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EXAM DATE **26** **AUGUST 2018**

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Matrix Counting

Problem Code: **MATRCOMB**

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Consider an $n * n$ matrix A consisting of all zeros. Find the number of ways to fill this matrix with exactly $n + 2$ ones such that the permanent of the matrix is zero. Output your answer modulo $10^9 + 7$.

Note that permanent of a matrix A is defined to be
$Perm(A) = \sum_{\sigma \in S_n} \prod_{i=1}^{n} A[i][\sigma(i)]$, where S_n is the set of all permutations of $\{1, 2, \ldots, n\}$. For more details on the permanent, you can check here (https://en.wikipedia.org/wiki/Permanent_(mathematics)).

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Input

- The only line of the input contains an integer n.

Output

- Output a single line containing your answer modulo $10^9 + 7$.

Constraints

- $2 \leq n \leq 10^3$

Information to score partial points

- For 30% of the score: $1 \leq n \leq 10$
- Remaining 70%: No extra constraints.

Sample Input #1

```
2
```

Sample Output #1

```
0
```

Explanation #1

n is 2. Hence we should fill the matrix with 4 ones. There is only one matrix with 4 ones of size 2 * 2, i.e. all entries of the matrix are one. The permanent of this matrix is 2. Thus, there is no way to fill the matrix with 4 ones and have permanent zero. So, the answer will be zero.

Sample Input #2

```
3
```

Sample Output #2

```
45
```

Author: admin2 (/users/admin2)

Date Added: 14-07-2018

Time Limit:	1 secs
Source Limit:	50000 Bytes
Languages:	C, CPP14, JAVA, PYTH, PYTH 3.5, PYPY, CS2, PAS fpc, PAS gpc, RUBY, PHP, GO, NODEJS, HASK, rust, SCALA, swift, D, PERL, FORT, WSPC, ADA, CAML, ICK, BF, ASM, CLPS, PRLG, ICON, SCM qobi, PIKE, ST, NICE, LUA, BASH, NEM, LISP sbcl, LISP clisp, SCM guile, JS, ERL, TCL, kotlin, PERL6, TEXT, SCM chicken, CLOJ, COB, FS

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CodeChef was created as a platform to help programmers make it big in the world of algorithms, **computer programming** and **programming contests**. At CodeChef we work hard to revive the geek in you by hosting a **programming contest** at the start of the month and another smaller programming challenge in the middle of the month. We also aim to have training sessions and discussions related to **algorithms**, **binary search**, technicalities like **array size** and the likes. Apart from providing a platform for **programming competitions**, CodeChef also has various algorithm tutorials and forum discussions to help those who are new to the world of **computer programming**.

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