

## Lab 11 Tasks

**Q1.** The slogan of the recent fresher's reception of the CSE department made some of the students curious about computer displays and how images are represented in computers. The students found out that when any picture is stored in a computer the picture is divided into a  $n \times n$  grid where  $n$  is a positive integer. Each cell of the grid contains an integer value which represents a specific shade of a color. What they found even more interesting is that they could now easily implement some of the simple filters that they use in Snapchat, Facebook and Instagram. Your task is to implement one of these filters which makes an image look smoother.

You already know an image will be represented by a  $n \times n$  integer array where  $n$  is an integer. A neighbor distance,  $d$  is also specified where  $d$  is an integer. For any given index  $(i, j)$  in the array, all the indices that are within distance  $d$  are considered to be the neighbors of index  $(i, j)$ . For example, in the figure below, if  $d = 1$  then the neighbors of the index  $(1,1)$  are  $(0,0)$ ,  $(0,1)$ ,  $(0,2)$ ,  $(1,0)$ ,  $(1,2)$ ,  $(2,0)$ ,  $(2,1)$ ,  $(2,2)$ . For  $d = 2$ , all the indices of the array would be the neighbor of  $(2,2)$ .

5 (0,0)	7 (0,1)	5 (0,2)	4 (0,3)	0 (0,4)
8 (1,0)	1 (1,1)	15 (1,2)	2 (1,3)	11 (1,4)
3 (2,0)	4 (2,1)	2 (2,2)	13 (2,3)	4 (2,4)
9 (3,0)	12 (3,1)	7 (3,2)	8 (3,3)	6 (3,4)
11 (4,0)	3 (4,1)	8 (4,2)	15 (4,3)	12 (4,4)

Now to make the image smooth, follow these steps:

1. Take the first index  $(0, 0)$
2. Find the average of the values stored in the neighbor indices and also the current index.
3. Store this value in the current index location. If the index of any neighbor is out of bound then ignore that neighbor. For example, the value to be stored in index  $(0, 0)$  for  $d = 1$  will be  $\frac{7+8+1}{3}$
4. Repeat steps 2 and 3 for every index in the array.

### Input

The first line of input will be the integers  $n$  and  $d$ . The following lines will be the  $n \times n$  array.

### Output

The output will be the  $n \times n$  after applying the filter.

### Example

Input	Output
3 1 1 2 3 4 5 6 7 8 9	3 3 4 4 5 5 6 6 7

**Q2.** Given an integer  $n$ , determine if  $n$  is a power of 3.

### Example

Input 15	Output False
Input 27	Output True