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Exercise – *Radiation Therapy*

Doctors use radiation to destroy cancerous tumors or lesions. To do this without accidentally hurting healthy surrounding tissue requires that the doctor be extremely precise in targeting the radiation beams. Just a year ago, radiation was difficult to harness and channel directly to the tumor, and healthy tissue often was damaged during treatment.

A research group at ETH developed a new technique, known as "polynomial kernel radiation therapy" (PKRT) providing the medical equivalent of a guided navigation system to irradiate the tumor itself while avoiding healthy tissue nearby. The new technique is so precise that they can hit the tumor while barely straying outside its perimeter.

The radiation device sends radiation towards the tumor. It has to be calibrated precisely so that the radiation is high in regions with many tumor cells and very low in other regions. The PKRT technique allows to define these regions by a polynomial p – of degree $d \leq 30$ – depending on coordinates x, y, z. The radiation will be high in regions where p is positive and low in regions where p is negative.

However, there is still some undesirable dispersion close to the boundary defined by $p = 0$. Thus it is desirable to use polynomials of small degree.

This is exactly what the doctors ask you to do: Given a set of measurements, indicating healthy and tumor cells, determine the smallest number d, such that a polynomial of degree d can completely distinguish all (measured) tumor cells from the (measured) healthy tissue. In particular this means that there is also no (measured) cell on the boundary defined by $p = 0$.

Input The first line of the input contains the number of testcases $1 \leq N \leq 50$. N testcases follow. Each of them starts with a line containing two integers, indicating the number of measured healthy cells h and the number of measured tumor cells t ($1 \leq h + t \leq 50$). The following h lines indicate the integer coordinates x, y, z ($|x|$, $|y|$, $|z| \leq 2^{10}$) of the healthy cells. The subsequent t lines provide the locations of the tumor cells in the same way.

Output For each testcase, the output is a line containing one integer, denoting the minimal number d, such that a polynomial of degree d can separate the h healthy cells from the t tumor cells. If $d > 30$ output `Impossible!` as the device currently only works for $d \leq 30$.

Sample Input/Output is provided on the next page.

Sample Input

```
2
2 2
-2 0 0
-1 -1 0
0 0 0
0 0 -1
2 1
0 -2 0
0 0 0
0 -1 0
```

Sample Output

```
1
2
```

(Points)*100