Lab6 Questions

YAO ZHAO

Lab6.A: Invisible
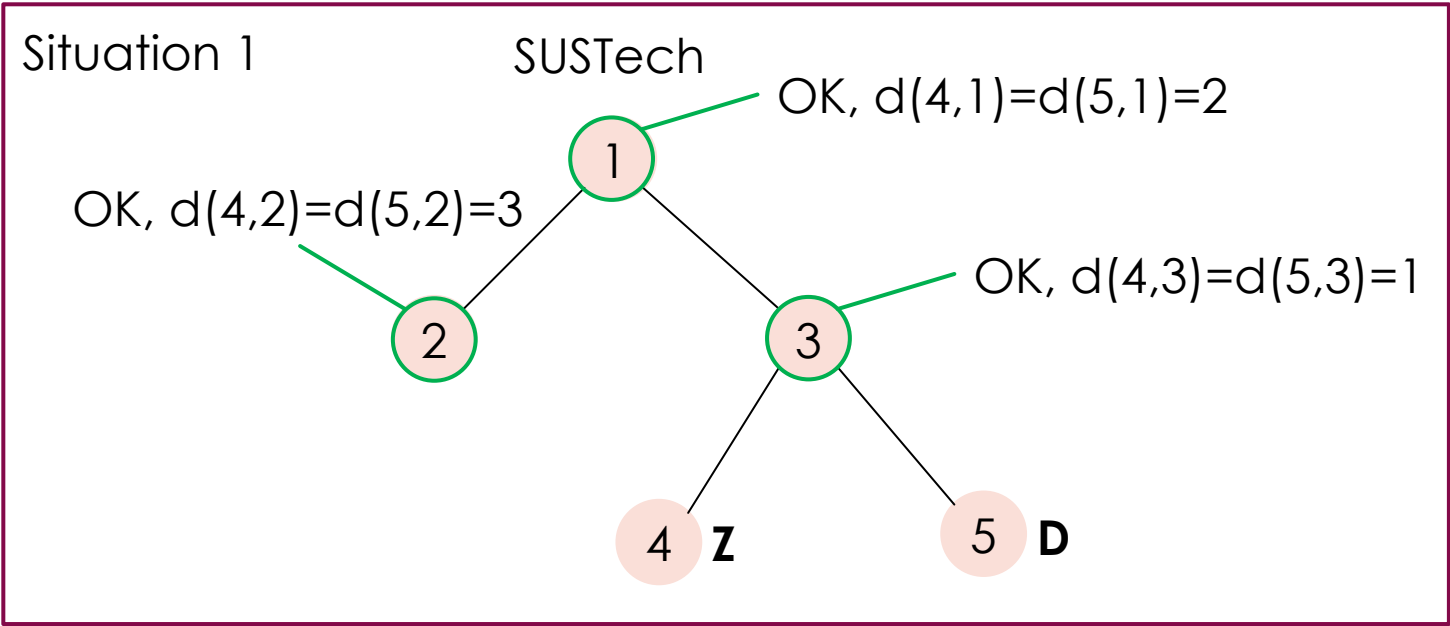
▶ **Z** and **D** want to catch **C**, but **C** wants to sleep.

▶ SUSTech is a tree with N nodes. Let $d(x, y)$ denote the number of edges that the shortest path from node x to node y passes through.

▶ **C** has happily discovered that he will be invisible on node z, if **Z** is on x, **D** is on y, and $d(x, z) = d(y, z)$.

