Practice ＞ Algorithms ＞ Game Theory ＞ Nimble Game

Nimble Game ⭐
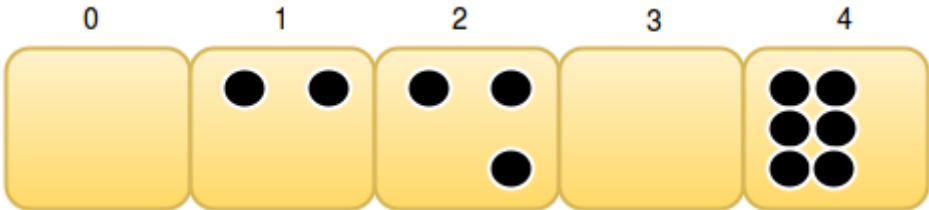
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Two people are playing Nimble! The rules of the game are:

- The game is played on a line of n squares, indexed from 0 to $n-1$. Each square i (where $0 \leq i < n$) contains c_i coins. For example:

- The players move in alternating turns. During each move, the current player must remove exactly 1 coin from square i and move it to square j if and only if $0 \leq j < i$.
- The game ends when all coins are in square 0 and nobody can make a move. The first player to have no available move loses the game.

Given the value of n and the number of coins in each square, determine whether the person who wins the game is the first or second person to move. Assume both players move optimally.

Input Format

The first line contains an integer, T, denoting the number of test cases.

Each of the $2T$ subsequent lines defines a test case. Each test case is described over the following two lines:

1. An integer, n, denoting the number of squares.
2. n space-separated integers, $c_0, c_1, \ldots, c_{n-1}$, where each c_i describes the number of coins at square i.

Constraints

- $1 \leq T \leq 10^4$
- $1 \leq n \leq 100$
- $0 \leq c_i \leq 10^9$

Output Format

For each test case, print the name of the winner on a new line (i.e., either **First** or **Second**).

Sample Input

```
2
5
0 2 3 0 6
4
0 0 0 0
```

Sample Output

```
First
Second
```

Explanation

Explanation for 1st testcase:

The first player will shift one coin from $square_2$ to $square_0$. Hence, the second player is left with the squares $[1, 2, 2, 0, 6]$. Now whatever be his/her move is, the first player can always nullify the change by

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Difficulty Easy
Max Score 20
Submitted By 3318

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shifting a coin to the same square where he/she shifted it. Hence the last move is always played by the first player, so he wins.

Exlanation for 2nd testcase:

There are no coins in any of the squares so the first player cannot make any move, hence second player wins.

```cpp
C++14

1    #include <bits/stdc++.h>
2
3    using namespace std;
4
5    vector<string> split_string(string);
6
7    // Complete the nimbleGame function below.
8    string nimbleGame(vector<int> s) {
9
10
11   }
12
13   int main()
14   {
15       ofstream fout(getenv("OUTPUT_PATH"));
16
17       int t;
18       cin >> t;
19       cin.ignore(numeric_limits<streamsize>::max(), '\n');
20
21       for (int t_itr = 0; t_itr < t; t_itr++) {
22           int n;
23           cin >> n;
24           cin.ignore(numeric_limits<streamsize>::max(), '\n');
25
26           string s_temp_temp;
27           getline(cin, s_temp_temp);
28
29           vector<string> s_temp = split_string(s_temp_temp);
30
31           vector<int> s(n);
32
33           for (int i = 0; i < n; i++) {
34               int s_item = stoi(s_temp[i]);
35
36               s[i] = s_item;
37           }
38
39           string result = nimbleGame(s);
40
```

Line: 1 Col: 1

⇪ Upload Code as File   ☐ Test against custom input   **Run Code**   **Submit Code**