Balatro

Input file:	`standard input`
Output file:	`standard output`
Time limit:	4 seconds
Memory limit:	256 mebibytes

Do we really have to explain the rules of *Balatro*? Just play it yourself. And remember to stop before the next contest.

For those unfamiliar with the rules: you have n cards in your hand. Each card has two associated values: a_i and b_i. You can select any subset S of exactly k cards and play them together to obtain a score calculated as:

$$\left(\sum_{i \in S} a_i\right) \cdot \left(\sum_{i \in S} b_i\right)$$

Your task is to determine the maximum possible score you can achieve in a single play using exactly k cards.

It is additionally known that the deck is *balanced*, meaning no card has both a_i and b_i simultaneously too high. Specifically, for every card, $\min(a_i, b_i) \leq 100$.

Input

Each test contains multiple test cases. The first line contains the number of test cases t ($1 \leq t \leq 10^4$). The description of the test cases follows.

Each test case begins with a line containing two integers n and k ($1 \leq n \leq 10^5$, $1 \leq k \leq \min(n, 5)$): the total number of cards and the number of cards to select for a single play.

Each of the next n lines contains two integers a_i and b_i ($1 \leq a_i, b_i \leq 10^9$), representing the values of a card. For every card, $\min(a_i, b_i) \leq 100$.

The total number of cards across all test cases does not exceed 10^5.

Output

For each test case, print a single integer: the maximum possible score that can be obtained by selecting exactly k cards.

Examples

standard input	*standard output*
1 5 5 1 1 2 2 3 3 4 4 5 5	225
1 6 5 1 1 2 6 3 5 4 4 5 3 6 2	400

Note

In the first test case, we use all the cards. The score is $(1+2+3+4+5)\cdot(1+2+3+4+5) = 15^2 = 225$.

In the second test case, we have to drop one card. The set with cards $[2, 3, 4, 5, 6]$ has the value 400.

Fun fact: In the real Balatro game, a_i of a card is based on it's *poker* value, and b_i can be 0, 4, or 20 (20 can happen with a 20% chance). Also, there are hundreds of bonus cards and rules that influence how the sums of a and b are calculated.