NOI Winter Camp '09 P1 - A Shortest Path Problem

Time limit: 2.0s **Memory limit:** 256M

You are given a $6 \times n$ grid, where each lattice point is labelled by a (not necessarily distinct) non-negative integer. There are two types of operations:

1. Change the label of a lattice point to another non-negative integer.
2. Find the shortest path between two lattice points.

Here the length of a path is defined as the sum of labels of all lattice points the path passes through, and two lattice points are adjacent if they have Manhattan distance 1 (i.e. $(x_1, y_1) \sim (x_2, y_2)$ if $|x_1 - x_2| + |y_1 - y_2| = 1$).

Input Specification

The first line of input will contain a single integer, n.
The next 6 lines will contain n integers each, where the jth integer in the $(i+1)$th row is the label of (i, j).
The following line will contain a single integer, Q, the number of operations.
The operations will be one of the following:

- `1 x y c`: The label of (x, y) is changed to c, where $1 \leq x \leq 6$, $1 \leq y \leq n$, $0 \leq c \leq 10\,000$.
- `2 x1 y1 x2 y2`: Output the length of the shortest path between (x_1, y_1) and (x_2, y_2), as defined above, where $1 \leq x_1, x_2 \leq 6$, $1 \leq y_1, y_2 \leq n$.

Output Specification

For each type 2 operation, output the length of the shortest path between (x_1, y_1) and (x_2, y_2) on a new line.

Sample Input

```
5
0 0 1 0 0
0 1 0 1 0
0 2 0 1 0
0 1 1 1 0
0 0 0 0 0
1 1 1 1 1
5
2 1 2 1 4
1 1 1 10000
2 1 2 1 4
1 2 3 10000
2 1 2 3 3
```

Sample Output

```
0
1
2
```

Constraints

Case	n	Q
1	10	20
2	100	200
3	1000	2000
4	$10\,000$	$20\,000$
5	$10\,000$	$20\,000$
6	$10\,000$	$30\,000$
7	$35\,000$	$30\,000$
8	$50\,000$	$50\,000$
9	$100\,000$	$60\,000$
10	$100\,000$	$100\,000$