everything. Blue Mary, the well-known scientist, is to work out the secret of this aerolite for further study.

Blue Mary has found out that their are some numbers on this aerolite, 5 per line:

```
1 1 1 1 6
0 0 6 3 57
8 0 11 3 2845
```

With her genius, Blue Mary knows that the 5th number is the key to solve the problem, but in some lines the 5th numbers were destroyed and we cannot know what they are instantly.

After some days, she finds out the way to calculate the 5th number finally, which is:

- A Regular Expression(RE) is a string which only contains characters '{', '[', '(', ')', ']', '}' and satisfies the rules below.
- An empty string is an RE.
- If there's no character '[', ']', '{', '}' in RE A, then (A) is an RE.
- If there's no character '{', '}' in RE A, then [A] is an RE.
- If A is an RE, {A} is an RE.
- If both A and B are REs, AB is an RE.

For example "()(())[]", "{()[()]}", "{{[[(())]]}}"(all without quotes) are REs and "()([])()", "[()" are not REs.

The deep of an RE A, D(A), is defined as below:

- If A is an empty string, D(A) = 0;
- If A can be written as BC, D(A) = max(D(B), D(C));
- If A can be written as (B) or [B] or {B}, D(A) = D(B)+1.

Such as $D("(){()}[]") = 2$.

Suppose the first 4 numbers in current line are L1, L2, L3 and D, then the 5th number in current line is the number of REs modulo 11380. Each of the REs must have a depth of D and is made of L1 {}, L2 [] and L3 ().

Now Mary needs your help to work out the 5th number.

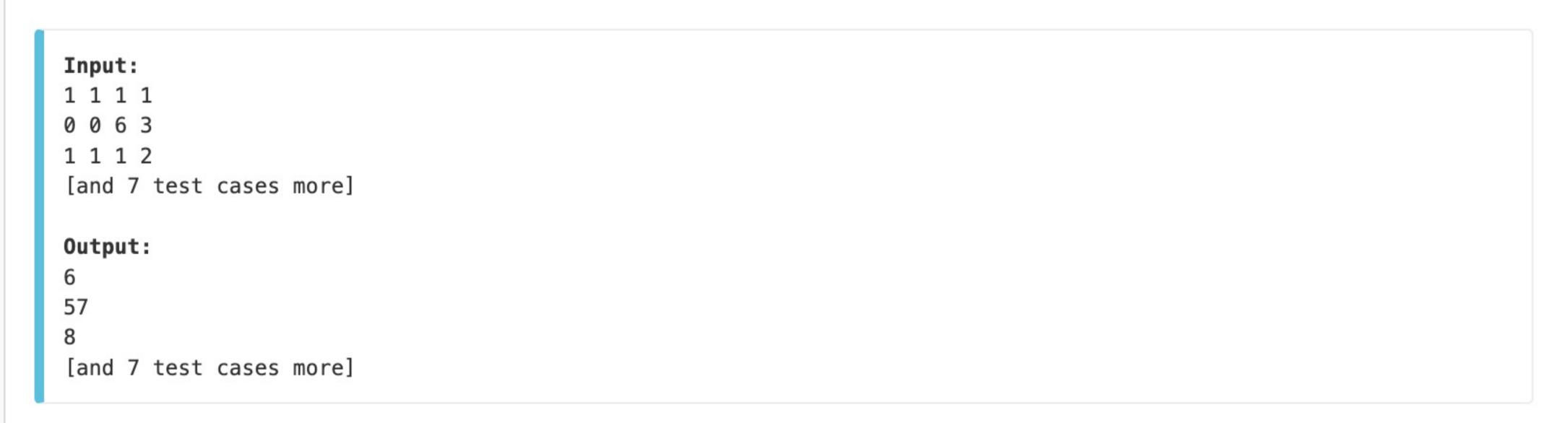
Input

Input contains exactly 10 test cases. Each test case contains one line, which contains 4 numbers L1, L2, L3, D (0 ≤ L1, L2, $L3 \le 10$, $0 \le D \le 30$), separated by single spaces.

Output

Ten lines, each contains a single integer denoted the 5th number.

Example



Submit solution!

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sky_scraper: 2019-06-03 20:52:50

The time limit is very open and it allows you to even code 6D recursive top-down solution. It is a very nice problem to learn parenthesis style DP.

Last edit: 2019-06-03 20:53:27



narek: 2017-12-30 06:56:36

@techidspoj:

[()]{} {}[()]

{()}[] [] { () }

{ [] } ()

() { [] } { () [] }

{ [] () }

techidspoj: 2017-04-02 06:39:36

Can someone explain to me why 1 1 1 2 in the example of test case is equal to 8?

raga39: 2016-02-15 07:10:43 Can anyone say me how to approach this problem?

Hussain Kara Fallah: 2012-07-29 20:10:14 L1 defines the number of pairs of {} or the number of brackets {}

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