CV Project 3: 5x5 Corner Preserving Averages C++

Student: Michael Grossman

Project Due Date: 03/02/2022

Algorithm Steps for Computing Corner Preserving Averages given an array of 2d 5x5 masks named masks, a 2d array representing the framed input image named frameAry, and a 2d array for storing the averages at each pixed called outAry:

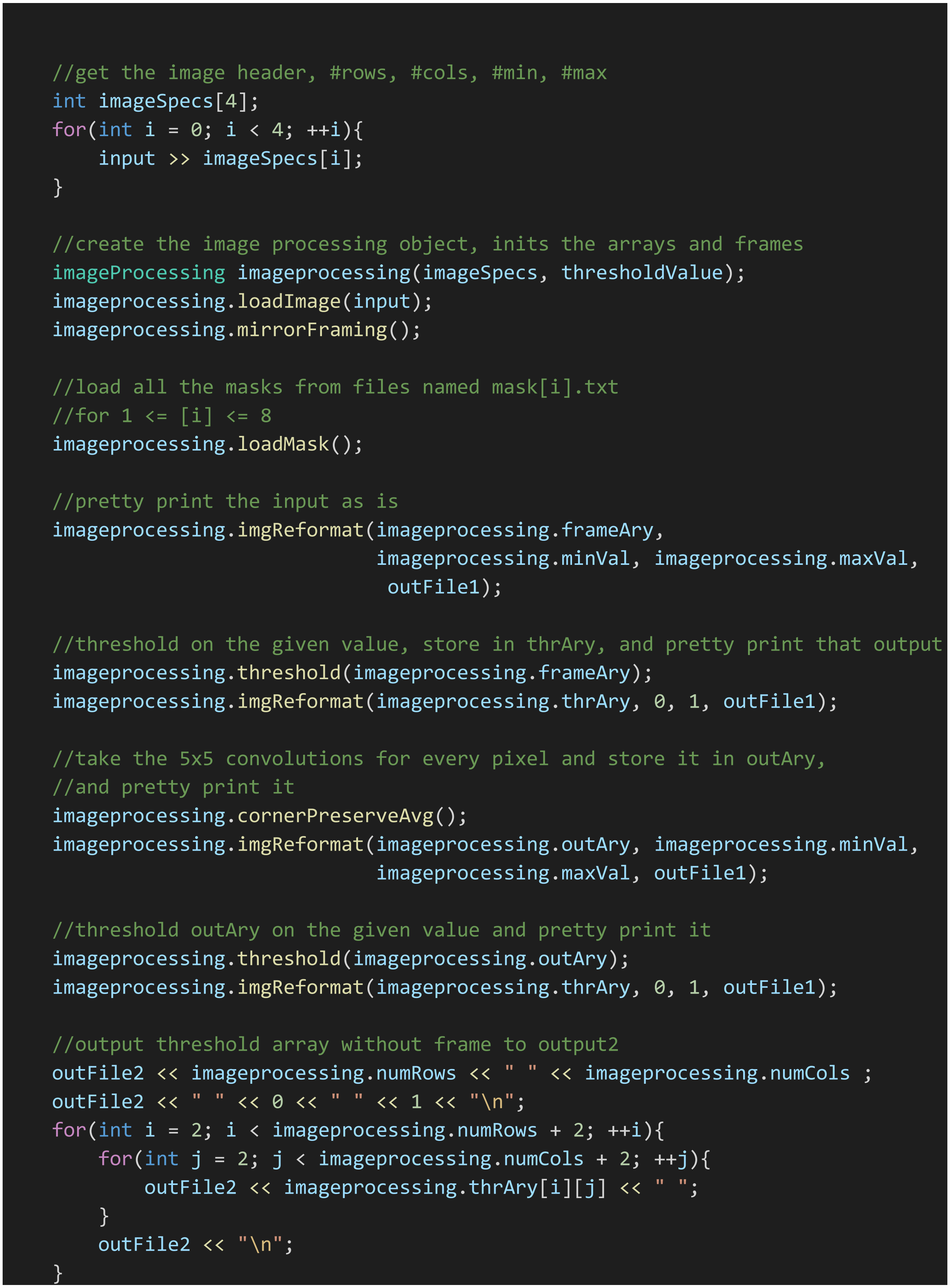
```
1.  r ← 2
2.  c ← 2
3.  maskIndex ← 0
4.  minAvg ← frameAry[r][c]
5.  minDiff ← 9999
6.  result ← convolution5x5( r, c, masks[masksIndex] ) / 9
7.  diff ← abs( result – frameAry[r][c] )
8.  if diff < minDiff:
9.      minDiff ← diff
10.     minAvg ← result
11. maskIndex++
12. repeat steps 6 to 11 while maskIndex < 8
13. c++
14. repeat steps 3 to 13 while c  < numCols + 2
15. r++
16. repeat steps 3 to 15 while r < numRows + 2
```

Algorithmic Steps for Computing Image Reformatting for pretty printing with frame given an array to read from named ary, a min pixel value named newMin, a max pixel value named newMax, and an output file named output:

```
1.  output ← output numRows, numCols, newMin, newMax
2.  str ← to_string( newMax )
3.  width ←  str.length()
4.  r ← 2
5.  c ← 2
6.  output ← ary[r][c]
7.  str ← to_string( ary[r][c] )
8.  ww ← str.length()
9.  output ← " " //one blank space
10. ww++
11. repeat steps 9 to 10 while ww < width
12. c++
13. repeat steps 6 to 12 while c < numCols + 4
14. repeat steps 5 to 13 while r < numRows + 4
```

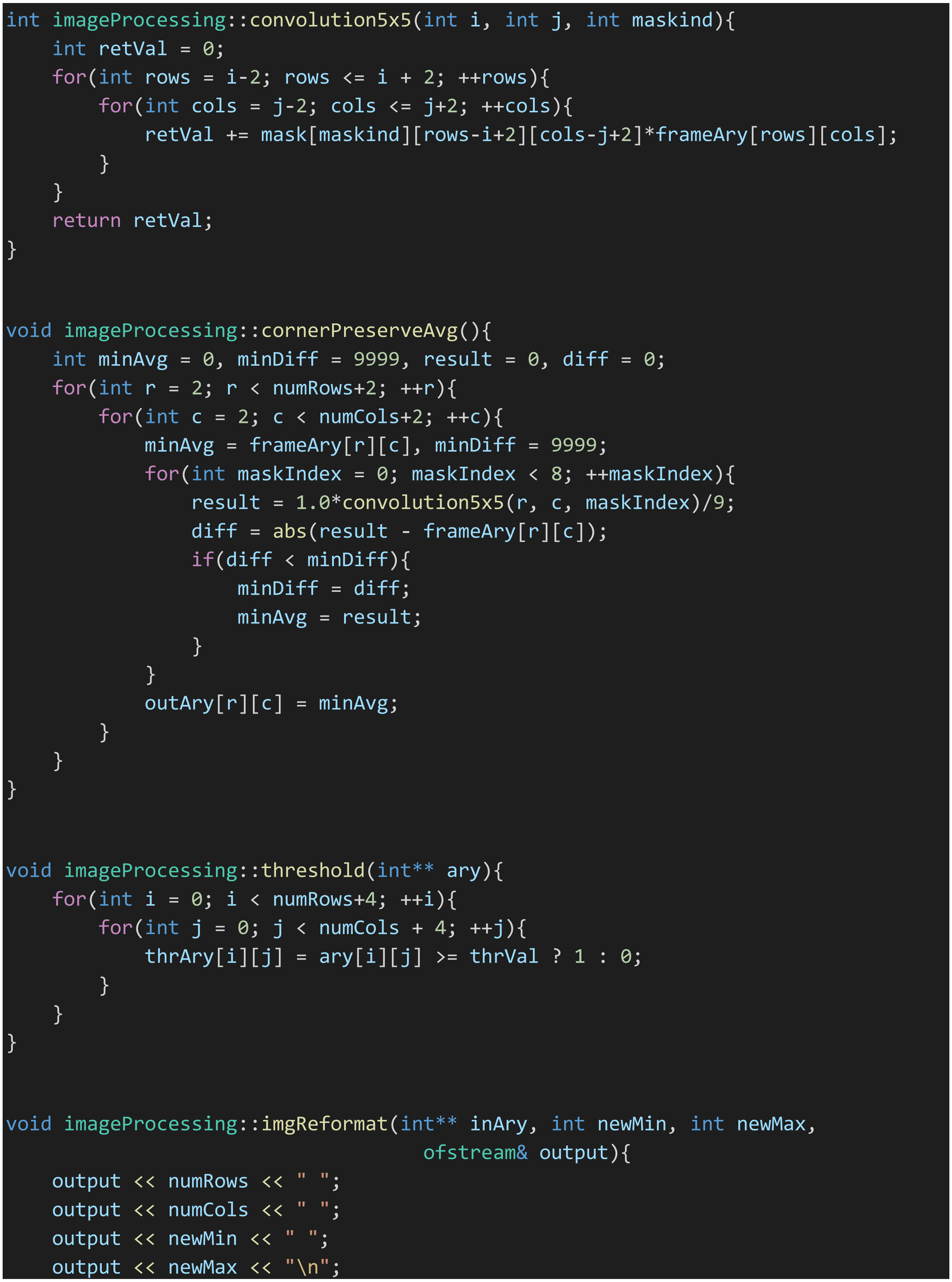
Source Code:

```
#include <iostream>
#include <fstream>
#include <string>

using namespace std;

class imageProcessing{
    public:

    //variables
    int numRows, numCols, minVal, maxVal, thrVal;
    int **frameAry, **outAry, **thrAry;
    int*** mask;

    //constructor + destructor
    imageProcessing(int* vals, int thrv);
    ~imageProcessing();

    //functions
    void loadImage(ifstream& input);
    void mirrorFraming();
    void loadMask();
    int convolution5x5(int i, int j, int maskind);
    void cornerPreserveAvg();
    void threshold(int** ary);
    void imgReformat(int** inAry, int newMin, int newMax, ofstream& output);

};

int main(int argc, char** argv){

    //get the input information
    string inputFilename = argv[1];
    string outputfile1 = argv[3];
    string outputFile2 = argv[4];

    //open the streams
    ifstream input(inputFilename);
    ofstream outFile1(outputfile1);
    ofstream outFile2(outputFile2);

    //get the threshold value
    int thresholdValue = atoi(argv[2]);
```

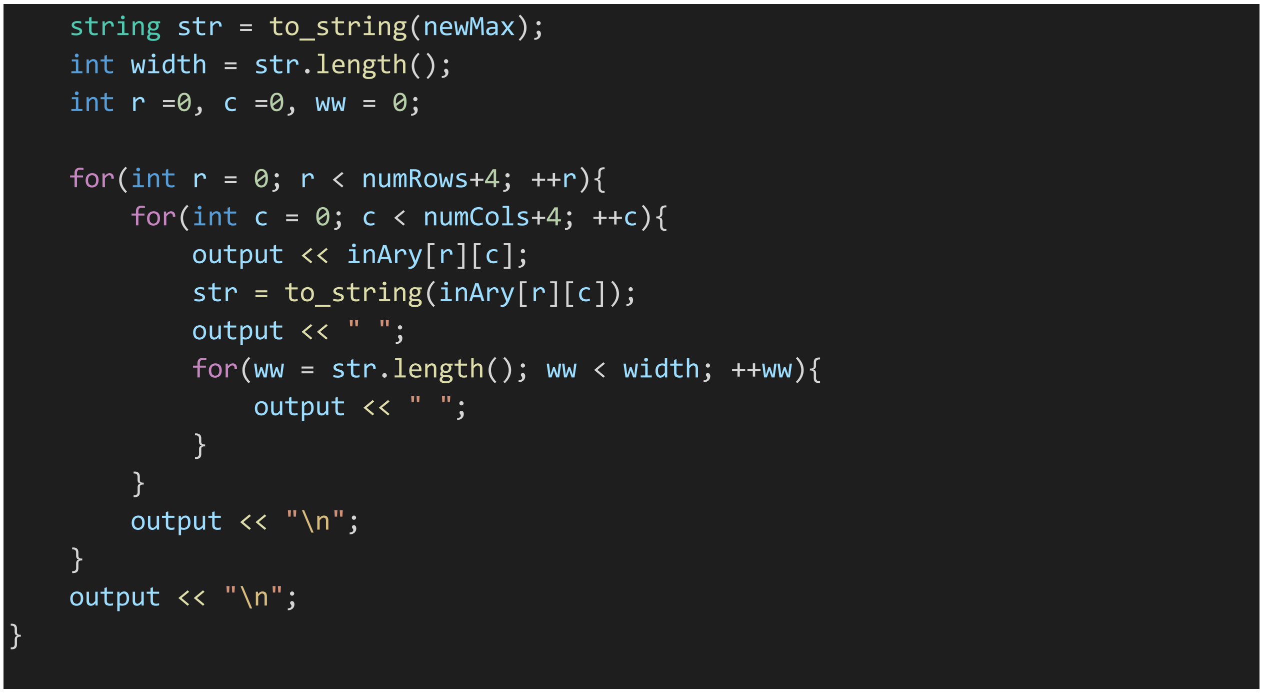


```
//get the image header, #rows, #cols, #min, #max
