

Life on Fornax

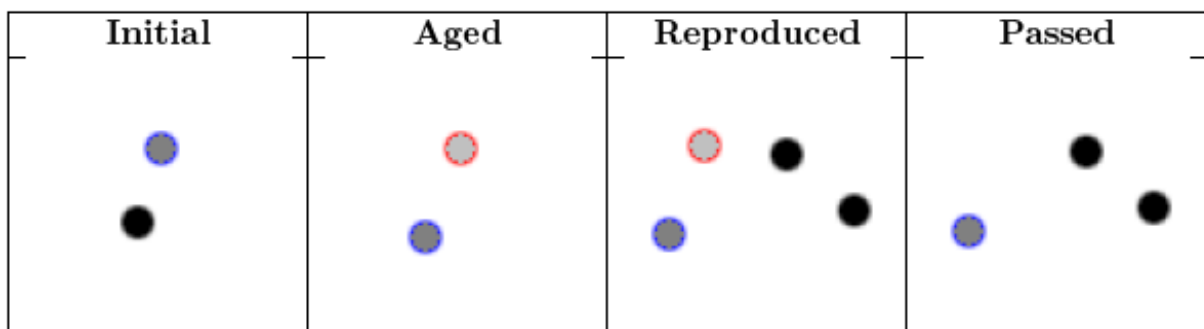
NASA's Ultrasonic Crawling Vessel, UCV for short, has arrived to galaxy UDFj - 39546284 in the Fornax constellation and has found a peculiar type of bacteria-like lifeform. As you may imagine a plan to collect samples and bring them back to earth has been set in motion. However, it would be rather unfortunate if they are all dead by the time the UCV gets back, the trip would take approximately 13.42×10^9 years travelling at light speed. Therefore, it's necessary to pick a number of bacteria so that there are at least some of them alive when the UCV arrives back.

The UCV has studied the reproduction cycle of the bacteria inside a cryogenic pod and their behavior when released from the pod, but it lacks the algorithm to compute the final number for such a long period of time. Fortunately, it's been designed with a wormhole plugin installation mechanism that allows to upload algorithms in a matter of only a few years.

When the bacteria are inside the cryogenic pod, they follow a very simple reproduction cycle. Every year the following three phases, in order, occur:

1. Aging phase: Each bacteria becomes a year older.
2. Reproduction phase: Each bacteria gives birth to a new bacteria, this is slightly different to earth bacteria in the sense that the new and old bacteria are not identical. The new bacteria is 0 years old while the old bacteria is at least 1 year old.
3. Passing phase: Each bacteria that reaches maturity, exactly M years old, dies.

For example, this one reproduction cycle given a 0 years old bacteria and a 1 years old bacteria if maturity is reached at 2 years old.



As you can see, during cryogenic reproduction, there's no fear of bacteria extinction, the number of births is at least as much as the number of deaths. However, when the pod is opened the bacteria enter into a strange iterative reduction phase, in each step of the reduction the oldest R bacteria die immediately; this process ends when there are fewer than R bacteria left. Note that the biggest problem arises when at some iteration there are exactly R bacteria left because they all die at that moment.

NASA has asked you to write the algorithm that will be uploaded to the UCV to determine the number of bacteria that will exist after the pod is opened here on earth.

Input

The input contains several test cases, each one corresponding to a single simulation. Each test case starts with a line with three integers, the maturity age ($1 \leq M \leq 50$), the number of years for the UCV to come back ($0 \leq Y \leq 10^{12}$) and the reduction size ($1 \leq R \leq 10^9$); separated by a single space. The following line contains M integers, they represent the number of 0, 1, ..., $M - 1$ years old bacterium placed inside the cryogenic pod.

The end of input is indicated by a test case with $M = Y = R = 0$.

Output

For each simulation output a single line containing a single integer, the number of bacterium that will be alive after the reduction process has nalized.

Example

Input:

```
2 1 4
1 1
2 1 2
1 1
2 2 2
1 1
2 2 5
1 1
6 0 100000
0 1 2 3 4 5
6 1000000000000 100000
0 1 2 3 4 5
0 0 0
```

Output:

```
3
1
1
0
15
21809
```