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## 2. Boggle

**Program Name: Boggle.java**

**Input File: boggle.dat**

Boggle is a word game played with 16 six-sided cubes that have a letter on each side of each cube. The 16 cubes are randomly rolled into a square 4x4 grid creating a puzzle. Each cube in the puzzle has exactly one letter facing up.

The object of the game is to find as many words as possible during a given amount of time. Words are formed using the following rules:

- Letters in a word must be adjacent horizontally, vertically or diagonally within the borders of the 4x4 grid.
- The letter on an individual cube can be used at most once per word.
- The same word can be used only once even if it appears more than once in the puzzle.

Points are scored by the length of the word as follows:

No. of letters:	2 or less	3	4	5	6	7	8 or more
Points:	0	1	1	2	3	5	11

### Input

The first line of input will contain a single integer  $n$  that indicates the number of games to follow. For each game,

- The first four lines will each contain 4 uppercase letters of the alphabet that make up the puzzle.
- The next line will contain a single integer  $m$  that indicates the number of words that a player found in that puzzle.
- Each of the next  $m$  lines will contain a single word comprised of at most 15 uppercase letters.

### Output

For each game, you will determine which words actually appear in the puzzle and print the total number of points scored in that game in the format: PUZZLE # $x$ :  $y$  where  $x$  is the number of the puzzle and  $y$  is the number of points scored.

**Example Input File (The Boggle cubes are in bold for readability purposes only.)**

```
2
ERTD
HILS
DESK
TRAI
5
DESK
LID
RAISE
SCARED
LESS
REJO
ECIE
NERN
RATE
5
RACE
JOIN
REJOICE
RECREATE
TRAIT
```

### Example Output to Screen

```
PUZZLE #1: 5
PUZZLE #2: 17
```