In [1]:
```
pip install numpy
```

```
Requirement already satisfied: numpy in ./lib/python3.8/site-packages (1.24.2)
Note: you may need to restart the kernel to use updated packages.
```

In [2]:
```
pip install opencv-python
```

```
Requirement already satisfied: opencv-python in ./lib/python3.8/site-packages (4.7.0.72)
Requirement already satisfied: numpy>=1.17.3; python_version >= "3.8" in ./lib/python3.8/site-packages (from opencv-python) (1.24.2)
Note: you may need to restart the kernel to use updated packages.
```

In [3]:
```
pip install --upgrade Pillow
```

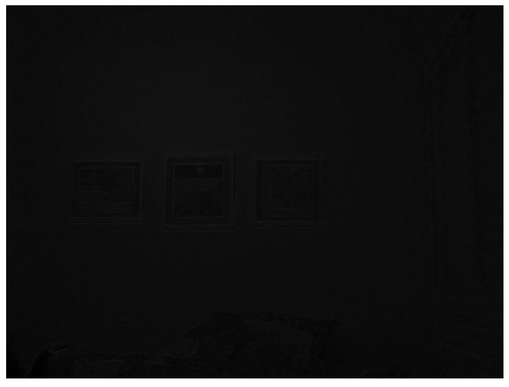
```
Requirement already up-to-date: Pillow in ./lib/python3.8/site-packages (9.4.0)
Note: you may need to restart the kernel to use updated packages.
```

In [12]:
```
import cv2 as cv
import numpy as np
import time
from PIL import Image
from IPython.display import display

cap = cv.VideoCapture(0)

num = 10

images = []

for i in range(num):
    ret, frame = cap.read()

    if not frame is None:
        frame = cv.cvtColor(frame, cv.COLOR_BGR2GRAY) #passa as fotos para cinza

    images.append(frame)

    cv.waitKey(1000)#espera 1 segundo
cv.destroyAllWindows()
cap.release()

#calculando diferença acumulada:
diff_acum = np.zeros_like(images[0], dtype=np.float32) #inicializar com o mesmo valores de pixels das fotos

for i in range(num - 1):
    diff = cv.absdiff(images[i], images[i + 1])
    if diff is None:
        diff = np.zeros_like(images[0], dtype=np.float32)
    diff_acum += diff.astype(np.float32)


#calculando média:

media = np.average(images, axis = 0)

#calculando desvio padrão:

dsv = np.std(images, axis = 0)

cv.imwrite("diff_acum.jpg", diff_acum)
cv.imwrite("media.jpg", media)
cv.imwrite("desvio.jpg", dsv)

img = Image.open("diff_acum.jpg")
img2 = Image.open("media.jpg")
img3 = Image.open("desvio.jpg")

print("Diferença acumulada")
display(img)
print("Média")
display(img2)
print("Desvio padrão")
display(img3)
```

```
Diferença acumulada
```

```
Média
```

```
Desvio padrão
```



In [ ]: