<u>Day-4</u> Test-2 No. of problem=3 , Timing 10:30-12:00

Problem -1
The college team, along with their coach, is going to the sports fest to play a football match. There are n players in the team, numbered from 1 to n.
Someone gives a paper to the coach. The paper elaborates on the positions and strategies of the opponent team. Based on it, the coach creates a winning strategy. In that strategy, he decides and gives a particular position to every player.
After this, the coach starts swapping two players at a time to make them stand according to new positions decided on paper.
He swaps players by applying following rules:

1. Any player can swap with the player standing next to him.

2. One player can swap with at most two other players.

Given that initially all the players are standing linearly, numbered from 1 to n, you have to tell whether it is possible for the coach to create new positions by swapping within the constraints defined in the task.

Constraints

1 <= T <= 50

1 =< N <= 10^5
1 <= A[i] <= n
Sample Input 1:

1

5

2 1 5 3 4

Sample Output 1:
YES

3
Explanation

In this case, we can achieve winning strategy positions in 3 swaps. Initial state of positions: 1 2 3 4 5

Three moves required to form winning strategy positions:

1 2 3 4 5 -> 1 2 3 5 4 -> 1 2 5 3 4 -> 2 1 5 3 4

Sample Input 2:

1

5

2 5 1 3 4
Sample Output 2:
NO

Explanation:
In the second case, there is no way to form the specific winning strategy positions by swapping within the constraints mentioned in the task.

Question no 2.
rinka is feeling lonely, so he started playing online games. While searching for fun, he found an exciting game. In this game, rinka has to choose four cards at random. On each card, there is a number between 1 to 9, both inclusive. For rinka to win, he has to make the number 24 using the number on cards and the following operator *, /, +, -, (,).
Help rinka to find whether he will win the game or not, on the basis of his selection. If rinka can win the game, print true otherwise, print false.
Example:-
If the cards rinka chooses are 4, 1, 8, 7. Then rinka can make 24 by (8 - 4) * (7 - 1). Hence rinka can win, so you have to return true.

Note:-
The division operator '/' represents actual division, not integer division. For example, 4 / (1 - ⅔) = 12.

Input Format:
The first line of input contains an integer 'T' denoting the number of test cases to run. Then the test case follows.

The next line of each test contains four space-separated integers denoting the cards which rinka has.

Output Format:
For each test case, print true if rinka can win the game; otherwise, print false.
Constraints:-
1 <= T <= 3000
1 <= NUMS[i] <= 9 where 0 <= i <= 4
Sample Input 1:-
2
4 1 8 7
1 2 1 2
Sample Output 1:-
True
False
Explanation Of Sample Input 1:-
Test case 1:- Here, we can make 24 by (8 - 4) * (7 - 1). Hence we will return true.
Test case 2:- Here, there is no way to make 24 using these cards, so rinka can't win, hence return false.
Sample Input 2 :-
2
6 7 8 9
1 2 3 4
Sample Output 2:-
True
True
Explanation Of Sample Input 2:-

Test case 1:- Here, we can make 24 by (8 - 4) * (7 - 1). Hence we will return true.

Test case 2:- Here, there is no way to make 24 using these cards, so rinka can't win, hence return false.

Question no 3:

There are an infinite number of electric bulbs. Each bulb is assigned a unique integer starting from 1. There are 'N' switches also and each switch is labeled by a unique prime number. If a switch labeled with prime integer 'p' is turned ON, then all the bulbs having a number that is multiple of 'p' will start glowing. For example, if we turn ON the switch labelled 2, then all the bulbs having numbers 2, 4, 6, 8, 10, ... i.e all bulbs with numbers as multiples of 2 will start glowing.

You are given an array/list 'LABELS' consisting of 'N' unique prime integers representing the label of the switches and an integer 'K'. Your task is to find the integer assigned to Kth glowing bulb from the start when all these 'N' switches are turned ON.

Note :

1. Some bulbs can glow by multiple switches and some are not glowed by any switch.
2. If any of the switches that can glow a bulb is turned 'ON', then the corresponding bulb will glow.

Example :

Consider 3 switches with labels [3, 5, 7] and we need to find the 5th glowing bulb from the start after turning these 3 switches ON.

We can see that bulbs numbered 3, 6, 9, 15, 18 … will glow if the switch having label 3 is turned ON.

The bulbs numbered 5, 10, 15, 20 … will glow if the switch having label 5 is turned ON.

The bulbs numbered 7, 14, 21, 28 … will glow if the switch having label 7 is turned ON.

It implies that bulbs numbered 3, 5, 6, 7, 9, 10, 14, 15, 18, 20, 21… will glow when these three switches are turned ON.
The 5th glowing bulb from start is assigned integer 9. Thus, we should return 9.

Input Format :

The first line of input contains an integer 'T' denoting the number of test cases. Then 'T' test cases follow.

The first line of each test case consists of two space-separated integers 'N' and 'K' respectively.

The second line of each test case consists of 'N' space-separated prime integers representing array/list 'LABELS'.

Output Format :

For each test case, print the integer assigned to the Kth glowing bulb when all the given switches in ‘LABELS’ are turned ON.

Constraints :

1 <= T <= 50

1 <= N <= 10

1 <= K <= 10^12

1 < LABELS[i] < 30

Where 'LABELS[i]' is a prime integer and all integers in array/list ‘LABELS’ are distinct.

Sample Input 1 :

2

1 5

2

3 5

3 5 7

Sample Output 1 :

10

9

Explanation Of Sample Input 1 :

Test case 1:

Here, there is only one switch having label 2. When this switch is turned On, then the bulbs having numbers which are multiples of 2 i.e, 2, 4, 6, 8, 10, 12, 14, 16… will start glowing. Clearly, the 5th such bulb from start is assigned integer 10.

Test case 2:

See the problem statement for an explanation.

Sample Input 2 :

2

2 6

2 3

2 6

7 11

Sample Output 2 :

9

28