You are given a 3D grid, which have dimensions N, M and P. Each of the $M \times N \times P$ cells has a light. Initially all lights are off. You will have K turns. In each of the K turns,

- You will select a cell A randomly from the grid

- You will select a cell B randomly from the grid

- Toggle the states of all the bulbs bounded by cell A and cell B, ie make all the ON lights OFF and make all the OFF lights ON which are bounded by A and B. To be more clear, consider cell A is (x_1, y_1, z_1) and cell B is (x_2, y_2, z_2). Then you have to toggle all the bulbs in grid cell (x, y, z) where $\min(x_1, x_2) \leq x \leq \max(x_1, x_2)$, $\min(y_1, y_2) \leq y \leq \max(y_1, y_2)$ and $\min(z_1, z_2) \leq z \leq \max(z_1, z_2)$.

How many bulbs are expected to be ON after K turns?

Note: A and B can be the same cell.

Input

First line of the input is an integer T ($T < 101$) which denotes the number of test cases. Each of the next T lines represents one test case by 4 integers N, M, P ($0 < M, N, P < 101$) and K ($0 \leq K \leq 10000$) separated by spaces.

Output

Output one line for each test cases giving the expected number of ON lights. Up to 1E-6 error in your output will be acceptable. Print the case number followed by the output. Look at the sample output for exact format.

Sample Input

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

Sample Output

```
Case 1: 6.3750000000
Case 2: 9.0976562500
```