

7465 Reward the Troop

Long long time ago, there was an ancient country with a strong army. The soldiers and all the high ranking officers formed one of the most powerful troops. Besides having a high sense of honor, they organized the army in a very regular pattern. There were m military ranks in total. Each higher ranking officer led n soldiers of a lower rank. Figure 1 shows the three layers of ranks. Each higher ranking officer is leading two lower ranking soldiers.

After each victorious battle, the king would award all the soldiers certain titles to inspire them. The soldiers were also looking forward to the titles. To be honored by unique and individual titles in the large units seemed to be more important, to all the soldiers, than what the titles really were. They wish to have each soldier titled differently from other soldiers who are direct subordinates to the upper two layers and the lower two layers. Also, everyone's title should differ from the one in his same rank from the same direct commander. In order to satisfy the needs, the king and his advisers discussed a variety of titles, such as "most courageous", "kill the most", "fastest dispatch" and so on. Everyone was conferred on an individual title with different amounts of golds.

Due to the great amount of commanders and soldiers, the king wished to title each commander and his subordinate soldier diversely in the state of saving the expense of the exchequer. Take the 3-layer ranking in Figure 1 for example, the general gets title 4 since he cannot have the same title as any soldier in the lower two ranks, while his left subordinate one gets title 3 and his right subordinate one gets title 2 in Figure 2 because they should not have the same title. Meanwhile, the left commander's subordinate officers were conferred on titles 1 and 2 while the right commander's subordinate officers were titled 1 and 3 which are distinct from their direct commander. Therefore, the total amount of the gold to these 7 soldiers in Figure 2 is $4 + 3 + 2 + 2 + 1 + 1 + 3 = 16$. The gold of the exchequer was the most efficiently distributed in this way. Please help the king find the least amount of gold needed to reward the troop.

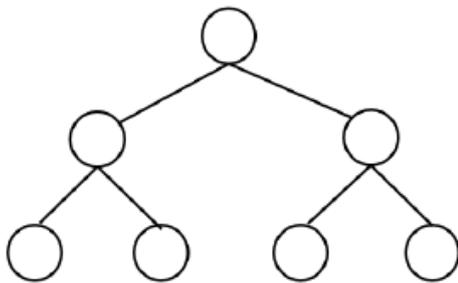


Figure 1: Troop with 3 ranks.

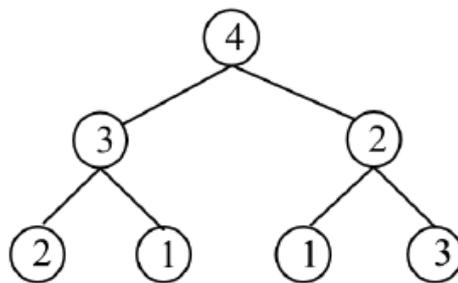


Figure 2: Reward for the troop.

Technical Specification

- The number of military ranks is bounded by 1000, i.e., $1 \leq m \leq 1000$.
- Each commander led at most 100 sergeants of the next rank, i.e., $1 \leq n \leq 100$.
- There are total of $n^0 + n^1 + \dots + n^{m-1}$ military in the troop.

Input

There are at most 10 test cases. The first line is the number of test cases. Each test case contains two integers m and n separated by a space which are the numbers of military ranks and the number of soldiers led by each general respectively.

Output

For each test case, output the minimum amount of gold (*module* by 10000000) needed to reward the troop.

Sample Input

```
3
3 2
3 4
1 2
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Sample Output

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16
66
1
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