

Multiplicative digital root

For an integer find the multiplicative digital root of it! Multiple all nonzero digits of that number and repeat this process until it is only a single digit. We call that digit the multiplicative digital root of the number. For example the multiplicative digital root of $n=2009$ is 8, because the first iteration is: $2*9=18$, the second is $1*8=8$, and we stop here.

Input

The first line of the input file contains one integer T , the number of test cases. The following T lines each contains a big positive integer: n , where $n < 10^{10000}$

Output

Output the multiplicative digital root for each n .

Example

Input:

```
4
6
2009
55555555
847938630482747410708417738635300464477112059683336648877683
```

Output:

```
6
8
5
2
```

Warning: large input data, be careful with certain languages

Warning: not every languages are available for this task