int imageSpecs[4];
for(int i = 0; i < 4; ++i){
    input >> imageSpecs[i];
}

//create the image processing object, inits the arrays and frames
imageProcessing imageprocessing(imageSpecs, thresholdValue);
imageprocessing.loadImage(input);
imageprocessing.mirrorFraming();

//load all the masks from files named mask[i].txt
//for 1 <= [i] <= 8
imageprocessing.loadMask();

//pretty print the input as is
imageprocessing.imgReformat(imageprocessing.frameAry,
                            imageprocessing.minVal, imageprocessing.maxVal,
                             outFile1);

//threshold on the given value, store in thrAry, and pretty print that output
imageprocessing.threshold(imageprocessing.frameAry);
imageprocessing.imgReformat(imageprocessing.thrAry, 0, 1, outFile1);

//take the 5x5 convolutions for every pixel and store it in outAry,
//and pretty print it
imageprocessing.cornerPreserveAvg();
imageprocessing.imgReformat(imageprocessing.outAry, imageprocessing.minVal,
                            imageprocessing.maxVal, outFile1);

//threshold outAry on the given value and pretty print it
imageprocessing.threshold(imageprocessing.outAry);
imageprocessing.imgReformat(imageprocessing.thrAry, 0, 1, outFile1);

//output threshold array without frame to output2
outFile2 << imageprocessing.numRows << " " << imageprocessing.numCols ;
outFile2 << " " << 0 << " " << 1 << "\n";
for(int i = 2; i < imageprocessing.numRows + 2; ++i){
    for(int j = 2; j < imageprocessing.numCols + 2; ++j){
        outFile2 << imageprocessing.thrAry[i][j] << " ";
    }
    outFile2 << "\n";
}
```

```cpp
    //close all streams
    input.close();
    outFile1.close();
    outFile2.close();
    return 0;
}


imageProcessing::imageProcessing(int* vals, int thrv){
    numRows = vals[0];
    numCols = vals[1];
    minVal = vals[2];
    maxVal = vals[3];
    thrVal = thrv;

    int frameSizeRows = numRows + 4, frameSizeCols = numCols + 4;

    frameAry = new int*[frameSizeRows];
    outAry = new int*[frameSizeRows];
    thrAry = new int*[frameSizeRows];

    for(int i = 0; i < frameSizeRows; ++i){
        frameAry[i] = new int[frameSizeCols]{0};
        outAry[i] = new int[frameSizeCols]{0};
        thrAry[i] = new int[frameSizeCols]{0};
    }
    mask = new int**[8];
    for(int i = 0; i < 8; ++i){
        mask[i] = new int*[5];
        for(int j = 0; j < 5; ++j){
            mask[i][j] = new int[5];
        }
    }
}


imageProcessing::~imageProcessing(){
    int frameSizeRows = numRows + 4;

    for(int i = 0; i < frameSizeRows; ++i){
