While excavating old ruins in the Amazon jungle, you've come across an underground tunnel that forms a large circle, filled with strange machinery. You have finally found the site of the fabled Mayan particle accelerator! Before starting to flip any switches to see if it can be turned on (and hopefully avoiding any of the traps which will kill you with high-powered lasers), it's important to make sure you know exactly where in the tunnel you are.

The tunnel has mystic symbols carved into the walls at regular intervals. Your assistants have made a map that shows all the symbols encountered when walking clockwise around the tunnel, starting from some arbitrary point. Unfortunately, the same mystic symbol may occur in more than one place in the tunnel, so it might not be enough to just look at the nearest symbol. You may need to walk around the tunnel looking at symbols until you have enough information to be sure you know where you are on the map. It might even be impossible (for example, if all the symbols are the same).

You want to know the shortest possible time in which you can be sure you know where you are, if it is possible. It takes you one minute to walk from one symbol to an adjacent one. Ignore the time needed to walk from where you start to the nearest symbol. Note that the symbols are positioned so that they can only be read when standing directly in front of them.

As an example, suppose the map reads `AAB` (where each English letter represents one mystic symbol). In this case, one minute suffices: if you start at a `B`, you already know where you are, while if you start at an `A`, then you can move to the next symbol in either direction to have enough information to know where you started.

Input

Input consists of an arbitrary number of maps, but no more than 25. Each map consists of a line containing upper-case English letters ('`A`' to '`Z`'), which represent the symbols on the tunnel in the order they appear walking clockwise around the tunnel. Each map contains between 3 and 1000 symbols, inclusive.

The end of input is indicated by a line containing only the value '`-1`'.

Output

For each input map, output a line containing the minimum time (in minutes) in which you can guarantee that it will be possible to know your location, regardless of where you started. If it is impossible to ever know your location, output '`-1`' for that map instead.

Sample Input

```
AAB
ABCABC
ABCABCD
CABBABBAAA
-1
```

Sample Output

```
1
-1
2
3
```