▶ **C** is so eager for sleep that he did not even want to think about where he can be invisible. Help **C** find the number of nodes where he can be invisible for Q situations such that **Z** is on x_i and **D** is on y_i.
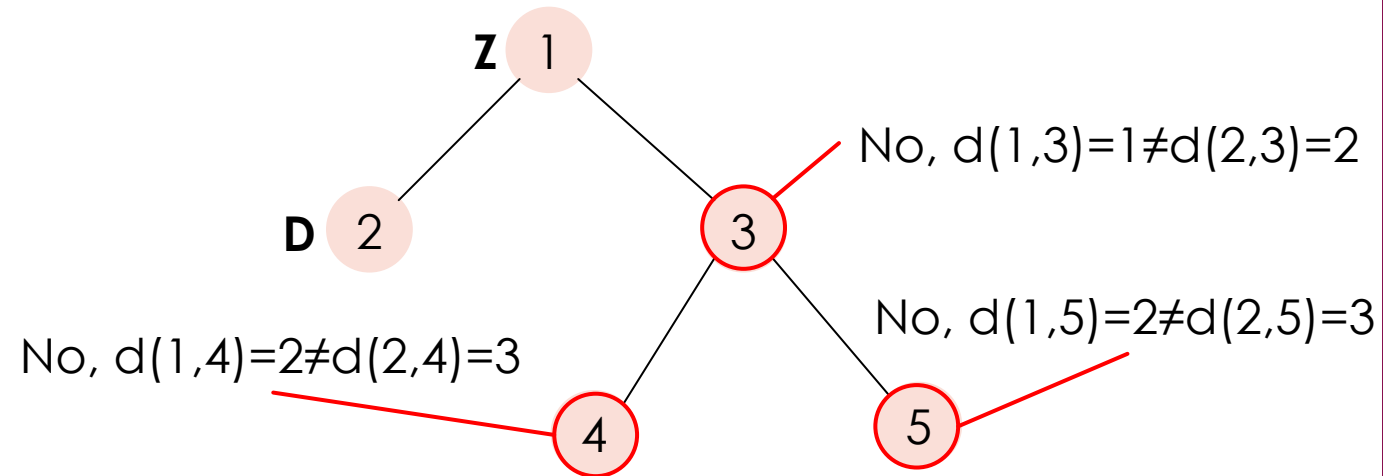
Sample Input

