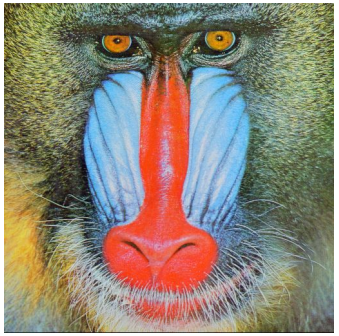
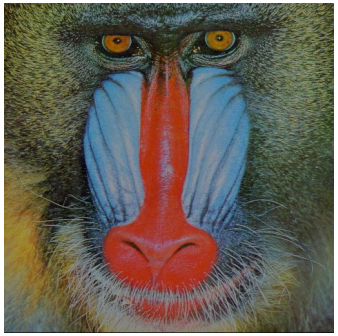
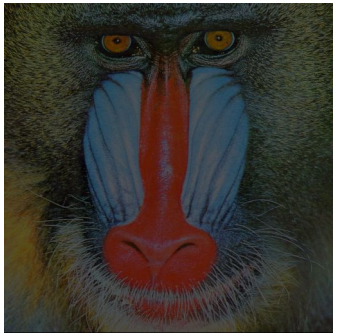
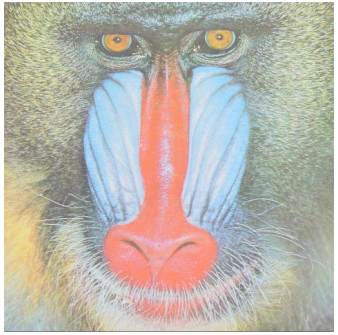
Task 1

