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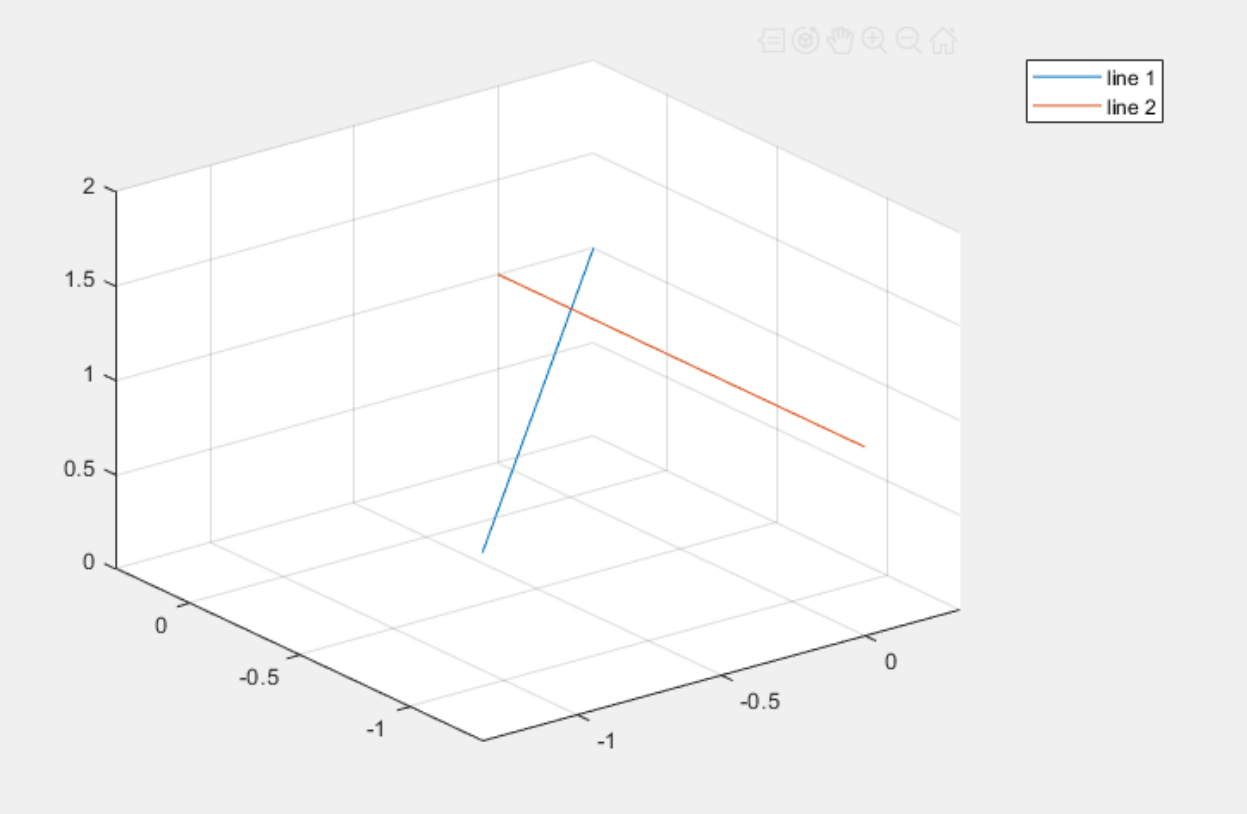
CSE 6367

