10. Runners

Program Name: Runners.java Input File: runners.dat

Russell, Seth, and Thomas are runners for their school's programming contest. Their job is to collect the disk containing a program from a programming team and deliver it to the judge's room for judging. They noticed that frequently the person with the shortest path to the programming team was not always the person that picked up the program. They want a program that will find which runner would have the shortest path to a programming team given the location of each runner, the team that has a program complete, and the setup of the contest room.

You are to write a program that will find the runner with the shortest path from his original location to the team with the finished program to the judge's room.

The rectangular contest room will contain the following symbols:

`.`	Indicates an empty floor space.
`*`	Indicates a wall or desk that the runner must go around.
`P`	Indicates the location of the programming problem. A runner must move either horizontally or vertically adjacent to the cell containing the `P` to collect the problem.
`R`, `S`, and `T`	Indicates the locations of `RUSSELL`, `SETH`, and `THOMAS` respectively.
`J`	Indicates the location of the entrance to the judge's room.

The rules for movements are:

- All movement must be vertical or horizontal.
- A runner cannot go through a wall, another runner, or the location of the programming problem.
- The length of the runner's path does not include the original location of the runner or the location of the programming problem but does include the location of the entrance to the judge's room.

Input

The first line of input will contain a single integer `n` that indicates the number of contest rooms to follow. For each contest room, the first line will contain two integers in the form `r c`, indicating the number of rows and columns in the contest room, respectively. The next `r` lines will contain the maze with symbols listed above with no spaces.

Output

For each contest room, you will print on a single line the length of the shortest path from the runner's location to the programming problem to the judge's room followed by a space and the name of the runner with the shortest path. If two or more runners have a path that is a shortest path, list those runners in alphabetical order separated by a space. Names should be all uppercase.

Example Input File

```
2
5 12
************
*.....R*T.**
**P**....S**
*.........**
*****J******
5 10
**********
**S*T...**
*........J
*..P*R..**
**********
```

Example Output to Screen

```
10 RUSSELL
8 SETH THOMAS
```