Products of matrices   P97589_en

Write a program that, given a sequence of square matrices $m_1, \ldots, m_n$, prints in which order the matrices must be multiplied exactly once so that the the result is as big as possible. We consider that the matrices are to be compared in lexicographical order, from top to bottom and from left to right.

Input

Input consists of a natural number $n > 0$, followed by $m_1, \ldots, m_n$. All the matrices have size 2×2, and their four elements (natural numbers between 0 and 9) appear in one or more lines.

Output

Print the order in which the matrices must be multiplied exactly once so that the result is maximum, following the format of the examples. If there is more than one way to obtain the same result, choose the lexicographically smallest, comparing the matrices from left to right.

Sample input 1

```
2

1 2
3 4

5 6
7 8
```

Sample output 1

```
5 6 * 1 2 = 23 34
7 8   3 4   31 46
```

Sample input 2

```
1

3 4
6 7
```

Sample output 2

```
3 4 = 3 4
6 7   6 7
```

Sample input 3

```
3

9 0 3 3

2 2 0 2

1 1 5 0
```

Sample output 3

```
2 2 * 1 1 * 9 0 = 114 6
0 2   5 0   3 3   90 0
```

Sample input 4

```
2

3 0 0 3

1 3 0 4
```

Sample output 4

```
1 3 * 3 0 = 3 9
0 4   0 3   0 12
```

Problem information

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