

# Dilation

Problem Code	hw05b_dilation
Running Time Limit	1 sec
Memory Limit	16 mb

## Objective

- Be able to find dilation in binary images.

## Introduction

A binary image is a 2D grid of size  $N \times M$  cells such that a value in each cell is either 0 or 1. We define a **distance** of two cells  $(x_1, y_1)$  and  $(x_2, y_2)$  as  $(|x_1 - x_2| + |y_1 - y_2|)$ . A **closest-one-distance** of any cell is the smallest distance from that cell to the other cell with value 1.

A **distance K dilation** of a binary image is a modification of that binary image by converting every value 0 cell that has closest-one-distance not more than  $K$  into value 1 cell. The following example shows dilations of a binary image.

Original Image					Distance 1 dilation					Distance 2 dilation				
0	0	0	0	0	0	1	0	0	0	1	1	1	0	0
0	1	0	0	0	1	1	1	0	0	1	1	1	1	0
0	0	0	0	0	0	1	0	0	0	1	1	1	0	1
0	0	0	0	0	0	0	0	0	1	0	1	0	1	1
0	0	0	0	1	0	0	0	1	1	0	0	1	1	1

## Task

Given a binary image and a distance  $K$ , your task is to compute distance  $K$  dilation of that image.

## Input

The first line contains three numbers  $N, M$  and  $K$  ( $1 \leq M, N, K \leq 500$ ) describing the width and the height of the image and the value  $K$  for dilation. This is followed by  $M$  lines; each contains  $N$  number of value 1 and 0 that describes each line in the image.

## Output

There must be  $M$  lines in the output; each has  $N$  numbers describes the distance  $K$  dilation of the given image.

## Example

### Ex1

Input	Output
5 4 2	1 1 1 1 1
0 1 0 0 1	1 1 1 1 1
0 0 0 0 0	0 1 0 0 1
0 0 0 0 0	0 0 0 0 0
0 0 0 0 0	0 0 0 0 0