Problem C
Abstract Painting

Problem ID: abstractpainting
CPU Time limit: 1 second
Memory limit: 1024 MB

Source: The 2019 ICPC Asia Danang Regional Contest

Gon is currently training to become a modern artist.

Abstract Painting.

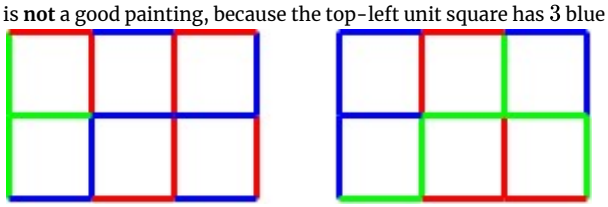
Everyday, Gon practices his painting skill on a rectangular canvas, divided into $R \cdot C$ unit squares, with R rows and C columns. Gon wants to paint all the edges of all unit squares.

Contrary to popular belief, creating a good modern painting is not an easy task. A good modern painting should use a limited number of colors, simple yet elegant. Thus, when creating his painting, Gon strictly adheres to the following rules:

- Only 3 colors are used: Red, Green and Blue.
- All edges of all unit squares must be painted. Each edge must be painted with exactly one color.
- For each unit square, exactly 2 colors must be used to paint its 4 edges. Furthermore, each color must be used to paint exactly 2 edges.

In the following figure:

- The painting on the left is a good painting.
- The painting on the right is **not** a good painting, because the top-left unit square has 3 blue edges.



Now Gon is wondering, how many different good paintings are there? Two paintings, both with R rows and C columns, are considered different, if there exists one edge painted with different colors in the two paintings. Please help Gon!

Input

The first line contains exactly one integer T — the number of test cases ($1 \leq T \leq 5$).

T lines follow, each line contains exactly two integers R and C ($1 \leq R \leq 14, 1 \leq C \leq 2\,000$).

Output

Output exactly T lines, each line contains a single integer — the number of different good paintings, modulo $10^9 + 7$.

Sample Input 1

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3
1 1
1 2
2 1
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Sample Output 1

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18
108
108
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