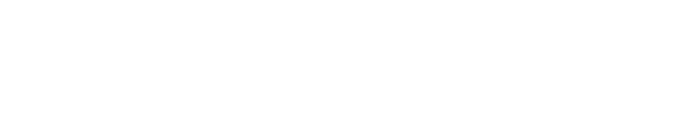
Final Project

Image Processing

College of Management Academic Studies

Computer Science





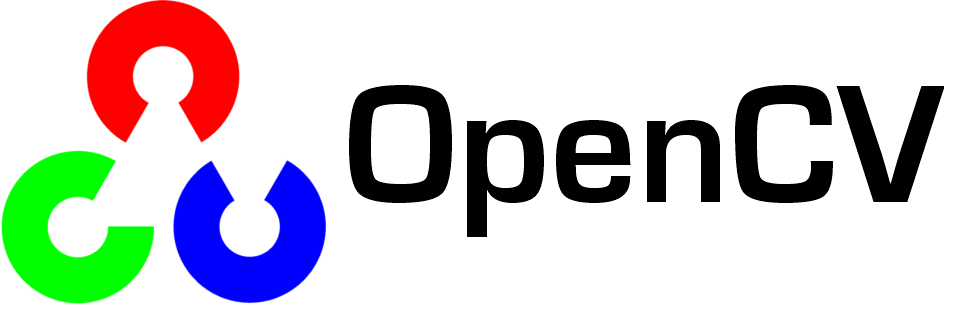


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# Submission Details

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**Submitted Due date:**

28.03.2017

**Submitted To:**

Dr. Moshe Butman

# Part A: Single image processing

The answers in the section are written in MATLAB.

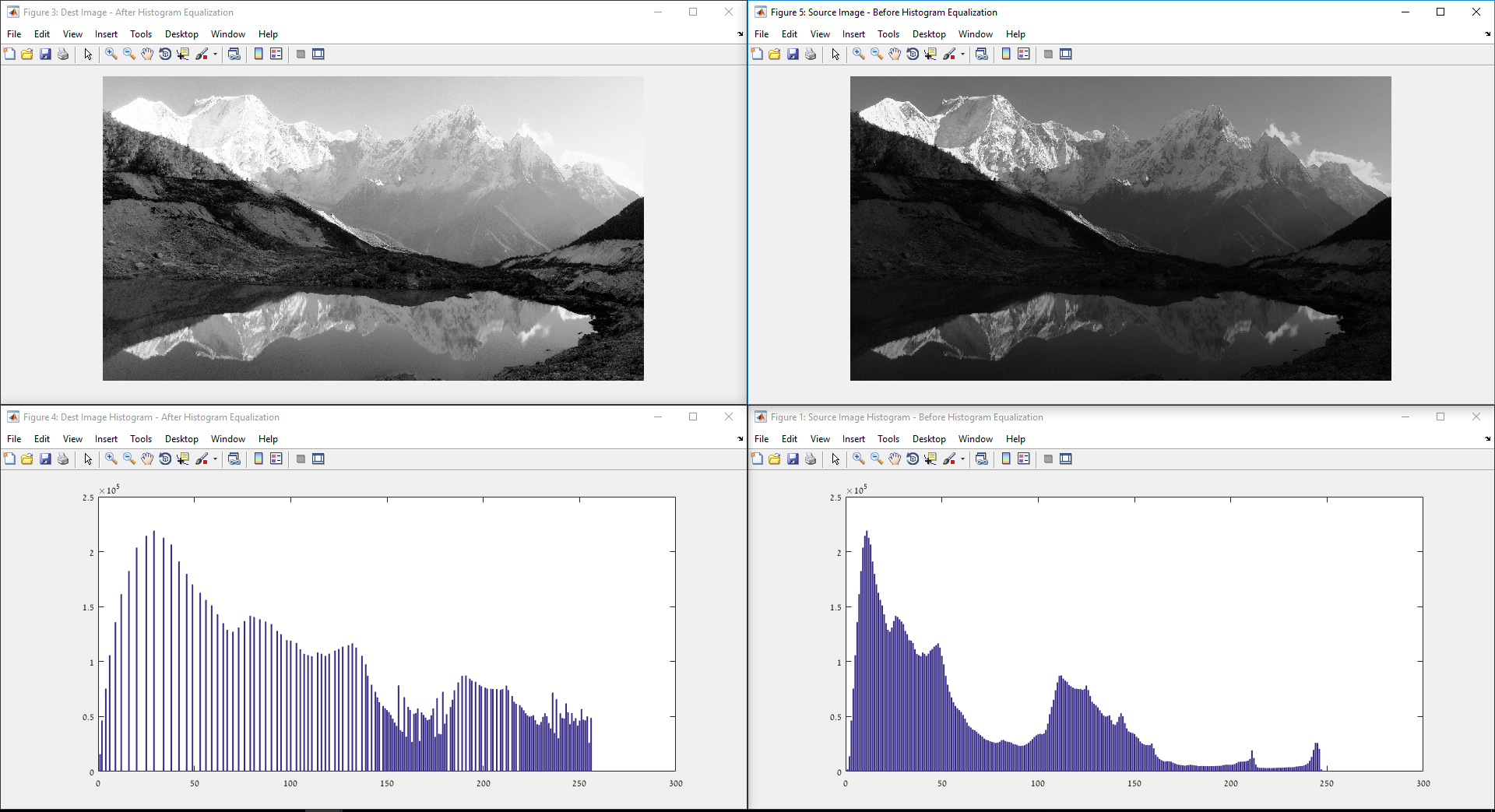
## Question 1: Histogram Equalization Algorithm

