

**Input:**

8  
-1  
1 2 3  
4 5 6  
0 7 8

**Output:**

2  
left  
left

**Input:**

8  
0  
1 2 0  
3 4 5  
6 7 8

**Output:**

2  
right  
right

**Input:**

15  
-1  
1 2 3 4  
5 6 7 8  
9 10 11 12  
13 14 0 15

**Output:**

1  
left

**Input:**

8  
8  
1 2 3  
4 5 6  
0 7 8

**Output:**

2  
left  
left

**Input:**

8  
-1  
1 2 3  
4 5 6  
7 8 0

**Output:**

0

**Input:**

8  
-1  
6 5 3  
2 4 8  
7 0 1

**Output:**

21  
left  
down  
down  
right  
right  
up  
left  
up  
right  
down  
left  
down  
left  
up  
right  
down  
right  
up  
up  
left  
left

**Input:**

8  
4  
1 2 3  
4 5 0  
6 7 8

**Output:**

1  
right

**Input:**

8  
-1  
1 2 3  
4 5 6  
8 7 0

**Output:**

-1