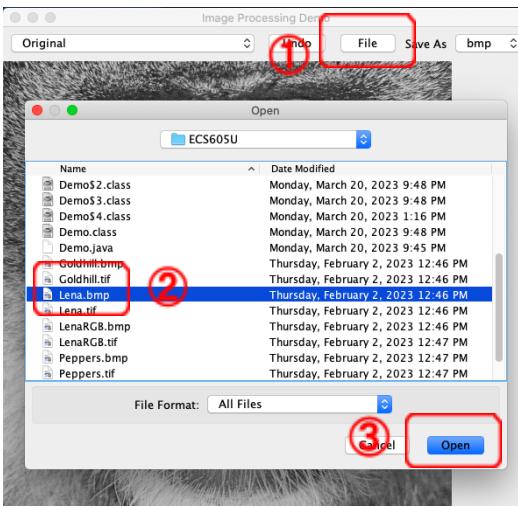
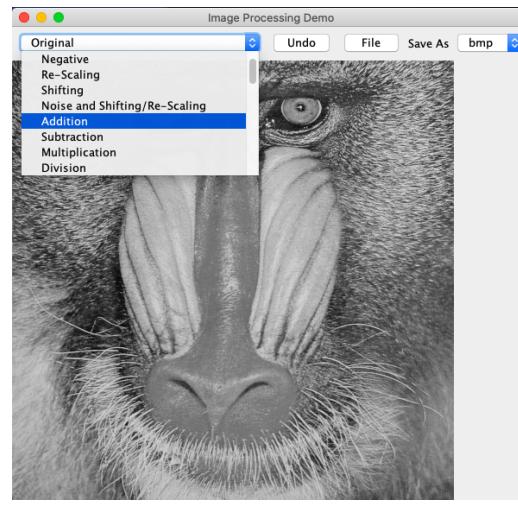
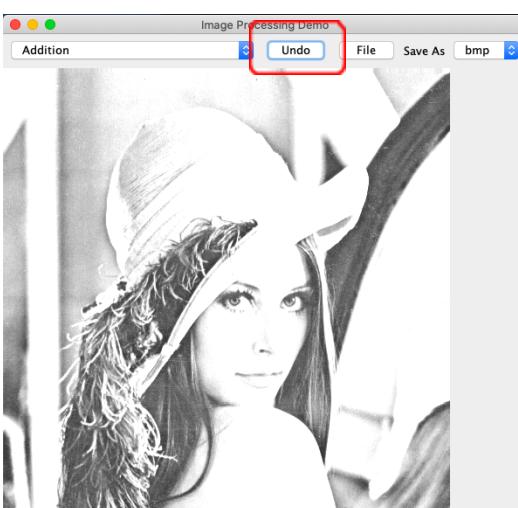
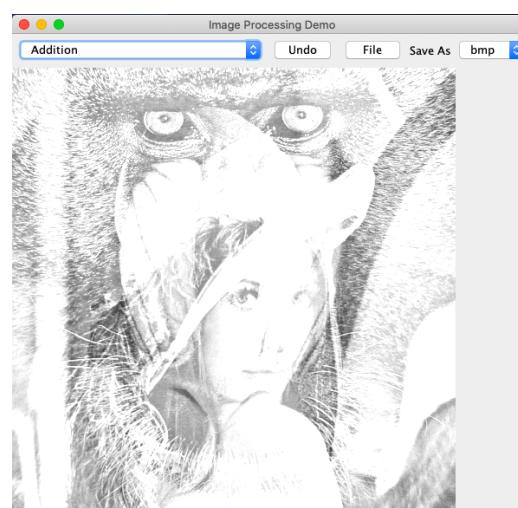


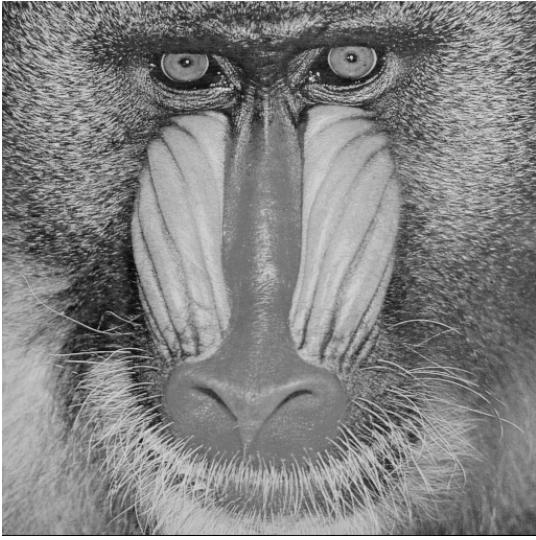
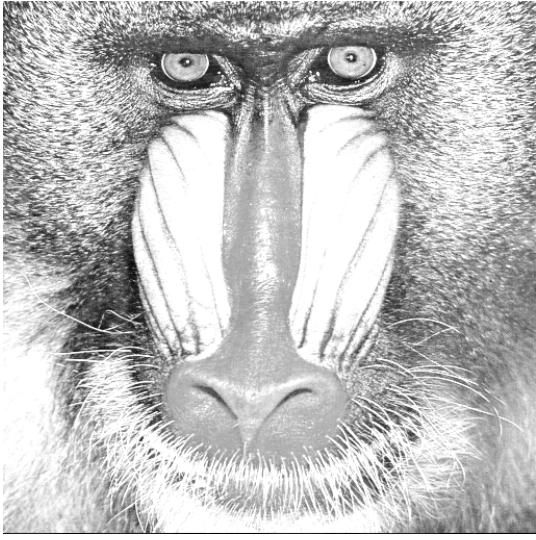
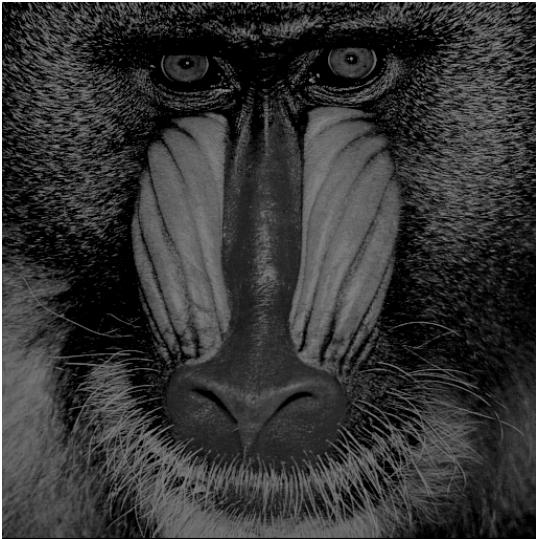
Hina Matsuzaki (ID: 220855723)

