الجامعة الإسلامية العالمية شيتاغونغ

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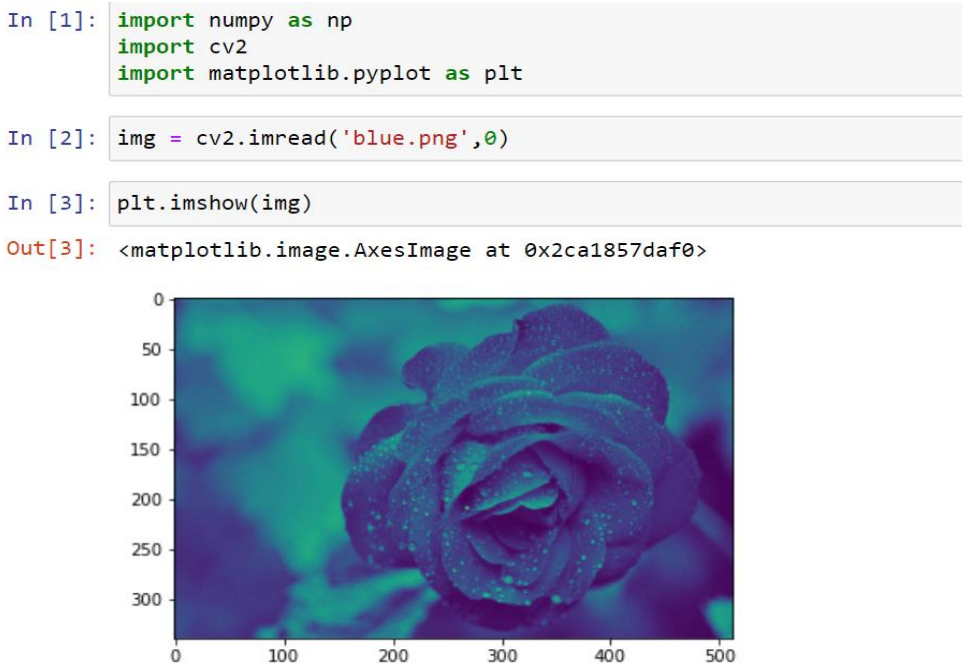
LAB 5

5.1. Histogram processing

5.2. Histogram Equalization

Show the unequalized Image

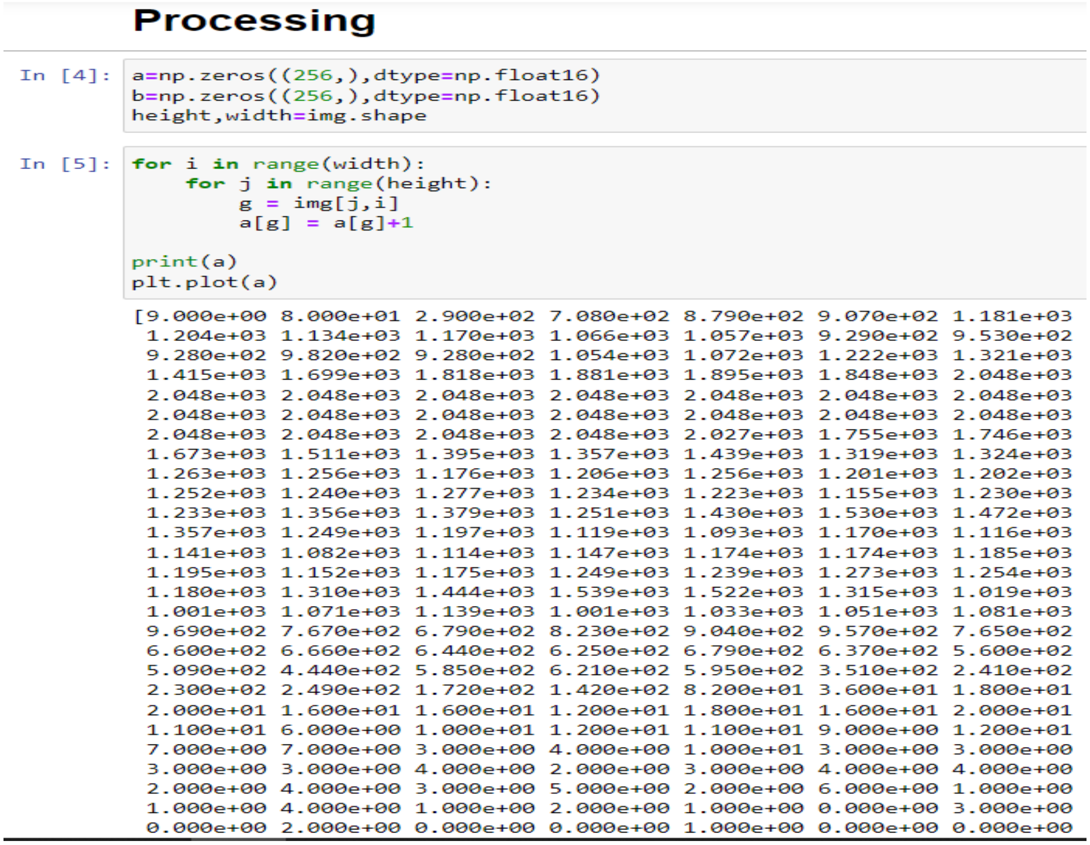


```
In [1]: import numpy as np
        import cv2
        import matplotlib.pyplot as plt

In [2]: img = cv2.imread('blue.png',0)

In [3]: plt.imshow(img)

Out[3]: <matplotlib.image.AxesImage at 0x2ca1857daf0>
```



