Project Panoptes

Project Panoptes (projectpanoptes.org) will attempt to use low-cost robotic telescopes to collect data, in order to find exoplanets (planets outside of our solar system). For this program you will implement a simple version of software to detect exoplanets from readings from these telescopes.

The telescope will take daily readings of the brightness of a star. If the brightness of the star decreases, a planet may be passing in front of it. If the brightness decreases following a regular pattern, it is a candidate for having an exoplanet.

For example, consider the daily readings of a star's brightness below:

Day	Brightness	Day	Brightness	Day	Brightness
1	20.6	6	22.2	11	**10.8**
2	21.0	7	**4.8**	12	22.9
3	23.2	8	25.9	13	30.4
4	**12.0**	9	**13.0**	14	**8.6**
5	17.5	10	**12.2**	15	24.9

The average of these readings is **18**. If a reading is less than **80%** of the average of all readings, it is considered to have decreased, so readings below **14.4** are considered to be potential planet sightings (and are highlighted here). The readings at days **4**, **9**, and **14** happen every fifth day (and thus has a period of **5**) and may be because of an exoplanet. Similarly, the readings for day **7** and **14** may indicate an exoplanet. Days **4**, **7**, and **10** do not form a pattern because it would also have to include day **1** and day **13**. Only integer length periods should be considered.

Input

Each input will consist of a single test case. Note that your program may be run multiple times on different inputs. The first line of input contains two integers, ***n*** (**2≤*n*≤*1,000***) and ***p*** (**1≤*p*≤*n*-1**), where ***n*** is the number of observations, and ***p*** is the minimum period length to consider. Each of the next ***n*** lines will contain a floating point number ***x*** (**0.0≤*x*≤100.0**), which is the brightness for that day. The days will be in order.

Output

Output a single integer, indicating the smallest possible period of an exoplanet (must be ≥***p***), or **-1** of there is none.

Sample Input	Sample Output
15 2 20.6 21.0 23.2 12.0 17.5 22.2 4.8 25.9 13.0 12.2 10.8 22.9 30.4 8.6 24.9	5