Notes:

1. Click Undo button for just one operation back (I confirmed with the lecturer)
2. To run *Re-Scaling, Shifting, Noise and Shifting/Re-Scaling, Power-Law, Bit-Plane Slicing, Simple Thresholding*, select the operation and then enter values in the console
3. To select ROI, select the same image (the image displayed in the window) from File, click Select Region from the operation menu and then enter values (x-, y-coordinates, width, height) in the console
4. To run arithmetic and boolean operations (operation that use two images),

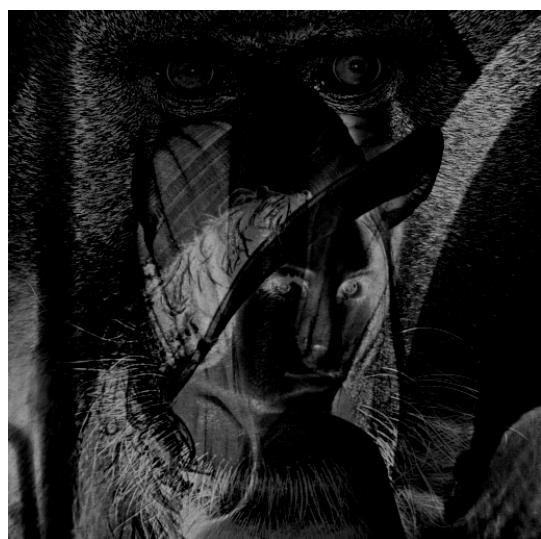
Step 1	Step 2
	
<p>① Click <i>File</i> ② Select the second image ③ Click <i>Open</i></p>	<p>① Select a filter</p>
 <p>① The second image will be displayed ② Click <i>Undo</i></p>	 <p>① Select the filter, which you selected in Step 2, again</p>

Part 1

1. Loads and displays an image [10%]	2. Pixel value rescaling and shifting [5%] 2-1: Re-Scaling (e.g. 1.5)
	
① change the File name in line 71 to change a image <code>bi = ImageIO.read(new File("Baboon.bmp"));</code> ② original image is displayed in a separate window	
2-2: Shifting (e.g.-80)	2-3: Noise and Shifting/Re-Scaling (e.g. shifting: -80, rescaling: 1.5)
	