        delete[] frameAry[i];
        delete[] outAry[i];
        delete[] thrAry[i];
    }
    delete[] frameAry;
    delete[] outAry;
    delete[] thrAry;


    for(int i = 0; i < 8; ++i){
        for(int j = 0; j < 5; ++j){
            delete[] mask[i][j];
        }
        delete[] mask[i];
    }
    delete[] mask;
}


void imageProcessing::loadImage(ifstream& input){
    int rows = numRows+2, cols = numCols + 2;
    for(int i = 2; i < rows; ++i){
        for(int j = 2; j < cols; ++j){
            input >> frameAry[i][j];
        }
    }
}


void imageProcessing::mirrorFraming(){
    int frameRows = numRows + 4, frameCols = numCols + 4;

    //mirror top then bottom
    for(int i = 0; i < 2; ++i){
        for(int j = 2; j < numCols+2; ++j){
            frameAry[i][j] = frameAry[3-i][j];
        }
    }
    for(int i = frameRows- 2; i < frameRows; ++i){
        for(int j = 2; j < numCols + 2; ++j){
            frameAry[i][j] = frameAry[2*frameRows-5 - i][j];
        }
    }

    //mirror left then right
    for(int i = 2; i < frameRows-2; ++i){
        for(int j = 0; j < 2; ++j){
            frameAry[i][j] = frameAry[i][3-j];
        }
    }
    for(int i = 2; i < frameRows - 2; ++i){
        for(int j = frameCols-2; j < frameCols; ++j){
            frameAry[i][j] = frameAry[i][2*frameCols-5-j];
        }
    }

    //mirror corners, reflected over appropriate corner
    frameAry[0][0] = frameAry[3][3];
    frameAry[1][1] = frameAry[2][2];
    frameAry[0][1] = frameAry[2][3];
    frameAry[1][0] = frameAry[3][2];
    frameAry[0][frameCols-2] = frameAry[2][frameCols-4];
    frameAry[0][frameCols-1] = frameAry[3][frameCols-4];
    frameAry[1][frameCols-2] = frameAry[2][frameCols-3];
    frameAry[1][frameCols-1] = frameAry[3][frameCols-3];
    frameAry[frameRows-2][0] = frameAry[frameRows-4][2];
    frameAry[frameRows-2][1] = frameAry[frameRows-3][2];
    frameAry[frameRows-1][0] = frameAry[frameRows-4][3];
    frameAry[frameRows-1][1] = frameAry[frameRows-3][3];
    frameAry[frameRows-2][frameCols-2] = frameAry[frameRows-3][frameCols-3];
    frameAry[frameRows-2][frameCols-1] = frameAry[frameRows-4][frameCols-3];
    frameAry[frameRows-1][frameCols-2] = frameAry[frameRows-3][frameCols-4];
    frameAry[frameRows-1][frameCols-1] = frameAry[frameRows-4][frameCols-4];

}


void imageProcessing::loadMask(){
    int rows, cols, mnv, mxv;
    for(int i = 1; i<= 8; ++i){
        ifstream maskInput("mask" + to_string(i) + ".txt");
        maskInput >> rows;
        maskInput >> cols;
        maskInput >> mnv;
        maskInput >> mxv;
        for(int j = 0; j < rows; ++j){
