

Problem G – Game of Slots

Alice and Bob are playing the following game. Initially, each of them receives N cards, each card with an integer randomly and uniformly chosen from the interval $[1, 10^{18}]$ written on it. There are also N slots, numbered from 1 to N .

Alice starts by placing her cards on the slots, in such a way that exactly one card is placed on each slot. She may choose any of the $N!$ options of placement she wants. After that, Bob looks at the numbers placed by Alice on each slot and does the same with his cards. The game then ends, and for each slot i the person who placed the largest number on it earns i points ($i = 1, 2, \dots, N$). If both of the placed numbers happen to be equal, the players share the points for this slot, that is, each player gets $i/2$ points.

As an example of the game, suppose $N = 3$, Alice is given cards with numbers 10, 20 and 40, and Bob is given cards with numbers 10, 30 and 50. Alice may choose to place numbers 40, 20 and 10 on slots 1, 2 and 3 respectively. After seeing her moves Bob may choose to place numbers 30, 50 and 10 on slots 1, 2 and 3 respectively. In this case, Alice earns 1 point for slot 1, 0 points for slot 2, and $3/2 = 1.5$ points for slot 3. Her total score is 2.5 points.

The purpose of the above example is to illustrate the rules of the game. Alice and Bob may not place their cards as described, because both of them play optimally. You may wonder what does it mean.

In his turn, Bob has full information on Alice's cards and decisions, and of course, he knows his cards. He plays in such a way to maximize his total score.

On the other hand, Alice does not know Bob's cards when it's her turn. She knows Bob's strategy, and that his cards were randomly and uniformly chosen. Thus, she plays to maximize the expected value of her total score.

Given N , you must calculate the expected value of Alice's total score at the end of the game, if the players play optimally as described.

Input

The input consists of a single line that contains an integer N ($1 \leq N \leq 100$), the number of slots in the game.

Output

Output a single line with a number indicating the expected value of Alice's total score at the end of the game, if the players play optimally as described. The result must be output as a rational number with exactly six digits after the decimal point, rounded if necessary.

Sample input 1 1	Sample output 1 0.500000
Sample input 2 2	Sample output 2 1.333333
Sample input 3 99	Sample output 3 589.631287