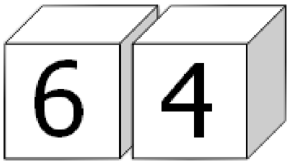
Project Euler #90: Cube digit pairs

Problem Statement

This problem is a programming version of Problem 90 from projecteuler.net

Each of the six faces on a cube has a different digit (0 to 9) written on it; the same is done to a second cube. By placing the two cubes side-by-side in different positions we can form a variety of 2-digit numbers.

For example, the square number 64 could be formed:



In fact, by carefully choosing the digits on both cubes it is possible to display all of the square numbers below one-hundred: $01, 04, 09, 16, 25, 36, 49, 64, \ and\ 81$.

For example, one way this can be achieved is by placing $0, 5, 6, 7, 8, 9$ on one cube and $1, 2, 3, 4, 8, 9$ on the other cube.

However, for this problem we shall allow the 6 or 9 to be turned upside-down so that an arrangement like $0, 5, 6, 7, 8, 9$ and $1, 2, 3, 4, 6, 7$ allows for all nine square numbers to be displayed; otherwise it would be impossible to obtain 09.

In determining a distinct arrangement we are interested in the digits on each cube, not the order.

$1, 2, 3, 4, 5, 6$ is equivalent to $3, 6, 4, 1, 2, 5$
$1, 2, 3, 4, 5, 6$ is distinct from $1, 2, 3, 4, 5, 9$

But because we are allowing 6 and 9 to be reversed, the two distinct sets in the last example both represent the extended set $1, 2, 3, 4, 5, 6, 9$ for the purpose of forming 2-digit numbers.

How many distinct arrangements of the M cubes allow for all of the first N square numbers ($1..N^2$) to be displayed?

Input Format

Each test contains a single line with two numbers - N and M

$1 \leq M \leq 3$
$1 \leq N < 10^{\frac{M}{2}}$

Output Format

Output should contain the only number - the answer to the problem.

Sample Input

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3 1
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Sample Output

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55
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Explanation

In order to display 3 numbers - 1, 4 and 9 - our only cube should have (1,4,9) or (1,4,6).
That gives us $\binom{7}{3} = 35$ variants for (1,4,9), $\binom{7}{3} = 35$ variants for (1,4,6) and $\binom{6}{2} = 15$ variants for (1,4,6,9) as the intersection to be subtracted.
Now, $35 + 35 - 15 = 55$.