Classical Image Processing – Hands On

Lecture 1: Sampling & Quantization

Task 1: write code that takes an image and sample it in a rate of 2^n (every second pixel, every forth pixel till you can't)

Task 2: write code that take 8 bits image and quantize it to 4, 2 and 1 bit.

Task 3: write code that does gamma correction for an image

Task 4: write code that calculates the histogram of an image

Task 5: write code that does contrast stretching for an image:

Search for Low Contrast Image and present the image and its histogram before and after contrast stretching.

Images:

1. Sinewaves horizontal – for tasks 1&2

```
import numpy as np
import matplotlib.pyplot as plt

N = 256
x = np.linspace(-np.pi,np.pi, N)
sine1D = 128.0 + (127.0 * np.sin(x * 8.0))
sine1D = np.uint8(sine1D)
sine2D = np.tile(sine1D, (N,1))
print(sine2D.shape)
plt.imshow(sine2D, cmap='gray')
```

2. Barbara image (use only green channel) – for tasks 1, 2, 3, 4