Problem A: Airline

A smuggling case has been all over the news lately, and the embarrassment did not stop at the airline that was caught. It became a black eye for the whole country. Your airline is determined that nothing of the sort will ever happen on one of your flights. The plan is simple: shrink the carry-on allowance until there is barely enough room to hide anything at all. In other words, make the allowed box as small **in volume** as you possibly can.

However, if you tighten the allowance so much that too many passengers' bags are turned away at the gate, the complaints, and quite possibly the lawsuits, will pile up fast. To stay out of trouble you decide that at least M of the current bags must still be allowed on board.

The allowance is a single box of dimensions $W \times H \times D$, and a bag is allowed only if it fits inside that box. Because a bag can be turned and rotated any way at the gate, it fits as long as its three side lengths can be matched, in some order, to W, H, and D so that each is at most the box dimension it is matched with. Given N bags, each with a width, height, and depth, choose box dimensions W, H, D so that at least M of the bags fit, minimizing the volume $W \times H \times D$. Output the minimum possible volume.

Input:

The first line contains an integer T, the number of test cases. For each test case:

- a line with two integers N and M: the number of bags and the minimum number that must still be allowed
- then N lines, each with three integers w_i h_i d_i the width, height, and depth of a bag.

Output:

For each test case, print one line: the minimum possible volume of an allowance box that lets at least M of the bags fit.

Sample Input	Sample Output
2 3 2 3 6 3 7 1 4 2 3 8 5 3 2 3 4 5 1 1 1 5 2 3 3 3 4 2 6	64 30

Explanation:

- Test Case #1: there are many ways to choose the box dimension
  - ***W*** = 8, ***H*** = 8, ***D*** = 8 fits all the bags (total volume = 8 x 8 x 8 = 512)
  - ***W*** = 7, ***H*** = 3, ***D*** = 4 fits bag # 1 and bag #2 (total volume = 7 x 3 x 4 = 84)
    - You can rotate bag #1 from 3 x 6 x 3 to 6 x 3 x 3 and it fits the box
  - ***W*** = 8, ***H*** = 4, ***D*** = 2 fits bag # 2 and bag #3 (total volume = 8 x 4 x 2 = 64)
    - This is the minimum volume to fit at least 2 bags
- Test Case #2:
  - ***W*** = 3, ***H*** = 5, ***D*** = 2 gives the total volume = 30, which is the minimum to fit at least 3 bags

Constraints:

- $1 \leq T \leq 20$
- $1 \leq M \leq N \leq 50$
- $1 \leq w_i , h_i , d_i \leq 1,000$