Processing

```
In [4]: a=np.zeros((256,),dtype=np.float16)
        b=np.zeros((256,),dtype=np.float16)
        height,width=img.shape

In [5]: for i in range(width):
            for j in range(height):
                g = img[j,i]
                a[g] = a[g]+1

        print(a)
        plt.plot(a)

        [9.000e+00 8.000e+01 2.900e+02 7.080e+02 8.790e+02 9.070e+02 1.181e+03
         1.204e+03 1.134e+03 1.170e+03 1.066e+03 1.057e+03 9.290e+02 9.530e+02
         9.280e+02 9.820e+02 9.280e+02 1.054e+03 1.072e+03 1.222e+03 1.321e+03
         1.415e+03 1.699e+03 1.818e+03 1.881e+03 1.895e+03 1.848e+03 2.048e+03
         2.048e+03 2.048e+03 2.048e+03 2.048e+03 2.048e+03 2.048e+03 2.048e+03
         2.048e+03 2.048e+03 2.048e+03 2.048e+03 2.048e+03 2.048e+03 2.048e+03
         2.048e+03 2.048e+03 2.048e+03 2.048e+03 2.027e+03 1.755e+03 1.746e+03
         1.673e+03 1.511e+03 1.395e+03 1.357e+03 1.439e+03 1.319e+03 1.324e+03
         1.263e+03 1.256e+03 1.176e+03 1.206e+03 1.256e+03 1.201e+03 1.202e+03
         1.252e+03 1.240e+03 1.277e+03 1.234e+03 1.223e+03 1.155e+03 1.230e+03
         1.233e+03 1.356e+03 1.379e+03 1.251e+03 1.430e+03 1.530e+03 1.472e+03
         1.357e+03 1.249e+03 1.197e+03 1.119e+03 1.093e+03 1.170e+03 1.116e+03
         1.141e+03 1.082e+03 1.114e+03 1.147e+03 1.174e+03 1.174e+03 1.185e+03
         1.195e+03 1.152e+03 1.175e+03 1.249e+03 1.239e+03 1.273e+03 1.254e+03
         1.180e+03 1.310e+03 1.444e+03 1.539e+03 1.522e+03 1.315e+03 1.019e+03
         1.001e+03 1.071e+03 1.139e+03 1.001e+03 1.033e+03 1.051e+03 1.081e+03
         9.690e+02 7.670e+02 6.790e+02 8.230e+02 9.040e+02 9.570e+02 7.650e+02
         6.600e+02 6.660e+02 6.440e+02 6.250e+02 6.790e+02 6.370e+02 5.600e+02
         5.090e+02 4.440e+02 5.850e+02 6.210e+02 5.950e+02 3.510e+02 2.410e+02
         2.300e+02 2.490e+02 1.720e+02 1.420e+02 8.200e+01 3.600e+01 1.800e+01
         2.000e+01 1.600e+01 1.600e+01 1.200e+01 1.800e+01 1.600e+01 2.000e+01
         1.100e+01 6.000e+00 1.000e+01 1.200e+01 1.100e+01 9.000e+00 1.200e+01
         7.000e+00 7.000e+00 3.000e+00 4.000e+00 1.000e+01 3.000e+00 3.000e+00
         3.000e+00 3.000e+00 4.000e+00 2.000e+00 3.000e+00 4.000e+00 4.000e+00
         2.000e+00 4.000e+00 3.000e+00 5.000e+00 2.000e+00 6.000e+00 1.000e+00
         1.000e+00 4.000e+00 1.000e+00 2.000e+00 1.000e+00 0.000e+00 3.000e+00
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```

