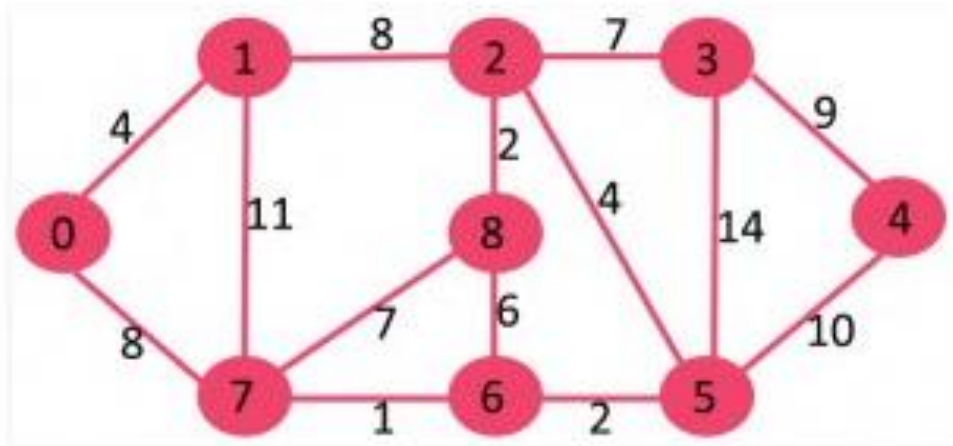


Problem 1

ID:

Given a undirected graph with weights, return the **shortest path** between two nodes (shortest path between two vertices). Input must read from file and write output into file.



Problem 2

ID:

Shortest Word Distance

Given a list of words and two words word1 and word2, return the shortest distance between these two words in the list.

For example, assume that words = ["practice", "makes", "perfect", "coding", "makes"].

Given word1 = "coding", word2 = "practice", return 3. Given word1 = "makes", word2 = "coding", return 1.

Note You may assume that word1 does not equal to word2, and word1 and word2 are both in the list. Input must read from file and write output into file.

Problem 3

ID:

Some of the secret doors contain a very interesting word puzzle. The team of archaeologists has to solve it to open that doors. Because there is no other way to open the doors, the puzzle is very important for us. There is a large number of magnetic plates on every door. Every plate has one word written on it. The plates must be arranged into a sequence in such a way that every word begins with the same letter as the previous word ends. For example, the word acm" can be followed by the word motorola". Your task is to write a computer program that will read the list of words and determine whether it is possible to arrange all of the plates in a sequence (according to the given rule) and consequently to open the door.

Input

The input consists of T test cases. The number of them (T , equal to about 500) is given on the first line of the input file. Each test case begins with a line containing a single integer number N that indicates the number of plates ($1 \leq N \leq 100000$). Then exactly N lines follow, each containing a single word. Each word contains at least two and at most 1000 lowercase characters, that means only letters 'a' through 'z' will appear in the word. The same word may appear several times in the list.

Output

Your program has to determine whether it is possible to arrange all the plates in a sequence such that the first letter of each word is equal to the last letter of the previous word. All the plates from the list must be used, each exactly once. The words mentioned several times must be used that number of times. If there exists such an ordering of plates, your program should print the sentence "Ordering is possible.". Otherwise, output the sentence "The door cannot be opened.".

Example

Sample input:

```
3
2
acm
ibm
3
acm
malform
mouse
2
ok
ok
```

Sample output:

```
The door cannot be opened.
Ordering is possible.
The door cannot be opened.
```

Problem 4

ID:

Skender Box is a renowned bank robber. He is known worldwide for accomplishing the most profitable bank robbery, in Fortaleza, friends dug a tunnel to get into the main chest. There were some bags, with different amounts of money or jewelry and weight. They had to leave about 50% of the total value, since the truck couldn't carry all the bags.

Skender wasn't caught, and to show that he can do it all again, he is planning a robbery to one of the safer banks in USA -the Wachovia Bank. He wants your help to maximize the amount stolen, avoiding a huge loss as it happened in Fortaleza.

Write a program that, given the maximum weight the truck is able to carry and the information about each bag in the bank, determine the maximum value that Skender can steal.

Input

The input consists of several instances. There is an integer N ($1 \leq N \leq 200$) in the first line; it stands for the number of instances. The first line of each instance contains two integers, K and M ($8 \leq K \leq 1000$ and $1 \leq M \leq 50$) representing, respectively, the maximum weight the truck can handle and the amount of bags in the bank. The next M lines describe each bag with two integers A and B ($8 \leq A \leq 200$ and $1 \leq B \leq 25$): the weight and the value of the bag, respectively.

Output

For each instance output a sentence "Hey stupid robber, you can get P.", and P represents the maximum value Danilo can steal and also show which items are picked.

Example

Input:

```
3
34 5
178 12
30 1
13 7
34 8
87 6
900 1
900 25
100 10
27 16
131 9
132 17
6 5
6 23
56 21
100 25
1 25
25 25
100 2
```

Output:

```
Hey stupid robber, you can get 8.
Hey stupid robber, you can get 25.
Hey stupid robber, you can get 99.
```

Problem 5

ID:

A palindrome is a symmetrical string, that is, a string read identically from left to right as well as from right to left. You are to write a program which, given a string, determines the minimal number of characters to be inserted into the string in order to obtain a palindrome. As an example, by inserting 2 characters, the string "Ab3bd" can be transformed into a palindrome ("dAb3bAd" or "Adb3bdA"). However, inserting fewer than 2 characters does not produce a palindrome.

Input

The first line contains one integer: the length of the input string N , $3 \leq N \leq 5000$. The second line contains one string with length N . The string is formed from uppercase letters from 'A' to 'Z', lowercase letters from 'a' to 'z' and digits from '0' to '9'. Uppercase and lowercase letters are to be considered distinct.

Output

The first line contains one integer, which is the desired minimal number.

Example

Input:

5

Ab3bd

Output:

2