### **SIENA COLLEGE**

**29th Annual** High School Programming Contest

##### **April 1, 2016**

###### Problem #2:  Mr. Bill’s Triangular Year(s)

Background Information:  Bill Powers (aka mrbill) has competing in college level programming contests and volunteering at Siena’s high school programming contests since he was a student here. For most of his career he has worked and lived in the Boston/New Hampshire area. Almost every spring he has come back to Siena for the contests. mrbill is “retiring” from the contest this year. In recognition of his loyalty and many years of hard work, we have dedicated this 2016 problem to him.

Think back just a few short months to the start of the year 2016. Were you thinking about how interesting the number 2016 is? The number 2016 = 48 x 42 = (45 + 3)(45 – 3) = the difference of two perfect squares, 452 – 32. The number 2016 = 210 + 29 + 28 + 27 + 26 + 25 which is the sum of consecutive powers of two. Not only can 2016 be expressed as the sum of consecutive powers of two, the number can be expressed as the difference of a pair of powers of two, 2016 = 211 - 25. There are other interesting things about 2016. For those who like cubes, 2016 = 33 + 43 + 53 + 63 + 73 +83 + 93. If you want more power than cubes, 2016 = 114 – 104 – 94 + 84 – 74 + 64 + 54 + 44 + 34 – 24 – 14. For factorial and double factorial fans, 2016 = 9!! + 8!! + 7!! + 6! - 5! - 4! + 3! - 2! + 1! + 0! where the single factorial of X is the product of the natural numbers less than or equal to X (for example: 5! = 5x4x3x2x1) and the double factorial of an even value of X is the product of the even natural numbers less than or equal to X (for example: 8!! = 8x6x4x2 = 384) and the double factorial of an odd value of X is the product of the odd natural numbers less than or equal to X (for example 9!! = 9x7x5x3x1 = 945).

Perhaps the coolest thing about 2016 is that it is 1 + 2 + 3 + 4 + 5 + 6 + … + 58 + 59 + 60 + 61 + 62 + 63. This means that 2016 is a triangular number and specifically, it is the 63rd triangular number.

The following sequence of dots shows why the sum of consecutive integers is called triangular. 

From the diagrams above you can see that 1 is the first triangular, 3 is the second, 6 is the third, and so on.

###### Programming Problem:

Input:  A positive integer N less than or equal to 1,000,000,000.

Output: The integer 0 if N is not a triangular number and if N is a triangular number which one.

###### Example 1: Input:  10

######  Output:  4

###### Example 2: Input:  7

######  Output:  0

###### Example 3:  Input:  2016

###### Output:  63