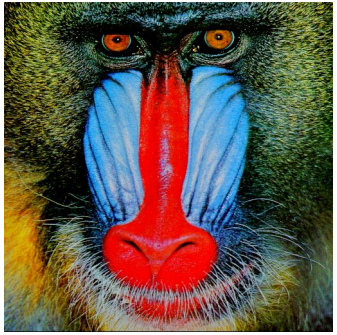




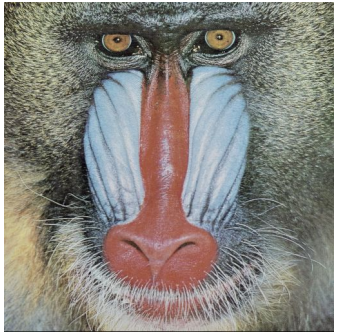


brightness



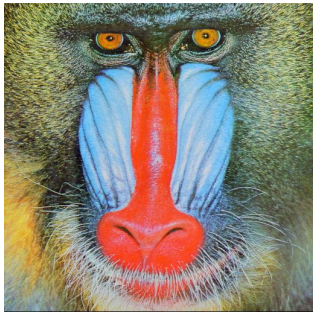


contrast

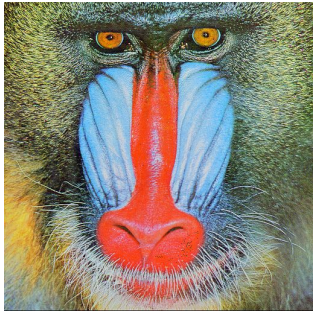


saturation

Task 1



Box filtering



sharpening

Gaussian
Smooth

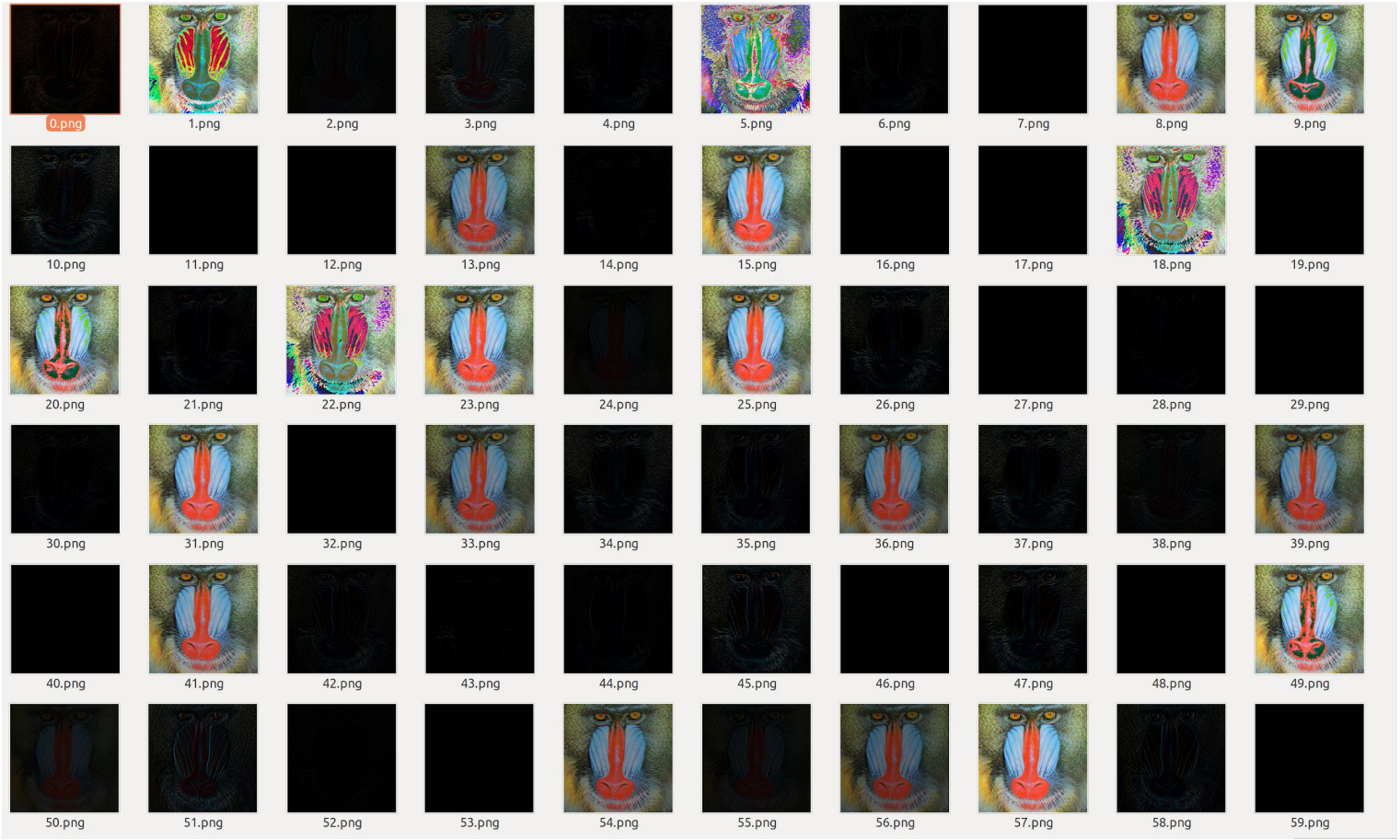
Task 1

Edge Detection

# Task 3 Profiling

```
============== Profiling 1 ==============
Profiling the Gaussian smoothing filter with increasing kernel size on a fixed image (e.g., 1024x1024) to analyze the scaling behavior.
profiling with gaussian kernel 7
conv takes time: 0.868352 ms
profiling with gaussian kernel 9
conv takes time: 1.413120 ms
profiling with gaussian kernel 11
conv takes time: 2.082816 ms
profiling with gaussian kernel 13
conv takes time: 2.790400 ms
profiling with gaussian kernel 15
conv takes time: 3.643392 ms
============== End of Profiling 1 ==============
============== Profiling 2 ==============
Profiling with fixed size smoothing filter (e.g., 25x25) on randomly initialized images of increasing size (128x128, ..., 1024x1024, ...) to analyze the scaling behavior.
profiling an random initialized image with image size 128
conv takes time: 0.764928 ms
profiling an random initialized image with image size 256
conv takes time: 2.208768 ms
profiling an random initialized image with image size 512
conv takes time: 9.953280 ms
profiling an random initialized image with image size 1024
conv takes time: 10.264576 ms
============== End of Profiling 2 ==============
```

# Bonus 2


0.png
1.png
2.png
3.png
4.png
5.png
6.png
7.png
8.png
9.png
10.png
11.png
12.png
13.png
14.png
15.png
16.png
17.png
18.png
19.png
20.png
21.png
22.png
23.png
24.png
25.png
26.png
27.png
28.png
29.png
30.png
31.png
32.png
33.png
34.png
35.png
36.png
37.png
38.png
39.png
40.png
41.png
42.png
43.png
44.png
45.png
46.png
47.png
48.png
49.png
50.png
51.png
52.png
53.png
54.png
55.png
56.png
57.png
58.png
59.png