11638   Temperature Monitoring

We have a device to monitor temperature. After configuring it, we place it inside the chamber whose temperature we wish to monitor. The device is equipped with four alarms each of which can be configured differently. The Alarms are identified by the numbers 1, 2, 3 and 4. The device takes a reading of its surrounding at a regular interval.

In this problem you will be simulating the behavior of such a device.

Input

The first line of input contains a positive integer $T < 101$, which denotes the number of test cases. Each case consists of several lines which are described below.

The first line contains a positive integer M, which denotes the measurement interval. That is, the device takes a reading every M seconds.

The second line contains a non-negative integer S, which denotes the 'Startup delay'. This is the amount of time that the device will remain idle after placing inside the chamber before it takes its first reading. The device will instantly take a reading when the 'Startup delay' ends.

The third line contains four integers. The integers give the threshold temperature for alarm 1,2,3,4 respectively. Here threshold temperature means, when a recorded temperature crosses this temperature the corresponding alarm will be triggered.

The fourth line contains a non-negative integer C. The least significant 8 bits of this integer represents the configurations of the four alarms. The rightmost 4 bits (bit 0 to 3) determine if the alarms are enabled (bit value 1) or disabled (bit value 0). For example, if the bits are set as 0011, this means Alarm 1 and 2 are enabled and Alarm 3 and 4 are disabled. If an alarm is disabled, it will never be triggered.

The next 4 bits (bits 4 to 7) determine the triggering type of each alarm. A value of 0 means, it's a low trigger and a value of 1 means it's a high trigger. For example, if the bits are set as 1100, this means Alarm 1 and 2 are set for low trigger and Alarm 3 and 4 for high trigger. Here high trigger means if a recorded temperature is above the set threshold temperature for an alarm, it will be triggered. Similarly, a Low trigger means if a recorded temperature is below the set threshold temperature for an alarm, that alarm will be triggered.

The fifth line contains a positive integer $K \le 100$. The following K lines contain a pair of integers each in the format '*time temp*'. Here *time* represents the duration of a period with constant temperature and *temp* indicates the temperature of the environment in that period. Note that, time is always positive. The time value of first pair indicates the period immediately following the placement of the device inside the environment to be monitored. Successive time values indicate the duration of periods in the order they occur. The temperature at the border regions is considered to be that of the period just ending. Also, the temperature at the very beginning is that of the first period. Every value in the input will fit in 32 bit signed integer.

Output

For each case of input, there will be one line of output. It will first contain the case number, followed by the triggering status of each of the four alarms. The triggering status will contain four strings of either yes or no, separated by a space. The first string will be yes if alarm 1 was triggered at least once and no otherwise. The second string will be the status of alarm 2 and so on. Look at the sample output for exact formatting.

Sample Input

```
2
5
5
5 10 15 20
15
1
5 15
1
0
5 10 15 20
7
2
10 15
10 20
```

Sample Output

```
Case 1: no no no yes
Case 2: no no no no
```