Costly Graphs



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Let's define the *cost of a simple undirected graph* as the sum of the costs of its nodes. The *cost of a node* is defined as D^K , where D is its degree.

You are given *N* and *K*. You need to find the sum of the costs of all possible simple undirected graphs with *N* nodes. As this number may be very large, output the sum modulo *1005060097*.

Definitions

Here are a few definitions from graph theory in case you're not familiar with them.

An *undirected graph* is an ordered pair (*V*, *E*) consisting of a set *V* of *nodes*, and a set *E* of *edges* which consists of unordered pairs of nodes from *V*.

The *degree* of a node is the number of edges incident to it.

A *simple undirected graph* is an undirected graph with no loops and multiple edges. A *loop* is an edge connecting a node to itself. *Multiple edges* are two or more edges connecting the same pair of nodes.

Input Format

The first line contains the number of test cases T.

Each of the next T lines contains two integers N and K separated by a space.

Output Format

For each test case, output one line containing the sum of the costs of all possible simple undirected graphs with *N* nodes, modulo *1005060097*.

Constraints

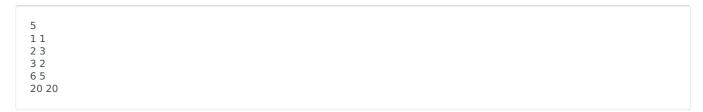
```
1 \le T \le 2 \cdot 10^5
```

 $1 \le N \le 10^9$

 $1 \le K \le 2 \cdot 10^5$

The sum of the K's in a single test file is at most $2 \cdot 10^5$.

Sample input



Sample Output

```
0
2
36
67584000
956922563
```

Explanation

In the first case, there is only one simple graph with 1 node, and the cost of that graph is $0^1 = 0$.

In the second case, there are two simple graphs with 2 nodes, one with a single edge and one with no edges.

The cost of the graph with a single edge is $1^3+1^3=2$.

The cost of the graph with no edges is $0^3+0^3=0$.

Thus, the total is 2+0=2.

In the third case, there are eight simple graphs with 3 nodes. There is one graph with three edges, and its cost is $2^2+2^2+2^2=12$. There are three graphs with two edges, and the cost of each is $1^2+1^2+2^2=6$. There are three graphs with one edge, and the cost of each is $0^2+1^2+1^2=2$. There is one graph with no edges, and its cost is $0^2+0^2+0^2=0$. Thus, the total is $12\cdot 1+6\cdot 3+2\cdot 3+0\cdot 1=36$.