

Problem F. Nearest Black Vertex

Time limit 2000 ms

Mem limit 1048576 kB

Problem Statement

You are given a simple connected undirected graph with N vertices and M edges (a simple graph contains no self-loop and no multi-edges).

For $i = 1, 2, \dots, M$, the i -th edge connects vertex u_i and vertex v_i bidirectionally.

Determine whether there is a way to paint each vertex black or white to satisfy both of the following conditions, and show one such way if it exists.

- At least one vertex is painted black.
- For every $i = 1, 2, \dots, K$, the following holds:
 - the minimum distance between vertex p_i and a vertex painted black is exactly d_i .

Here, the distance between vertex u and vertex v is the minimum number of edges in a path connecting u and v .

Constraints

- $1 \leq N \leq 2000$
- $N - 1 \leq M \leq \min\{N(N - 1)/2, 2000\}$
- $1 \leq u_i, v_i \leq N$
- $0 \leq K \leq N$
- $1 \leq p_1 < p_2 < \dots < p_K \leq N$
- $0 \leq d_i \leq N$
- The given graph is simple and connected.
- All values in the input are integers.

Input

The input is given from Standard Input in the following format:

```

N M
u1 v1
u2 v2
⋮
uM vM
K
p1 d1
p2 d2

```

⋮

p_K d_K

Output

If there is no way to paint each vertex black or white to satisfy the conditions, print **No** .
Otherwise, print **Yes** in the first line, and a string S representing a coloring of the vertices in the second line, as shown below.
Here, S is a string of length N such that, for each $i = 1, 2, \dots, N$, the i -th character of S is 1 if vertex i is painted black and 0 if white.

Yes

S

If multiple solutions exist, you may print any of them.

Sample 1

Input	Output
5 5 1 2 2 3 3 1 3 4 4 5 2 1 0 5 2	Yes 10100

One way to satisfy the conditions is to paint vertices 1, 3 black and vertices 2, 4, 5 white.
Indeed, for each $i = 1, 2, 3, 4, 5$, let A_i denote the minimum distance between vertex i and a vertex painted black, and we have $(A_1, A_2, A_3, A_4, A_5) = (0, 1, 0, 1, 2)$, where $A_1 = 0, A_5 = 2$.

Sample 2

Input	Output
5 5 1 2 2 3 3 1 3 4 4 5 5 1 1 2 1 3 1 4 1 5 1	No

There is no way to satisfy the conditions by painting each vertex black or white, so you should print **No** .

Sample 3

Input	Output
1 0 0	Yes 1