J Organization

Time Limit	1 second

Elb Co., Ltd. has ***n*** employees divided into ***k*** nonempty teams. Obsessed with team dynamics and numerical metrics, it turns everything into numbers:

- Every employee a has undergone two tests, resulting in two numerical values x_a and y_a.
- The difference between employees a and b is given by $D(a, b) = |x_a - x_b| + |y_a - y_b|$.
- The company's ***strength index*** (SI) is measured as

$$\text{SI} = \min \{ D(a, b) : a \text{ and } b \text{ are in different teams} \}$$

Next year, the company will continue to work with ***k*** teams but will arrange their employees to maximize the strength index. In this task, you will calculate the **largest-possible strength index** SI from ***k*** nonempty teams.

Input

The first line of input contains an integer, **T**, representing the number of test cases. $1 \le \mathbf{T} \le 10$.

Following that are **T** test cases. The first line of a test case contains two numbers: **n** and **k** ($2 \le \mathbf{k} \le 10$ and $\mathbf{k} \le \mathbf{n} \le 1000$). Then, for the next **n** lines, each line represents an employee and contains this employee's test results x and y, separated by a single space ($0 \le x, y \le 100{,}000$).

Output

For each test case, print the largest-possible strength index SI, followed by a new line character.

Sample Input	Sample Output
2 3 2 0 0 2 2 3 2 6 2 0 1 0 0 1 0 2 2 2 3 3 2	4 3

(The examples' explanations are on the next page)

From example 1, we are given 3 people, and k = 2. Note that, there are 3 ways of arranging, since each team must have at least 1 person. All cases are listed below.

Case 1: {(0,0)} {(2,2),(3,2)}, SI_1 = min{ D ((0,0), (2,2)), D ((0,0), (3,2))} = min{ 4, 5 } = 4
Case 2: {(0,0),(2,2)} {(3,2)}, SI_2 = min{ D ((0,0), (3,2)), D ((2,2), (3,2))} = min{ 5, 1 } = 1
Case 3: {(0,0),(3,2)} {(2,2)}, SI_3 = min{ D ((0,0), (2,2)), D ((3,2), (2,2))} = min{ 5, 1 } = 1

Hence, the **largest SI is SI_1 = 4**.

For example 2, we are given 6 people (0,1), (0,0), (1,0), (2,2), (2,3), (3,2), and k = 2. If you try to generate all cases, there will be 31 total possible assignments. If you calculate all the SI values, you will see that, the best team assignment is {(0,1), (0,0), (1,0)} and {(2,2), (2,3),(3,2)}. For this team assignment, its **SI is 3**. This is attained by D((0,1), (2,2)) pair or the D((1,0), (2,2)) pair.