Apple

Time Limit: 1000/1000 MS (Java/Others) Memory Limit: 65535/32768 K (Java/Others)
Total Submission(s): 639 Accepted Submission(s): 210

Problem Description

Apple is Taotao's favourite fruit. In his backyard, there are three apple trees with coordinates (x_1, y_1), (x_2, y_2), and (x_3, y_3). Now Taotao is planning to plant a new one, but he is not willing to take these trees too close. He believes that the new apple tree should be outside the circle which the three apple trees that already exist is on. Taotao picked a potential position (x, y) of the new tree. Could you tell him if it is outside the circle or not?

Input

The first line contains an integer T, indicating that there are $T (T \leq 30)$ cases.
In the first line of each case, there are eight integers $x_1, y_1, x_2, y_2, x_3, y_3, x, y$, as described above.
The absolute values of integers in input are less than or equal to $1,000,000,000,000$.
It is guaranteed that, any three of the four positions do not lie on a straight line.

Output

For each case, output "Accepted" if the position is outside the circle, or "Rejected" if the position is on or inside the circle.

Sample Input

```
3
-2 0 0 -2 2 0 2 -2
-2 0 0 -2 2 0 0 2
-2 0 0 -2 2 0 1 1
```

Sample Output

```
Accepted
Rejected
Rejected
```

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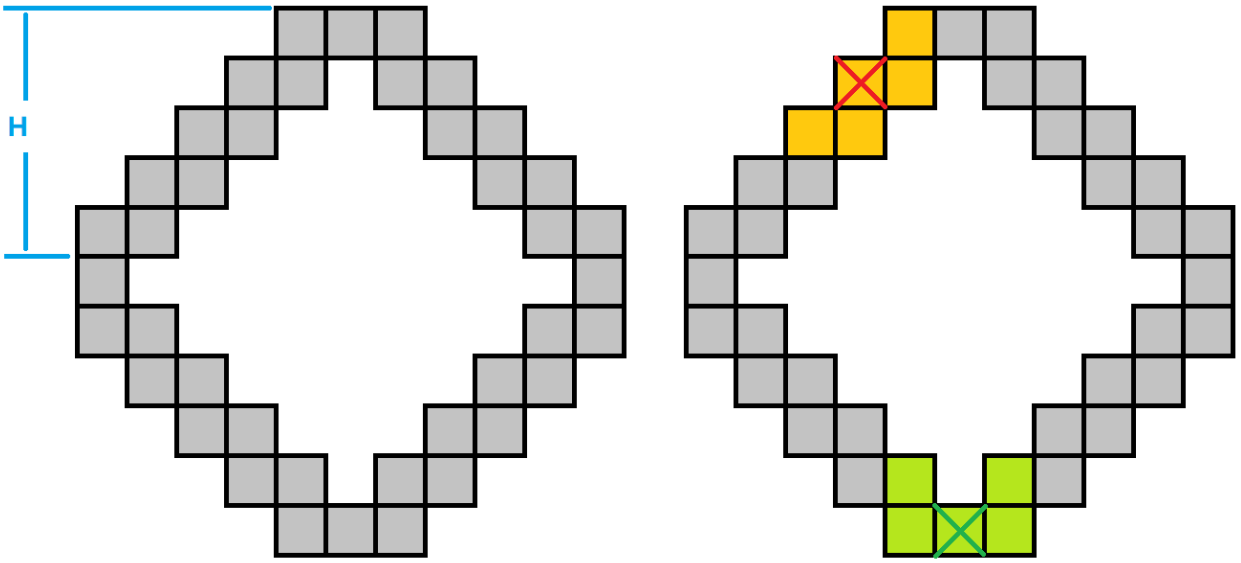
Bomberman

Time Limit: 3000/3000 MS (Java/Others) Memory Limit: 65535/32768 K (Java/Others)
Total Submission(s): 55 Accepted Submission(s): 16

Problem Description

The story begins with bomberman growing bored of making bombs in an underground factory of the Bungeling Empire. After hearing a rumor that robots reaching his surface become human, he decides to escape. When he does, he transform into an organic human being. To distinguish him from other bombermen, our main character is given the name White Bomber. However another bomberman, known as Black Bomber is an enemy due to a programming error, trying to destroy the entire map.
A two dimensional lattice with a coefficient H $(4 \leq H \leq 100)$ describes the map. All pairs of integers (x, y) satisfying $x + y = H$ or $x + y = H + 1$ but $(0, H + 1), (0, -H - 1), (H + 1, 0)$ and $(-H - 1, 0)$ make up the range. Were a bomb deployed at a grid (x, y) by Black Bomber, all grids around it would disappear, including $(x - 1, y - 1)$, $(x - 1, y)$, $(x - 1, y + 1)$, $(x, y - 1)$, (x, y), $(x, y + 1)$, $(x + 1, y - 1)$, $(x + 1, y)$ and $(x + 1, y + 1)$ if exist.