3. Performs arithmetic and boolean operations between images [5%] 3-1: Addition	3-2: Subtraction



3-3: Multiplication



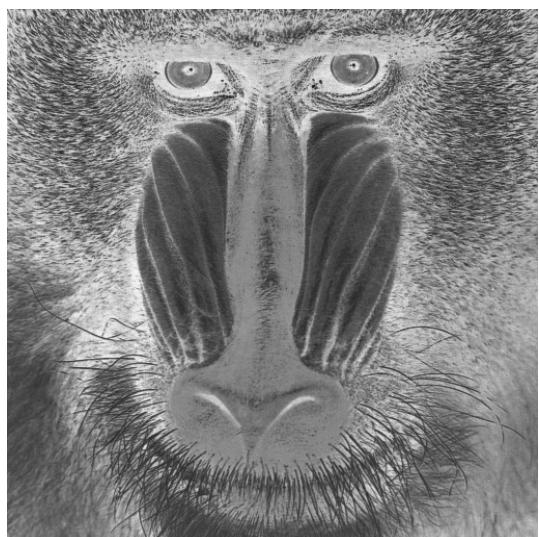
3-4: Division

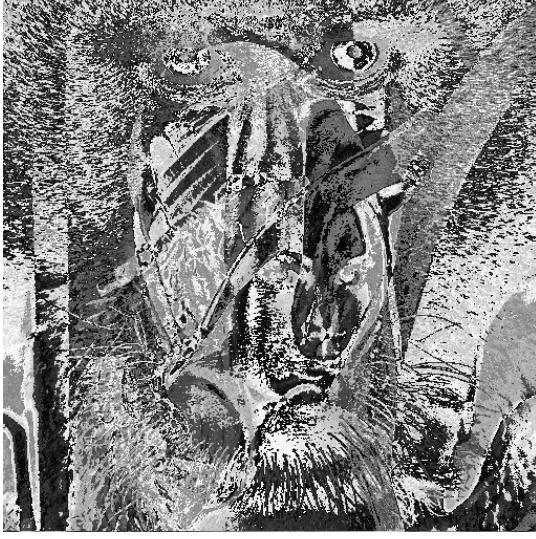
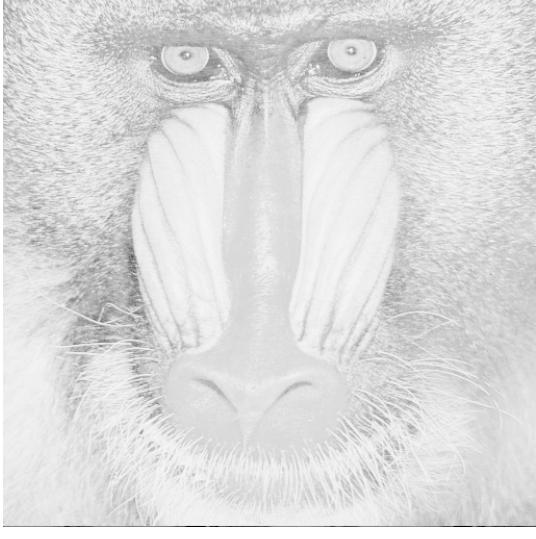


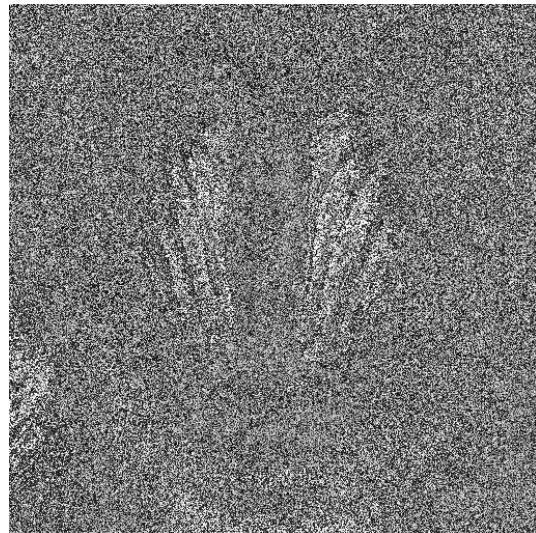
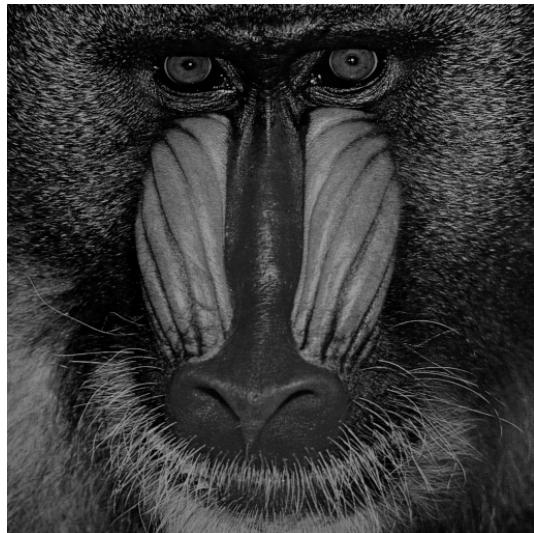
3-5: BitwiseNOT



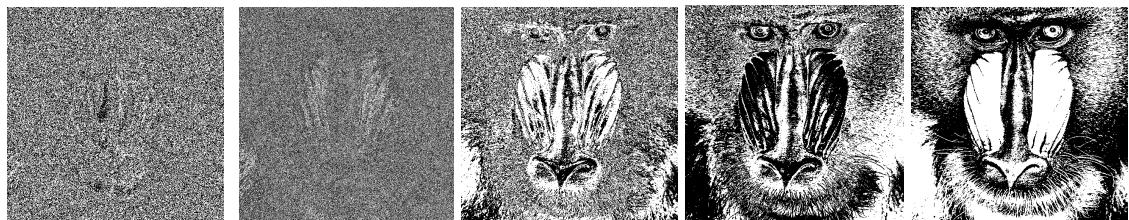
3-6: AND



3-7: OR	3-8: XOR
	
3-9: ROI-Based Operation 	<p>4. Performs point processing and bit-plane slicing [10%]</p> <p>4-1: Logarithmic Function</p> 
4-2: Power-Law (e.g. 2.5)	4-3: Random LUT



4-4: Bit-Plane (e.g. bit = 3 to 7)



