Name: Jingshi Liu

Section: Image Processing

Project: **Project 0B - Binary and Non-binary Thresholding Operations**

Due Date: Sept 4nd

Algorithm Steps

step 0:

inFile <- open args[0]

outFile1 <- open args[1] // i.e., FileWriter outFile1 = new FileWriter(args[1]);

outFile2 <- open args[2]

numRows, numCols, minVal, maxVal <- read from inFile

thrValue <- ask user from console // Scanner in = new Scanner(system.in);

step 1:

outFile1 <- output numRows, numCols, 0, 1

outFile2 <- output numRows, numCols, 0, maxVal

step 2:

processing (inFile, outFile1, outFile2, thrValue)

step 3: close all files

Video: https://youtu.be/jZ6FB6rErhE

Source Code:

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

using namespace std;

void processing(ifstream& inFile, ofstream& outFile1, ofstream& outFile2, int
thrVal, int numCols){
    int pixelVal;

    int i = 0;
    while(inFile >> pixelVal){
        if(pixelVal >= thrVal){
            outFile1 << 1 << " ";
            outFile2 << pixelVal << " ";
        }else{
            outFile1 << 0 << " ";
            outFile2 << 0 << " ";
        }
        if(++i == numCols){
            outFile1 << '\n';
            outFile2 << '\n';
            i = 0;
        }
    }
}

int main(int argc, const char * argv[]){
    ifstream inFile;
    ofstream outFile1, outFile2;

    inFile.open(argv[1]);
    outFile1.open(argv[2]);
    outFile2.open(argv[3]);

    int numRows, numCols, minVal, maxVal;
    inFile >> numRows >> numCols >> minVal >> maxVal;

    int thrVal;
    cout<<"Enter a Threshold Value: ";
    cin>>thrVal;
    cout<<endl;

    outFile1<< numRows<< " "<< numCols<< " "<< minVal<< " "<< 1<< '\n';
    outFile2<< numRows<< " "<< numCols<< " "<< minVal<< " "<< maxVal<< '\n';

    processing(inFile, outFile1, outFile2, thrVal, numCols);

    inFile.close();
    outFile1.close();
    outFile2.close();
}
```

Program Output

Output 1

31 40 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 1 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 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 1 1 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 0 0 0 1 0 0 0

0 0 0 0 0 0 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 0 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 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 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 0 0 0 0 1 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 0 1 1 1 1 1 0 0 0 0 0 0

0 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 0 1 0 1 1 1 1 1 0 0 0 1 0 0 0 0

0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 0 1 0 1 0 1 1 1 1 1 1 0 0 1 1 1 1 1 0 0 0 0 0 0 1 0

0 0 0 0 0 0 0 0 1 1 1 1 1 0 0 1 1 0 0 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 0 0 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 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 0 0 0 0 0 0 1 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 0 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 0 0 1 1 1 1 1 1 0 0 0 0 1 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 0 0 0 0 0 1 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 0 1 1 1 1 1 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 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 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 0 0 0 0 0 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 1 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 1 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 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

Output 2

31 40 0 9

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 7 0 0 0 0 5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 9 5 0 0

0 0 0 0 0 0 0 0 5 6 5 6 5 6 5 6 5 6 5 6 5 6 5 6 5 6 5 6 5 6 0 0 0 9 0 0 0

0 0 0 0 0 0 5 0 5 7 7 8 7 7 8 7 7 7 7 8 7 8 7 7 7 8 7 7 7 7 7 5 0 9 0 0 0 0 0

0 0 0 0 0 0 0 0 5 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 7 6 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 6 9 9 9 7 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 8 7 5 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 8 7 5 0 0 0 0 5 0 0

0 0 0 0 0 0 0 0 5 9 9 9 9 9 9 9 9 9 9 9 9 9 9 0 9 9 9 9 8 7 0 0 0 0 0 0 0 0 0

0 9 9 0 0 0 0 0 5 9 9 9 9 9 9 9 9 9 9 9 9 9 9 0 9 0 9 9 9 8 7 0 0 0 5 0 0 0 0

0 0 0 0 0 0 0 0 5 8 9 9 9 9 0 9 0 9 0 9 9 9 9 9 9 0 0 9 9 9 9 8 0 0 0 0 0 0 5 0

0 0 0 0 0 0 0 0 6 9 9 9 9 0 0 9 9 0 0 9 9 9 9 9 9 9 9 9 9 8 7 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 5 6 9 9 9 9 9 9 9 9 0 0 9 9 9 9 9 9 9 9 9 9 8 7 0 0 0 0 0 0 0 0

0 0 0 0 0 0 5 5 7 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 0 9 9 9 9 8 7 0 0 0 0 0 5 0

0 0 0 0 0 0 0 5 6 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 0 9 9 9 9 9 8 7 0 0 0 0 0 0 0

0 0 0 0 0 0 0 5 5 9 9 7 9 9 9 9 9 9 9 9 9 9 9 0 0 9 9 9 9 9 9 0 0 0 0 9 0 0 0 0

0 0 0 0 0 0 0 0 5 8 8 8 8 8 8 8 8 8 9 8 8 8 8 7 8 8 8 8 8 8 7 0 0 0 0 0 9 0 0

0 0 0 0 0 0 5 6 5 9 9 7 9 7 7 8 7 8 8 7 9 7 9 7 7 7 0 9 7 7 7 7 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 5 6 5 6 5 6 5 6 5 6 5 6 5 6 5 6 5 6 5 6 5 6 5 6 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 5 0 0 0 0 0 0 0 0 0 5 0 0 0 0 0 0 0 0 0 5 0 0 0 0

0 0 0 0 0 0 0 0 5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 0 0 0 5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0