Independent Set

Problem Code: **INDEP**

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Read problem statements in Bengali, Mandarin Chinese, Russian, and Vietnamese as well.

You are given a graph G with N vertices (numbered 1 through N) and M edges. You should partition the vertices of G into two sets A and B such that:

- each vertex of G belongs to exactly one of these sets
- A is non-empty
- A is an independent set in G, i.e. for each pair of vertices $u, v \in A$, G does not contain an edge (u, v)
- for each vertex $a \in A$ and each vertex $b \in B$, there is an edge (a, b) in G

Find the number of such partitions (A, B). Also, give an example of one of these partitions or determine that no such partition exists.

Two partitions are considered different if there is a vertex that is in the set A in one partition and in the set B in the other partition.

Input

- The first line of the input contains a single integer T denoting the number of test cases. The description of T test cases follows.
- The first line of each test case contains two space-separated integers N and M.
- Each of the next M lines contains two space-separated integers u and v denoting that vertices u and v are connected by an edge.

Output

For each test case, print two lines.

- The first of these lines should contain a single integer — the number of partitions satisfying the given conditions.
- The second line should contain a single string with length N. If there are no partitions satisfying the given conditions, each character of this string should be '0'. Otherwise, this string should describe one such partition — for each valid i, the i-th character should be '1' if vertex i belongs to A or '0' if it belongs to B.

Constraints

- $1 \le T \le 5 \cdot 10^5$
- $1 \le N, M \le 5 \cdot 10^5$
- $1 \le u, v \le N$
- there are no self-loops or duplicate edges in the graph
- the sum of N over all test cases does not exceed $5 \cdot 10^5$
- the sum of M over all test cases does not exceed $5 \cdot 10^5$

Subtasks

Subtask #1 (30 points): $N, M, T \le 100$

Subtask #2 (70 points): original constraints

Example Input

```
1
5 7
1 3
1 4
1 5
2 3
2 4
2 5
```

```
3 4
```

Example Output

```
1
11000
```

Explanation

Example case 1: The only possible partition satisfying the given conditions is $A = \{1, 2\}, B = \{3, 4, 5\}$.

Author:	3★ pshishod2645
Date Added:	25-02-2021
Time Limit:	1 secs
Source Limit:	50000 Bytes
Languages:	CPP14, C, JAVA, PYTH 3.6, PYTH, CS2, ADA, PYPY, PYP3, TEXT, CPP17, PAS fpc, RUBY, PHP, NODEJS, GO, TCL, HASK, PERL, SCALA, kotlin, BASH, JS, PAS gpc, BF, LISP sbcl, CLOJ, LUA, D, R, CAML, rust, ASM, FORT, FS, LISP clisp, SQL, swift, SCM guile, PERL6, CLPS, WSPC, ERL, ICK, NICE, PRLG, ICON, PIKE, COB, SCM chicken, SCM qobi, ST, NEM, SQLQ

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