

Round D APAC Test 2017

## A. Vote

[B. Sitting](#)

[C. Codejamon Cipher](#)

[D. Stretch Rope](#)

[Questions asked](#)

### Submissions

Vote	
5pt	Not attempted <b>1360/2559 users</b> correct (53%)
8pt	Not attempted <b>913/1257 users</b> correct (73%)
Sitting	
9pt	Not attempted <b>683/1467 users</b> correct (47%)
10pt	Not attempted <b>305/472 users</b> correct (65%)
Codejamon Cipher	
7pt	Not attempted <b>653/819 users</b> correct (80%)
16pt	Not attempted <b>348/624 users</b> correct (56%)
Stretch Rope	
15pt	Not attempted <b>477/655 users</b> correct (73%)
30pt	Not attempted <b>36/146 users</b> correct (25%)

### Top Scores

jinzhaio	100
axp	100
wcswswws	100
t3cmax	100
prabowo	100
ZJiaQ	100
BoyZhou	100
sgtlaugh	100
YeYifan	100
shyoshyo	100

## Problem A. 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 A-small

Large input  
8 points

Solve A-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  $(\mathbf{N} + \mathbf{M})!$  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	Case #1: 0.33333333
2 1	Case #2: 1.00000000
1 0	

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.

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