3

4

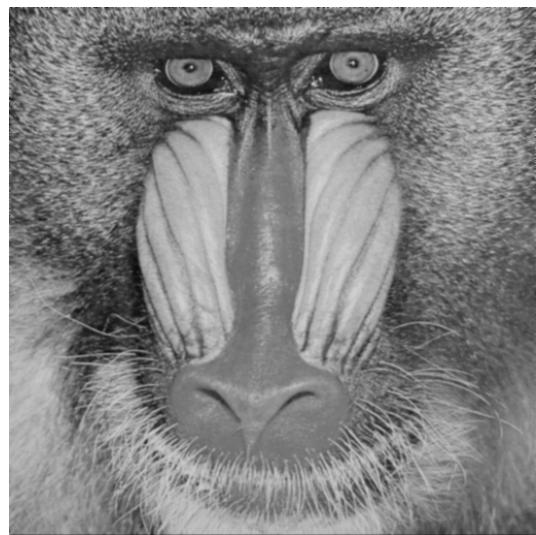
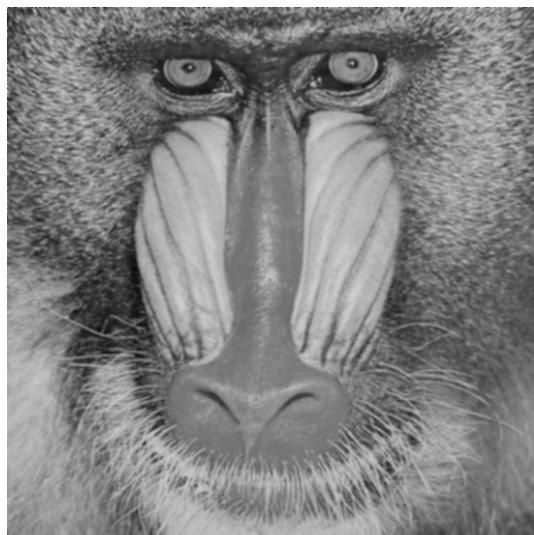
5

6

7

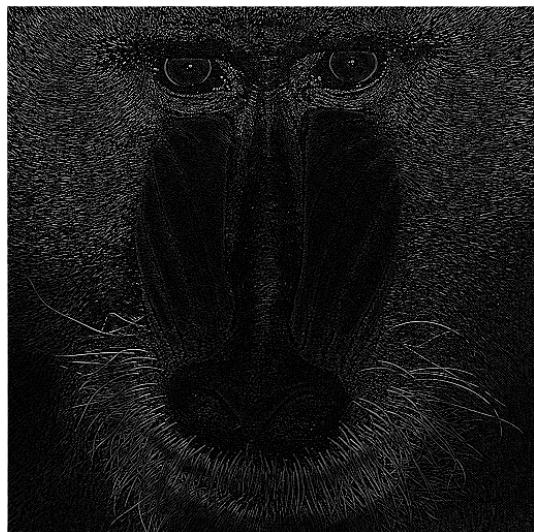
5. Performs a convolution on the image for smoothing the image [10%]
5-1: Averaging

