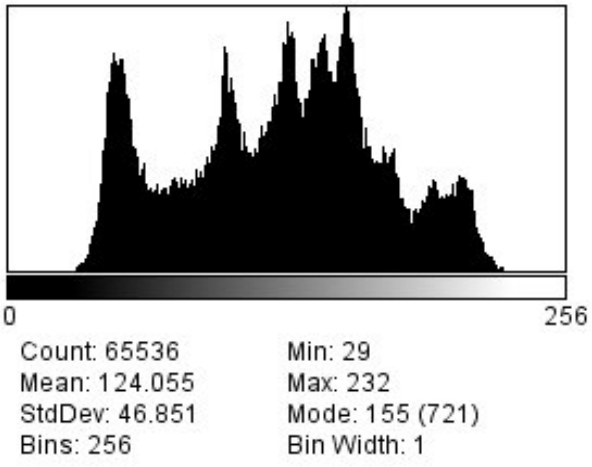
IVT Akande Mayowa Session 1

Session1

- **Get started**

1. A basic "Hello World" C++ program was compiled successfully without warning.
2. The IMAGEJ viewer was installed successfully and the 256 * 256 pixels RAW 32 bpp image of "Lena" was imported by dragging and dropping it on the image J viewer.
3. Histogram is a graph which tells us about the frequency of occurrence of any intensity level in an image. For a grayscale images, the pixel value is a single number that represents the brightness of the pixel. The pixel format here is the byte image, where this number is stored as an 8-bit integer giving a range of possible values from 0 to 255. The horizontal axis represents the intensity levels (0 – 255). The vertical axis represents the frequency of occurrence of the intensity value.



Darker values are to the left, while brighter values are to the right. Black =0, White =255.

The higher the graph is, the more the pixel at that brightness.
Count: is the number of pixels: Row * column (256 * 256) =65,536
Min: The least intensity value in the image is 29.
Max: The biggest intensity value in the image is 232.

Mode: The most frequent intensity is 155 with a value of 721.

Mean: The average value of intensity = Sum of intensity values / Total frequency.
Standard deviation: A measure of amount of variation or dispersion of a set of values.

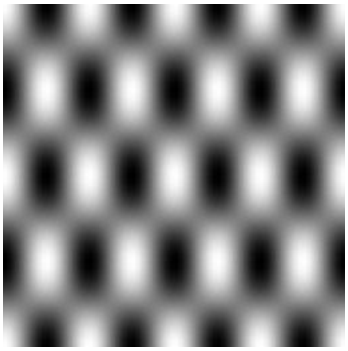
Low standard deviation values tend to be close to the mean.

High standard deviation values are spread over a wider range.

Bins: Total number of intensities is 256
Bin width: Spacing between bins.

Create and store a RAW 32 bpp grayscale image

1. The code to generate the normalized grayscale image was written.



2. I was expecting a size of 256*256*4 bytes = 256 KB (262,144 bytes). The size in bytes of my output matches exactly what I expected. 262,144 bytes as expected.

3. When I take a very small window (say 0.01), it splits the image into two (binary- either black or white), with a vertical level of 0.5, all values above 0.5 will be black and values below 0.5 are white. As the level decreases from 0.5 to 0, white intensity dominates, the reverse is for black intensity.

   Which intensity level and smallest window width enclose the full range of pixel values? For the normalized grayscale, I have Intensity level:0.5 Window: 1.0 to enclose the full range ofpixel values.

Load and modify a RAW 32 bpp grayscale image

A functional code was also implemented for this exercise.

MSE is 5613.45, RMSE is 74.923 and the PSNR is 29.3847 dB