Introduction
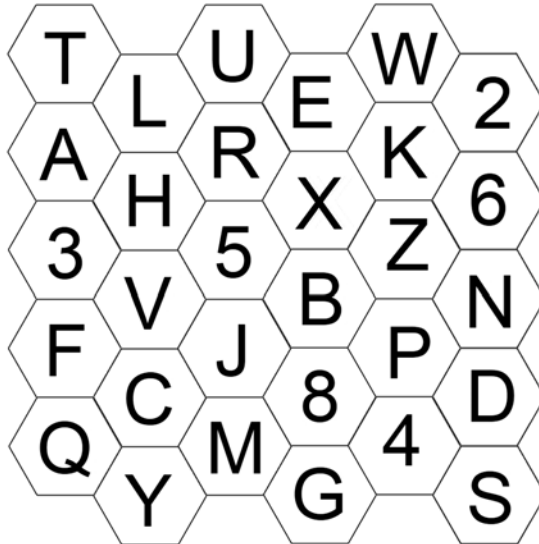
Many classic table-top games are played on a hexagonal grid. It is often necessary to calculate the distance between two hexes. Write a program to calculate distances on the following grid. For example, the distance from U to B is 3 hexes, and from A to M is 4 hexes.

Input

The first line of input is the number of letter pairs. Each line after is a pair of letters separated by a space.

```
5
U B
M A
3 D
R E
Q K
```

Output

For each letter pair, the program should print the pair and the hex distance between them.

```
U B 3
M A 4
3 D 5
R E 1
Q K 5
```