5-2: Weighted Averaging

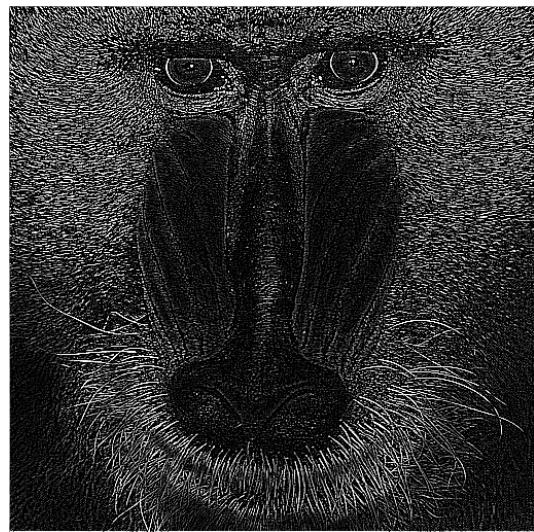


5-3: 4-neighbor Laplacian

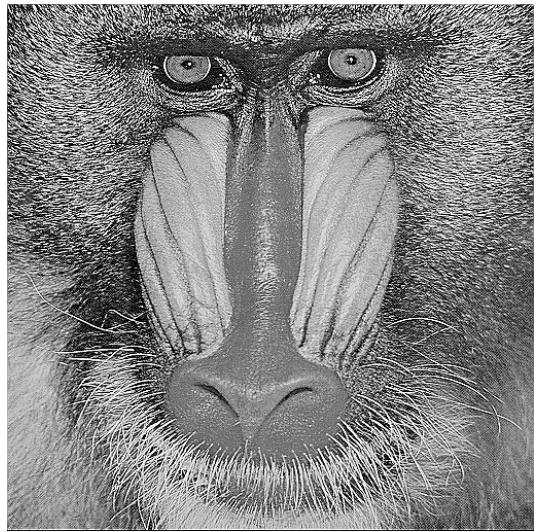
5-4: 8-neighbor Laplacian



5-5: 4-neighbor Laplacian Enhancement

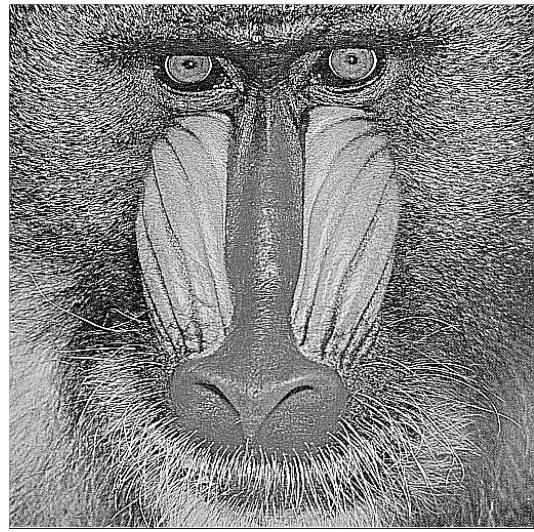


5-6: 8-neighbor Laplacian Enhancement

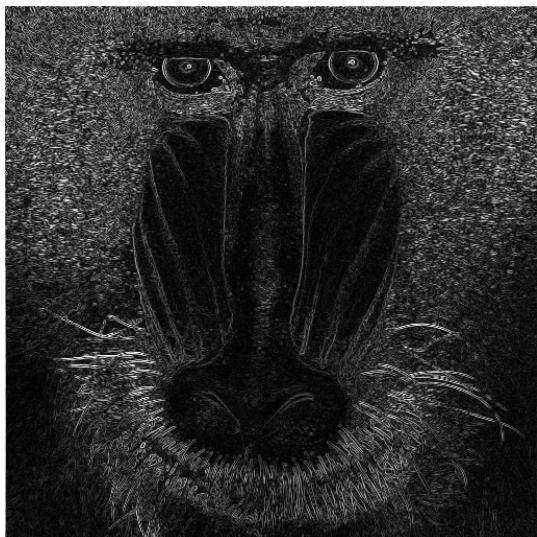


5. Performs a convolution on the image for edge detection [10%]

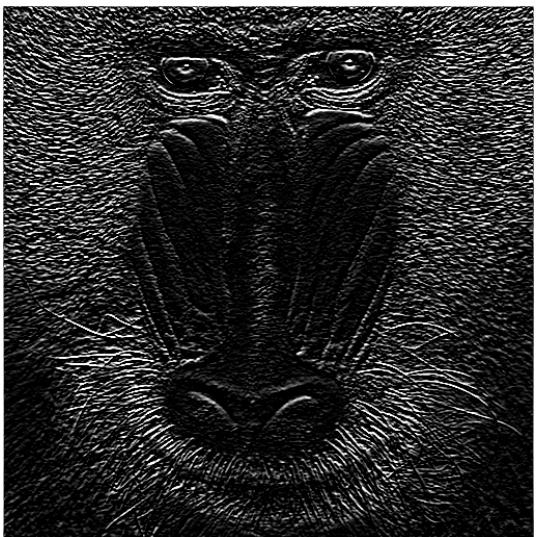
5-7: Roberts



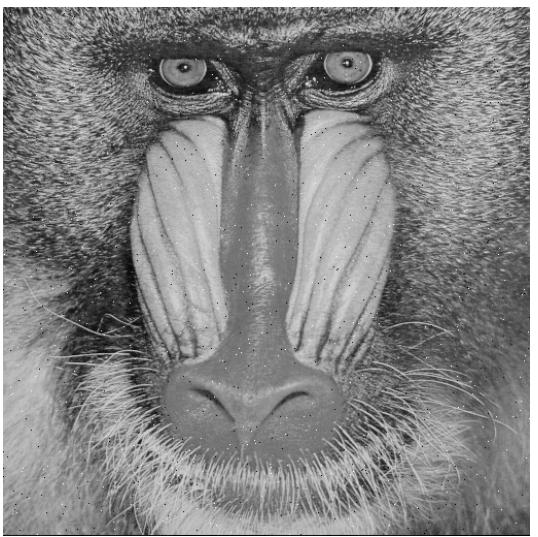
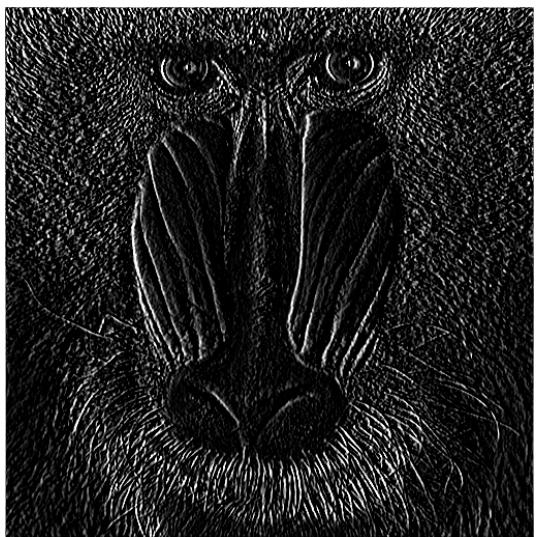
5-8: Sobel X



