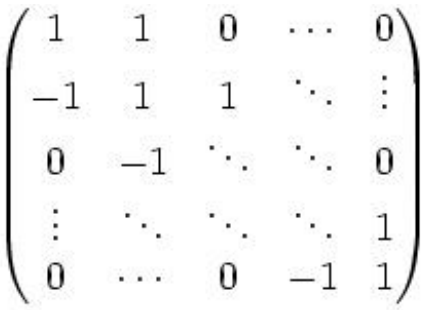
Interesting determinant

Consider the following **nxn** matrix:



Calculate the determinant of such matrix given some **n**

Input

The first line of the input contains number **t** – the amount of tests. Then **t** test descriptions follow. Each test consist of a single integer **n**.

Constraints

1 <= **t** <= 1000
1 <= **n** <= 10^{15}

Output

For each test print the determinant of the matrix modulo **1000000007**.

Example

Input:
3
1
2
3

Output:
1
2
3