# Cave Escape

Captain Hook is trapped in a cave with his crew of space creatures. The crew consists of creatures of different colors, each with different abilities to survive various threats. In particular, a red crew member is impervious to fire, a green crew member is impervious to electricity, a blue crew member is impervious to water, and a yellow crew member is impervious to poison.

The cave consists of a number of chambers and passageways. The chambers are inhabited by deadly monsters. Each monster can be defeated by an attack of a given minimum number of crew members. Thus with a large-enough crew, Captain Hook can pass through a chamber, otherwise he and his crew will be eaten by the monster in that chamber. Even when the crew can defeat the monster, the monster will eat one crew member of each color in that chamber.

The passageways also have their own dangers. They do not contain monsters but they contain traps based on fire, electricity, water, and/or poison. If there are crew members that are impervious to the traps, then the traps can be disarmed, and Captain Hook and his whole crew can pass through a passageways. Otherwise, the passageway can not be used.

Your goal is to determine the maximum number of crew members with which Captain Hook can escape the cave.

## Input

The first line in the input contains the number $T$ of caves to solve. Then $T$ cave descriptions follow. Each cave description starts with a line containing six integers $n, m, r, g, b, y$. $n$ ($2 \leq n \leq 50$) is the number of chambers in the cave; $m$ ($0 \leq m \leq 200$) is the number of passageways; and $r, g, b, y$ are the initial numbers (all in the range of 0 and 500, inclusive) of red, green, blue, and yellow members of the crew.

Each of the following $n$ input lines describes a cave, with the $i$th line describing chamber $i$. The description of a chamber consists of a single integer between 0 and 2000 (inclusive) representing the minimum number of crew members needed to defeat the monsters in that chamber. A value of 0 indicates that there are no monsters, and therefore that the chamber can be visited without any losses. Chamber 1 is where Captain Hook and his crew enter the cave, and camber $n$ is the exit, and both are guaranteed to contain no monsters.

Each of the following $m$ lines describes a passageway. Each description consists of two integers followed by a string. The integers indicate the chamber numbers of the two endpoints of the passageway. So, these two numbers are distinct and each between 1 and $n$. The string is either "N" to indicate that there are no hazards, or contains one or more of the characters 'F', 'E', 'W', or 'P', with each letter appearing at most once, indicating the presence of fire, electricity, water, or poison, respectively. You may assume that there is at most one passageway between any two chambers.

## Output

For each input cave $i$, the output contains one line that indicates the maximum number $x$ of crew members that can escape that cave with Captain Hook or the string `DOOMED` if Captain Hook can not escape that cave. The format is: `Cave #`$i$`:` $x$ or `Cave #`$i$`: DOOMED`.

## Examples

### Sample input 1

```
2
4 3 1 15 15 1
0
20
28
0
1 2 FP
2 3 EW
3 4 N
4 4 20 1 20 10
0
62
5
0
1 2 N
2 4 N
1 3 N
3 4 E
```

### Sample output 1

```
Cave #1: 26
Cave #2: DOOMED
```

## Limits

Time limit is 1 second.

Memory limit is 256 megabytes.