

Roll or Push

You have to transport a cube by a distance of S meters. The edge of the cube is A meters long and the cube weighs M kilograms. S is a multiple of A . One can proceed in two ways:

1. by rolling the box along its edges (fighting gravity)
2. by pushing it along one of its square faces (fighting friction)

You are given the coefficient of friction F and have to decide which way is better.

Input

Standard input contains N ($1 \leq N \leq 60\,000$) lines, each containing four values A, M, S, F ($10 \leq A, M, S \leq 30\,000$; $0.001 \leq F \leq 1.000$) separated by spaces. In line $N+1$ there are four zeros separated by spaces. Do not process this test case.

Output

Write N lines to standard output. Each should contain a single number 1 if less work is done when rolling the box and 2 if less work is done when pushing it. You are guaranteed that the difference between the works counted in both ways will never be closer than 1% of the larger of the considered values. You can assume the following value of gravitational acceleration: $g=9.80665$.

Example

Input:

```
10 50 10 0.2
20 40 60 0.3
30 100 30 0.4
0 0 0 0.0
```

Output:

```
2
1
1
```

Scoring

For solving this problem you will score **10** points.