Name: Mubashar Khan **Assignment #:** 9

Summary of Problem Statement

Problem # 1

Detect the edge of objects using Sobel Edge Detection

Known / Input

crystal = imread('crystals.jpeg')

Unknown / Output

Horizontal = Normalized Horizontal Edge

Veritcle = Normalized Verticle Edge

Assumptions

For task 2, the program will use the same matrices
horizontal = [-1 -2 -1;0 0 0; 1 2 1];
verticle = [-1 0 1;-2 0 2;-1 0 1];

Other Variables

red = crystal(:,:,1); Gets the red layer of crystal
green = crystal(:,:,2); Gets the green layer of crystal
blue = crystal(:,:,3); Gets the green layer of crystal
intensity = 0.2989*red + 0.5870*green + 0.1140*blue; GrayScale Conversion

Algorithm

Start by importing the image
Convert the image to gray-scale
You can do this by either separating Crystal into red, green, and blue then using the formula
intensity = 0.2989*red + 0.5870*green + 0.1140*blue
Or you can use rbg2gray(Crystal) which will convert to gray-scale
Next you need to create the Horizontal and Vertical Normalized plots.
To do this use the command conv2() with all values as doubles
Lastly plot the the four different plots with the bottom left plot found using sqrt(Vertical^2 + Horizontal^2)

Test Cases

Using the given test case, the output matches exactly. The two squares on the right are a little bit lighter in intensity but overall the final image is an exact match meaning the program works properly