5
1 2
1 3
3 4
3 5
3
4 5
1 2
3 3

SUSTech

OK, d(4,1)=d(5,1)=2

OK, d(4,2)=d(5,2)=3

OK, d(4,3)=d(5,3)=1
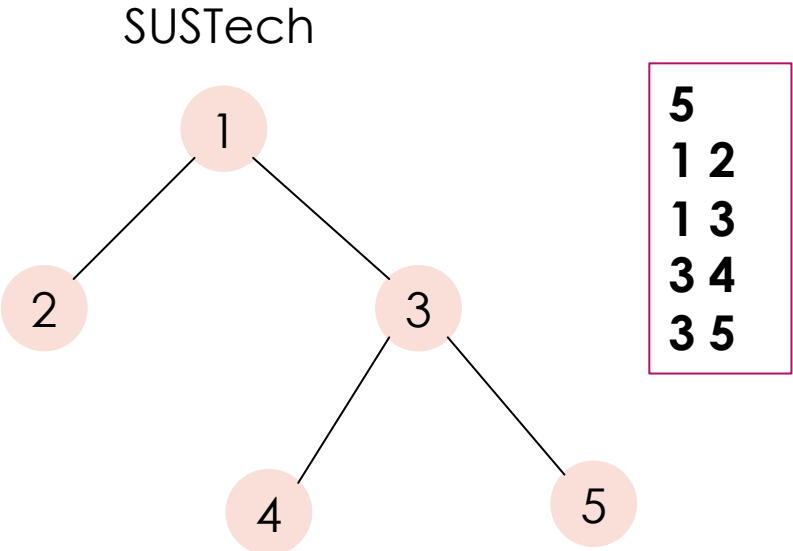
Situation 1

SUSTech

Situation 1:
3

Situation 2   SUSTech

Z 1

No, d(1,3)=1≠d(2,3)=2

D 2   3

No, d(1,5)=2≠d(2,5)=3

No, d(1,4)=2≠d(2,4)=3

4   5

Situation 2:
0

Situation 1   SUSTech

OK, d(3,1)=d(3,1)=1

1

OK, d(3,2)=d(3,2)=2

OK, d(3,3)=d(3,3)=0

2   Z 3 D

OK, d(3,5)=d(3,5)=1

OK, d(3,4)=d(3,4)=1

4   5
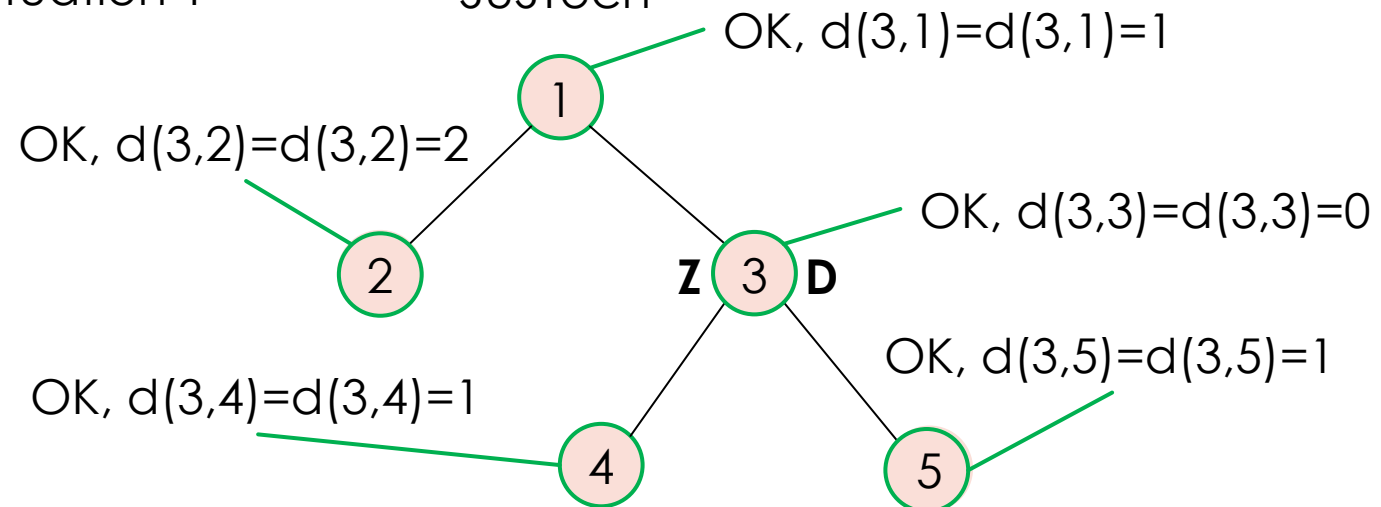
Situation 3:
5

Situation 1:
3

Situation 2:
**0**

Situation 3:
5

Sample Output

3
0
5

Lab6.B: Tea

▶ **Mr.H** is an elegant artist. As a servant of **Mr.H**, the bunny has to pour tea for him.

▶ The tea cups can be regarded as a $N \times N$ matrix. Initially, the cups are all empty.

▶ In each operation, the bunny can choose k_1 distinct rows $a_1, a_2, \ldots a_{k1}$ and k_2 distinct columns $b_1, b_2, \ldots b_{k2}$, then pour tea into the cups at position $(a_i, b_j)(1 \leq i \leq k_1, 1 \leq j \leq k_2)$.

▶ **Mr.H** has his own special artistic style so that:

    ▶ tea cups on the main diagonal must stay empty

    ▶ tea cups that are not on the main diagonal must be filled

▶ It is acceptable to fill a cup for more than once.

