# Research Team

A Research team want to establish a research center in a region where they found some rare-elements.

They want to make it closest to all the rare-elements as close as possible so that they can reduce overall cost of research over there. It is given that all the rare-element's location is connected by roads. It is also given that Research Center can only be built on road. Team decided to assign this task to a coder. If you feel you have that much potential.

Here is the Task: - **Find the shortest of the longest distance of research center from given locations of rare-elements.**

Locations are given in the matrix cell form where 1 represents roads and 0 no road. Number of rare-element and their location was also given(number<=5) and order of square matrix was less than equal to (20).

For this you have to implement bfs for every position where road exist to find the distance of every research center or do Vice-versa. for each position store maximum distance of all distances to research center and the compare each maximum distance to find minimum of them.

**Input -**

6

5 2

4 3

3 4

1 1 0 0 0

1 1 0 0 0

1 1 1 1 1

1 1 1 0 1

1 1 1 1 1

8 2

5 6

6 4

1 1 1 1 1 1 0 0

1 1 1 1 1 1 1 0

1 1 0 1 0 1 1 0

1 1 1 1 0 1 1 0

1 1 1 1 1 1 1 0

1 1 1 1 1 1 1 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

10 3

8 2

5 3

7 1

0 0 0 1 1 1 1 1 1 0

1 1 1 1 1 1 1 1 1 0

1 0 0 1 0 0 0 0 1 0

1 1 1 1 1 1 1 1 1 1

1 1 1 1 0 1 0 0 1 1

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1 1 1 1 1 1 1 1 1 1

15 4

11 15

15 9

1 2

14 3

1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

1 0 1 1 1 1 1 1 1 1 1 1 1 0 1

1 0 1 0 0 0 1 0 0 0 0 1 1 0 1

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1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

0 0 1 0 0 0 1 1 1 1 1 1 1 0 1

0 0 1 1 1 1 1 1 1 1 1 1 1 1 1

20 4

13 6

20 4

1 2

17 16

1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0

1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0

1 0 1 0 0 0 0 0 0 0 1 0 0 1 1 0 0 0 0 0

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1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0

5 2

2 1

3 5

1 0 1 1 1

1 1 1 0 1

0 1 1 0 1

0 1 0 1 1

1 1 1 0 1

**Output -**

1

2

2

12

15

4