Computer Vision HW3
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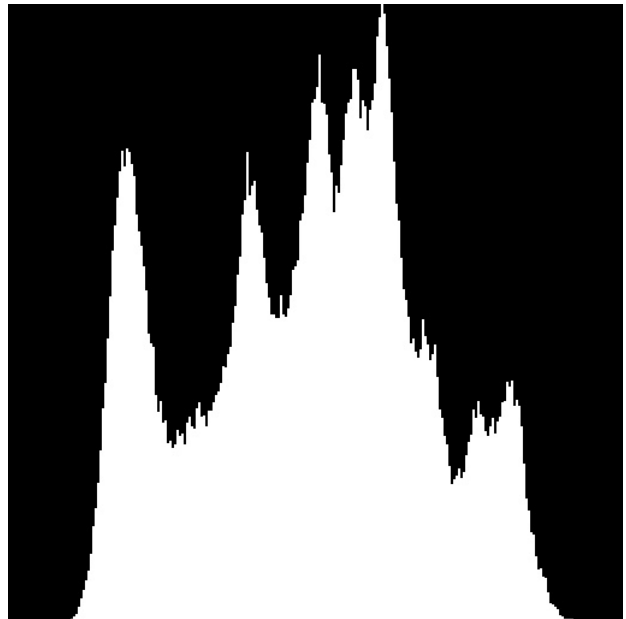
(a) original image and its histogram

steps: 1.count the amount of pixels
       2.draw histogram

code:

```cpp
for (int i = 0; i < 256;i++) {
    int draw_pixel_count = (int)floor(pixel_count[i]*scale);
    for (int j = 0; j < draw_pixel_count;j++) {
        histogram.at<uchar>(512 - j - 1, i * 2) = 255;
        histogram.at<uchar>(512 - j - 1, i * 2 + 1) = 255;
    }
}
```
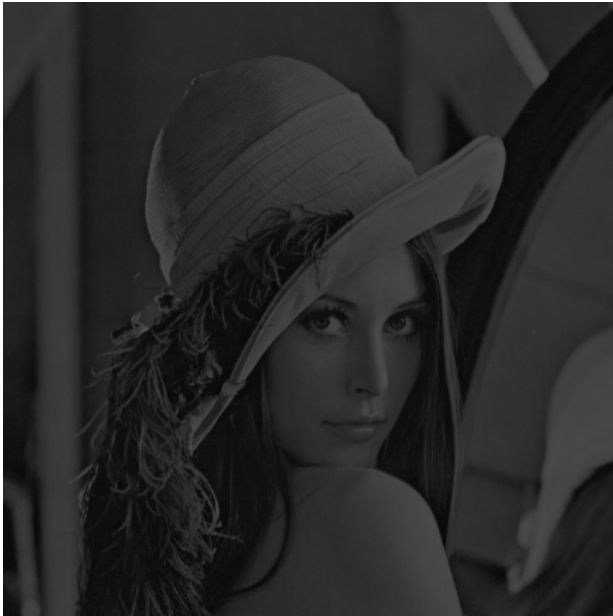
result :

(b)image with intensity divided by 3 and its histogram

steps: 1. divide every pixel with 3
        2. draw histogram by using (a) code

code:

```
for (int i = 0; i < x; i++) {
    for (int j = 0; j < y; j++) {
        img.at<uchar>(i, j) = img.at<uchar>(i, j) / 3;        ///div3
    }
}
```

result:

(c)image after applying histogram equalization to (b) and its histogram

steps: 1.count (b)'s pic pixel
   2.count CDF and its min
   3.draw new img by the formula below

$$h(v) = \text{round}(\frac{cdf(v) - cdf_{min}}{(M * N) - cdf_{min}} * (L-1))$$

I saw this formula from: https://iter01.com/203384.html

4.draw histogram by using (a) function

code:

```
for(int i = 0 ; i < x ; i++){
    for(int j = 0 ; j < y ; j++){
        s_k = double(CDF[img.at<uchar>(i,j)] - min)/double(x*y - min);
        his_eq.at<uchar>(i,j) = floor(s_k*255);

    }
}
```

result: