E. Matching vs Independent Set

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

You are given a graph with $3 \cdot n$ vertices and m edges. You are to find a matching of n edges, **or** an independent set of n vertices.

A set of edges is called a matching if no two edges share an endpoint.

A set of vertices is called an independent set if no two vertices are connected with an edge.

Input

The first line contains a single integer $T \geq 1$ — the number of graphs you need to process. The description of T graphs follows.

The first line of description of a single graph contains two integers n and m, where $3 \cdot n$ is the number of vertices, and m is the number of edges in the graph ($1 \leq n \leq 10^5$, $0 \leq m \leq 5 \cdot 10^5$).

Each of the next m lines contains two integers v_i and u_i ($1 \leq v_i, u_i \leq 3 \cdot n$), meaning that there is an edge between vertices v_i and u_i.

It is guaranteed that there are no self-loops and no multiple edges in the graph.

It is guaranteed that the sum of all n over all graphs in a single test does not exceed 10^5, and the sum of all m over all graphs in a single test does not exceed $5 \cdot 10^5$.

Output

Print your answer for each of the T graphs. Output your answer for a single graph in the following format.

If you found a matching of size n, on the first line print "Matching" (without quotes), and on the second line print n integers — the indices of the edges in the matching. The edges are numbered from 1 to m in the input order.

If you found an independent set of size n, on the first line print "IndSet" (without quotes), and on the second line print n integers — the indices of the vertices in the independent set.

If there is no matching and no independent set of the specified size, print "Impossible" (without quotes).

You can print edges and vertices in any order.

If there are several solutions, print any. In particular, if there are both a matching of size n, and an independent set of size n, then you should print exactly one of such matchings **or** exactly one of such independent sets.

Example

input Copy

```
4
1 2
1 3
1 2
1 2
1 3
1 2
2 5
1 2
3 1
1 4
5 1
1 6
2 15
1 2
1 3
```

```
1 4
1 5
1 6
2 3
2 4
2 5
2 6
3 4
3 5
3 6
4 5
4 6
5 6
```

output Copy

```
Matching
2
IndSet
1
IndSet
2 4
Matching
1 15
```

Note

The first two graphs are same, and there are both a matching of size 1 and an independent set of size 1. Any of these matchings and independent sets is a correct answer.

The third graph does not have a matching of size 2, however, there is an independent set of size 2. Moreover, there is an independent set of size 5: `2 3 4 5 6`. However such answer is not correct, because you are asked to find an independent set (or matching) of size **exactly** n .

The fourth graph does not have an independent set of size 2, but there is a matching of size 2.

58089671	Jul/31/2019 20:02	Wrong answer on test 1
58089352	Jul/31/2019 19:55	Wrong answer on test 1

→ Problem tags

constructive algorithms | graphs

No tag edit access

→ Contest materials

- Announcement (en)
- Tutorial (en)