

Problem G

Goals

Time Limit: 1 second
Memory Limit: 512 megabytes

Quang and Trong participate in a special soccer match. In this competition, each of them is given N soccer balls at random, each with a random weight in the range of $[1, 10^{18}]$.

The match unfolds as follows: the soccer field has N goals, numbered from 1 to N . Quang kicks off the game by shooting his N balls into these N goals, with one ball going into each goal (assuming both Quang and Trong have 100% shooting accuracy). He is free to choose the order in which the balls are shot. After Quang has taken all his shots, Trong considers the weight of Quang's balls in the current goals and then decides to shoot his N balls into the corresponding N goals, each ball into each goal.



At the end of the match, for the i^{th} goal, the player whose ball has a higher weight wins and gets i score ($i = 1, 2, \dots, N$). If both balls in the i^{th} goal have the same weight, the score is split equally, meaning each player gets $i/2$ score. The player who has a higher total score wins the match.

As an example of the match, suppose $N = 3$, Quang is given N balls with weights 1, 2, and 4, and Trong is given balls with weights 1, 3, and 5. Quang may shoot balls weighted 4, 2 and 1 on goals 1, 2 and 3, respectively. After seeing Quang's moves, Trong may shoot the balls weighted 3, 5 and 1 on goals 1, 2 and 3, respectively. In this case, Quang earns 1 point for slot 1, 0 points for slot 2, and $3/2 = 1.5$ points for slot 3. His total score is 2.5 points. The purpose of the above example is to illustrate the rules of the match. Quang and Trong may not shoot the balls as described because both play optimally.

Knowing that, during his turn, Trong is aware of the positions of Quang's balls. Trong chooses his shooting strategy to maximize the score he can earn. Meanwhile, during Quang's turn, he does not know the information about Trong's balls. Still, he is aware of Trong's optimal strategy and that the ball weights are uniformly and randomly distributed. Hence, Quang chooses his playing strategy to maximize the expected value of his total score.

Given N , please help Quang calculate the expected value of his total score at the end of the match if both players make their choices optimally as described.

Input

The input contains a single integer N ($1 \leq N \leq 100$), the number of goals.

Output

A single number indicating the expected value of Quang's total score at the end of the match. The result must have exactly six digits after decimal point, rounded if necessary.

Sample Input

Sample Output

1	0.500000
2	1.333333
100	598.874902