World Map

Mr. Pacha, a Bolivian archeologist, discovered an ancient document near Tiwanaku that describes the world during the Tiwanaku Period (300-1000 CE). At that time, there were N countries, numbered from 1 to N.

In the document, there is a list of M different pairs of adjacent countries:

$$(A[0], B[0]), (A[1], B[1]), \ldots, (A[M-1], B[M-1]).$$

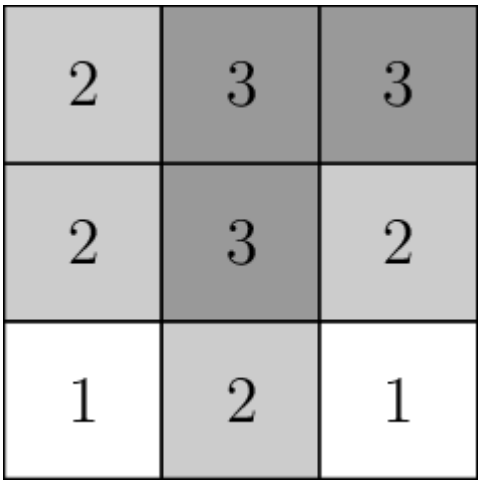
For each i ($0 \leq i < M$), the document states that country $A[i]$ was adjacent to country $B[i]$ and vice versa. Pairs of countries not listed were not adjacent.

Mr. Pacha wants to create a map of the world such that all adjacencies between countries are exactly as they were during the Tiwanaku Period. For this purpose, he first chooses a positive integer K. Then, he draws the map as a grid of $K \times K$ square cells, with rows numbered from 0 to $K-1$ (top to bottom) and columns numbered from 0 to $K-1$ (left to right).

He wants to color each cell of the map using one of N colors. The colors are numbered from 1 to N, and country j ($1 \leq j \leq N$) is represented by color j. The coloring must satisfy all of the following **conditions**:

- For each j ($1 \leq j \leq N$), there is at least one cell with color j.
- For each pair of adjacent countries $(A[i], B[i])$, there is at least one pair of adjacent cells such that one of them is colored $A[i]$ and the other is colored $B[i]$. Two cells are adjacent if they share a side.
- For each pair of adjacent cells with different colors, the countries represented by these two colors were adjacent during the Tiwanaku Period.

For example, if $N = 3$, $M = 2$ and the pairs of adjacent countries are $(1, 2)$ and $(2, 3)$, then the pair $(1, 3)$ was not adjacent, and the following map of dimension $K = 3$ satisfies all the conditions.



In particular, a country **does not** need to form a connected region on the map. In the map above, country 3 forms a connected region, while countries 1 and 2 form disconnected regions.

Your task is to help Mr. Pacha choose a value of K and create a map. The document guarantees that such a map exists. Since Mr. Pacha prefers smaller maps, in the last subtask your score depends on the value of K, and lower values of K may result in a better score. However, finding the minimum possible value of K is not required.

Implementation Details

You should implement the following procedure:

```
std::vector<std::vector<int>> create_map(int N, int M,
    std::vector<int> A, std::vector<int> B)
```

- N: the number of countries.
- M: the number of pairs of adjacent countries.
- A and B: arrays of length M describing adjacent countries.
- This procedure is called **up to** 50 **times** for each test case.

The procedure should return an array C that represents the map. Let K be the length of C.

- Each element of C must be an array of length K, containing integers between 1 and N inclusive.
- $C[i][j]$ is the color of the cell at row i and column j (for each i and j such that $0 \leq i, j < K$).
- K must be less than or equal to 240.

Constraints

- $1 \leq N \leq 40$
- $0 \leq M \leq \frac{N \cdot (N-1)}{2}$
- $1 \leq A[i] < B[i] \leq N$ for each i such that $0 \leq i < M$.

- The pairs $(A[0], B[0]), \ldots, (A[M-1], B[M-1])$ are distinct.
- There exists at least one map which satisfies all the conditions.

Subtasks and Scoring

Subtask	Score	Additional Constraints
1	5	$M = N - 1, A[i] = i + 1, B[i] = i + 2$ for each $0 \leq i < M$.
2	10	$M = N - 1$
3	7	$M = \frac{N \cdot (N-1)}{2}$
4	8	Country 1 is adjacent to all other countries. Some other pairs of countries may also be adjacent.
5	14	$N \leq 15$
6	56	No additional constraints.

In subtask 6, your score depends on the value of K.

- If any map returned by `create_map` does not satisfy all the conditions, your score for the subtask will be 0.
- Otherwise, let R be the **maximum** value of K / N over all calls to `create_map`. Then, you receive a **partial score** according to the following table:

Limits	Score
$6 < R$	0
$4 < R \leq 6$	14
$3 < R \leq 4$	28
$2.5 < R \leq 3$	42
$2 < R \leq 2.5$	49
$R \leq 2$	56

Example

In CMS, both of the following scenarios are included as part of a single test case.

Example 1

Consider the following call:

```
create_map(3, 2, [1, 2], [2, 3])
```

This is the example from the task description, so the procedure can return the following map.

```
[
[2, 3, 3],
[2, 3, 2],
[1, 2, 1]
]
```

Example 2

Consider the following call:

```
create_map(4, 4, [1, 1, 2, 3], [2, 3, 4, 4])
```

In this example, $N = 4$, $M = 4$ and the country pairs $(1, 2)$, $(1, 3)$, $(2, 4)$, and $(3, 4)$ are adjacent. Consequently, the pairs $(1, 4)$ and $(2, 3)$ are not adjacent.

The procedure can return the following map of dimension $K = 7$, which satisfies all the conditions.

```
[
[2, 1, 3, 3, 4, 3, 4],
[2, 1, 3, 3, 3, 3, 3],
[2, 1, 1, 1, 3, 4, 4],
[2, 2, 2, 1, 3, 4, 3],
[1, 1, 1, 2, 4, 4, 4],
[2, 2, 1, 2, 2, 4, 3],
[2, 2, 1, 2, 2, 4, 4]
]
```

The map could be smaller; for example, the procedure can return the following map of dimension $K = 2$.

```
[
[3, 1],
[4, 2]
]
```

Note that both maps satisfy $K / N \leq 2$.

Sample Grader

The first line of the input should contain a single integer T, the number of scenarios. A description of T scenarios should follow, each in the format specified below.

Input Format:

```
N M
A[0] B[0]
:
A[M-1] B[M-1]
```

Output Format:

```
P
Q[0] Q[1] ... Q[P-1]

C[0][0] ... C[0][Q[0]-1]
:
C[P-1][0] ... C[P-1][Q[P-1]-1]
```

Here, P is the length of the array C returned by `create_map`, and $Q[i]$ ($0 \leq i < P$) is the length of $C[i]$. Note that line 3 in the output format is intentionally left blank.