Problem A. Dogs and Cages

Jerry likes dogs. He has N dogs numbered $0, 1, \ldots, N-1$. He also has N cages numbered $0, 1, \ldots, N-1$. Everyday he takes all his dogs out and walks them outside. When he is back home, as dogs can't recognize the numbers, each dog just randomly selects a cage and enters it. Each cage can hold only one dog.

One day, Jerry noticed that some dogs were in the cage with the same number of themselves while others were not. Jerry would like to know what's the expected number of dogs that are **NOT** in the cage with the same number of themselves.

Input

The first line of the input gives the number of test cases, T. T test cases follow.

Each test case contains only one number N, indicating the number of dogs and cages.

Output

For each test case, output one line containing "`Case #x: y`", where `x` is the test case number (starting from 1) and `y` is the expected number of dogs that are **NOT** in the cage with the same number of itself.

`y` will be considered correct if it is within an absolute or relative error of 10^{-6} of the correct answer.

Limits

- $1 \leq T \leq 10^5$.
- $1 \leq N \leq 10^5$.

Example

standard input	standard output
2 1 2	Case #1: 0.0000000000 Case #2: 1.0000000000

Note

In the first test case, the only dog will enter the only cage. So the answer is 0.

In the second test case, if the first dog enters the cage of the same number, both dogs are in the cage of the same number, the number of mismatch is 0. If both dogs are not in the cage with the same number of itself, the number of mismatch is 2. So the expected number is $\frac{0+2}{2} = 1$.