            for(int k = 0; k < cols; ++k){
                maskInput >> mask[i-1][j][k];
            }
        }
    }
}
```

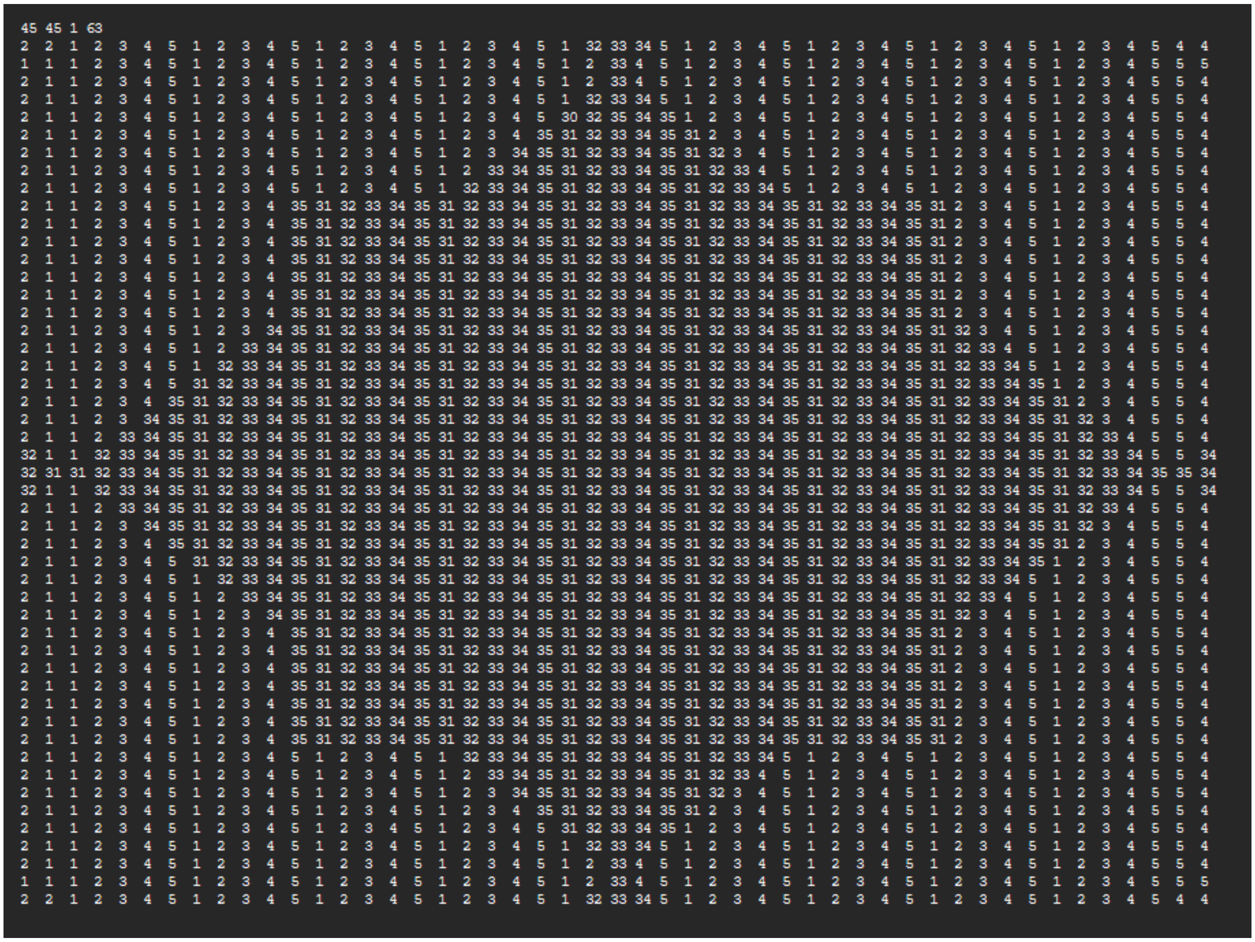


```
int imageProcessing::convolution5x5(int i, int j, int maskind){
    int retVal = 0;
    for(int rows = i-2; rows <= i + 2; ++rows){
        for(int cols = j-2; cols <= j+2; ++cols){
            retVal += mask[maskind][rows-i+2][cols-j+2]*frameAry[rows][cols];
        }
    }
    return retVal;
}


void imageProcessing::cornerPreserveAvg(){
    int minAvg = 0, minDiff = 9999, result = 0, diff = 0;
    for(int r = 2; r < numRows+2; ++r){
        for(int c = 2; c < numCols+2; ++c){
            minAvg = frameAry[r][c], minDiff = 9999;
            for(int maskIndex = 0; maskIndex < 8; ++maskIndex){
                result = 1.0*convolution5x5(r, c, maskIndex)/9;
                diff = abs(result - frameAry[r][c]);
                if(diff < minDiff){
                    minDiff = diff;
                    minAvg = result;
                }
            }
            outAry[r][c] = minAvg;
        }
    }
}


void imageProcessing::threshold(int** ary){
    for(int i = 0; i < numRows+4; ++i){
        for(int j = 0; j < numCols + 4; ++j){
            thrAry[i][j] = ary[i][j] >= thrVal ? 1 : 0;
        }
    }
}


void imageProcessing::imgReformat(int** inAry, int newMin, int newMax,
                                          ofstream& output){
    output << numRows << " ";
    output << numCols << " ";
    output << newMin << " ";
    output << newMax << "\n";
```

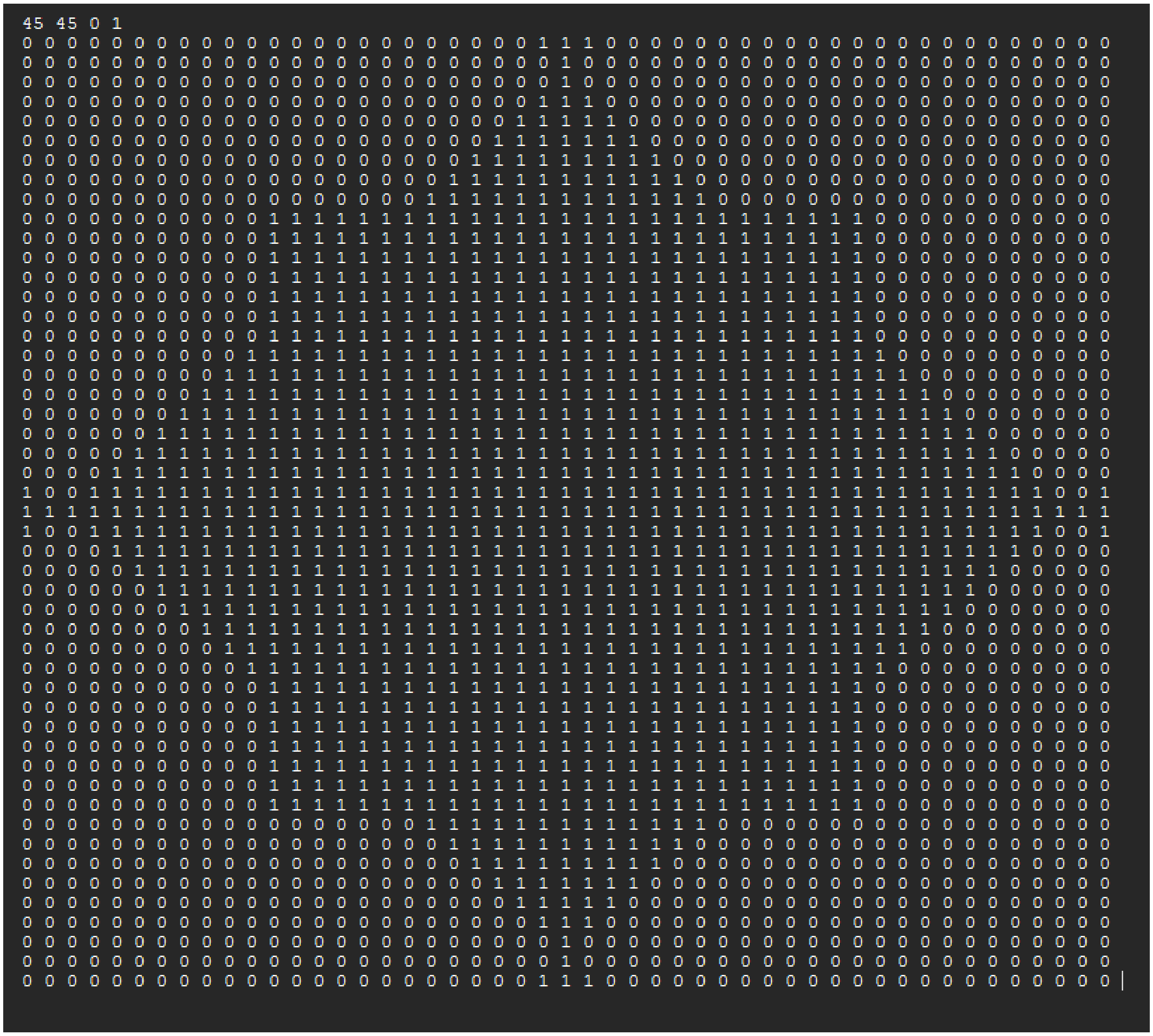


```
    string str = to_string(newMax);
    int width = str.length();
    int r =0, c =0, ww = 0;

    for(int r = 0; r < numRows+4; ++r){
        for(int c = 0; c < numCols+4; ++c){
            output << inAry[r][c];
            str = to_string(inAry[r][c]);
            output << " ";
            for(ww = str.length(); ww < width; ++ww){
                output << " ";
            }
        }
        output << "\n";
    }
    output << "\n";
}
```

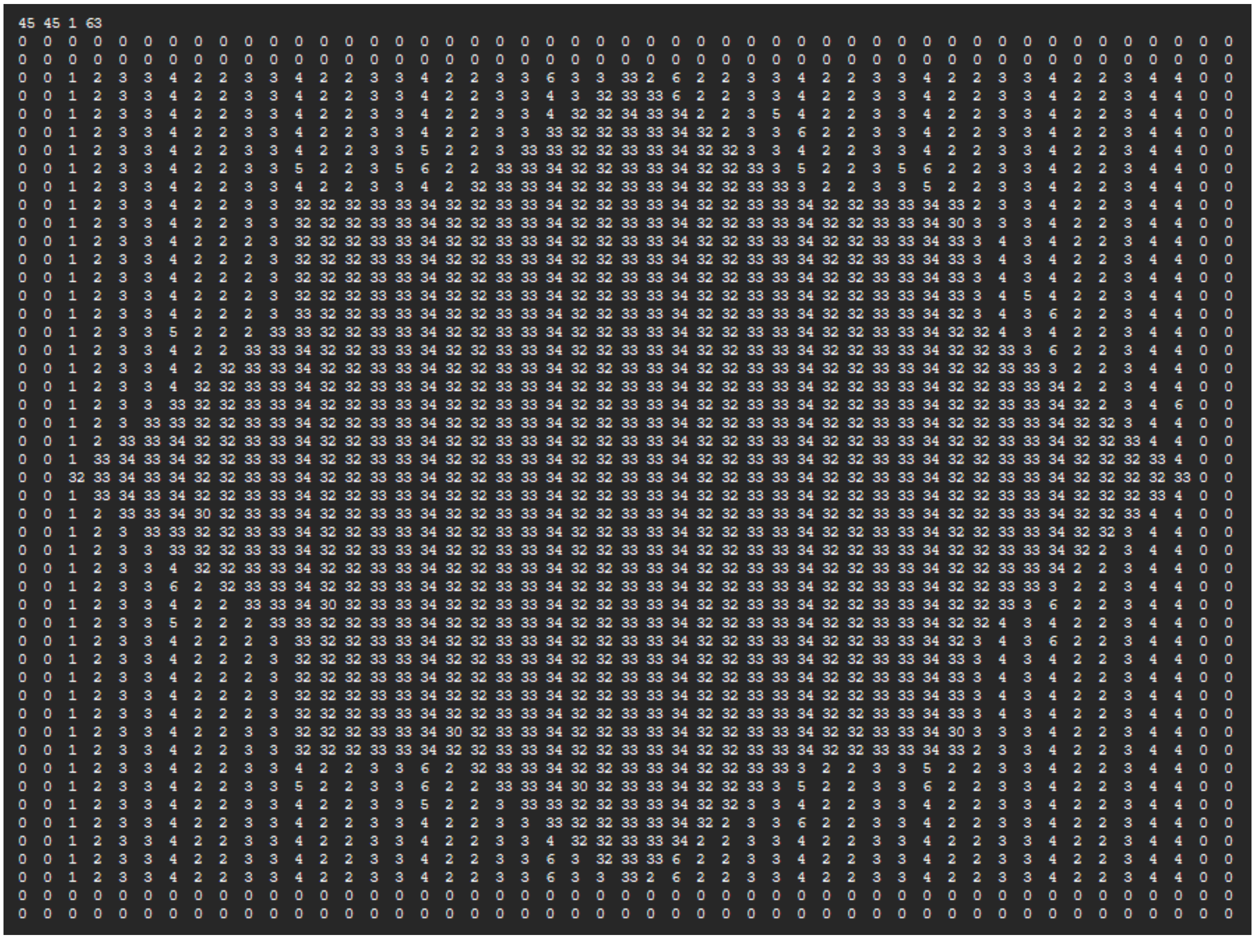
Output File 1:



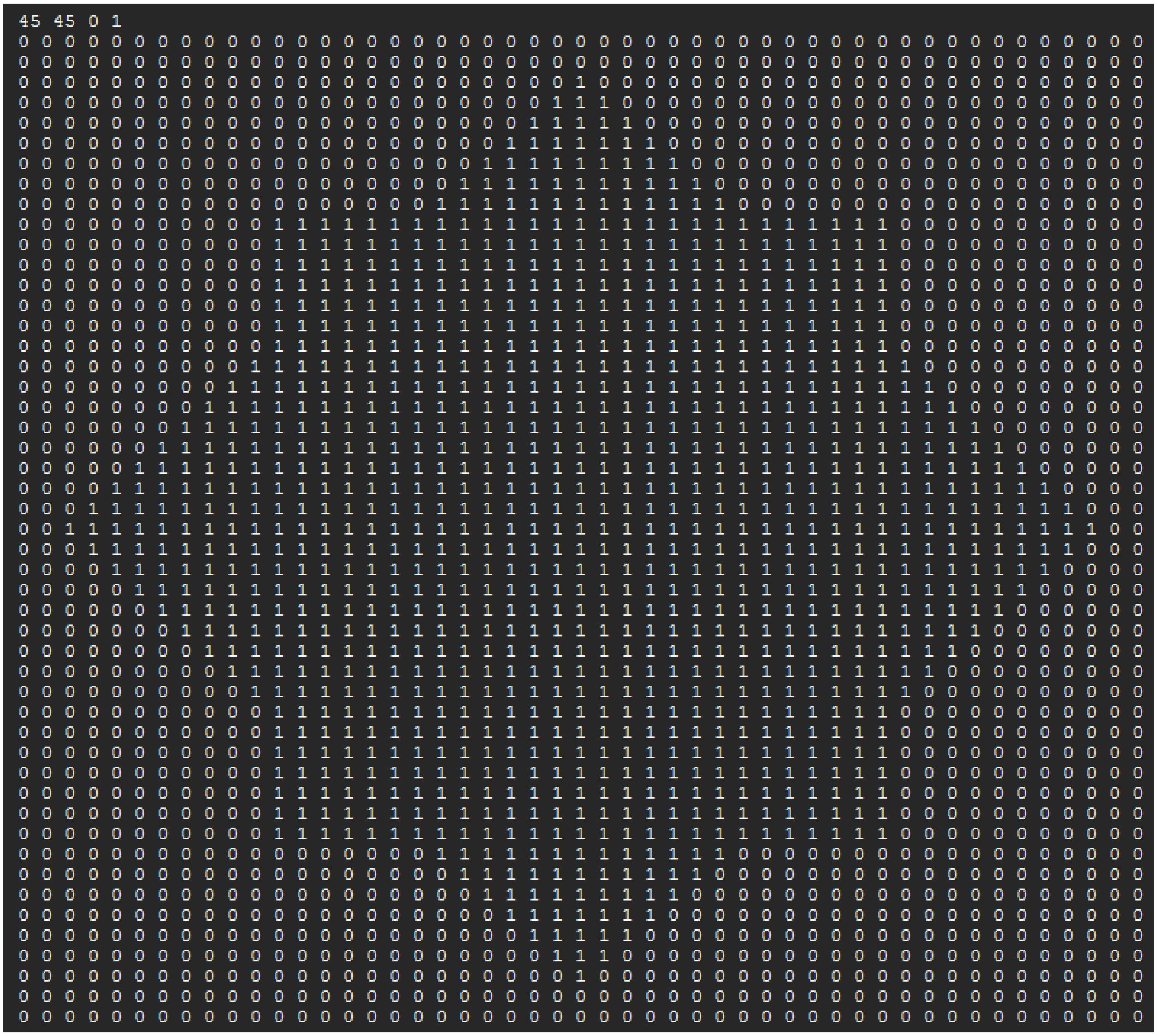
```
45 45 1 63
2 2 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 32 33 34 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 4 4
1 1 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 33 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 5 5
