Guess the Memory Limit

Chef has designed a program but has forgotten the memory limits that he is allowed to consume on his system.

There is a limit of L

bytes of memory that Chef's program can consume on Chef's computer.

If Chef's program attempts to use more than L

bytes then it will result in segmentation fault.

Fortunately he has designed his program in such a manner that given an integer M

, the program will consume exactly M bytes of memory. (Chef can change this number M

at will and run the program).

Help Chef in finding the memory limit of the program.

It is guaranteed that the memory limit is strictly less than 1 billion bytes or 1 giga byte and at least 1.

You are given a function $run\_program(m)$

that will return **true** if the program ran properly while consuming exactly m

bytes of memory, and **false** if it receives segmentation fault, i.e. the program used too much memory.

Help Chef in writing a program that does not take more than 31

tries to figure out the memory limit.

You are given a solution template.

You can use the function $run\_program(x)$

to determine whether x

bytes are allowed or not.

Find the memory limit L

. You cannot call $run\_program$

more than 31 times in your code, if you do so you will receive a "Wrong Answer" verdict.

Instructions

Follow the solution template. Copy paste the same code in your computer and complete the function $find\_memory\_limit$

.

Do not make any changes to the other part of the code given in the solution template.

Local Testing

Local Tester is a python program where you will find an empty function $find\_memory\_limit$

, fill in your solution here and run this program as you would normally run a python program in your computer.

The given tester generates random arrays, you can play around with them or give specific values to test your code locally.

Constraints

$1 \le L \le 109-1$

Sample Solution

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Explanation

In the sample solution, we run the program for all possible memory limits starting from 1

. If the smallest number for which the program failed is x then $x-1$

must be the memory limit.

However the program receives Wrong Answer because it calls $runprogram$

too many times. For example if the memory limit $L=33$ bytes, then it will call the function 32 times, however you are allowed to run it only 31 times.