Assignment 1

Problem 1

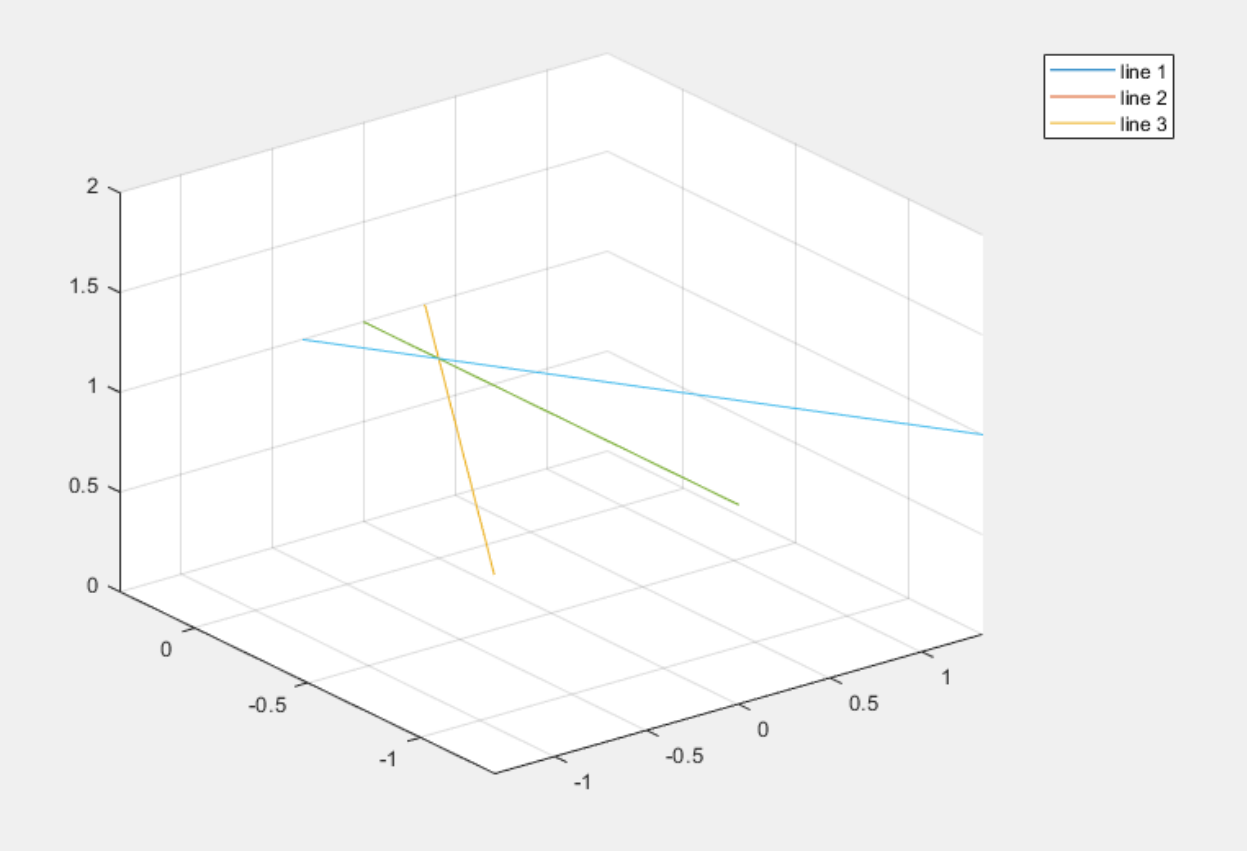
(b)Using the function projectpoint, write a MATLAB function Q = findintersection(P11, P12,P21, P22)that takes as input two points from each line,L1andL2, and computes the point of intersection of the lines projected on the image plane. Plot the given lines, their projections, and the point of intersection using MATLAB visualization functions (e.g.plot3).

The lines intersect at 0, 0, 1.



