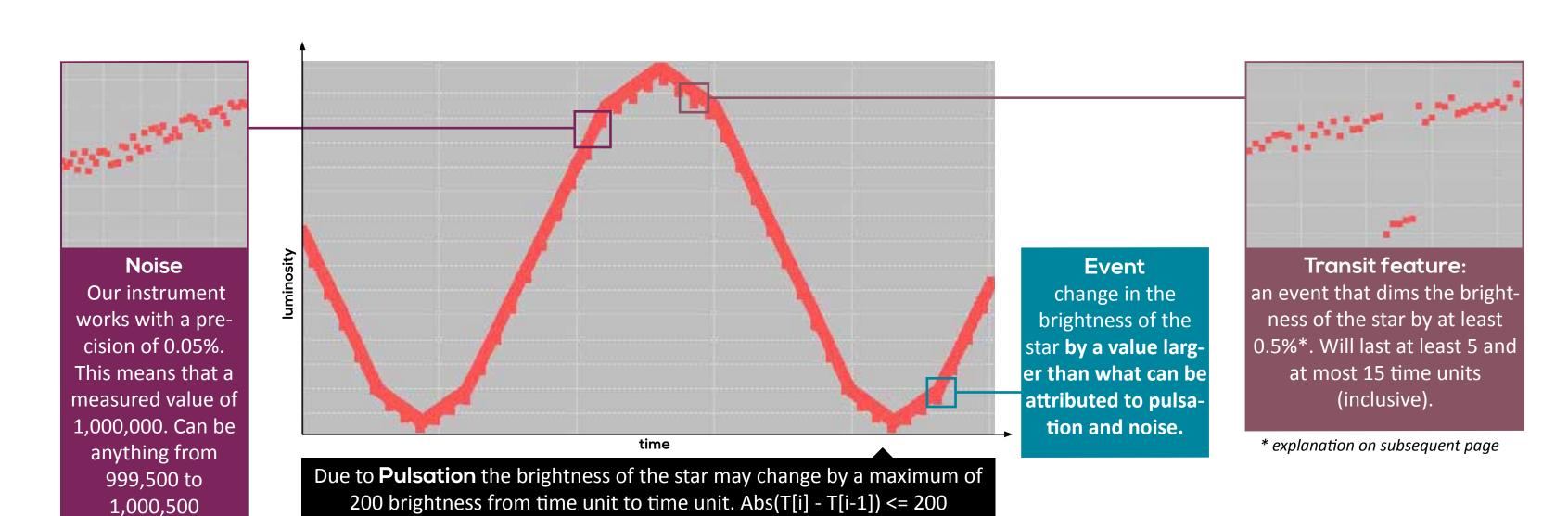
level 4



Not all stars are quiet. Some of them might be pulsating. Our instruments are not exact. We might have noise in the data. You are given a short light curve containing at most 1 event.

Your task is to determine if the light curve contains a transit feature, a solar flare, a random event or nothing.



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level 4



Explanation

Given 2 brightness points L[i] and L[i+1], where L[i] does not belong to an event, a transit feature starts at i+1 if and only if: L[i] * (1 + 0.05 / 100) - L[i+1] * (1 - 0.05 / 100) - 200 > L[i]*0.5/100

For example:

```
L[i] = 1,000,200, L[i+1] = 995,000, where L[i] does not belong to another event L[i] * (1 + 0.05 / 100) = 1,000,700 \mid L[i+1] * (1 - 0.05 / 100) = 994,502 \mid L[i] * 0.5 / 100 = 5,001 1,000,700 - 994,502 - 200 = 5,998 | 5,998 > 5,001, therefore <math>L[i+1] is the beginning of a transit feature
```

Input

- format: same as for level 3

- file: level4.zip

Output

A list of star names, each followed by its type: An event can have one of the following types:

- solar flare (output: 'flare')

- transit feature (output: 'transit')

random event (output: 'something')

- no event (output: 'nothing')

Input Example

3 f 15 994746 994569 994918 994337 999006 998520 999411 998843 999136 995730 995282 995268 996255 996184 995914 t 15 1083157 1082612 1082807 1083624 1077503 1078030 1078569 1078587 1078606 1083314 1084230 1083641 1084852 1084784 1084226 s 15 1006323 1005792 1005615 1005893 998006 998008 998014 1006890 1007124 1007144 1007428 1006954 1006845 1006988 1007477

Output Example

f flare t transit s something

level 4



Constraints (it is guaranteed that):

- During a single event the luminosity is constant.
 - Pulsation and noise DO have an effect.
- An event can last from 1 to 15 time units. (inclusive)

Remember that

- Solar flares are events that increase the brightness of the star.
- Transit features are events that decrease the brightness of the star by at least 0.5% and have a length of at least 5.
- If an event is not a solar flare or a transit feature then it's just a random event.

