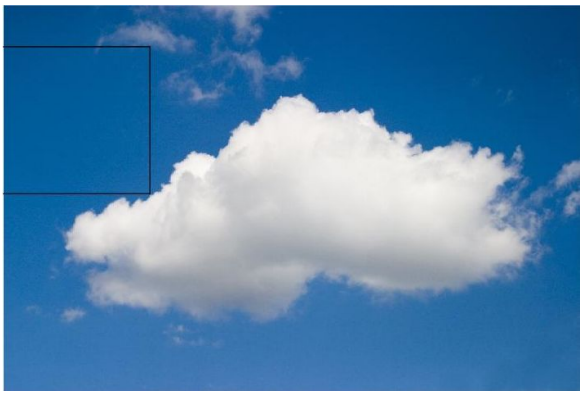
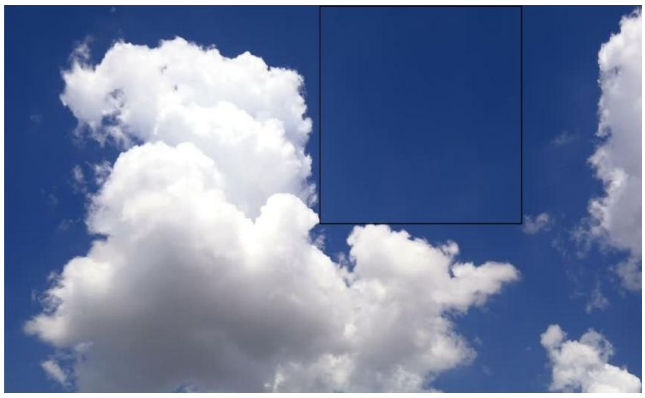
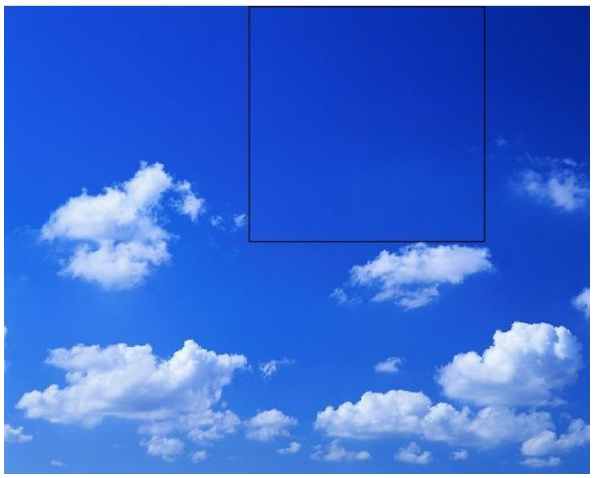
Digital Image Processing, Assignment 4 Report
201401074

Problem 1

- Threshold image using Otsu's method.
- Find largest rectangle using recurrence : dp(i, j) = min(dp(i+1, j),min(dp(i, j+1),dp(i+1, j+1)))+1 where dp(i, j) denotes maximum side length of the square that can fit with (i, j) as it's top-left corner.

