Problem 125: Pascal's Triangle

Difficulty: Medium

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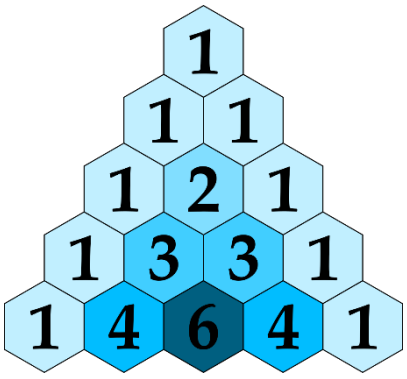
Problem Background



Pascal's Triangle is a mathematical construct that illustrates a wide range of interesting mathematical properties... which we won't bore you with here. In most of the Western world, the triangle is named after French mathematician Blaise Pascal in honor of his work on the triangle, but the formation of the triangle itself and some of its properties were well known long before Pascal came along. As a result, the triangle has many other names, including the "Khayyam Triangle" (Iran, after Omar Khayyám), "Yang Hui's Triangle" (China, after Yang Hui), and "Tartaglia's Triangle" (Italy, after Niccolò Fontana Tartaglia), among others.

Despite its numerous qualities and names, constructing the triangle is relatively simple. The triangle consists of a series of rows, in which each row is used to create the next. The first row, row 0, consists of a single number 1. Each subsequent row adds an additional number, creating a pyramid shape, where each number is the sum of the two above it (blank values from outside the triangle are considered to be 0). As a result, row 1 consists of two numbers, 1 and 1, since there are no other numbers to add together. Row 2 is the first row to contain a number greater than 1, with the numbers 1, 2, and 1; the center cell is the value of both cells from the previous row added together.

While its construction is simple, the numbers in the triangle grow in magnitude very quickly and can become unmanageable if building a triangle by hand. Even computers can begin to run into problems after too many rows!

Problem Description

Your team must write a program that can calculate the largest number in a given row of Pascal's Triangle. Remember that row 0 contains only the number 1; the image above shows the numbers contained in rows 0 through 4. (Note that the second number in each row equals the row's index number; this is one of many patterns that may help you solve this problem!) Also keep in mind that the numbers in Pascal's triangle can get very large very quickly; depending on your programming language, that could prove difficult.

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 line containing a single non-negative integer less than or equal to 60, representing the index number of a row in Pascal's Triangle.

```
3
3
4
7
```

Sample Output

For each test case, your program must output the highest value present in the given row of Pascal's Triangle. Each test case must be printed on a separate line.

```
3
6
35
```