Problem 5: Fibbing Fibonacci, Byteman!

Difficulty: Easy

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Problem Background

Leonardo Bonacci, more commonly known as Fibonacci, was an Italian mathematician from the 12th century. Among his claims to fame are the Fibonacci numbers, which were originally derived to help model population growth amongst rabbits. The sequence has since been found to be related to the "golden ratio," a ratio inspired by nature with many applications to science, engineering, and design.

As a result, Fibonacci numbers have many applications today, including at Lockheed Martin! Teams using the Agile development methods sometimes use Fibonacci numbers to rate the difficulty of an upcoming task. This works well, because as a task's difficulty increases, there is more uncertainty associated with completing the task on time; the increasingly large gaps between Fibonacci numbers helps to illustrate this increased risk.

Your team has started to use Agile methods to help manage your workload, but it seems as though you spend more time arguing over which numbers are Fibonacci numbers than you do actually planning anything. Let's write a software program to settle the matter once and for all, so that we can get on to more important topics.

Problem Description

The Fibonacci numbers are a sequence of numbers, where each number is equal to the sum of the two previous values. The Fibonacci numbers usually start with 0 and 1, so the beginning of the sequence is:

$$0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, ...$$

Put another way, the ith Fibonacci number can be expressed as...

$$f_i = f_{i-1} + f_{i-2}$$

...where $f_0 = 0$ and $f_1 = 1$.

Given an integer, your program needs to determine if that integer is part of the Fibonacci sequence.

Sample Input

The first line of your program's input, received from the standard input channel, will contain a positive integer representing the number of test cases. Each test case will include a single line containing a non-negative integer.

2
12
89

Sample Output

For each test case, your program must print a line with the word "TRUE" if the given number is a Fibonacci number, or "FALSE" if it is not.

FALSE
TRUE