

Robots

Input file: **standard input**
Output file: **standard output**
Time limit: 1 second
Memory limit: 256 megabytes

There are 4 types of robots:

- **A**: Can move only down and right. That is, a robot at point (x, y) can move to point $(x + 1, y)$ or $(x, y + 1)$.
- **B**: Can move only down and left. That is, a robot at point (x, y) can move to point $(x + 1, y)$ or $(x, y - 1)$.
- **C**: Can move only up and right. That is, a robot at point (x, y) can move to point $(x - 1, y)$ or $(x, y + 1)$.
- **D**: Can move only up and left. That is, a robot at point (x, y) can move to point $(x - 1, y)$ or $(x, y - 1)$.

There are 2 types of cells in the grid:

- **.** (Empty): A robot can be freely placed and move through empty cells.
- **#** (Blocked): A robot cannot move to blocked cells.

Given a value N , construct a grid of size $(N + 1) \times (N + 1)$ such that each cell is either empty or blocked. Then place N robots of any type you want. Robots should be placed in empty cells, and no two robots should be placed in the same cell.

You are also given a tree, where each non-leaf vertex has at least 4 neighbours. Let E be the set of edges (x_i, y_i) . Let S_i be the set of cells to which robot i can move. The following conditions should be satisfied:

- For all pairs $(i, j) \in E$, $S_i \cap S_j \neq \emptyset$ must hold.
- For all pairs $(i, j) \notin E$, $S_i \cap S_j = \emptyset$ must hold.

Input

- The first line contains one integer T ($1 \leq T \leq 10^3$), the number of tests.
- Then, for each test:
 - The first line contains one integer N ($1 \leq N \leq 50$).
 - Then, $N - 1$ lines follow, each containing two space-separated integers x_i, y_i ($1 \leq x_i, y_i \leq N$).

Output

For each test, print the answer in the following format:

- First, print $N + 1$ lines, each containing $N + 1$ characters consisting of **.** or **#**. The j -th character in the i -th line ($1 \leq j \leq N + 1, 1 \leq i \leq N + 1$) should represent the type of cell at position (i, j) .
- Then, print N lines, each containing two space-separated integers and one character A_i, B_i, C_i ($1 \leq A_i, B_i \leq N + 1; C_i \in \{\mathbf{A}, \mathbf{B}, \mathbf{C}, \mathbf{D}\}$), where (A_i, B_i) is the cell where the i -th robot is placed, and C_i is the type of robot. *Note that all robots must be placed in different cells.*

Example

standard input	standard output
1
5
1 2
1 3	.##...
1 4	..#...
1 5
	6 1 C
	1 6 C
	1 5 D
	2 6 A
	2 5 B

Note

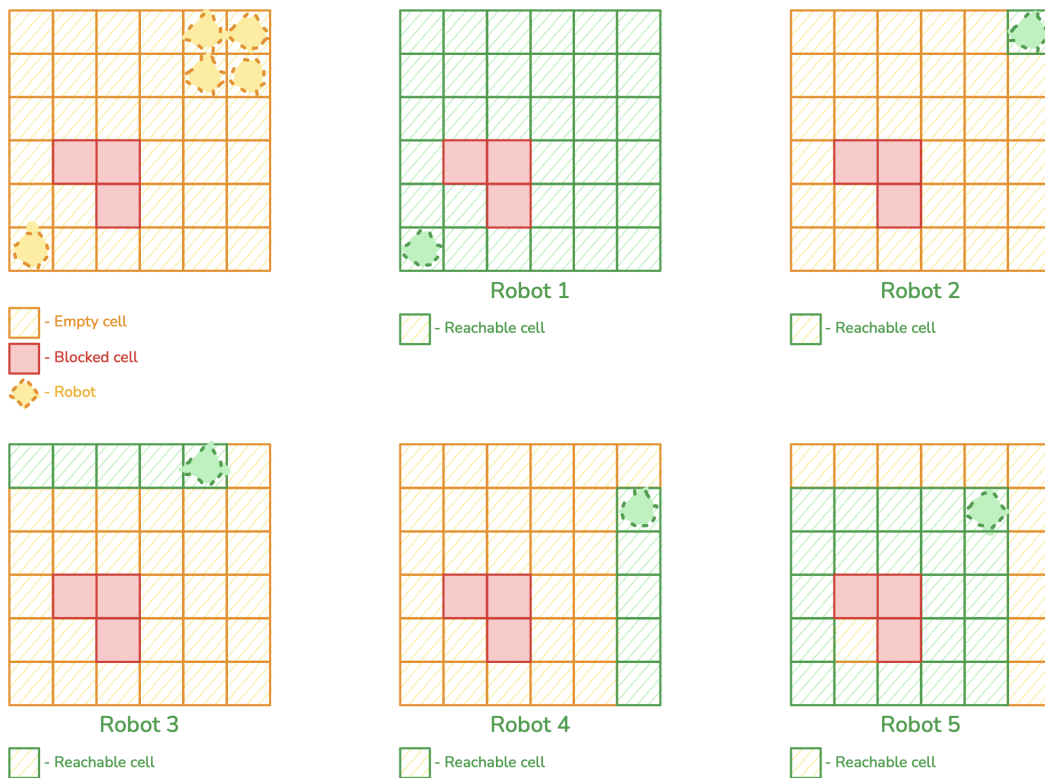


Figure 1. Specification for sample.