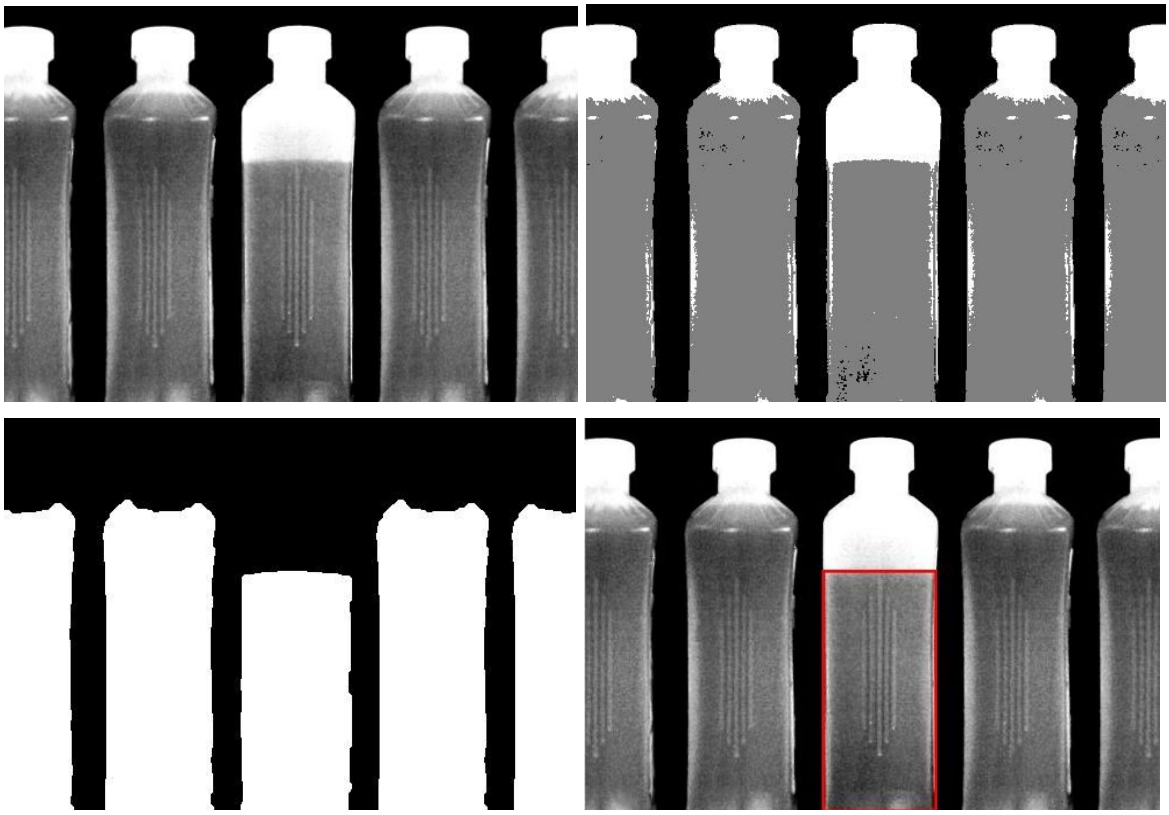






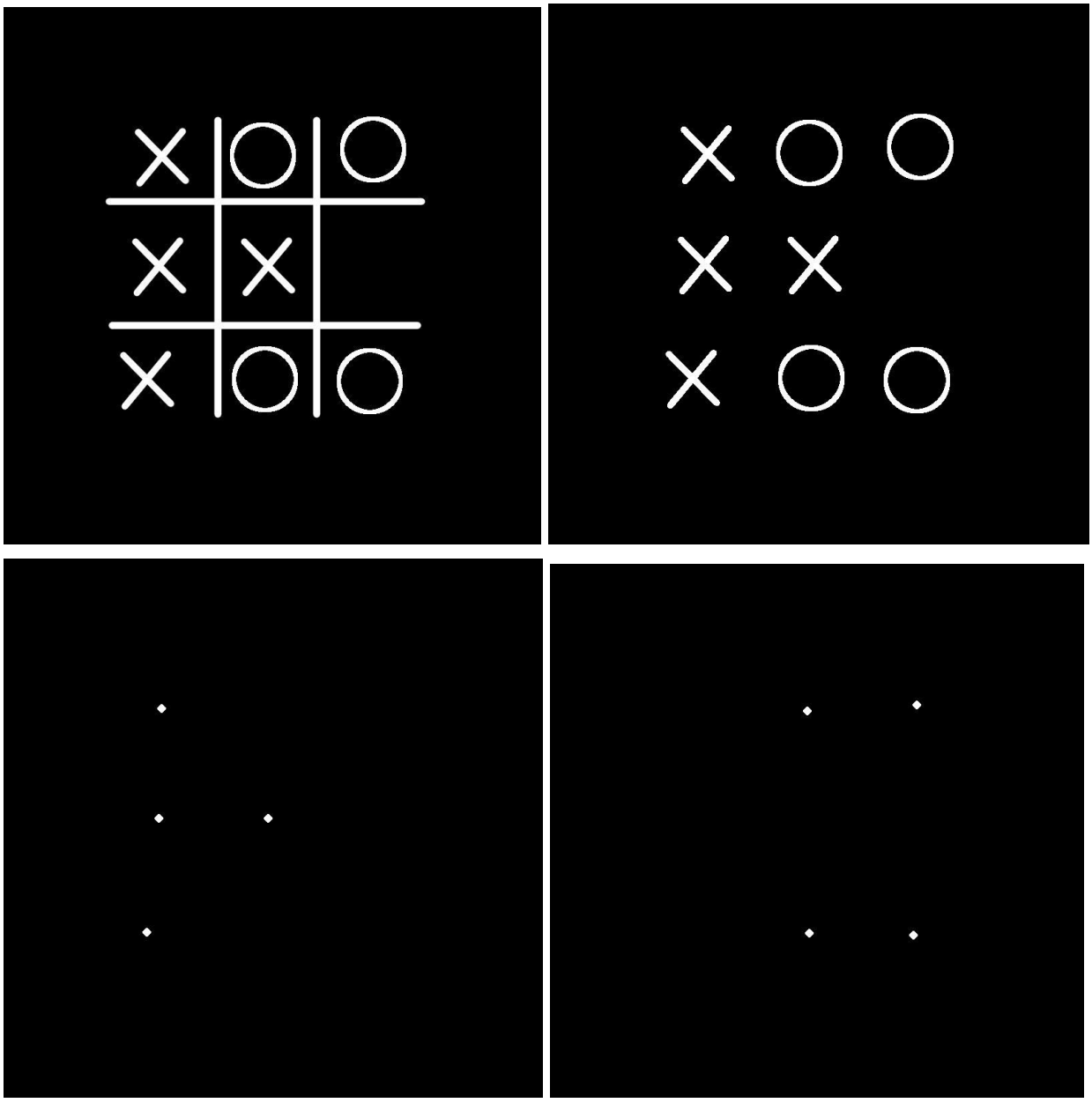
Problem 2

- Assumption is that 3 major colors are present : white(bottle), gray(water), black(background).
- Use multithresh() for segmenting out 3 colors.
- Choose gray color to denote water in each bottle.
- Bottles with less water will have significantly lesser height of bounding box bounding the water part than the other heights (full bottles).



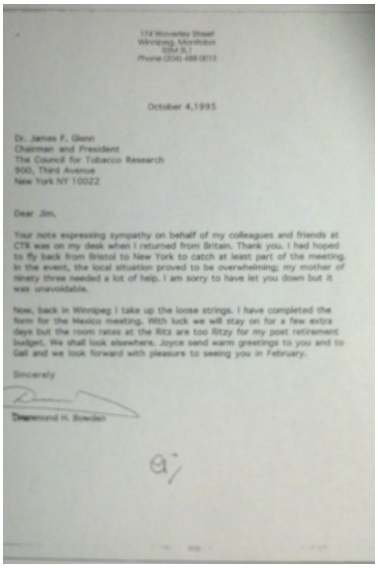
Problem 3

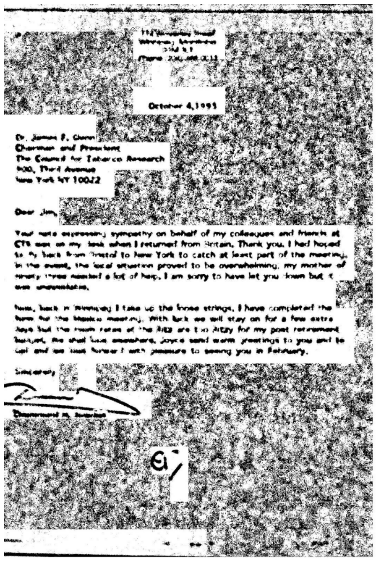
- Binarise image
- Segment out board (the big hash) by removing largest perimeter of connected component image
- Classify X's and O's on basis of euler number. 1 for X and 0 for Y. Thus we get 2 images, one of all X's and one of all O's.
- Predict winner based on max values of hough matrix (Winner will have larger value, nearly equal values for Draw)
- Board_1 : O won, Board_2 : O won, Board_3 : Draw, Board_4 : X won

