The Sums of Powers ★

Points: 553.1800000000001 Rank: 1150

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Find the number of ways that a given integer, X, can be expressed as the sum of the Nth power of unique, natural numbers.

Input Format

The first line contains an integer X.

The second line contains an integer N.

Constraints

- $1 \leq X \leq 1000$
- $2 \leq N \leq 10$

Output Format

Output a single integer, the answer to the problem explained above.

Sample Input 0

```
10
2
```

Sample Output 0

```
1
```

Explanation 0

If $X = 10$ and $N = 2$, we need to find the number of ways that 10 can be represented as the sum of squares of unique numbers.

$10 = 1^2 + 3^2$

This is the only way in which 10 can be expressed as the sum of unique squares.

Sample Input 1

```
100
2
```

Sample Output 1

```
3
```

Explanation 1

$100 = 10^2 = 6^2 + 8^2 = 1^2 + 3^2 + 4^2 + 5^2 + 7^2$

Sample Input 2

```
100
3
```

Sample Output 2

```
1
```

Explanation 2

100 can be expressed as the sum of the cubes of $1, 2, 3, 4$.
$(1 + 8 + 27 + 64 = 100)$. There is no other way to express 100 as the sum of cubes.

Change Theme   Language [Haskell   ˅]

```haskell
1   import Data.List as L
2   import Data.Maybe
3   import Control.Monad
4   import Debug.Trace
5
6   nsum :: Int -> Int -> [Int] -> [Maybe [Int]]
7   nsum n t [] = []
8   nsum n t (x:xs) = f (n-1) (t-x) [x] xs ++ nsum n t xs
9       where f 0 0 hs _    = [Just hs]
10            f 0 _ _ _     = [Nothing]
11            f _ _ _ []    = [Nothing]
12            f n' t' hs xs' = g hs <$> nsum n' t' xs'
13            g hs (Just ts) = Just $ hs ++ ts
14            g hs Nothing = Nothing
15
16  solve :: Int -> Int -> Int
17  solve x n = foldl' f 0 [1..m]
18      where xs = L.takeWhile (<= x) $ (^ n) <$> [1..]
19            m = length $ fromJust $ L.find ((>= x) . sum) $ L.inits xs
20            f ans i = ans + length (catMaybes $ nsum i x xs)
21
22
23  main = do
24      x <- read <$> getLine
25      n <- read <$> getLine
26      print $ solve x n
27
```

Line: 27 Col: 1

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