

11508 Life on Mars?

Recently, the top-secret space vehicle *Stardust* was launched by the Association for the Cosmos Mission, ACM for short. The sole purpose of this mission is to collect scientific data regarding the existence of life on Mars. As a matter of fact, *Stardust* is an unmanned vehicle.

The *Stardust Atmospheric and Surface Composition Spectrometer*, *Stardust*'s one-of-a-kind instrument, will measure the abundance of atmospheric gases around Mars and detect minerals in its surface materials. Once samples are taken, *Stardust* will transmit the findings to the *Stardust Mission* back to Earth. Nevertheless, scientists are afraid that upon the existence of *Martians*, Mars inhabitants, they will be clever enough to intercept messages, not only destroying them but also faking them.

An *Stardust* message is a non-empty sequence $S = S(0) S(1) \dots S(n-1)$ of natural numbers. The **blank** is used to delimit the elements of the sequence. A message is considered *valid* if there is a permutation of S , say S' , such that S' is idempotent, that is, for all $0 \leq i < |S'|$ it holds that $S'(S'(i)) = S'(i)$. Any non-valid sequence is considered *hacked*.

You have been assigned to the *Stardust Mission*. Your task is to write an efficient verifier for the messages received from the *Stardust*.

Input

The input consists of several test cases, one per line. Each test case contains a *Stardust* message: a non-empty sequence $S = S(0) S(1) \dots S(n-1)$ of natural numbers ($1 \leq n \leq 10^5$). The **blank** is used to delimit the elements of the sequence.

The end of the input is indicated when the *Stardust* message is '0'. Do not process this last line.

Output

For each case in the input, print one line. If the input message is valid, any idempotent permutation of the input message S must be printed following the format of the input messages. If the input message is hacked, the warning 'Message hacked by the Martians!!!' must be printed in a single line.

Sample Input

```
2 0 1
2 1 1
3 2 2
2 2 2
1 2 2 1 1
2 4 1 3 0
2 4 2 3 0
2 4 6 3 0
5 8 1 9 4 0 7 11 2 6 10 3
5 2 1 2 4 0 7 11 2 6 2 3
1 2 1 2 1 0 7 11 2 6 2 1
1 2 1 2 1 0 7 7 2 6 2 1
1 2 1 2 1 0 7 7 2 6 12 1
0
```

Sample Output

```
0 1 2
1 1 2
Message hacked by the Martians!!!
2 2 2
1 1 2 1 2
0 1 2 3 4
0 2 2 3 4
Message hacked by the Martians!!!
0 1 2 3 4 5 6 7 8 9 10 11
0 1 2 3 4 5 6 7 2 2 2 11
0 1 2 1 1 1 6 7 2 2 2 11
0 1 2 1 1 1 6 7 2 2 2 7
Message hacked by the Martians!!!
```