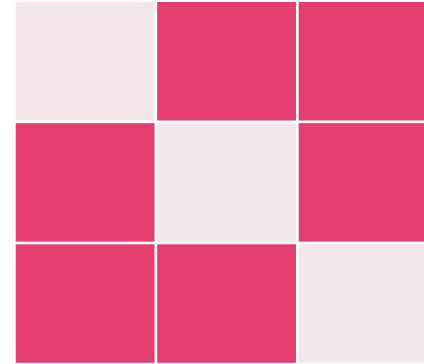▶ **Mr.H** thinks that waiting is not elegant. He wishes that you can finish the job using no more than 12 operations.
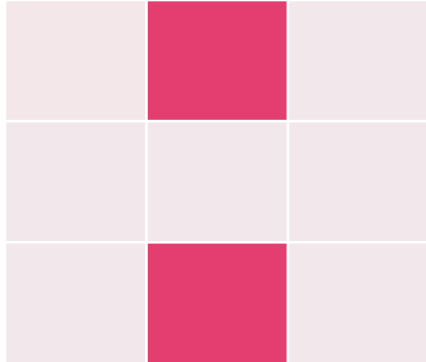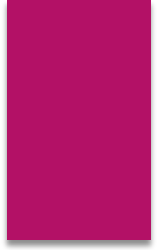
Sample Input

3
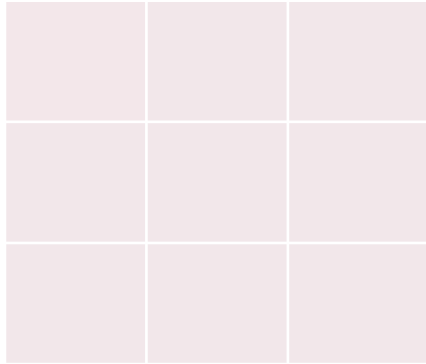
Possible operations :

Operation 1 :

initial

target

Rows: 1 3
Column: 2

Operation 2:

Rows: 2
Column: 1 3

Operation 3:

Rows: 1
Column: 3

Operation 4:

Rows: 3
Column: 1

Sample Output
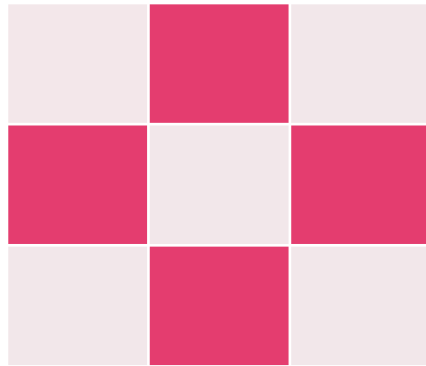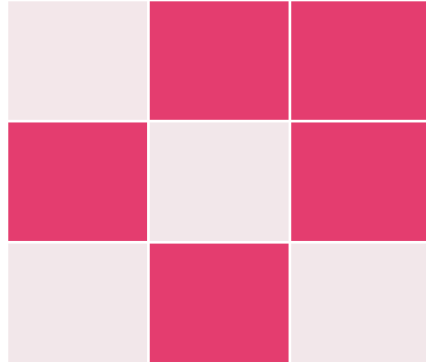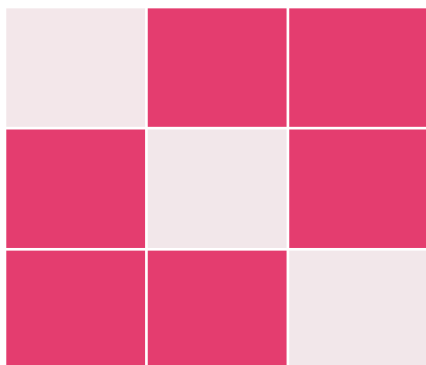
Operation 1:   Rows: 1 3
Column: 2

Operation 2:   Rows: 2
Column: 1 3

Operation 3:   Rows: 1
Column: 3

Operation 4:   Rows: 3
Column: 1

4

| **2 1 3** |
| **1 2** |

| **1 2** |
| **2 1 3** |

| **1 1** |
| **1 3** |

| **1 3** |
| **1 1** |