```
 0.000e+00 0.000e+00 0.000e+00 0.000e+00 0.000e+00 0.000e+00 0.000e+00
 0.000e+00 0.000e+00 0.000e+00 0.000e+00 0.000e+00 0.000e+00 0.000e+00
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 0.000e+00 0.000e+00 0.000e+00 0.000e+00]
```
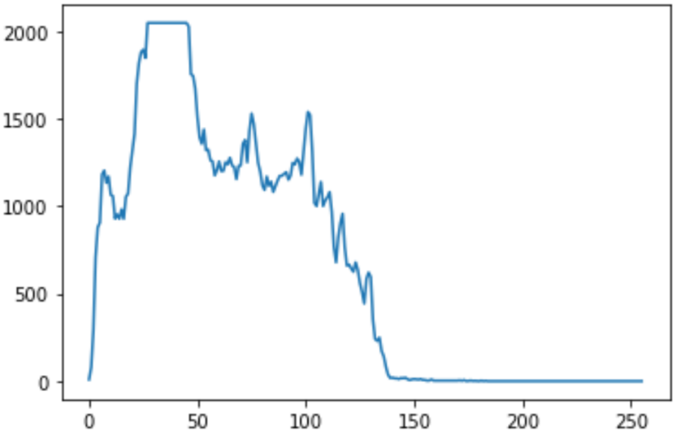

```
Out[5]: [<matplotlib.lines.Line2D at 0x2ca18d3cb50>]
```



Equalization

```
In [6]: tmp = 1.0/(height*width)
        b = np.zeros((256,),dtype=np.float16)

        for i in range(256):
            for j in range(i+1):
                b[i] += a[j] * tmp;
            b[i] = round(b[i] * 255);
```

```
In [7]: b=b.astype(np.uint8)

