We define a spanning tree in our problem as a collection of lines in the graph forming no closed loops, containing a path between any two points of the graph covering \( m^2 = n \) vertices and \( n - 1 \) edges. Spanning trees in a graph can have many shapes or patterns.

To calculate a number of spanning trees in \( G \), let \( C \) be a graph with vertices labeled \( v_1, \ldots, v_n \). We form an \( n \times n \) matrix tree \( T = [t_{ij}] \) as follows.

- If \( i = j \), then \( t_{ij} \) is the number of lines to \( v_i \) in the graph.
- If \( i \neq j \), then \( t_{ij} = 0 \) if there is no line between \( v_i \) and \( v_j \) in \( G \).
- If \( i \neq j \), then \( t_{ij} = -1 \) if there is a line between \( v_i \) and \( v_j \) in \( G \).

Then, the number of spanning trees in \( G \) is given by

\[
\text{cofactor of } a_{ij} = (-1)^{i+j} M_{ji}
\]

where \( M_{ji} \) is the determinant of the \((n-1) \times (n-1)\) matrix obtained by deleting row \( i \) and column \( j \) of the matrix tree \( T \). Evaluate any cofactor of \( T \) yields the same result.

Example 1: A matrix tree \( T \) of 2 \times 2 modified mesh graph is

\[
T = \begin{pmatrix}
-1 & 3 & -1 & -1 \\
-1 & -1 & 3 & -1 \\
-1 & -1 & -1 & -1 \\
-1 & -1 & -1 & -1 \\
\end{pmatrix}
\]

Evaluate any cofactor of \( T \). For example, covering up row 1 and column 1, we have

\[
(-1)^{1+1} M_{11} = \begin{vmatrix}
-1 & 3 \\
-1 & -1 \\
\end{vmatrix} = -1 - 3 = -4.
\]

Therefore, a number of spanning tree is 16.

Example 2: A matrix tree \( T \) of 3 \times 3 modified mesh graph is

\[
T = \begin{pmatrix}
-1 & -1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
-1 & -1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
-1 & -1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
-1 & -1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
-1 & -1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
-1 & -1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
-1 & -1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
-1 & -1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
\end{pmatrix}
\]

Evaluate any cofactor of \( T \) will yield the same value which is the number of spanning trees.

Hint: Determinant calculation using elementary row operation method.

To calculate a determinant you need to transform an original matrix into an upper triangular matrix (all elements below main diagonal are zero). Reduce the matrix to row echelon form using elementary row operations so that all the elements below diagonal are zero. Then multiply the main diagonal elements of a matrix to get the determinant value.

Your task is to write a program to find the number of spanning trees for a given size \( m \times m \) of a modified mesh graph.

Input
The first line of the input contains an integer \( N \) (1 \( \leq N \leq 5 \)) denoting the number of test cases. After that \( N \) test cases follow. Each test case contains a single integer \( m \) (2 \( \leq m \leq 6 \)) denoting a size of an \( m \times m \) modified mesh graph.

Output
For each test case, your program should output the number of spanning trees, which indicates how many patterns of spanning trees there are for a given modified mesh graph. Print out one line per test case, respectively.

Explanation
In the sample input below, there is only 1 test case \( N = 1 \). For example, in the first test case there are 16 different spanning trees for \( m = 2 \). These spanning trees are listed below. Note that your program is OK if you can output a pattern without space and order between the elements.

Sample Input
1
2
Sample Output
16