

Re: compositing / decomposing numbers

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=?ISO-8859-1?Q?Daniel_Sj=F6blom?= <dsjoblom@mbnet.fi_NOSPAM> writes in article <40c44f8e\$0\$12816\$7b6a8dc4@news.mbnet.fi> dated Mon, 07 Jun 2004 14:21:49 +0300:

>Matthijs Blaas <<remthis>thijs_blaas wrote:

>> Hi All,

>>

>> I want to construct a number from X values and do something with each number

>> so I can calculate a value on position P back.

>>

>> number 1: 5

>> number 2: 8

>> number 3: 9

>> total: 22

>>

>> For example, is there a way I could calculate number 2 back to 8 given the

>> total nr of values(3) and some kind of logic (like multiplying with

>> sequentially ordered prime numbers or something)? I don't think there's any

>> way of doing this with multiplication, but my knowledge of math is limited

>> (maybe there is some method available) and I need something similar to this

>> for an computer program Im writting...

>

>Assuming all the numbers are positive, you could do the following:

>

>First label each number x with a label i, starting from 1. Then for each

>x construct a number y so that

>

>y = i-th prime ^ x

>

>Then compose a number z that is the product of all y. To find x given i

>and z, do the following:

>

>Factor z into standard form:

>

> $p_0^{x_0} * p_1^{x_1} * ... * p_n^{x_n}$

>

> From that factoring find the prime p_n that is the i-th prime. Then x is

>the x_n corresponding to that p_n .

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That works great and even gives you the number of values. But it tends to make some large numbers — the example (5,8,9) would give 410,062,500,000.

If you have a range for your numbers the job is easier.