<br>You may try multiple times, with penalties for wrong submissions. |
| Large input<br>15 points | You must solve all small inputs first.<br>You have 8 minutes to solve 1 input file. (Judged after contest.) |

### 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

$1 \le \mathbf{T} \le 100$.
$1 \le \mathbf{K} \le \mathbf{N}$.

### Small dataset 1

$1 \le \mathbf{N} \le 1000$.

### Small dataset 2

$1 \le \mathbf{N} \le 10^6$.

### Large dataset

$1 \le \mathbf{N} \le 10^{18}$.

### Sample

| Input | Output |
|---|---|
| 5<br>4 2<br>5 2<br>6 2<br>1000 1000<br>1000 1 | Case #1: 1 0<br>Case #2: 1 0<br>Case #3: 1 1<br>Case #4: 0 0<br>Case #5: 500 499 |

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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