The location of the bomb is an uniformly random every time when Black Bomber deploys it, but bombs can not be placed at disappeared grids. Black Bomber deploys a bomb and ignites it, then deploys anothor bomb and ignites it again. He stops if the whole map has been destroyed. Help White Bomber calculate the expected number of bombs which would be deployed by Black Bomber. Furthermore, if White Bomber has discovered the first grid which Black Bomber would select, what is the expected number of bombs that would be deployed.

Input

The first line is an integer T $(1 \leq 100 \leq T)$ which is the number of test cases.
For each test case, there is a line containing an integer H $(4 \leq H \leq 100)$.

Output

For each test case, output two lines.
The first contains the the expected number of bombs deployed with the precision of 6 digits.
The second line contains expected numbers if the first grid has been confirmed.
Output $8H$ floats numbers with 6 places in a line corresponding to all grids in the clockwise direction and the first one indicates the situation of the top position $(0, H)$.

Sample Input

```
2
4
5
```

Sample Output

```
9.242411
9.138479 9.441946 9.066139 9.078795 9.627045 9.078795 9.066139 9.441946 9.138479 9.441946 9.066139 9.078795
9.627045 9.078795 9.066139 9.441946 9.138479 9.441946 9.066139 9.078795 9.627045 9.078795 9.066139 9.441946
9.138479 9.441946 9.066139 9.078795 9.627045 9.078795 9.066139 9.441946
11.430268
11.321153 11.580865 11.323971 11.357984 11.562263 11.331363 11.562263 11.357984 11.323971 11.580865 11.321153
11.580865 11.323971 11.357984 11.562263 11.331363 11.562263 11.357984 11.323971 11.580865 11.321153 11.580865
11.323971 11.357984 11.562263 11.331363 11.562263 11.357984 11.323971 11.580865 11.321153 11.580865 11.323971
11.357984 11.562263 11.331363 11.562263 11.357984 11.323971 11.580865
```

Source

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The Dominator of Strings

Time Limit: 3000/3000 MS (Java/Others) Memory Limit: 65535/32768 K (Java/Others)
Total Submission(s): 3850 Accepted Submission(s): 1332

Problem Description

Here you have a set of strings. A dominator is a string of the set dominating all strings else. The string S is dominated by T if S is a substring of T.

Input

The input contains several test cases and the first line provides the total number of cases.
For each test case, the first line contains an integer N indicating the size of the set.
Each of the following N lines describes a string of the set in lowercase.
The total length of strings in each case has the limit of 100000.
The limit is 30MB for the input file.

Output

For each test case, output a dominator if exist, or No if not.

Sample Input

```
3
10
you
better
worse
richer
poorer
sickness
health
death
faithfulness
youbemyweddedwifebetterworsericherpoorersicknesshealthtilldeathdouspartandpledgeyoumyfaithfulness
5
abc
cde
abcde
abcde
bcde
3
aaaaa
aaaab
aaaac
```

Sample Output

```
youbemyweddedwifebetterworsericherpoorersicknesshealthtilldeathdouspartandpledgeyoumyfaithfulness
abcde
No
```

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The Intersection

Time Limit: 3000/3000 MS (Java/Others) Memory Limit: 65535/32768 K (Java/Others)
Total Submission(s): 965 Accepted Submission(s): 225

Problem Description

A given coefficient K leads an intersection of two curves $f(x)$ and $g_K(x)$. In the first quadrant, the curve f is a monotone increasing function that $f(x) = \sqrt{x}$. The curve g is decreasing and $g(x) = K/x$.
To calculate the x-coordinate of the only intersection in the first quadrant is the following question. For accuracy, we need the nearest rational number to x and its denominator should not be larger than 100000.

Input

The first line is an integer T $(1 \le T \le 100000)$ which is the number of test cases.
For each test case, there is a line containing the integer K $(1 \le K \le 100000)$, which is the only coefficient.

Output

For each test case, output the nearest rational number to x. Express the answer in the simplest fraction.

