



PE Class

Time Limit: 2000/1000 MS (Java/Others) Memory Limit: 262144/262144 K (Java/Others)
 Total Submission(s): 0 Accepted Submission(s): 0

Problem Description

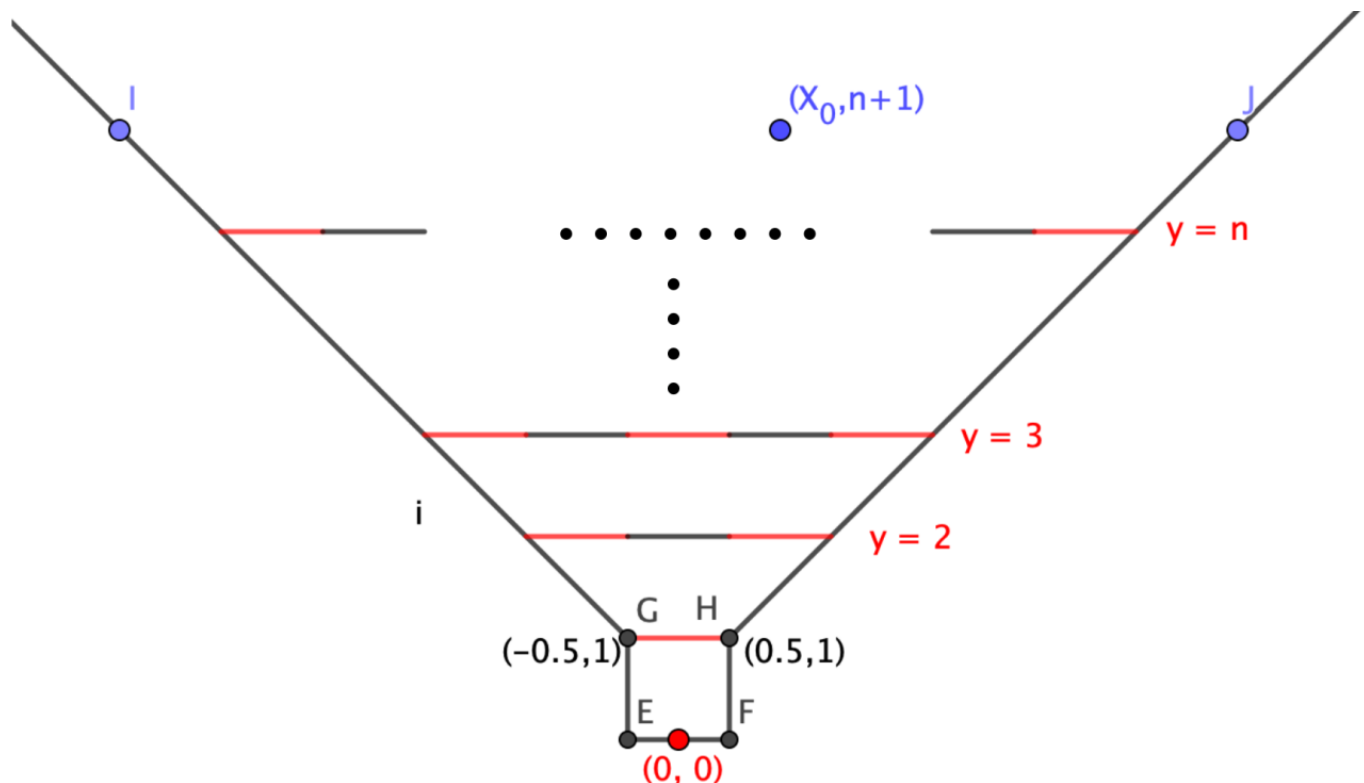
This class is on PE. Today, Baby Volcano is going to take part in a running competition in a maze. Could you help him win this competition?

For simplicity, we assume that this maze lies in a Euclidean plane. There is a graphical description for the maze shown in the following figure. We give some explanation here:

1. There are two kinds of obstructions in this maze, walls and doors. In the figure, black segments and rays are walls, red segments are doors. Some doors are closed while others are open. Baby volcano couldn't go through walls and closed doors, while he could pass open doors. He couldn't tell whether a door is open or not before reaching *its midpoint*.

2. In the outmost layer there are 5 pieces of walls, corresponding to segment GE , EF , FH , and ray GI , HJ .

3. In the inner part there are n layers of obstructions, the obstructions in the i -layer lies in $y = i$, consists of i doors and $i - 1$ walls, every obstruction is a segment with length 1. The j -th door ($1 \leq j \leq i$) in i -th layer is the segment $\left(\left(\frac{1-2i}{2} + 2j - 2, i \right), \left(\frac{1-2i}{2} + 2j - 1, i \right) \right)$. The j -th wall ($1 \leq j \leq i - 1$) in i -th layer is the segment $\left(\left(\frac{1-2i}{2} + 2j - 1, i \right), \left(\frac{1-2i}{2} + 2j, i \right) \right)$



Now for every $1 \leq i \leq n$, the teacher uniformly randomly choose k_i ($1 \leq k_i \leq i$) doors to be open. Baby Volcano wonders, if he starts at $(x_0, n + 1)$, and try to approach $(0, 0)$, what is the minimum expected length of walk?

Input

In the first line there is a number T , denotes the number of test cases.

Next, there are $2 \times T$ lines demonstrating each test case.

For every case, in the first line there are two integers, n, x_0 , denotes the number of layers in this maze and the start position of Baby Volcano.

In the second line there are n integers $k_1, k_2, k_3, \dots, k_n$, showing the number of doors open in the i -th layer.

The input guarantees that $1 \leq T \leq 100$, $1 \leq n \leq 50$, and $-n \leq x_0 \leq n$.

Output

Output T real numbers, for each test case, you need to output d , denotes the minimum expected length of walk. You need to output six decimal places.

Sample Input

```
4
2 1
1 2
2 1
1 1
3 2
1 2 3
4 2
1 2 2 1
```

Sample Output

```
3.414213
4.414213
4.828427
10.323520
```

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