Kickstart Practice Round 2017

A. Country Leader
B. Vote
C. Sherlock and Parentheses

Questions asked 1

Submissions

Country Leader

4pt	Not attempted **366/497 users** correct (74%)
7pt	Not attempted **279/360 users** correct (78%)

Vote

5pt	Not attempted **227/304 users** correct (75%)
8pt	Not attempted **165/214 users** correct (77%)

Sherlock and Parentheses

4pt	Not attempted **257/277 users** correct (93%)
7pt	Not attempted **220/256 users** correct (86%)

Top Scores

yashLadha	35
praran26	35
achaitanyasai	35
xhaler	35
iharsh234	35
Rajnikanth	35
sokokaleb	35
adtac	35
eon204	35
Irving.CL	35

Problem B. Vote

This contest is open for practice. You can try every problem as many times as you like, though we won't keep track of which problems you solve. Read the Quick-Start Guide to get started.

Small input 5 points	Solve B-small
Large input 8 points	Solve B-large

Problem

A and B are the only two candidates competing in a certain election. We know from polls that exactly **N** voters support A, and exactly **M** voters support B. We also know that **N** is greater than **M**, so A will win.

Voters will show up at the polling place one at a time, in an order chosen uniformly at random from all possible (**N** + **M**)! orders. After each voter casts their vote, the polling place worker will update the results and note which candidate (if any) is winning so far. (If the votes are tied, neither candidate is considered to be winning.)

What is the probability that A stays in the lead the entire time -- that is, that A will always be winning after every vote?

Input

The input starts with one line containing one integer **T**, which is the number of test cases. Each test case consists of one line with two integers **N** and **M**: the numbers of voters supporting A and B, respectively.

Output

For each test case, output one line containing `Case #x: y`, where x is the test case number (starting from 1) and y is the probability that A will always be winning after every vote.

y will be considered correct if y is within an absolute or relative error of 10^{-6} of the correct answer. See the FAQ for an explanation of what that means, and what formats of real numbers we accept.

Limits

$1 \leq \mathbf{T} \leq 100$.

Small dataset

$0 \leq \mathbf{M} < \mathbf{N} \leq 10$.

Large dataset

$0 \leq \mathbf{M} < \mathbf{N} \leq 2000$.

Sample

Input	Output
2 2 1 1 0	Case #1: 0.33333333 Case #2: 1.00000000

In sample case #1, there are 3 voters. Two of them support A -- we will call them A1 and A2 -- and one of them supports B. They can come to vote in six possible orders: A1 A2 B, A2 A1 B, A1 B A2, A2 B A1, B A1 A2, B A2 A1. Only the first two of those orders guarantee that Candidate A is winning after every vote. (For example, if the order is A1 B A2, then Candidate A is winning after the first vote but tied after the second vote.) So the answer is 2/6 = 0.333333...

In sample case #2, there is only 1 voter, and that voter supports A. There is only one possible order of arrival, and A will be winning after the one and only vote.