Connor Tremblay
Assignment 1

1)

a. The two image subsets are not 4 adjacent because none of the pixels in either of the two image subsets where V={1} are 4 adjacent.

b. The two image subsets are 8 adjacent because a pixel in S1 is 8 adjacent with a pixel in S2 by a diagonal.

c. The two image subsets are M adjacent because the two pixels in the subsets are 8 adjacent, and the intersection of their 4 adjacent neighbors where V={1} is empty.

2)

a.

i. The shortest 4 path between p and q does not exist because q is 4 adjacent to only two pixels of value 2, so there is no way to get from p to q through {0,1}

ii. The shortest 8 path (shown below) has length 4

	3	1	2	1	(q)
	2	2	0	2	
	1	2	1	1	
(p)	1	0	1	2	

iii. The shortest M path (shown below) has length 5

	3	1	2	1	(q)
	2	2	0	2	
	1	2	1	1	
(p)	1	0	1	2	

b. The 4, 8, and M paths are shown below from left to right for V = {1,2}

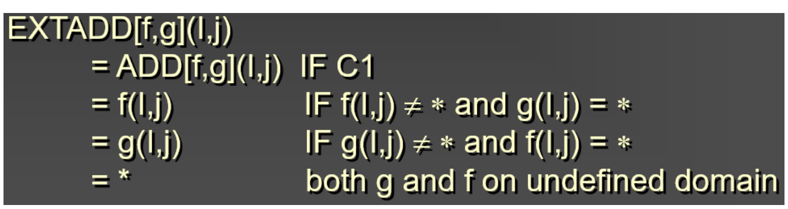
	3	1	2	1	(q)
	2	2	0	2	
	1	2	1	1	
(p)	1	0	1	2	

	3	1	2	1	(q)
	2	2	0	2	
	1	2	1	1	
(p)	1	0	1	2	

	3	1	2	1	(q)
	2	2	0	2	
	1	2	1	1	
(p)	1	0	1	2	

3) F

a. From the slides this is the block diagram for EXTADD



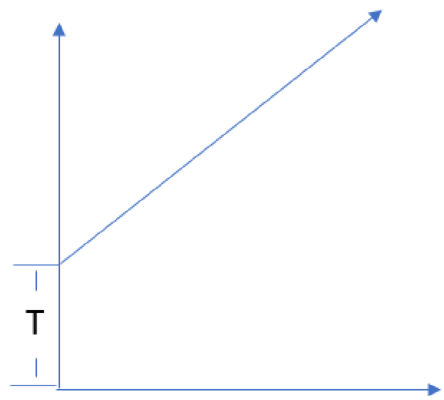
Connor Tremblay
Assignment 1

b. EXTADD(f,g) =

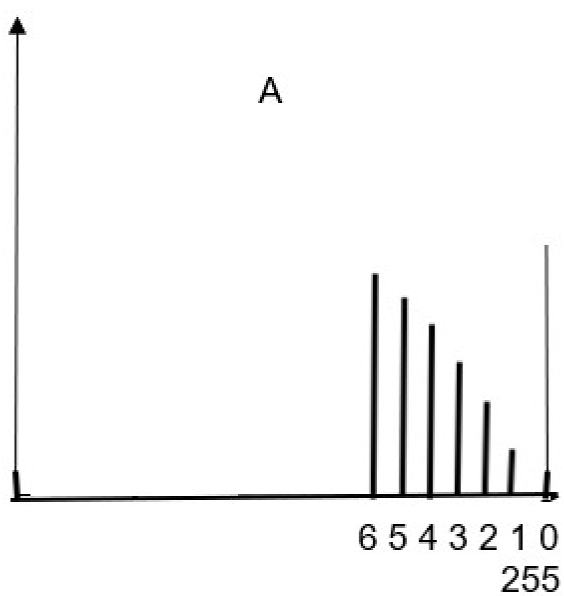
5	9	-2
3	9	*
-2	*	*

4)

a. $y = x + T$



b.



Connor Tremblay
Assignment 1

Writeup:

Connor Tremblay

ctrembl1@binghmaton.edu

Purpose:

The purpose of this project was to implement a negative image function, histogram equalization function, image thresholding function, and to label the largest regions of an image after performing a thresholding function.

Method:

For my negative image function, I set each pixel to 255-value which is a very well known and common way of implementing a negative function.

For my histogram equalization function, I redistributed the CDF of the pixel value probabilities over the entire domain of gray values, creating an image which is enhanced visually.

For my thresholding function, I used Balanced histogram Thresholding, and was inspired by the algorithm linked in the following page:
https://en.wikipedia.org/wiki/Balanced_histogram_thresholding

For my region detection algorithm, I first create a thresholded image then iterate through the pixels of the array and check if 4 adjacent pixels have the same white value, and store all values in a region in a vector. I then store that vector in another vector. I store checked pixels in a boolean array to prevent redundant checking. Lastly I sort the vector of vectors based on size of the regions and color the regions appropriately.

Results:

Everything that I implemented works as expected and I am very pleased with the results. The image thresholding algorithm causes some edge defects around the shapes, however I think that this is just my choice of algorithm and is not really an error.

Bug report:

None to mention