

12140 Magic Rings

Tanzibal has just reached the last level of the computer game 'icpcAxe'.

She has used up most of her superpowers in the earlier levels while defeating the monsters. Fortunately, there aren't too many monsters in this level that needs to be tackled with.

The first step of this level is to spot the locations of the monsters. After spotting the locations, Tanzibal has to drop the superpowers one after another on the ground, at different locations, in order to attack the monsters. A superpower, when dropped at certain point, creates a magic ring of certain radius. Any monster that lies within the periphery of this ring will be injured. The radii of the rings generated by the superpowers are all same, but its value is in Tanzibal's control. Tanzibal chooses a radius that is as low as possible. All the rings will have this particular radius that Tanzibal opts for.



Given the location of N monsters and the number of superpowers that Tanzibal has at her disposal, can you find out the minimum radius of the magic rings which would be enough to injure all the monsters.

Input

The first line of input is an integer T ($T \leq 80$) that indicates the number of test cases. Each case starts with two integers N ($0 < N < 19$) and K ($0 < K \leq N$). N represents the number of monsters and K represents the number of superpowers at hand. The next line contains the coordinates of the N monsters in the format $x_1 y_1 x_2 y_2 \dots x_n y_n$. All the coordinates are integers in the range $[0, 10000]$.

Note: For 70% of the test cases, ($0 < N < 11$).

Output

For each case, output the case number, followed by the minimum radius of the magic rings rounded to 2 decimal places. Look at the output for sample input for details.

Sample Input

```
3
2 1
0 0 10 0
6 2
0 0 1 1 2 2 10 10 10 11 10 12
4 2
0 0 10 0 5 10 1000 1000
```

Sample Output

```
Case 1: 5.00
Case 2: 1.41
Case 3: 6.25
```