
Hash tables

P83317_en

Assaig Primer Concurs de Programació de la FME (2004)

“Open Addressing” is a variant of hash tables, which (simplifiedly) consists of:

Being x any key, being MAX the size of the vector where the information is stored, being $h1(x)$, the first position where will be tried to store x (a value between 0 and $MAX-1$), and being inc a value (which sometimes depends on x) between 1 and $MAX-1$. Then, the following position where would be tried to store x in the case that $h1(x)$ was occupied would be $h2(x) = (h1(x) + inc) \bmod MAX$, and so forth to $hMAX(x) = (hMAX-1(x) + inc) \bmod MAX$. (Notice that with $inc = 1$ we obtain one of the variants of hash tables that we implemented in a laboratory practice.)

For instance, if $MAX = 5$, $h1(x) = 1$ and $inc = 2$, the positions of the vector would be visited (if it was needed) in the following order: 1, 3, 0, 2, 4. However, if $MAX = 6$, $h1(x) = 1$ and $inc = 2$, the order would be: 1, 3, 5, 1, 3, 5. As you can see, in the first case all the MAX positions are visited, but not in the second one.

Write a program that decides for each combination of MAX , $h1(x)$ and inc given, if the combination is good (visites all the positions) or it is not.

Input

Input consists of zero or more cases. Each case consists of a line with MAX , $h1(x)$ and inc . (We assure you that $2 \leq MAX \leq 50000$.) A line with three zeros indicates the end of the input.

Output

For each case, print in a line “good” or “bad” as required.

Sample input

```
5 1 2
6 1 2
0 0 0
```

Sample output

```
good
bad
```

Problem information

Author : Salvador Roura

Translator : Carlos Molina

Generation : 2024-05-03 00:28:36

© Jutge.org, 2006–2024.

<https://jutge.org>