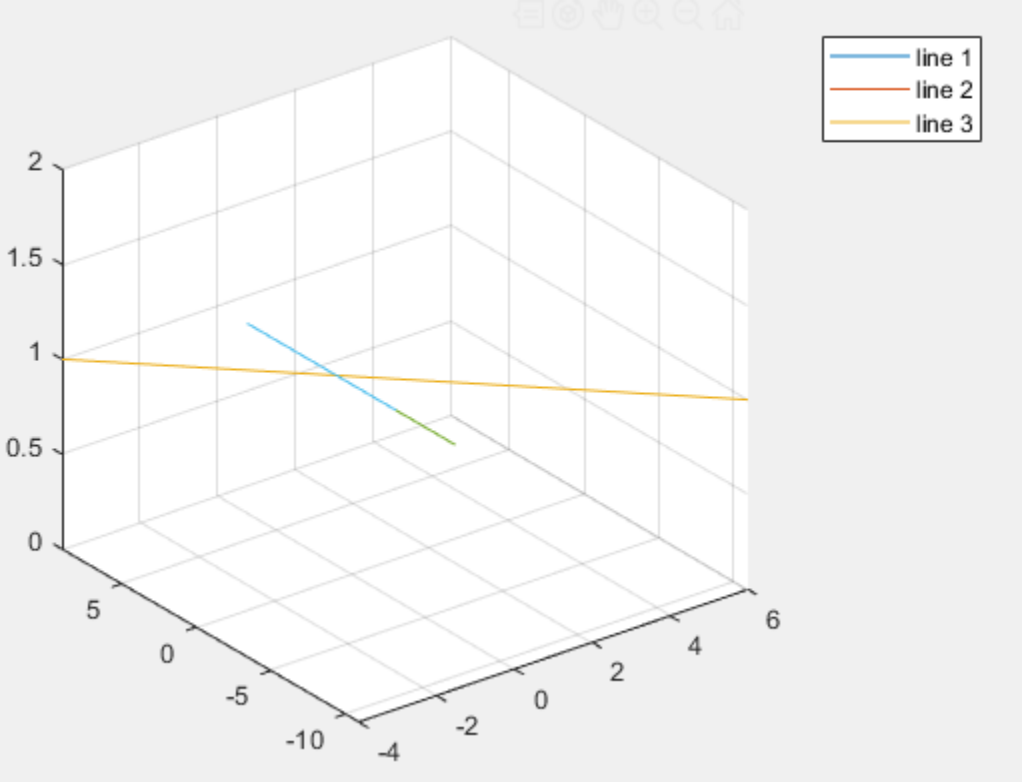
(c) Verify that the point of intersection for each pair of parallel linesL1 ,L2, andL3is the same by applying the findintersection function to each.

All three lines intersect at 0, 0, 1.



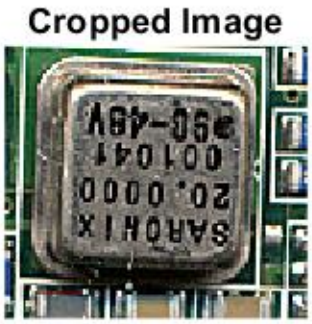
d)

Line 1 and 2 Intersect line 3.



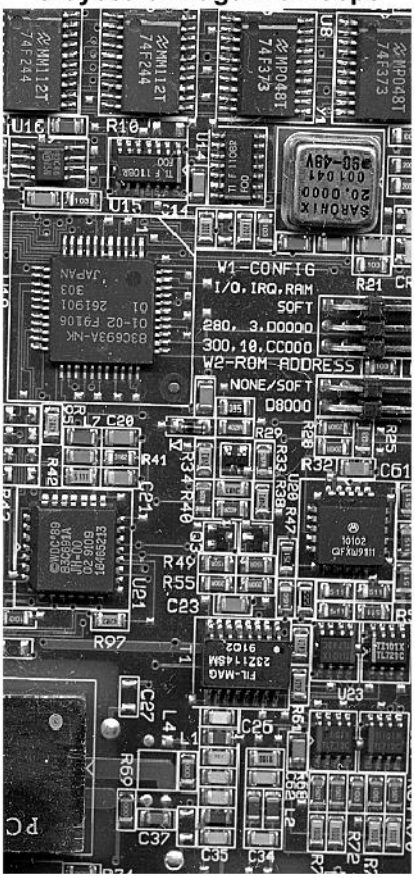
Problem 2

(a)Extract the rectangular block of the image between (200,90) and (300,180) corresponding to the crystal in the image. Display this block in a separate figure.

