Problem 8

Every Rose Has Its Thorn

6 Points

Program Name: rose.cpp Input File: rose.dat

Introduction

"...the roses fearfully on thorns did stand..." - William Shakespeare, playwright, 1564–1616
"...every rose has its thorn..." - Poison, 80s rock band

Oh, how you wish to win the heart of your true love with a single red rose, but you don't want to prick your finger when plucking the flower from the rosebush. Given the location of thorns on a 10cm rose stem, you must determine if you can pick the rose without touching a thorn. You are able to do this if there exists a 1.25cm stretch of no thorns at the same heighth on each of the four sides of the rose stem.

Input

Input to this problem will consist of a (non-empty) series of up to 100 data sets. Each data set will be formatted according to the following description, and there will be **no blank lines** separating data sets.

A single data set has 3 components:

1. *Start line* - A single line, "START X", where:
   X : (1 <= X <= 40) is the number of thorns on each side of a four-sided rose stem.
2. Each of the next four lines will contain a list of X thorn locations for a side of the rose stem. Thorn locations will be represented by a decimal number (to 2 decimal places) that signifies the distance in centimeters from the bottom of the stem to the thorn, and the list of these locations will be delimited by a single space. Locations will be between 0.00 and 10.00, inclusive.
3. *End line* - A single line, "END"

Output

For each data set, there will be exactly one line of output. If you able to pick the rose without touching a thorn, the output will be a single line with the statement, "A ROSE FOR MY LOVE". Otherwise, the output will be a single line with the statement, "A THORN FOR MY TROUBLES".

Example: Input File

```
START 4
1.00 5.00 6.00 8.00
2.00 3.00 4.00 7.00
0.25 0.50 5.75 8.75
0.50 0.75 4.00 4.25
END
START 5
2.00 3.00 4.00 5.00 6.00
5.00 6.00 7.00 8.00 9.00
2.25 3.43 6.89 7.00 8.40
1.24 4.58 6.78 7.12 8.34
END
```

Output to screen

```
A ROSE FOR MY LOVE
A THORN FOR MY TROUBLES
```