2 1 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 33 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 32 33 34 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 30 32 35 34 35 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 35 31 32 33 34 35 31 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 34 35 31 32 33 34 35 31 32 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 33 34 35 31 32 33 34 35 31 32 33 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 32 33 34 35 31 32 33 34 35 31 32 33 34 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 3 4 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 2 3 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 3 4 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 2 3 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 3 4 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 2 3 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 3 4 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 2 3 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 3 4 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 2 3 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 3 4 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 2 3 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 3 4 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 2 3 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 3 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 3 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 1 2 3 4 5 5 4
2 1 1 2 3 4 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 2 3 4 5 5 4
2 1 1 2 3 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 3 4 5 5 4
2 1 1 2 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 4 5 5 4
32 1 1 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 5 5 34
32 31 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 35 34
32 1 1 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 5 5 34
2 1 1 2 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 4 5 5 4
2 1 1 2 3 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 3 4 5 5 4
2 1 1 2 3 4 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 2 3 4 5 5 4
2 1 1 2 3 4 5 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 3 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 3 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 3 4 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 2 3 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 3 4 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 2 3 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 3 4 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 2 3 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 3 4 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 2 3 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 3 4 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 2 3 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 3 4 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 2 3 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 3 4 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 32 33 34 35 31 2 3 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 32 33 34 35 31 32 33 34 35 31 32 33 34 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 33 34 35 31 32 33 34 35 31 32 33 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 34 35 31 32 33 34 35 31 32 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 35 31 32 33 34 35 31 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 31 32 33 34 35 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 32 33 34 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 5 4
2 1 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 33 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 5 4
1 1 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 33 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 5 5
2 2 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 32 33 34 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 4 4
```



```
45 45 0 1
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0
0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0
0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0
0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0
1 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 1
0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0
0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0
0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0
0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
```

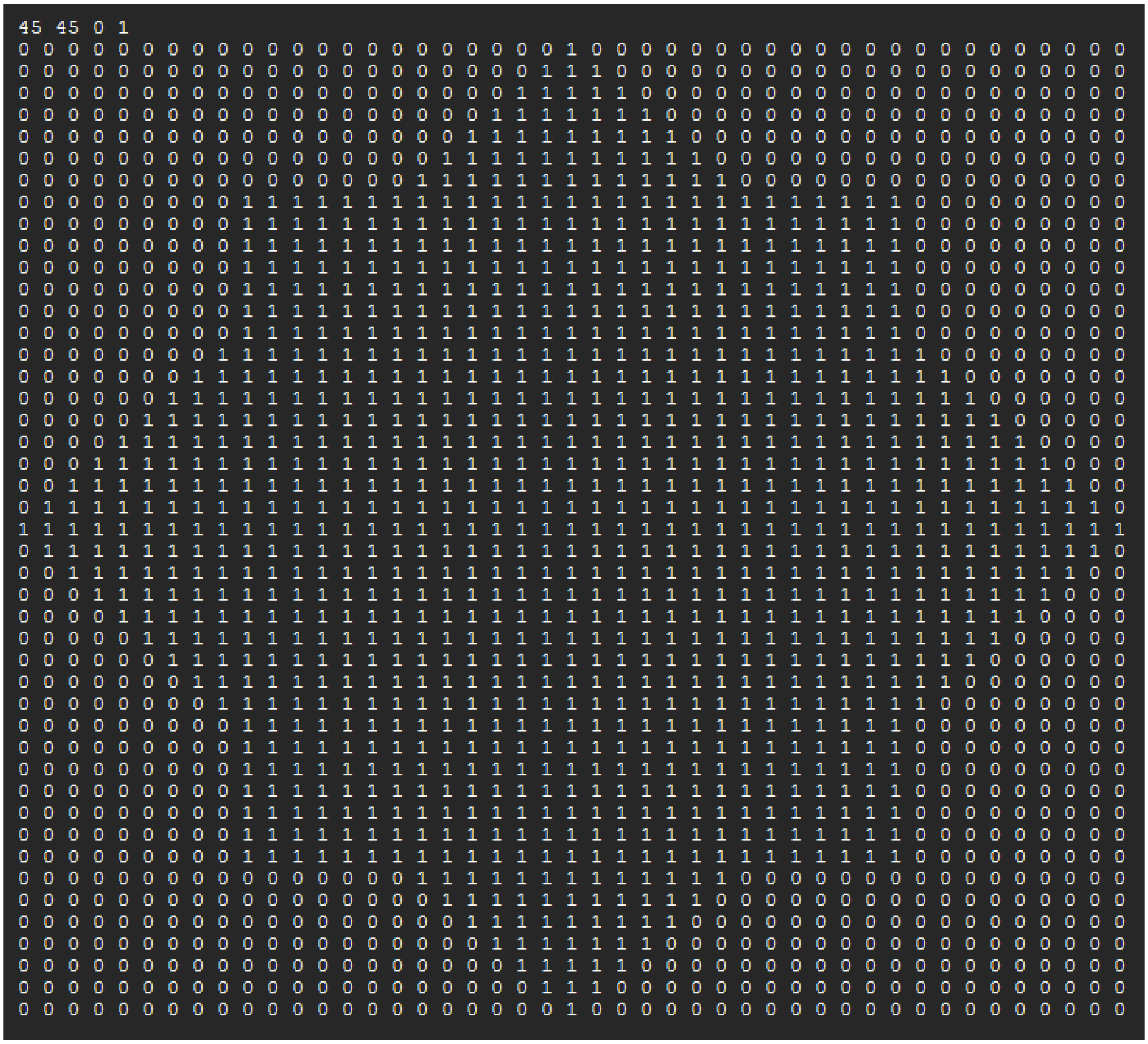


```
45 45 1 63
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 1 2 3 3 4 2 2 3 3 4 2 2 3 3 4 2 2 3 3 6 3 3 33 2 6 2 2 3 3 4 2 2 3 3 4 2 2 3 3 4 2 2 3 4 4 0 0
0 0 1 2 3 3 4 2 2 3 3 4 2 2 3 3 4 2 2 3 3 4 3 32 33 33 6 2 2 3 3 4 2 2 3 3 4 2 2 3 3 4 2 2 3 4 4 0 0
0 0 1 2 3 3 4 2 2 3 3 4 2 2 3 3 4 2 2 3 3 4 32 32 34 33 34 2 2 3 5 4 2 2 3 3 4 2 2 3 3 4 2 2 3 4 4 0 0
0 0 1 2 3 3 4 2 2 3 3 4 2 2 3 3 4 2 2 3 3 33 32 32 33 33 34 32 2 3 3 6 2 2 3 3 4 2 2 3 3 4 2 2 3 4 4 0 0
0 0 1 2 3 3 4 2 2 3 3 4 2 2 3 3 5 2 2 3 33 33 32 32 33 33 34 32 32 3 3 4 2 2 3 3 4 2 2 3 3 4 2 2 3 4 4 0 0
0 0 1 2 3 3 4 2 2 3 3 5 2 2 3 5 6 2 2 33 33 34 32 32 33 33 34 32 32 33 3 5 2 2 3 5 6 2 2 3 3 4 2 2 3 4 4 0 0
0 0 1 2 3 3 4 2 2 3 3 4 2 2 3 3 4 2 32 33 33 34 32 32 33 33 34 32 32 33 33 3 2 2 3 3 5 2 2 3 3 4 2 2 3 4 4 0 0