5-9: Sobel Y

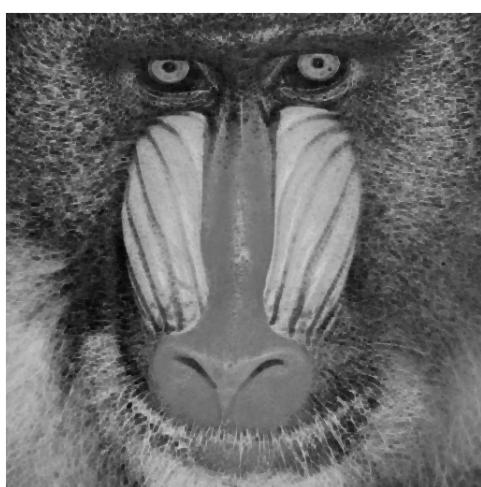


5-10: Salt-and-Pepper Noise

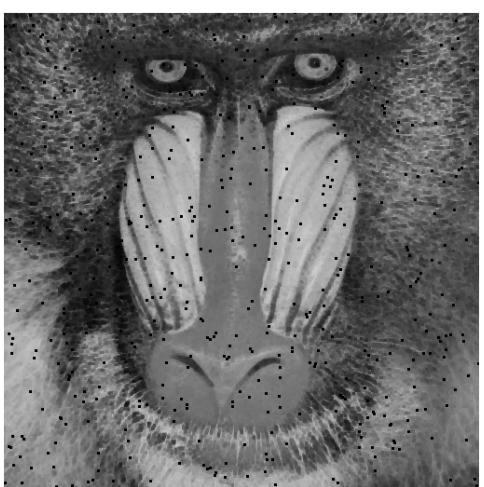


6. Performs order statistic filtering [10%]

6-1: Min Filtering

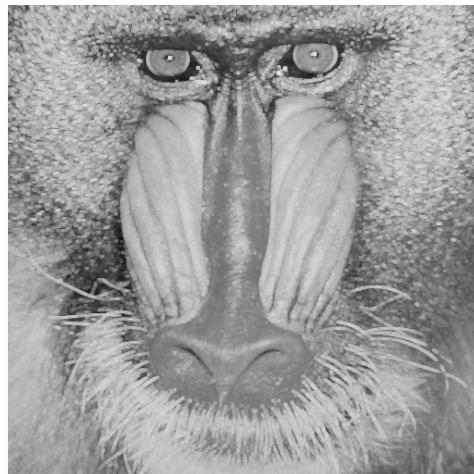


Min Filtering

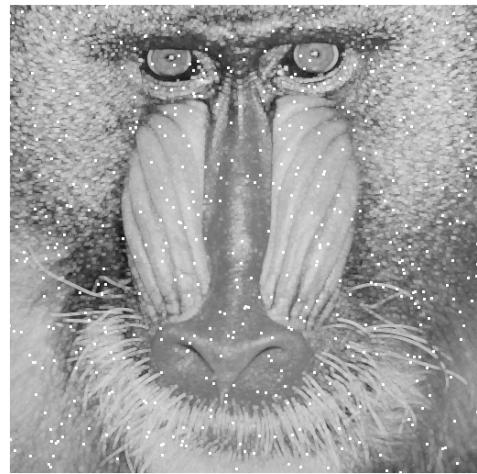


Salt-and-Pepper Noise → Min Filtering

6-2: Max Filtering

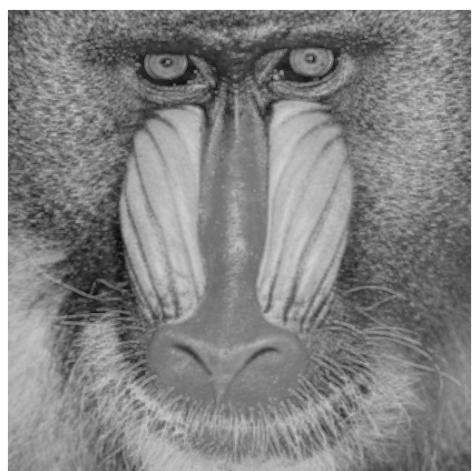


Max Filtering

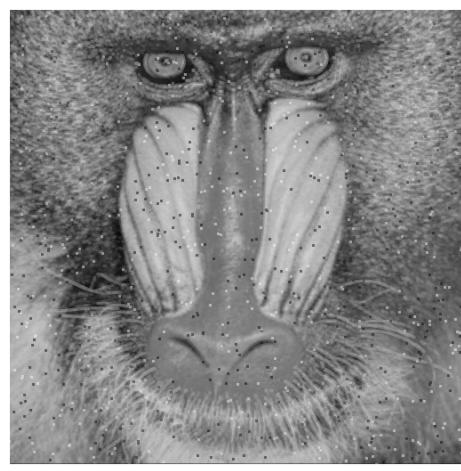


Salt-and-Pepper Noise → Max Filtering

6-3: Midpoint Filtering

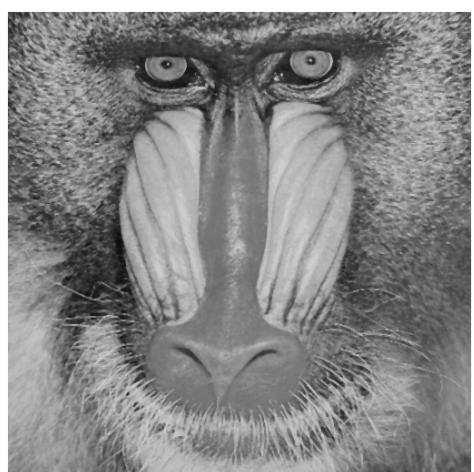


