G • Rhyme Schemes

Problem

The *rhyme scheme* for a poem (or stanza of a longer poem) tells which lines of the poem rhyme with which other lines. For example, a *limerick* such as

> If computers that you build are quantum
> Then spies of all factions will want 'em
> Our codes will all fail
> And they'll read our email
> 'Til we've crypto that's quantum and daunt 'em
>
> Jennifer and Peter Shor (http://www.research.att.com/~shor/notapoet.html)

Has a rhyme scheme of *aabba*, indicating that the first, second and fifth lines rhyme and the third and fourth lines rhyme.

For a poem or stanza of four lines, there are 15 possible rhyme schemes:
aaaa, aaab, aaba, aabb, aabc, abaa, abab, abac, abba, abbb, abbc, abca, a bcb, abcc, and *abcd*.

Write a program to compute the number of rhyme schemes for a poem or stanza of N lines where N is an input value.

Input

Input will consist of a sequence of integers N, one per line, ending with a 0 (zero) to indicate the end of the data. N is the number of lines in a poem.

Output

For each input integer N, your program should output the value of N, followed by a space, followed by the number of rhyme schemes for a poem with N lines as a decimal integer with at least 12 correct significant digits (use double precision floating point for your computations).

Example

Input	Output
1	1 1
2	2 2
3	3 5
4	4 15
20	20 51724158235372
30	30 846749014511809120000000
10	10 115975
0	