

## 2229 Maze

One day, looking at old documents inherited from his grandfather, Ramesh discovers a map. Reading the accompanying document, he realizes that the map is of a complex maze of chambers and passages inside a mountain. Chambers in this maze have doors opening to passages leading to other chambers. All the doors have one peculiarity: they have handles only on one side, and so can be opened either from the chamber or from the passage but not both. The passages leading from any chamber have been designed in such a way that either there is only one passage leading out or there is a passage such that upon following it one can *never come back* to the chamber. Also, there is at most one passage between any two chambers. On the ceiling of each chamber, a number is written. There are two special chambers: the entry chamber and the exit chamber. The entry chamber can be entered via a door from outside the mountain and the exit chamber has a door that leads to a secret chamber. The exit door opens only upon reciting a magic sequence of numbers. It is given that this sequence is the only sequence of numbers satisfying the following properties:

- The sequence can be constructed by noting the numbers written in chambers, in that order, on a path from entry chamber to exit chamber.
- The numbers in the sequence are all distinct.
- If any chamber has a number from this sequence written, then there is a path from the chamber to the exit chamber such that all the chambers in this path contain numbers *only* from this sequence.

Design an algorithm to help Ramesh reach the secret chamber.

### Input

The first line of the input consists of an integer  $T$  giving the number of test cases to follow.

The first line of each test case contains two integers  $N$  (between 1 and 100) and  $P$  (between 1 and 1000) giving the number of chambers and the number of passages in the maze respectively. The next line contains  $N$  numbers: the  $j$ -th number is written in the  $j$ -th chamber. Each of the next  $P$  lines contain four numbers  $a, b, c, d$  with  $a, b$  between 1 and  $N$  and  $c, d$  having binary value, giving that there is a passage between chamber number  $a$  and chamber number  $b$  such that the door to the passage from chamber  $a$  opens from inside the chamber iff  $c = 1$  and the door to the passage from chamber  $b$  opens from inside the chamber iff  $d = 1$ . The last line of the test case contains two numbers  $s$  and  $t$  with  $s$  being the entry chamber number and  $t$  being the exit chamber number.

### Output

For each test case in the input, there is one output line that contains the magic sequence with numbers separated by blanks.

### Sample Input

```
2
6 6
9 10 11 12 13 14
1 2 1 0
2 3 1 0
```

```
3 4 1 0
4 5 1 0
4 6 1 0
4 2 1 0
1 5
10 13
22 81 84 84 72 60 63 62 99 54
1 2 1 0
1 4 1 1
2 4 1 0
2 5 1 0
5 3 0 1
6 3 0 1
4 7 1 0
8 4 0 1
5 2 1 0
5 8 1 0
9 5 0 1
9 6 0 1
10 6 0 1
1 9
```

### Sample Output

```
9 10 11 12 13
22 81 72 99
```