CV Spring 2020 Mock Final - 1 Name: Andres Quintero

Project A: Given a binary image file (with image headers), we are interested to obtain two particular information about the input image:
(i) the number of none-zero pixels on each row of the input image;
(ii) the number of none-zero pixels on each column of the input image.
We also like to have the above two information to be output to two different files, say, sumRows and sumCol.

You are writing specs for project A, mimic the specs you have received for all projects this semester:

1. Programming language (your choice):

C++

2. Input specification. Be precise and brief.

infile (use argv[1]): a text file that contains a header line that includes information such as number of Rows, number of Columns, The mimimum value, and the Maximum value.
Then followed by rows an columns of ones and zeros

3. Output specification, write whatever you like to see in the out files. Be precise and brief.

outfile1 (use argv[2]): a text File that contains the original image header.
Followed by lines of pairs that have the Row number follwed by the number of non-zero pixels in that Row

```
45 45 0 1
1 : 0     // row 1 has
2 : 1       0 non-zero pixels
3 : 1
4 : 14  // Row 4 has 14
          nonzero pixels
  :
```

outfile2 (use argv[3]): a text file that contains the original imageheader followed by lines of pairs that have the Column number followed by the number of non-zero pixels in that Column.

```
45 45 0 1
  1 : 0  // col 1 has 0
  2 : 7    non-zero pixels
  3 : 14
  4 : 11  // col 4  has 11
    :        non zero pixels
```

3. Write the data structure (use just 1 class). Be precise and brief.

Image Class:

numRows (int)
numCols (int)
minVal (int)
maxVal (int)

imageAry (int**)

loadImageAry (infile) - load image into imageAry from input file

SumRows (outfile1) - prints pair of values corresponding to row number and number of non-zero pixels to outfile1

SumCols (outfile2) - prints pair of values corresponding to column number and number of non-zero pixels to outfile2

4. Write the algorithm steps for main (). and algorithm steps for any methods you may call from main.

Step 0: infile ← given
outfile1, outfile2 ← open
numRow, numCol, minVal, maxVal ← read from infile

Step 1: loadImageAry (infile)
0: initilaize imageAry to [numRow][numCol]
1: row ← 0
2: col ← 0
3: pixel ← read from infile
4: imageAry[row][col] ← pixel
5: col++
6: repeat 3-5 while col < numCol
7: row++
8: repeat 2-7 while row < numRow

5. Follow your specs to implement projectA, and run your projectA on the data provided in the email.

Step 2: output image header to outfile1 & outfile2

Step 3: SumRows(outfile1)

0 - sum ← 0
1 - row ← 0
2 - output row → outfile1
3 - col ← 0
4 - sum += imageAry[row][col]
5 - col ++
6 - repeat 4-5 while col < numCol
7 - output Sum → outfile1
8 - Sum ← 0
9 - row ++
10 - repeat 2-9 while row < numRow

SumCols(outfile2)

0 - sum ← 0
1 - col ← 0
2 - output col → outfile2
3 - row ← 0
4 - sum += imageAry[row][col]
5 - row ++
6 - repeat 4-5 while row < numRow
7 - output Sum → outfile2
8 - Sum ← 0
9 - col ++
10 - repeat 2-9 while

Step 4: Close all files