In [ ]:

```
def get_mask_for_edge():
    return np.array([-1,0,1,-2,0,2,-1,0,1]).reshape(3,3)

def apply_mask_for_edge(part_of_image):
    mask=get_mask_fo_edge()
    return sum(sum(part_of_image*mask))
def get_edges(im_1):
     m=im_1.shape[0]
    n=im_1.shape[1]
    im_2=np.zeros((m,n))
    for i in range(3,m-3):
        for j in range(3,n-3):
            poi=im_1[i-1:i+2:j-1:j+2]
            im_2[i,j]=apply_mask_for_edge(poi)
    return im_2



poi_1=get_mask_for_edge()
apply_mask_for_edge(poi_1)
```

In [ ]:

```
im_11=plt.imread(r'C:\Users\murat\resim\cameraman')
im_112=convert_to_gray_level(im_11)
im_with_edges_12=get_edges(im_12)
plt.figure(figsize=(20,20))
plt.subplot(1,3,1),plt.imshow(im_11)
plt.subplot(1,3,2),plt.imshow(im_12,cmap='gray')
plt.subplot(1,3,3),plt.imshow(im_witedges_12,cmap='gray')
```

In [ ]:

```
im_with_edges=get_edges(im_2)
```

In [ ]:

```
plt.imshow(im_with_edges,cmap='gray')
plt.subplot(1,2,1),plt.imshow(im_1)
plt.subplot(1,2,2),plt.imshow(im_2,cmap='gray')
plt.show()
```

In [ ]:

```
file_path=r"C:\Users\murat\resim\penguins.jpg"
im_1=plt.imread(file_path)
im_2=convert_to_rgb_to_gray_level(im_1)

plt.figure(figsize=(20,20))
plt.subplot(1,2,1),plt.imshow(im_1)
plt.subplot(1,2,2),plt.imshow(im_2,cmap='gray')
plt.show()
```

In [ ]:

```
import matplotlib.pyplot as plt
import numpy as np
```

In [ ]:

```
def convert_rgb_to_gray_level(im_1):
    m=im_1.shape[0]
    n=im_1.shape[1]
    im_2=np.zeros((m,n))
    for i in range(m):
        for j in range(n):
            im_2[i,j]=get_distance(im_1[i,j,:])
    return im_2
def get_distance(v,w=[1/3,1/3,1/3]):
    a,b,c=v[0],v[1],v[2]
    w1,w2,w3=w[0],w[1],w[2]
    d=((a**2)*w1)+
    (b**2)*w2+
    (c**20*w3)**.5
    return d
```