0 0 1 2 3 3 4 2 2 3 3 32 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 33 2 3 3 4 2 2 3 4 4 0 0
0 0 1 2 3 3 4 2 2 3 3 32 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 30 3 3 3 4 2 2 3 4 4 0 0
0 0 1 2 3 3 4 2 2 2 3 32 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 33 3 4 3 4 2 2 3 4 4 0 0
0 0 1 2 3 3 4 2 2 2 3 32 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 33 3 4 3 4 2 2 3 4 4 0 0
0 0 1 2 3 3 4 2 2 2 3 32 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 33 3 4 3 4 2 2 3 4 4 0 0
0 0 1 2 3 3 4 2 2 2 3 32 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 33 3 4 5 4 2 2 3 4 4 0 0
0 0 1 2 3 3 4 2 2 2 3 33 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 3 4 3 6 2 2 3 4 4 0 0
0 0 1 2 3 3 5 2 2 2 33 33 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 4 3 4 2 2 3 4 4 0 0
0 0 1 2 3 3 4 2 2 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 3 6 2 2 3 4 4 0 0
0 0 1 2 3 3 4 2 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 3 2 2 3 4 4 0 0
0 0 1 2 3 3 4 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 2 2 3 4 4 0 0
0 0 1 2 3 3 33 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 2 3 4 6 0 0
0 0 1 2 3 33 33 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 3 4 4 0 0
0 0 1 2 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 4 4 0 0
0 0 1 33 34 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 32 33 4 0 0
0 0 32 33 34 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 32 32 33 0 0
0 0 1 33 34 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 32 33 4 0 0
0 0 1 2 33 33 34 30 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 4 4 0 0
0 0 1 2 3 33 33 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 3 4 4 0 0
0 0 1 2 3 3 33 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 2 3 4 4 0 0
0 0 1 2 3 3 4 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 2 2 3 4 4 0 0
0 0 1 2 3 3 6 2 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 3 2 2 3 4 4 0 0
0 0 1 2 3 3 4 2 2 33 33 34 30 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 3 6 2 2 3 4 4 0 0
0 0 1 2 3 3 5 2 2 2 33 33 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 4 3 4 2 2 3 4 4 0 0
0 0 1 2 3 3 4 2 2 2 3 33 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 3 4 3 6 2 2 3 4 4 0 0
0 0 1 2 3 3 4 2 2 2 3 32 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 33 3 4 3 4 2 2 3 4 4 0 0
0 0 1 2 3 3 4 2 2 2 3 32 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 33 3 4 3 4 2 2 3 4 4 0 0
0 0 1 2 3 3 4 2 2 2 3 32 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 33 3 4 3 4 2 2 3 4 4 0 0
