Hapless Snail

Once upon a day, a little snail fell into a deep well. Since nobody came for him after several days, the little snail decided to climb out the well by himself.

On the first day, the little snail climbed 5 meters while the sun is up, but slid down 2 meters at night while sleeping. On the second day, the little snail felt a little hopeless and only climbed 90% of the distance as it did on the previous day. And then the following days, the snail only climbed 90% of the distance as it did on the previous day.

Since the snail is not stupid, he will stop climbing on the day when he found that the real distance he climbed the previous day was negative.

Given the depth of the well, on which day did the snail climb out the well or stop climbing?

Input

Input contains multiple test cases and is terminated by end of file. Each test case contains four integers: **H, U, D, F** in a single line. **H** is the depth of the well, **U** is the distance the snail can climb on the first day, **D** is the distance that the snail slid down at each night, where **F%** is the discount factor of the distance that the snail climbed at each day.

($1 \leq D < U < H \leq 100000000$, $1 \leq F < 100$**)**.

Output

For each test case, output a line indicating which day the snail climbed out the well or stopped climbing. Format the output exactly as shown in the example.

Sample Input

10 5 2 90

10 5 2 60

Sample Output

succeeded on day 4

failed on day 4

Hints

In the first example, $5 - 2 + 5 \times 0.9 - 2 + 5 \times 0.9^2 - 2 + 5 \times 0.9^3 \geq 10$

In the second example, $5 \times 0.6^2 - 2 < 0$, the snail would fail on day 4.