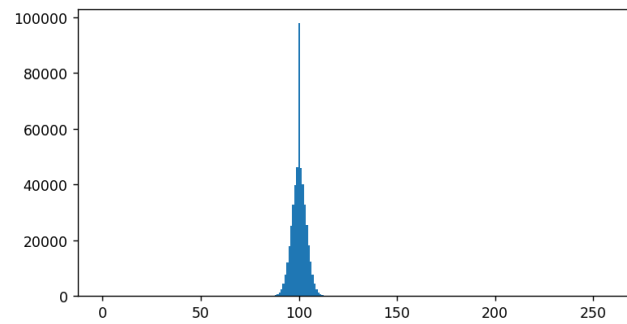
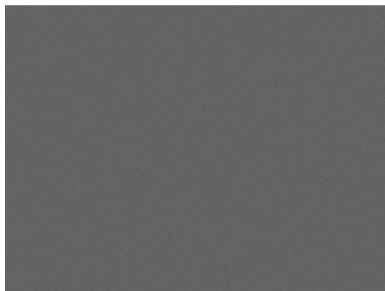
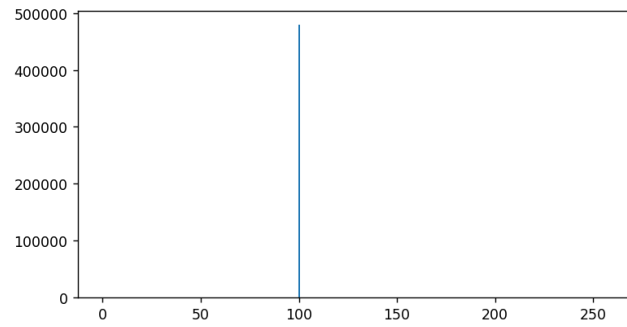


source code

```
1 import numpy as np
2 import matplotlib.pyplot as plt
3 import matplotlib.image as mpimg
4 import cv2
5
6 def getz(sigma, mu, phi, r):
7     z1 = sigma * np.cos(2 * np.pi * phi) * np.sqrt((-2) * np.log(r))
8     z2 = sigma * np.sin(2 * np.pi * phi) * np.sqrt((-2) * np.log(r))
9     return int(z1), int(z2)
10
11 def GNoiseImg(img, mu, sigma):
12     ret = img.copy()
13     for y in range(599):
14         for x in range(800):
15             z1, z2 = getz(sigma, mu, np.random.random_sample(),
16 np.random.random_sample())
17
18             f = img[y][x] + z1
19             ff = img[y + 1][x] + z2
20
21             if f < 0:
22                 ret[y][x] = 0
23             elif f > 254:
24                 ret[y][x] = img[y][x]
25             else:
26                 ret[y][x] = f
27
28             if ff < 0:
29                 ret[y + 1][x] = 0
30             elif ff > 254:
31                 ret[y + 1][x] = img[y + 1][x]
32             else:
33                 ret[y + 1][x] = ff
34
35     print(ret)
36     return ret
37
38 img = np.empty([600, 800])
39 img.fill(100)
40
41 print(img)
42
43 Gimg = GNoiseImg(img, 0, np.sqrt(15))
44
45 plt.subplot(221), plt.imshow(img, cmap = 'gray', vmin = 0, vmax = 255)
46 # disable axis
47 plt.axis('off')
48 plt.subplot(222), plt.hist(img.ravel(), 256, [0, 255])
49 plt.subplot(223), plt.imshow(Gimg, cmap = 'gray', vmin = 0, vmax = 255)
50 plt.axis('off')
51 plt.subplot(224), plt.hist(Gimg.ravel(), 256, [0, 255])
```

```
52 | # show the image
53 | plt.show()
```

output



Comment

一開始看不懂作業需求的G是什麼意思，同學提醒後才發現是 grey level 的最大值，不然原本所有的數值都在 100 以下，除此之外都蠻簡單的。