Sample Input

```
5
1
2
3
4
5
```

Sample Output

```
1/1
153008/96389
50623/24337
96389/38252
226164/77347
```

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King's Visit

Time Limit: 2000/2000 MS (Java/Others) Memory Limit: 65535/32768 K (Java/Others)
Total Submission(s): 24 Accepted Submission(s): 3

Problem Description

In chess, a king can move horizontally, vertically or diagonally to an adjacent cell in each move.
You are given an 8×8 board with some obstacles. The starting position of the king is also given. Your task is to calculate the maximum number of cells that the king can visit, such that:
1.The king never moves to an obstacle.
2.Each cell are visited at most once (the starting position has already been visited at the beginning).

Input

The first line is the number of test cases. For each test case, there are 8 lines and each line contains 8 characters, in which the letter 'K' is the starting position, a letter 'O' is an obstacle and a '.' is an empty cell. There is an empty line after each test case.

Output

For each test case, output a line containing an integer, which is the maximum number of cells that the king can visit.

Sample Input

```
2
.O....O.
O......O
........
...K....
........
........
O......O
.O....O.

.O....O.
O...OOO.
......O.
......O.
.O....O.
.O....O.
OOOOOO..
.......K
```

Sample Output

```
53
33
```

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Pythagoras

Time Limit: 4000/4000 MS (Java/Others) Memory Limit: 65535/32768 K (Java/Others)
Total Submission(s): 290 Accepted Submission(s): 154

Problem Description

Given a list of integers $a_0, a_1, a_2, \cdots, a_{2^k-1}$. Pythagoras triples over 10^9 are all solutions of $x^2 + y^2 = z^2$ where x, y and z are constrained to be positive integers less than or equal to 10^9. You are to compute the sum of $a_{y \bmod 2^k}$ of triples (x, y, z) such that $x < y < z$ and they are relatively prime, i.e., have no common divisor larger than 1.

Input

The first line is an integer T $(1 \le T \le 3)$ indicating the total number of cases.
For each test case the first line is the integer k $(1 \le k \le 17)$.
The second line contains 2^k integers corresponding to a_0 to a_{2^k-1}, where each a_i satisfies $1 \le a_i \le 255$.

Output

For each case output the sum of $a_{y \bmod 2^k}$ in a line.

Sample Input

```
3
2
0 0 0 1
2
1 0 0 0
2
1 1 1 1
```

Sample Output

```
39788763
79577506
159154994
```

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Zuma

Time Limit: 1000/1000 MS (Java/Others) Memory Limit: 65535/32768 K (Java/Others)
Total Submission(s): 971 Accepted Submission(s): 259

Problem Description

Think about the Zuma Game. You have a row of at most 200 black(0) or white(1) balls on the table at the start. Each three consecutive balls never share the same colour. You also have infinite amount of black and white balls in your hand. On each turn, you can choose a ball in your hand and insert it into the row, including the leftmost place and the rightmost place. Then, if there is a group of three of more balls in the same colour touching, remove these balls. Keep doing this until no more balls can be removed.
Find the minimal balls you have to insert to remove all the balls on the table.

Input

The first line of input contains an integer T $(1 \leq T \leq 100)$ which is the total number of test cases.
Each test case contains a line with a non-empty string of 0 and 1 describing the row of balls at the start.

Output

For each test case, output the case number and the minimal balls required to insert in a line.

Sample Input

```
4
10101
101001001
1001001001
01001101011001100
```

Sample Output

```
Case #1: 4
Case #2: 3
Case #3: 3
Case #4: 2
```

Source

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Chinese Zodiac

Time Limit: 1000/1000 MS (Java/Others) Memory Limit: 65535/32768 K (Java/Others)
Total Submission(s): 505 Accepted Submission(s): 344

Problem Description

The Chinese Zodiac, known as Sheng Xiao, is based on a twelve-year cycle, each year in the cycle related to an animal sign. These signs are the rat, ox, tiger, rabbit, dragon, snake, horse, sheep, monkey, rooster, dog and pig.
Victoria is married to a younger man, but no one knows the real age difference between the couple. The good news is that she told us their Chinese Zodiac signs. Their years of birth in luner calendar is not the same. Here we can guess a very rough estimate of the minimum age difference between them.
If, for instance, the signs of Victoria and her husband are ox and rabbit respectively, the estimate should be 2 years. But if the signs of the couple is the same, the answer should be 12 years.

Input

The first line of input contains an integer T $(1 \leq T \leq 1000)$ indicating the number of test cases.
For each test case a line of two strings describes the signs of Victoria and her husband.

Output

For each test case output an integer in a line.

Sample Input

```
3
ox rooster
rooster ox
dragon dragon
```

Sample Output

```
8
4
12
```

Source

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Smallest Minimum Cut

Time Limit: 2000/2000 MS (Java/Others) Memory Limit: 65535/32768 K (Java/Others)
Total Submission(s): 1868 Accepted Submission(s): 754

Problem Description

Consider a network $G = (V, E)$ with source s and sink t. An s-t cut is a partition of nodes set V into two parts such that s and t belong to different parts. The cut set is the subset of E with all edges connecting nodes in different parts. A minimum cut is the one whose cut set has the minimum summation of capacities. The size of a cut is the number of edges in the cut set. Please calculate the smallest size of all minimum cuts.

Input

The input contains several test cases and the first line is the total number of cases T $(1 \leq T \leq 300)$.
Each case describes a network G, and the first line contains two integers n $(2 \leq n \leq 200)$ and m $(0 \leq m \leq 1000)$ indicating the sizes of nodes and edges. All nodes in the network are labelled from 1 to n.
The second line contains two different integers s and t $(1 \leq s, t \leq n)$ corresponding to the source and sink.
Each of the next m lines contains three integers u, v and w $(1 \leq w \leq 255)$ describing a directed edge from node u to v with capacity w.

Output

For each test case, output the smallest size of all minimum cuts in a line.

Sample Input

```
2
4 5
1 4
1 2 3
1 3 1
2 3 1
2 4 1
3 4 2
4 5
1 4
1 2 3
1 3 1
2 3 1
2 4 1
3 4 3
```

Sample Output

```
2
3
```

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Brute Force Sorting

Time Limit: 1000/1000 MS (Java/Others) Memory Limit: 65535/32768 K (Java/Others)
Total Submission(s): 1901 Accepted Submission(s): 468

Problem Description

Beerus needs to sort an array of N integers. Algorithms are not Beerus's strength. Destruction is what he excels. He can destroy all unsorted numbers in the array simultaneously. A number $A[i]$ of the array is sorted if it satisfies the following requirements.
1. $A[i]$ is the first element of the array, or it is no smaller than the left one $A[i-1]$.
2. $A[i]$ is the last element of the array, or it is no bigger than the right one $A[i+1]$.
In $[1,4,5,2,3]$, for instance, the element 5 and the element 2 would be destoryed by Beerus. The array would become $[1,4,3]$. If the new array were still unsorted, Beerus would do it again.
Help Beerus predict the final array.

Input

The first line of input contains an integer T $(1 \le T \le 10)$ which is the total number of test cases.
For each test case, the first line provides the size of the inital array which would be positive and no bigger than 100000.
The second line describes the array with N positive integers $A[1], A[2], \cdots, A[N]$ where each integer $A[i]$ satisfies $1 \le A[i] \le 100000$.

Output

For eact test case output two lines.
The first line contains an integer M which is the size of the final array.
The second line contains M integers describing the final array.
If the final array is empty, M should be 0 and the second line should be an empty line.

Sample Input

```
5
5
1 2 3 4 5
5
5 4 3 2 1
5
1 2 3 2 1
5
1 3 5 4 2
5
2 4 1 3 5
```

Sample Output

```
5
1 2 3 4 5
0

2
1 2
2
1 3
3
2 3 5
```

Source

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A Cubic number and A Cubic Number

Time Limit: 1000/1000 MS (Java/Others) Memory Limit: 65535/32768 K (Java/Others)
Total Submission(s): 1221 Accepted Submission(s): 561

Problem Description

A cubic number is the result of using a whole number in a multiplication three times. For example, $3 \times 3 \times 3 = 27$ so 27 is a cubic number. The first few cubic numbers are $1, 8, 27, 64$ and 125. Given an prime number p. Check that if p is a difference of two cubic numbers.

Input

The first of input contains an integer T $(1 \leq T \leq 100)$ which is the total number of test cases.
For each test case, a line contains a prime number p $(2 \leq p \leq 10^{12})$.

Output

For each test case, output 'YES' if given p is a difference of two cubic numbers, or 'NO' if not.

Sample Input

```
10
2
3
5
7
11
13
17
19
23
29
```

Sample Output

```
NO
NO
NO
YES
NO
NO
NO
YES
NO
NO
```

Source

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