        print(b)
        plt.plot(b)
```

```
[  0   0   1   2   3   4   6   8   9  11  13  14  16  17  18  20  21  23
  24  26  28  30  32  35  38  41  43  46  49  52  55  58  61  64  67  70
  73  76  79  82  85  88  91  94  97 100 103 106 108 111 113 115 117 119
 121 123 125 127 128 130 132 134 135 137 139 141 143 144 146 148 150 152
 154 156 158 160 162 164 166 168 169 171 173 174 176 177 179 181 182 184
 186 188 189 191 193 195 197 199 200 202 204 207 209 211 212 214 215 217
 218 220 221 223 224 225 226 228 229 230 232 233 234 235 235 236 237 238
 239 240 240 241 242 243 243 243 244 244 244 244 244 244 244 244 244 244
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 244 244 244 244 244 244 244 244 244 244 244 244 244 244 244 244 244 244
 244 244 244 244 244 244 244 244 244 244 244 244 244 244 244 244 244 244
 244 244 244 244]
```
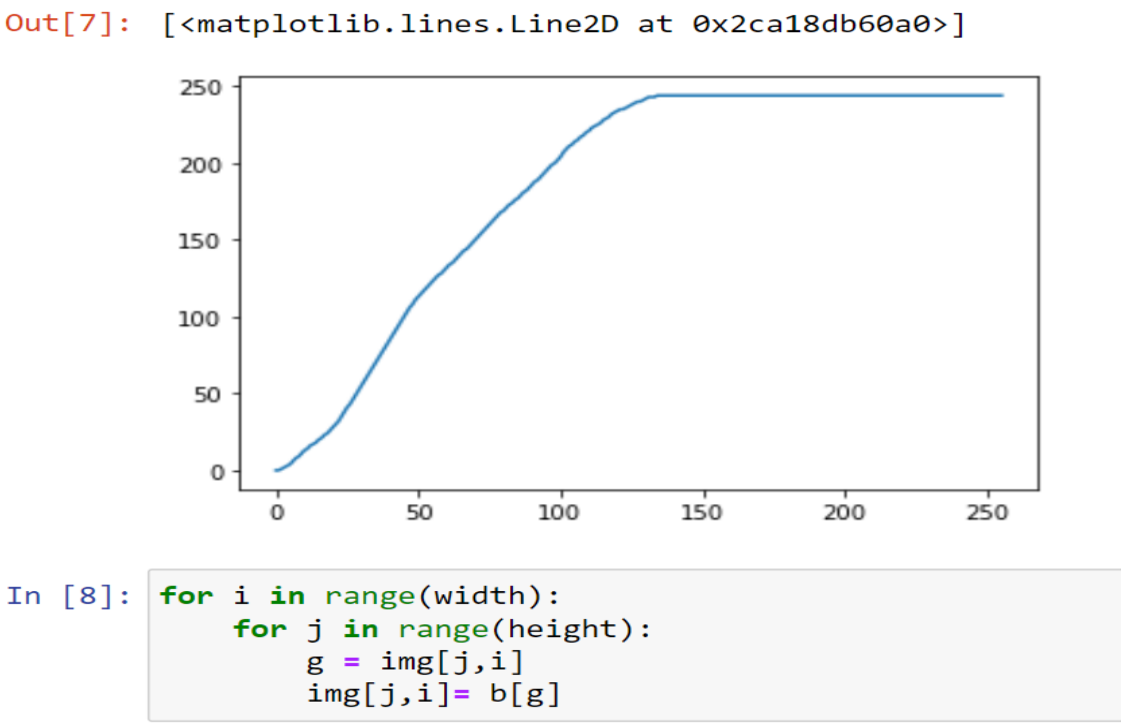
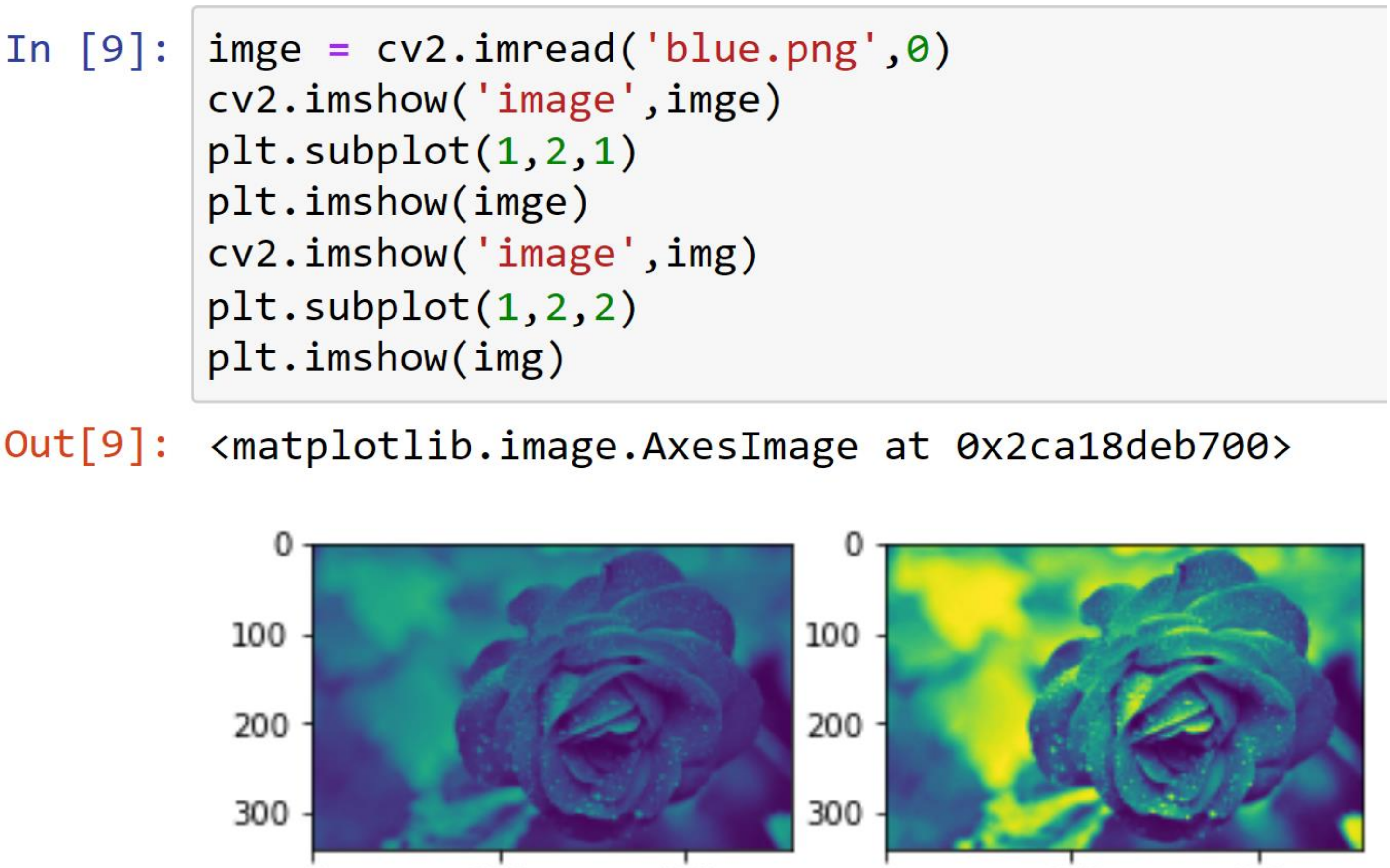



```
Out[7]: [<matplotlib.lines.Line2D at 0x2ca18db60a0>]
```

```
In [8]: for i in range(width):
            for j in range(height):
                g = img[j,i]
                img[j,i]= b[g]
```



```
In [9]: imge = cv2.imread('blue.png',0)
        cv2.imshow('image',imge)
        plt.subplot(1,2,1)
        plt.imshow(imge)
        cv2.imshow('image',img)
        plt.subplot(1,2,2)
        plt.imshow(img)
```

```
Out[9]: <matplotlib.image.AxesImage at 0x2ca18deb700>
```

Before and After Equalization