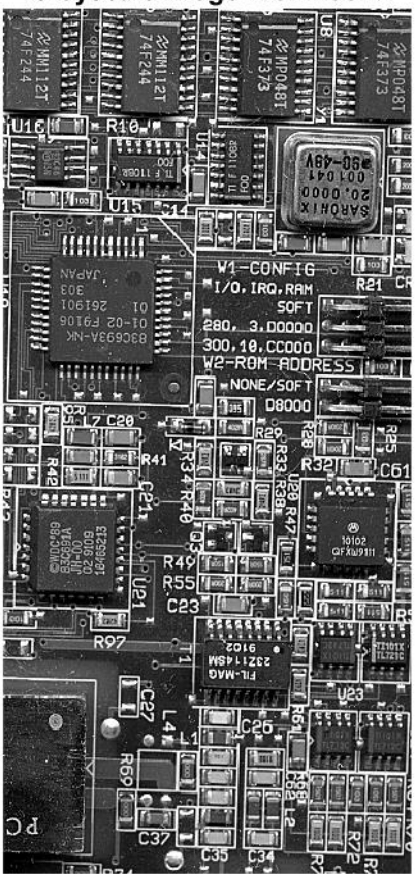


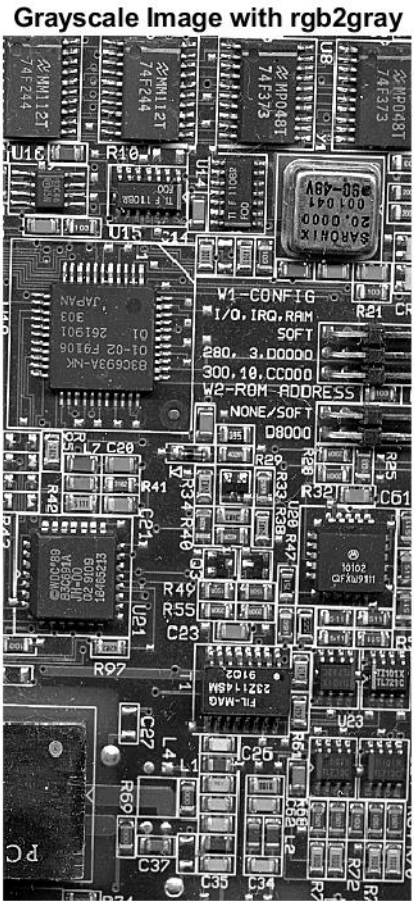
(b)Convert the image from RGB to grayscale. For each pixel, take the average of the R, G, and B values as the grayscale value.

Grayscale Image with loops



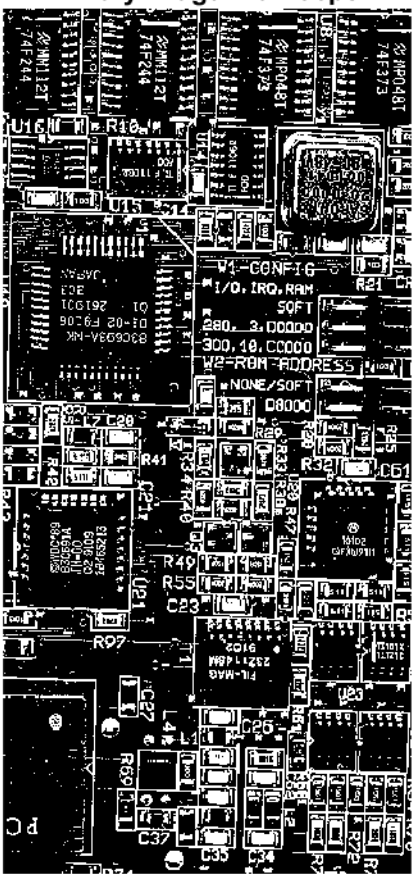
Grayscale Image with matrix



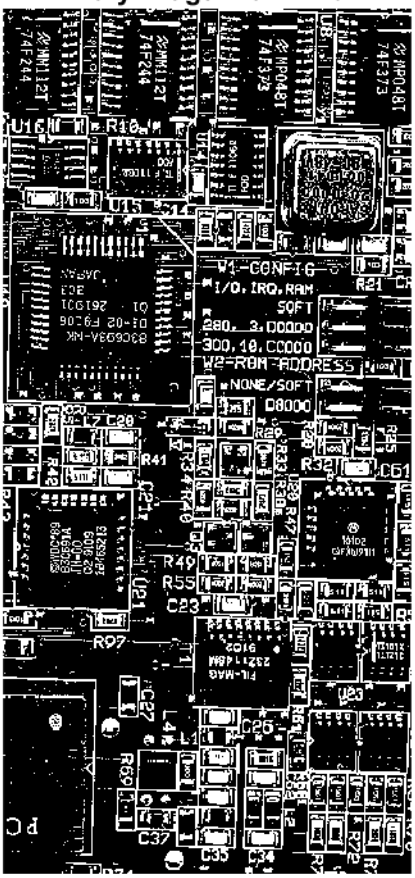


(c)Convert the grayscale image to a binary image using the mean grayscale value as the threshold. Displayboth the grayscale and binary images in the same window

