Task 2. GUESS

0.1 sec. 256 MB

Write a program **guess**, implementing the function `find_number` that will be compiled with the jury's program and should return one number – the unknown number for you that the jury has in mind. It is always positive. You have to guess by asking questions "Is the jury's number less than x?".

Implementation details

The function `find_number` must have the following prototype:

```
int find_number (int MAX);
```

It is called once by the jury's program with the argument MAX – the maximum possible value for the jury's number. When your function finds the unknown number, it must return it. To communicate with the jury's program, you have been provided with the following function:

```
bool smaller (int x);
```

This function ask whether the unknown jury number is less than x and returns `true` or `false`, depending on the inequality.

You must submit the file `guess.cpp` to the system which contains the `find_number` function. It may contain other code and functions necessary for your work, but it must not contain the `main` function. Also, you must not read from the standard input or print to the standard output. Your program must also include the `guess.h` header file by instruction to the preprocessor:

```
#include "guess.h"
```

Constraints and evaluation

- $1 \leq MAX \leq 10^9$
- Your points for one test are determined by the formula: $\min(\frac{\lceil log_2 MAX \rceil + 1}{c}, 1) \times t$, where c is the number of calls to function `smaller` and t is the maximum number of points given for the test.

Example communication

Let MAX be 5 and the unknown jury number be 3.

Contestant action	Jury's action	Explanation
`smaller(1)`	`false`	3 is not less than 1
`smaller(2)`	`false`	3 is not less than 2
`smaller(3)`	`false`	3 is not less than 3
`smaller(4)`	`true`	3 is less than 4. Here it can be concluded that the unknown number is 3
`return 3;`	–	–

Local testing

For local testing you are provided with the files `guess.h` and `Lgrader.cpp`. Place your file `guess.cpp` and the two provided files in the same folder. Then compile the three files together. In such a way, you will obtain a program to check the correctness of your function. The program will require the following sequence of data: on the only line of the standard input two positive integers – the maximal possible value and the jury's number. The program will output the number found by your function.