Round 2 2011

A. Airport Walkways
B. Spinning Blade
C. Expensive Dinner
D. A.I. War

Contest Analysis
Questions asked

Submissions

Airport Walkways
8pt Not attempted **2130/2490 users** correct (86%)
10pt Not attempted **2075/2126 users** correct (98%)

Spinning Blade
8pt Not attempted **1363/1667 users** correct (82%)
12pt Not attempted **516/957 users** correct (54%)

Expensive Dinner
13pt Not attempted **780/1197 users** correct (65%)
17pt Not attempted **491/645 users** correct (76%)

A.I. War
10pt Not attempted **261/452 users** correct (58%)
22pt Not attempted **87/219 users** correct (40%)

Top Scores

ACRushTC	100
mystic	100
meret	100
austrin	100
msg555	100
bmerry	100
wata	100
Gennady.Korotkevich	100
ilyaraz	100
Ahyangyi	100

Problem C. Expensive Dinner

This contest is open for practice. You can try every problem as many times as you like, though we won't keep track of which problems you solve. Read the Quick-Start Guide to get started.

Small input 13 points — Solve C-small

Large input 17 points — Solve C-large

Problem

Your friends are all going to a restaurant for dinner tonight. They're all very good at math, but they're all very strange: your **a**th friend (starting from 1) will be *unhappy* unless the total cost of the meal is a positive integer, and is divisible by **a**.

Your friends enter the restaurant one at a time. As soon as someone enters the restaurant, if that person is unhappy then the group will *call* a waiter immediately.

As long as there is at least one unhappy person in the restaurant, one of those unhappy people will buy the lowest-cost item that will make him or her happy. This will continue until nobody in the restaurant is unhappy, and then the waiter will leave. Fortunately, the restaurant sells food at every integer price. See the explanation of the first test case for an example.

Your friends could choose to enter the restaurant in any order. After the waiter has been called, if there is more than one unhappy person in the restaurant, any one of those unhappy people could choose to buy something first. The way in which all of those choices are made could have an effect on how many times the group calls a waiter.

As the owner of the restaurant, you employ some very tired waiters. You want to calculate the **spread** of your friends: the difference between the maximum number of times they might call a waiter and the minimum number of times they might call a waiter.

Input

The first line of the input gives the number of test cases, **T**. **T** test cases follow, each on its own line. Each test case will contain one integer **N**, the number of friends you have.

Output

For each test case, output one line containing "Case #x: y", where x is the case number (starting from 1) and y is the spread for that test case.

Limits

Small dataset

1 ≤ **T** ≤ 100.
1 ≤ **N** ≤ 1000.

Large dataset

1 ≤ **T** ≤ 1000.
1 ≤ **N** ≤ 10^{12}.

Sample

Input	Output
4	Case #1: 0
1	Case #2: 1
3	Case #3: 2
6	Case #4: 5
16	

Explanation

In Case #2, suppose your friends arrive in the order [1, 2, 3]. Then #1 arrives; is unhappy; calls a waiter; and buys something costing 1. Now nobody is unhappy. #2 arrives next; is unhappy; calls a waiter; and buys something costing 1 (for a total of 2). Now nobody is unhappy. #3 arrives next; is unhappy; calls a waiter; and buys something costing 1 (for a total of 3). Now

#2 is unhappy, and buys something costing 1 (for a total of 4). Now #3 is unhappy, and buys something costing 2 (for a total of 6). Finally nobody is unhappy, and a waiter was called three times.

Suppose instead that your friends arrived in the order [3, 1, 2]. Then #3 arrives; is unhappy; calls a waiter; and buys something costing 3. Now nobody is unhappy. #1 arrives next; nobody is unhappy. #2 arrives next; is unhappy; calls a waiter; and buys something costing 1 (for a total of 4). Now #3 is unhappy, and buys something costing 2 (for a total of 6). Now nobody is unhappy, and a waiter was called two times. The spread is 1.