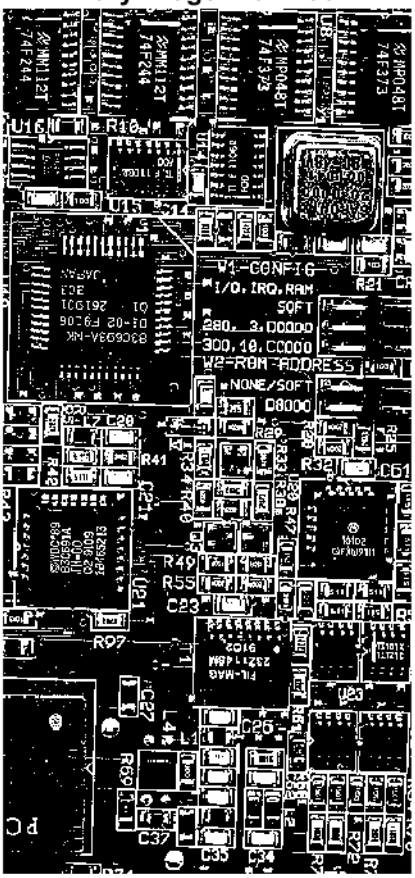
Binary Image with loops



Binary Image with im2bw

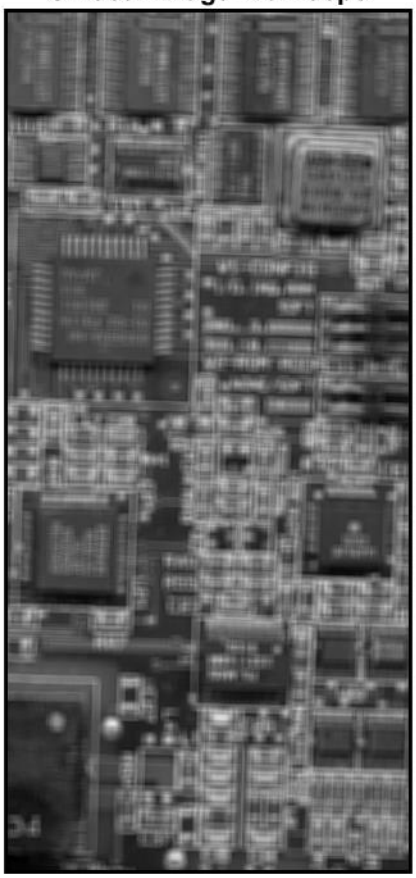


Binary Image with matrix

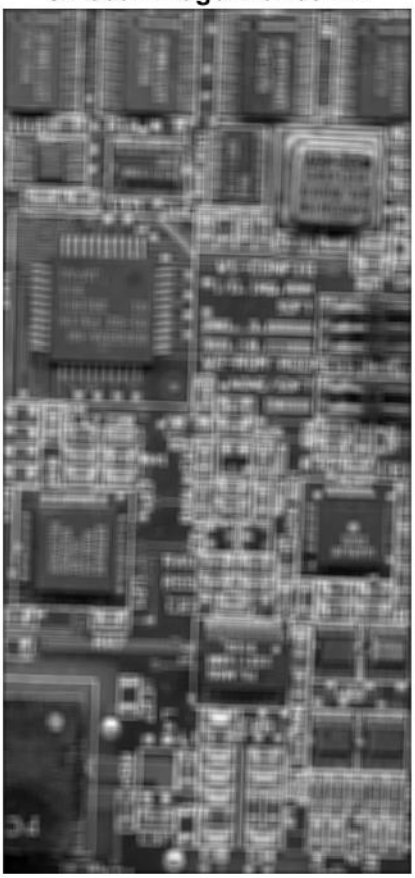


d. Smooth the grayscale image created above using a 7×7 averaging filter. This means that for each pixelat location (i, j), place a 7×7 window centered at (i, j) and replace the value of the pixel with the averageof the values of the pixels in the window.

Smooth Image with loops



Smooth Image with conv2



All together.