# -\*- coding: utf-8 -\*-

"""q3.ipynb

Automatically generated by Colaboratory.

Original file is located at

https://colab.research.google.com/drive/1Jt6KysFSFPcLnFm7AmrCTcPJxpotkF27

"""

import os

import numpy as np

import imageio as im

from matplotlib import pyplot as plt

A = np.load('q3-input.npy')

sorted\_data = np.sort((A.flatten()))

color\_bar\_image = np.tile(sorted\_data,(300,1))

plt.figure()

plt.title('Sorted Intensities from np.random.randint')

plt.imshow(color\_bar\_image, cmap='gray', interpolation = 'none')

plt.figure()

plt.hist(sorted\_data, bins = 20)

plt.title('Histogram of Sorted Intensities')

plt.show()

X = A[50:100, 0:50]

np.save('q3-output-x', X)

plt.figure()

plt.title('Image X')

plt.imshow(X, interpolation = 'none')

Y = A - np.mean(A)

np.save('q3-output-y', Y)

plt.figure()

plt.title('Image Y')

plt.imshow(Y, interpolation = 'none')

Z = np.zeros((100,100,3))

Z[np.where(A > np.mean(A))] = np.array([1.0,0.0,0.0])

im.imsave('q3-output-z.png', Z.astype(np.uint8))

plt.figure()

plt.title('Image Z')

plt.imshow(Z, interpolation = 'none')