

Given oriented graph. Find the distances from the vertex x to all other vertices of the graph.

The first line of the input contains two positive integers N and x ($1 \leq N \leq 1\,000$, $1 \leq x \leq N$) – the number of vertices in the graph and the starting vertex, respectively. Next, in N rows along N numbers, is the graph adjacency matrix: in the i -th row, at the j -th place, there are 1 if there is an edge from vertex i to j and 0 if there is no edge between them. Zeros are on the main diagonal of the matrix.

Print d_1, d_2, \dots, d_n , where d_i is -1 if there are no paths between x and i , and the minimum distance between x and i otherwise.

Sample input 1:

```
6 5
0 1 1 0 0 0
1 0 0 0 0 0
1 1 0 0 0 0
0 0 0 0 1 0
0 0 1 1 0 0
0 1 0 0 0 0
```

Sample output 1:

```
2 2 1 1 0 -1
```