Serhat and his best friend Selim

Problem

Submissions

Discussion Coming Soon

Türkçesi İçin Tıklayınız

Serhat wants to study algorithms with his very best friend Selim, who lives in a different city and has a distance of N units, but they cannot come together because of the increasing ticket prices. But one day, someone who sees this helpless situation of Serhat comes out and makes an offer to Serhat. This person with special powers takes a small toy in any of his hands and asks Serhat to guess which hand the toy is in. If Serhat knows correctly which hand the toy is in, this person says that he will teleport 2 units **forwards** with Serhat by using his special powers, but if Serhat does not know, he says that he will teleport 1 unit **forward** with Serhat.

Assuming that this person repeats this process every time a teleportation ends, what is the probability that Serhat and Selim will meet?

Input Format

The first line consists of an integer t (1 <= t <= 100) - number of test cases

The following t lines consist of N (1 <= N <= 10^5) - the distance between Serhat and Selim

Output Format

For each test case, print a single number - the probability that Serhat and Selim will meet.

You should print the number with exactly 6 digits after decimal.

Constraints

$1 \leq t \leq 100$

$1 \leq N \leq 10^5$

Sample Input 1

```
1
3
```

Sample Output 1

```
0.625000
```

Explanation 1

If we consider the possibilities:

Assuming he takes 2 steps if he knows which hand the toy is in, and 1 step if he does not know:

- 1-1-1 (can't know 3 times and can go 1-1-1 steps)
- 1-2 (can't know in the first time, knows in second time)
- 2-1 (knows in the first time, does not know in second time)

Since the probability of knowing which hand is correct is 1/2 and the probability of not knowing it is 1/2.

The probability of reaching the friend who is standing exactly at the 3rd point: (0.5 * 0.5 * 0.5)+ (0.5 * 0.5) + (0.5 * 0.5) = 0.125000 + 0.250000 + 0.250000 = 0.625000

Sample Input 2

Sample Output 2

```
2
3
8
```

```
0.625000
0.667969
```

C++ Bright **Memory Limit (kB) :** 256000 **Time Limit (s) :** 1

```
1  //Brace your keyboard
2  //inzva community built algoleague for every algorithm enthusiast hungry for self-improvement and fri
3
4  #include <bits/stdc++.h>
5
6  using namespace std;
7
8  int main() {
9  // write your code here
10
11      return 0;
12 }
13
```

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