Midpoint Filtering

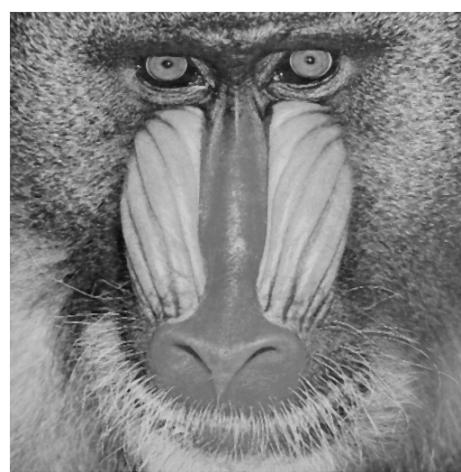


Salt-and-Pepper Noise → Midpoint Filtering

6-4 Median Filtering



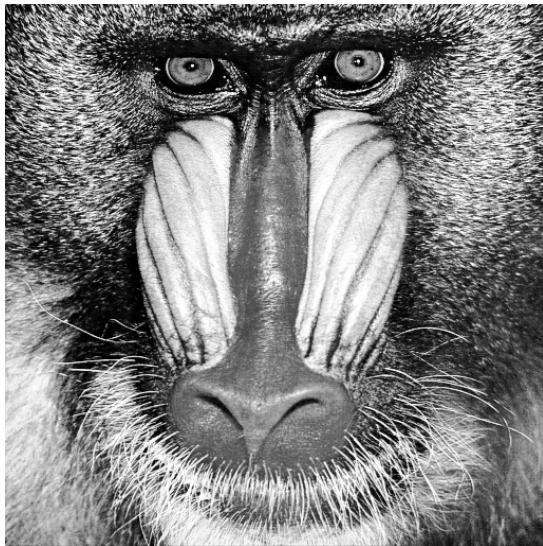
Median Filtering



Salt-and-Pepper Noise → Median Filtering

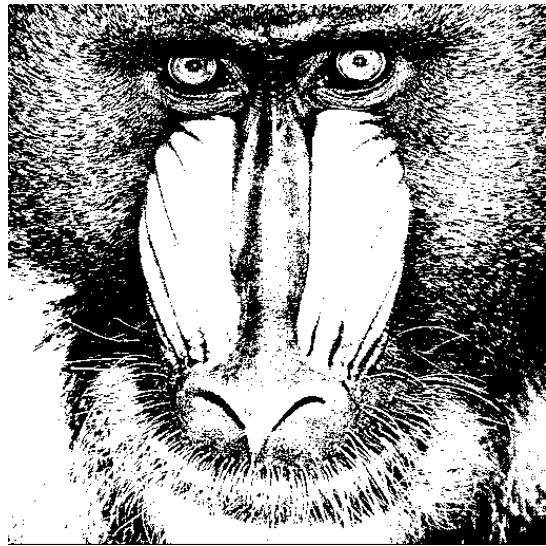
Part 2

1. Histogram equalization [10%]

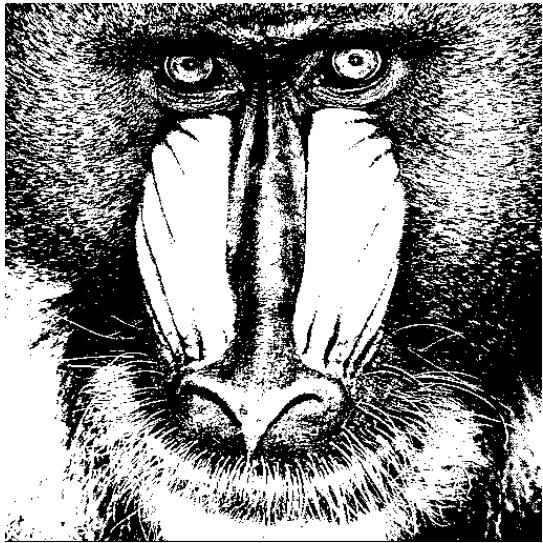


2. Thresholding [10%]

2-1: Simple Thresholding (e.g. 120)

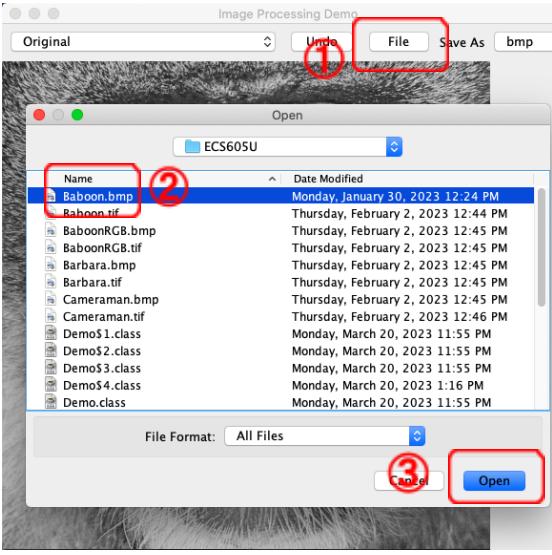
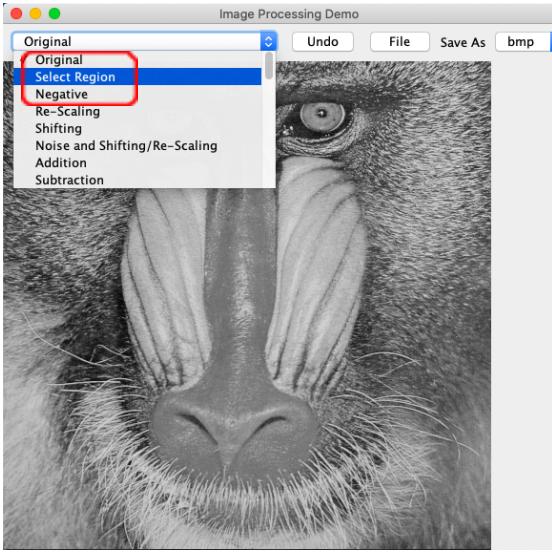
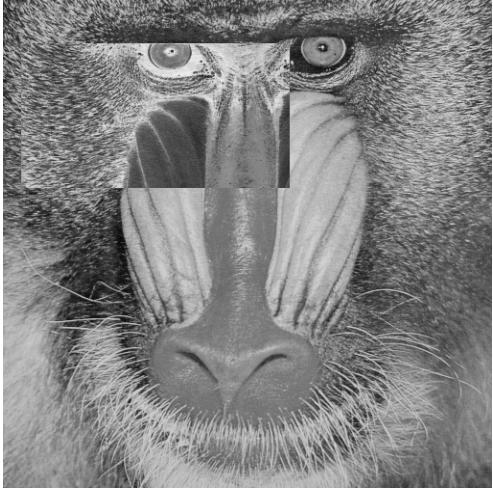


