

CCC '11 J2 - Who Has Seen The Wind

Time limit: 2.0s **Memory limit:** 256M

Canadian Computing Competition: 2011 Stage 1, Junior #2

Margaret has looked at the wind floating over the prairies for a long time. After these observations, she has created a formula that will describe the altitude of a weather balloon launched from her house. In particular, her equation predicts the altitude A (in metres above the ground) at hour t after launching her balloon is:

$$A = -6t^4 + ht^3 + 2t^2 + t$$

where h is an integer value representing the humidity as a value between 0 and 100 inclusive.

Margaret is curious at what the earliest hour is (if any) that her weather balloon will hit the ground after launch, so long as it is no more than the maximum time, M , that Margaret is willing to wait. You can assume that the weather balloon touches ground when $A \leq 0$.

In order to do this, your program should use the formula to calculate the altitude when $t = 1$, $t = 2$, and so on, until the balloon touches the ground or $t = M$ is reached.

Input Specification

The input is two non-negative integers: h , the humidity factor, followed by M , the maximum number of hours Margaret will wait for the weather balloon to return to ground. You can assume $0 \leq h \leq 100$ and $0 < M < 240$.

Output Specification

If the balloon does not touch the ground in the given time, then output

```
The balloon does not touch ground in the given time.
```

Otherwise, output

```
The balloon first touches ground at hour:  
T
```

where T is a positive integer value representing the earliest hour when the balloon has altitude less than or equal to zero.

Sample Input 1

30
10

Output for Sample Input 1

The balloon first touches ground at hour:
6

Sample Input 2

70
10

Output for Sample Input 2

The balloon does not touch ground in the given time.