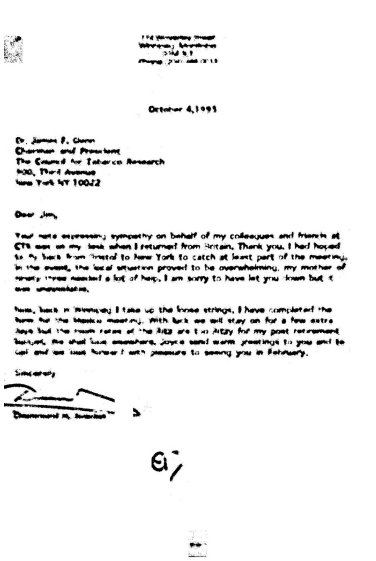


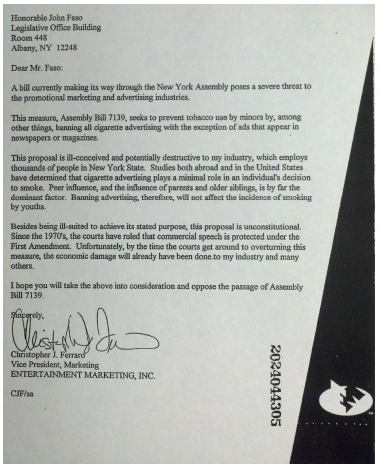
Problem 4

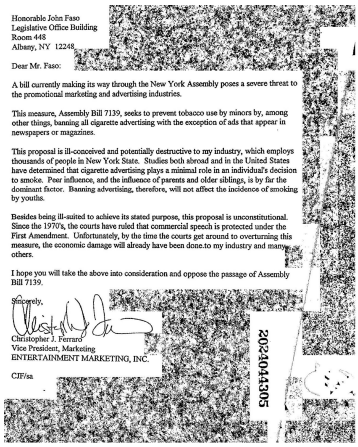
- Naive way : Do windowed thresholding based on Otsu's method. Drawbacks - Thresholding introduces noise on regions which are plain.
- Better way : Do windowed thresholding on windows only where local variance (or standard deviation) is high. Leave other windows as white.

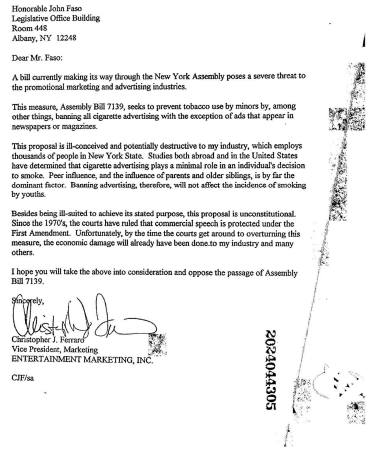


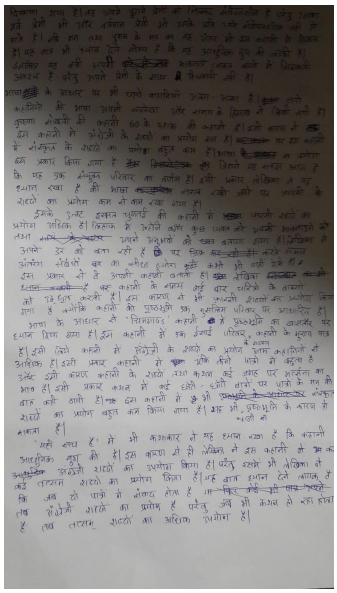


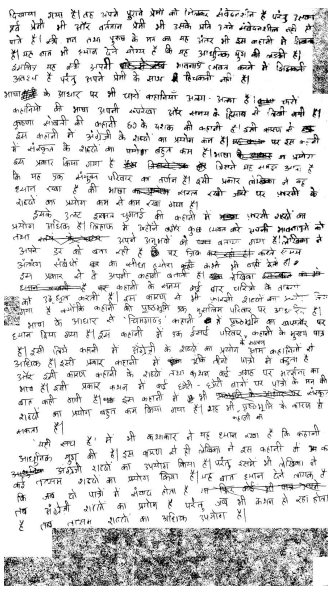












Problem 5

Images Here