2-2: Automated Thresholding
→ threshold value = 126.89709



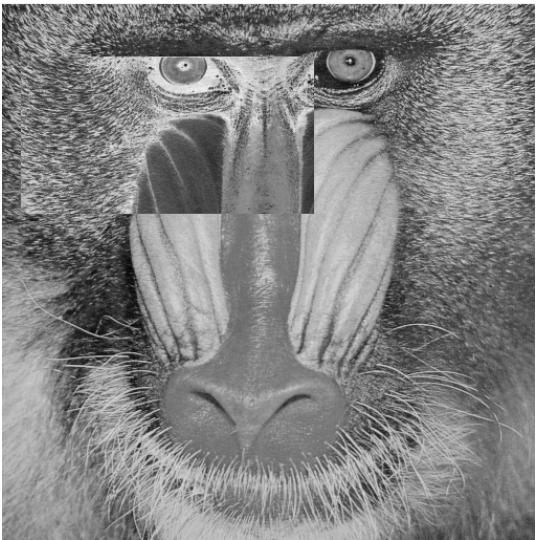
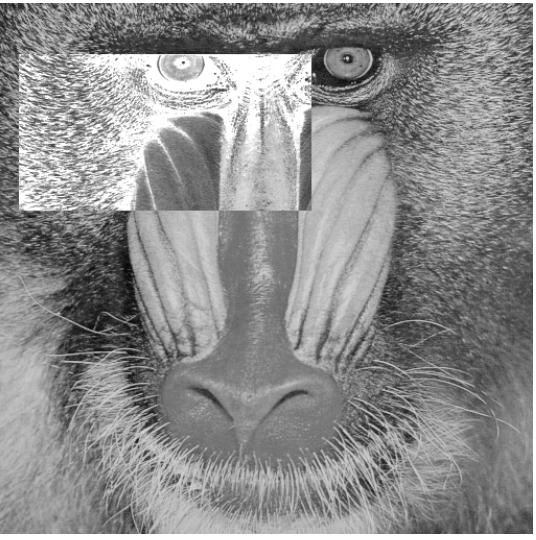
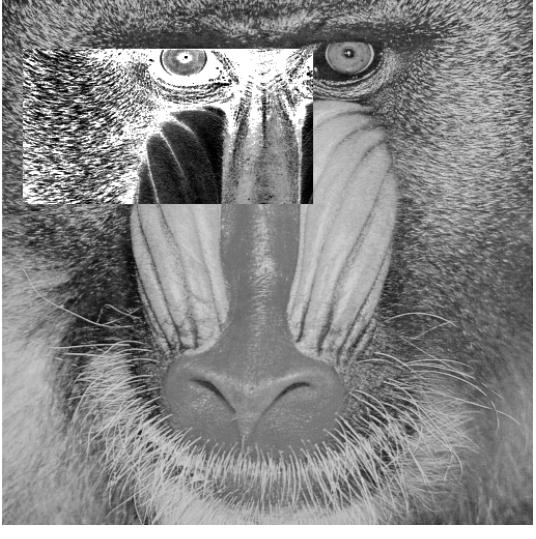
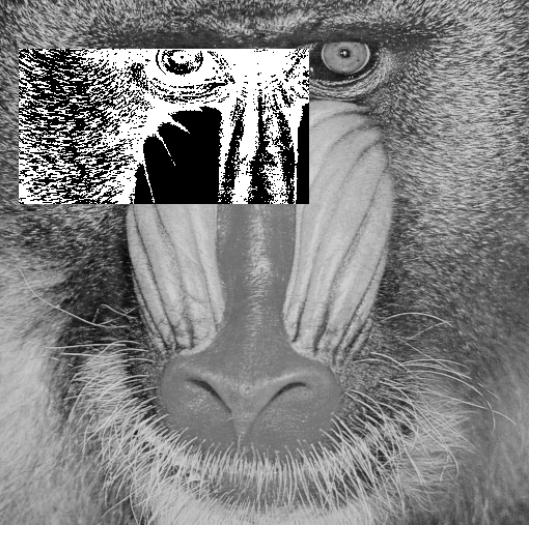
Part 3

Perform the image processing function on the ROI [10%]

Step 1	Step 2
 <p>① Click File ② Select the same image (the image displayed in the window: Baboon.bmp) from File ③ Click Open</p>	 <p>① Click Select Region from the operation menu</p>
<pre>Enter x coordinate of the top-left corner: 20 Enter y coordinate of the top-left corner: 50 Enter width of the region: 300 Enter height of the region: 200</pre>	 <p>Selected Negative from the operation menu</p>

Part 4

Perform a combination of image processing functions on the ROI [10%]

Negative	+ Re-Scaling (1.5)
	
+ Histogram Equalization	+ Automated Thresholding
	

Undo Button

Video:

https://drive.google.com/file/d/1KaMdNvyZGTjDGJBiwNGFd8odY8EVty4/view?usp=share_link

Original image	Apply Negative operation	Click Undo button
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