Hello World!

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1 HDTN:Introduction

A highly divisible triangle number is the sum of natural numbers.
The question posed in the archive of project euler, asks, what is the value of the first triangle number to have over 500 divisors. This seems slightly related to prime numbers as a prime is a number divisible by one and itself, so then no HDTN should be prime. The only prime contained in the HDTN sequence is 3 as the sum of 1 + 2. All numbers thereafter appear to be divisible. The point of these documents is to develop a sense of mathematical understanding in conjunction with haskell inorder to provide solutions that are as near to optimal as possible. This includes some deductive reasoning backed with inextensive proofs.

2 HDTN:Insights A

This section contains considered insights from the sequence of HDTN, the next section will be forming the general shape of assumptions that can be made based on these insights.

Consider; [1,3,6,10,15], HDTN sequence of cardinality 5.
0+1 = 1
1+2 = 3
1+2+3 = 6
1+2+3+4 = 10
1+2+3+4+5 = 15
Algebraic mapping of such;
$0 + 1 = 1$
$a + b = b \; when \; a = 0$ hence
$1 + 2 + 3 + 4 + 5 = 15$
$a + b + c + d + e = f$
with a further simplification as such;
$x_1 + x_2 + x_3 + x_4 + x_5 = y_5$

induction into sets;
$x_i \in [x_n ... x_d]$ $y_i \in [y_n ... y_d]$
as a set X maps to a singular value, it is expressed as such;
$f([x_i ... x_d]) = y_d$, where the function is of the form;

$$f([x_i ... x_d]) = \sum_{i}^{d} = x_i + x_{i+1} \tag{1}$$

3 HDTN:Insights B

Carefully. Very, carefully, avoid a pitfall, that being the dissolution of a pattern with hidden infinities. The above function, is hard, I think there are very few methods that yield insights into the function and generation of the final HDTN. Taking the rate of change may be the most fruitful method. First I will explain what is ment by a pitfall. Quite simply. It is a hidden polynomial. Where the degree of the polynomial is dependant on the cardinality of the domain.
Writing the full form of the above function with cardinality 4 results in such; $f([x_1...x_4]) = x_1 + x_2 + x_3 + x_4$ if not clear at this point, let $x = ax$ then; $f([x_1...x_4]) = a_1x_1 + a_2x_2 + a_3x_3 + a_4x_4$