Chef and Yoda

Problem code: CHEFYODA

SUCCESSFUL SUBMISSIONS ⊞

Read problems statements in Mandarin Chinese, Russian and Vietnamese as well.

Chef has arrived in Dagobah to meet with Yoda to study cooking. Yoda is a very busy cook and he doesn't want to spend time with losers. So he challenges the Chef to a series of games, and agrees to teach the Chef if Chef can win at least **P** of the games. The total number of games is **K**. The games will be played on a chessboard of size **N*M**. That is, it has **N** rows, each of which has **M** squares. At the beginning of the game, a coin is on square (1, 1), which corresponds to the top-left corner, and every other square is empty. At every step, Yoda and Chef have to move the coin on the chessboard. The player who cannot make a move loses. Chef makes the first move. They can't move the coin to a square where it had been placed sometime before in the game, and they can't move outside chessboard.

In this game, there are two different sets of rules according to which the game can be played:
-from (x, y) player can move coin to (x+1, y), (x-1, y), (x, y+1), (x, y-1) in his turn, if they are valid squares.
-from (x, y) player can move coin to (x+1, y+1), (x-1, y-1), (x-1, y+1), (x+1, y-1) in his turn, if they are valid squares.

Before every game, the Power of the kitchen chooses one among the two sets of rules with equal probability of **0.5**, and the game will be played according to those rules. Chef and Yoda are very wise, therefore they play optimally. You have to calculate the probability that Yoda will teach Chef.

Input

Input begins with an integer **T**, the number of test cases
Each test case begins with 4 integers **N**, **M**, **P**, **K**.

Output

For each test case, output a line containing the answer for task. The output must have an absolute error at most 0.000001 (10^{-6}).

Constraints and Subtasks

- **1 ≤ T ≤ 50**
- **1 ≤ K**

Subtask 1 : 10 points
- **2 ≤ N, M ≤ 5**
- **0 ≤ P ≤ K ≤ 5**

Subtusk 2 : 10 points
- **2 ≤ N, M ≤ 10**
- **0 ≤ P ≤ K ≤ 10^3**

Subtusk 3 : 20 points
- **2 ≤ N, M ≤ 100**
- **0 ≤ P ≤ K ≤ 10^3**

Subtusk 4 : 60 points
- **2 ≤ N, M ≤ 100**
- **0 ≤ P ≤ K ≤ 10^6**

Example

Input:
2
2 3 2 3
2 2 5 5
Output:
0.500000
1.000000

Author:	omelyanenko
Tester:	mgch
Date Added:	26-04-2015
Time Limit:	1.5 sec
Source Limit:	50000 Bytes
Languages:	ADA, ASM, BASH, BF, C, C99 strict, CAML, CLOJ, CLPS, CPP 4.3.2, CPP 4.9.2, CPP14, CS2, D, ERL, FORT, FS, GO, HASK, ICK, ICON, JAVA, JS, LISP clisp, LISP sbcl, LUA, NEM, NICE, NODEJS, PAS fpc, PAS gpc, PERL, PERL6, PHP, PIKE, PRLG, PYPY, PYTH, PYTH 3.4, RUBY, SCALA, SCM chicken, SCM guile, SCM qobi, ST, TCL, TEXT, WSPC

SUBMIT

Comments ▸

CodeChef is a non-commercial competitive programming community

Directi
Intelligent People. Uncommon Ideas.
The time now is: 05:23:48 PM
Your IP: 47.8.15.4

CodeChef - A Platform for Aspiring Programmers

CodeChef was created as a platform to help programmers make it big in the world of algorithms, **computer programming** and **programming contests**. At CodeChef we work hard to revive the geek in you by hosting a **programming contest** at the start of the month and another smaller programming challenge in the middle of the month. We also aim to have training sessions and discussions related to **algorithms, binary search**, technicalities like **array size** and the likes. Apart from providing a platform for **programming competitions**, CodeChef also has various algorithm tutorials and forum discussions to help those who are new to the world of **computer programming**.

Practice Section - A Place to hone your 'Computer Programming Skills'

Try your hand at one of our many practice problems and submit your solution in a language of your choice. Our **programming contest** judge accepts solutions in over 35+ programming languages. Preparing for coding contests were never this much fun! Receive points, and move up through the CodeChef ranks. Use our practice section to better prepare yourself for the multiple **programming challenges** that take place through-out the month on CodeChef.

Compete - Monthly Programming Contests and Cook-offs

Here is where you can show off your **computer programming** skills. Take part in our 10 day long monthly **coding contest** and the shorter format Cook-off **coding contest**. Put yourself up for recognition and win great prizes. Our **programming contests** have prizes worth up to INR 20,000 (for Indian Community), $700 (for Global Community) and lots more CodeChef goodies up for grabs.

Programming Tools	Practice Problems	Initiatives
Online IDE	Easy	Go for Gold
Upcoming Coding Contests	Medium	CodeChef for Schools
Contest Hosting	Hard	Campus Chapters
Problem Setting	Challenge	
CodeChef Tutorials	Peer	
CodeChef Wiki	School	
	FAQ's	