0 0 1 2 3 3 4 2 2 2 3 32 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 33 3 4 3 4 2 2 3 4 4 0 0
0 0 1 2 3 3 4 2 2 3 3 32 32 32 33 33 34 30 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 30 3 3 3 4 2 2 3 4 4 0 0
0 0 1 2 3 3 4 2 2 3 3 32 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 32 32 33 33 34 33 2 3 3 4 2 2 3 4 4 0 0
0 0 1 2 3 3 4 2 2 3 3 4 2 2 3 3 6 2 32 33 33 34 32 32 33 33 34 32 32 33 33 3 2 2 3 3 5 2 2 3 3 4 2 2 3 4 4 0 0
0 0 1 2 3 3 4 2 2 3 3 5 2 2 3 3 6 2 2 33 33 34 30 32 33 33 34 32 32 33 3 5 2 2 3 3 6 2 2 3 3 4 2 2 3 4 4 0 0
0 0 1 2 3 3 4 2 2 3 3 4 2 2 3 3 5 2 2 3 33 33 32 32 33 33 34 32 32 3 3 4 2 2 3 3 4 2 2 3 3 4 2 2 3 4 4 0 0
0 0 1 2 3 3 4 2 2 3 3 4 2 2 3 3 4 2 2 3 3 33 32 32 33 33 34 32 2 3 3 6 2 2 3 3 4 2 2 3 3 4 2 2 3 4 4 0 0
0 0 1 2 3 3 4 2 2 3 3 4 2 2 3 3 4 2 2 3 3 4 32 32 33 33 34 2 2 3 3 4 2 2 3 3 4 2 2 3 3 4 2 2 3 4 4 0 0
0 0 1 2 3 3 4 2 2 3 3 4 2 2 3 3 4 2 2 3 3 6 3 32 33 33 6 2 2 3 3 4 2 2 3 3 4 2 2 3 3 4 2 2 3 4 4 0 0
0 0 1 2 3 3 4 2 2 3 3 4 2 2 3 3 4 2 2 3 3 6 3 3 33 2 6 2 2 3 3 4 2 2 3 3 4 2 2 3 3 4 2 2 3 4 4 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
```
]



```
45 45 0 1
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0
0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0
0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0
0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0
0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0
0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0
0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0
0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0
0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0
0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0
0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
```

Output File 2:



```
45 45 0 1
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0
0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0
0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0
0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0
0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0
0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0
0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0
0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0
0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0
0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0
0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0
0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0
0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
```