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SP17-BCS-012

Harmonic Mean Filter

Note: I am Using Scipy v1.1.0. In case of any errors you can install scipy 1.1.0 by the following command: pip install scipy==1.1.0

In [20]:
```
import scipy
scipy.__version__
```

Out[20]:
```
'1.1.0'
```

To download images Click on this url: https://drive.google.com/drive/folders/1pcaTwofZGfoCxZ3Hv2X6vW6xf_1i88eb?usp=sharing (https://drive.google.com/drive/folders/1pcaTwofZGfoCxZ3Hv2X6vW6xf_1i88eb?usp=sharing)

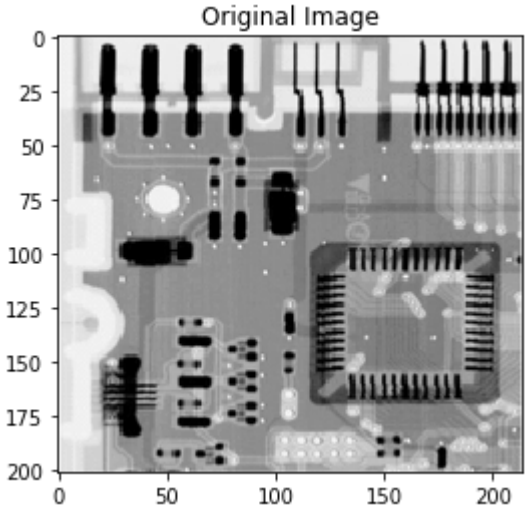
Import Libraries

In [21]:
```
import cv2
from scipy.misc import imread
import matplotlib.pyplot as plt
import numpy as np
from skimage.util import random_noise
from skimage.filters import rank
```

Read Image

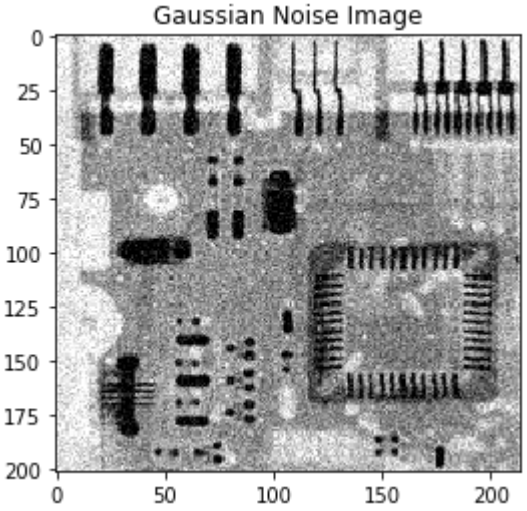
In [22]:
```
img=imread("circuit_image.png",False,'L')
img=img.astype(np.uint8)
img_2=img.copy()
plt.title("Original Image")
plt.imshow(img,plt.cm.gray)
plt.show()
```

```
C:\ProgramData\Anaconda3\lib\site-packages\ipykernel_launcher.py:1: DeprecationWarning: `imread` is deprecate
d!
`imread` is deprecated in SciPy 1.0.0, and will be removed in 1.2.0.
Use ``imageio.imread`` instead.
  """Entry point for launching an IPython kernel.
```



Adding Gaussian Noise

In [23]:
```
rows, cols = img.shape[:2]
noise_img = random_noise(img_2, mode='gaussian')
noise_image=noise_img*255
img_2=noise_image.copy()
plt.title("Gaussian Noise Image")
plt.imshow(noise_image,plt.cm.gray)
plt.show()
```



In [25]:
```
img_harmonic=np.zeros((rows,cols))
for i in range(1,rows-1):
    for j in range(1,cols-1):
        ans=img_2[i-1:i+2,j-1:j+2]
        ans=9/np.sum(1/ans)
        ans=round(ans)
        img_harmonic[i,j]=ans
print(img_harmonic[1:5,1:5])
```

```
C:\ProgramData\Anaconda3\lib\site-packages\ipykernel_launcher.py:5: RuntimeWarning: divide by zero encountered
in true_divide
  """

[[230. 219. 223. 227.]
 [232. 226. 230. 229.]
 [227. 229. 232. 231.]
 [234. 239. 241. 240.]]
```

In [26]:
```
plt.imshow(img_harmonic,plt.cm.gray)
```

Out[26]:
```
<matplotlib.image.AxesImage at 0x234efc63988>
```