In this question we were asked to create a histogram equalization function,

We created a function that calculates the frequency of each grey level and then the probability for each gray level in our image (between 0-1) and the cumulative probability.

By applying the cumulative probability on to our original image we will eventually get a new image with a much more balanced intensities of grey as little impact the image as possible.

### Print screen from MATLAB



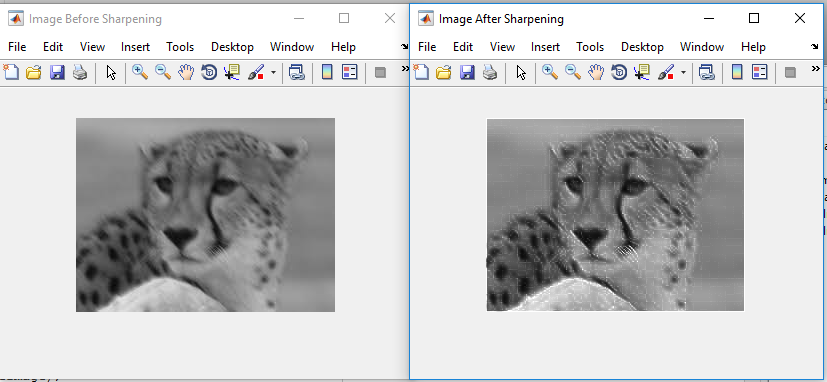
## Question 2: Image sharpening

In this question we were asked to sharpen an image,

We used a 2D convolution with a kernel of 3x3 with 0.111 to smooth the image

Than we used reduced it from the image and multiplied by the sharp rate

### Print screen from MATLAB



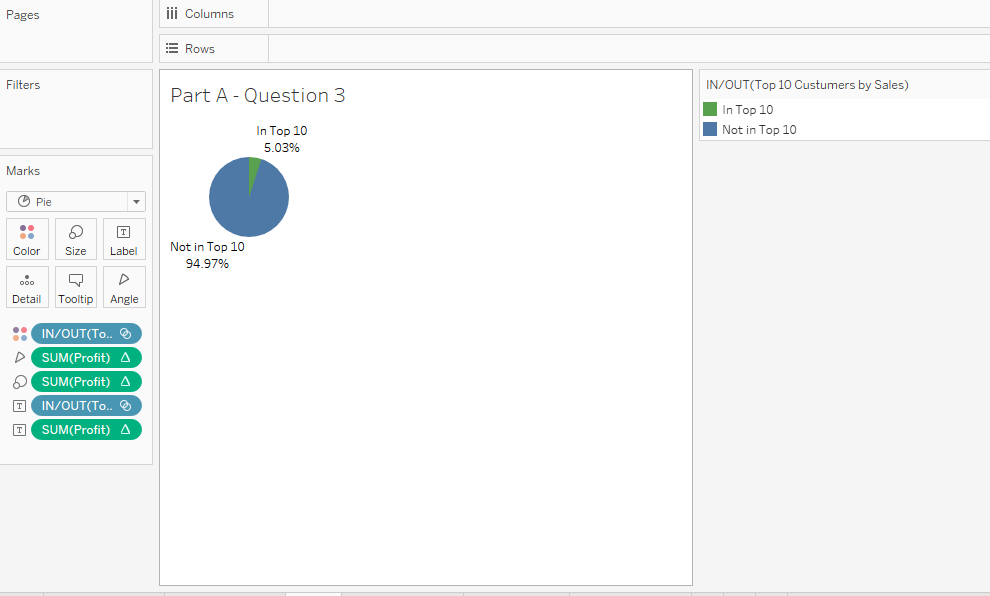
## Question3: Image compression using FFT

In this question we were asked to sharpen an image,

We used a 2D convolution with a kernel of 3x3 with 0.111 to smooth the image

Than we used reduced it from the image and multiplied by the sharp rate

### Print screen from MATLAB



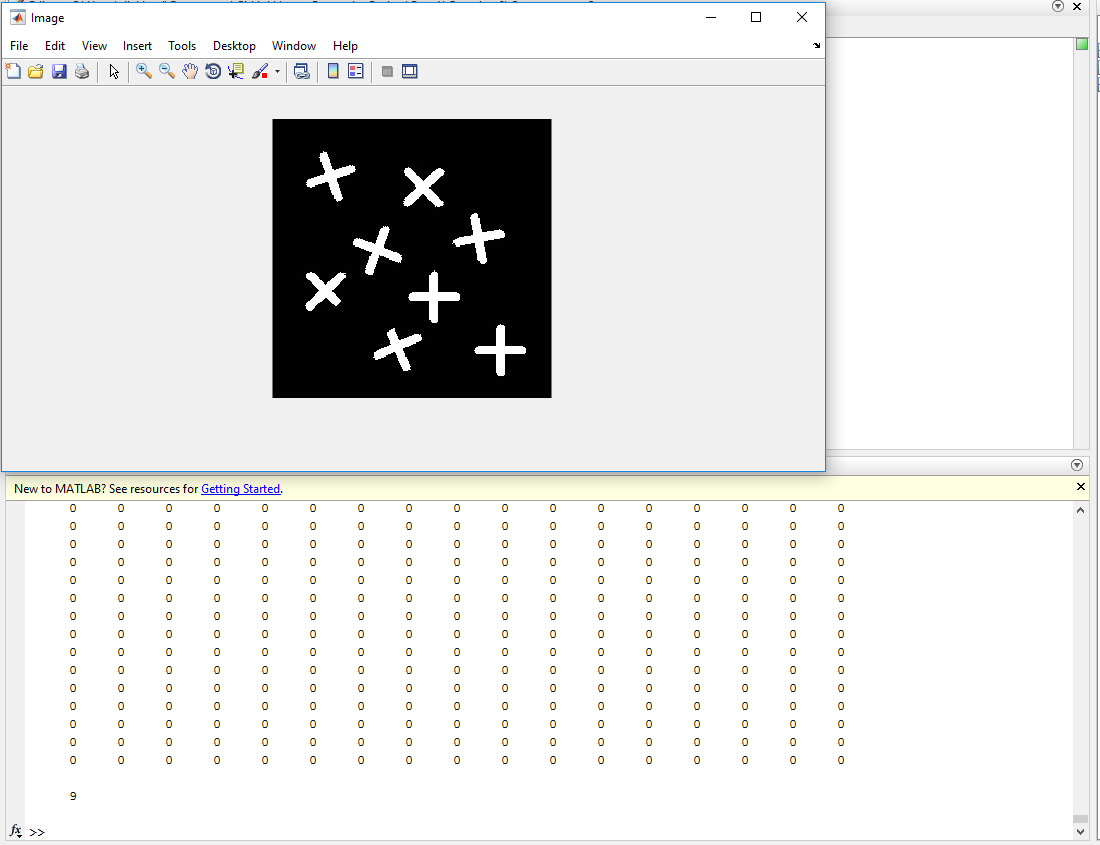
## Question 4: Finding connected components in a binary image

In this question we were asked find the number of connected components in a binary image,

We implemented a function that counts the connected components according to a threshold.

We traverse our image and check if with have a white pixel that wasn’t visited and then check all of his neighbors (from all angles) to see if they are also white, meaning the same component, all white neighbors we found will be added to a stack and do the same checks on them, when we don’t have other white neighbors in the stack that means that we found all the whites in the component, so we raise the component counter, next component will be identified as 2.

### Print screen from MATLAB



# Part B: Completion of straight lines using Hough Transform algorithm

The answers in the section are written in Python using the open-cv library.

## Question 1 (15 Points)

Q: Kaggle is a platform for data science competitions which includes many datasets available at: https://www.kaggle.com Sign up for Kaggle and download a dataset which is suitable for Tableau from https://www.kaggle.com/datasets Format the dataset, clean it, find outliers, and visualize the dataset using a Dashboard. Provide screenshots.

# Part C: Image watermarking

The answers in the section are written in MATLAB.