INTRODUCTION
TO
IMAGE PROCESSING

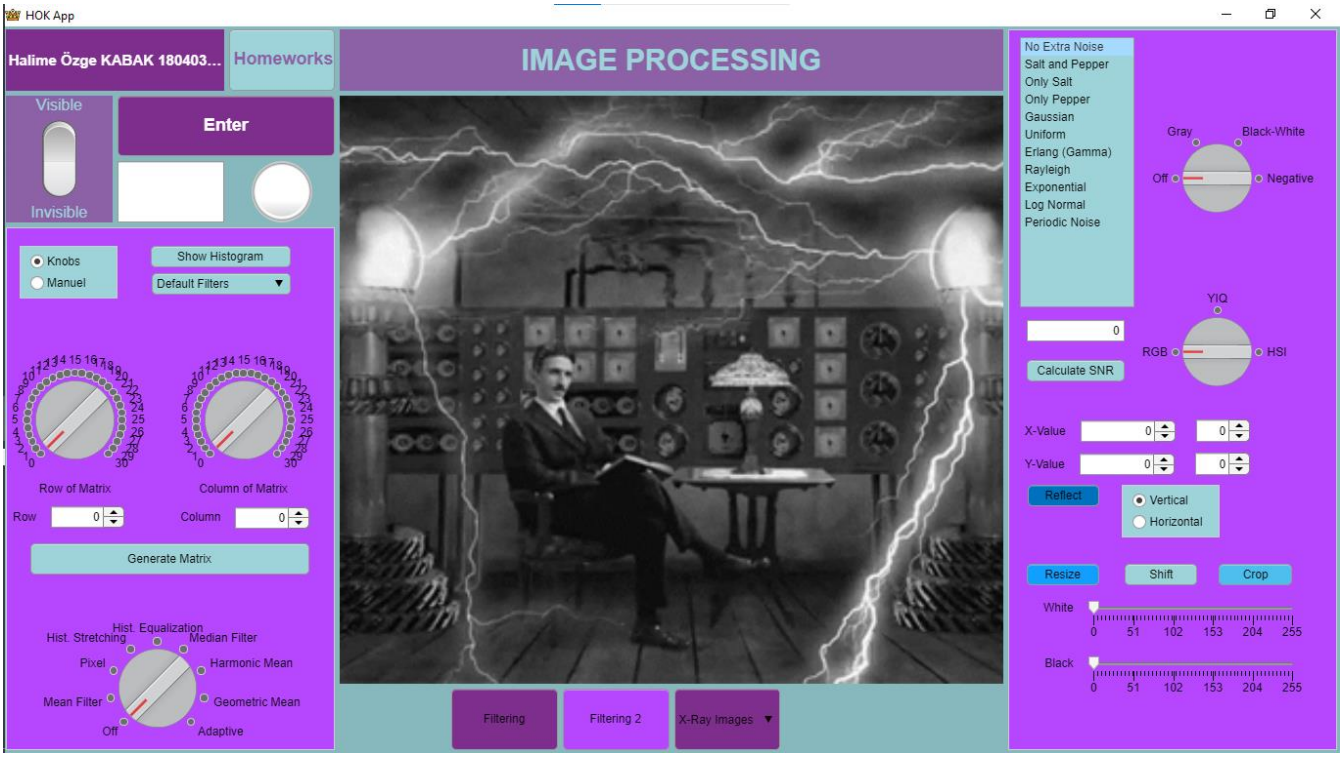
EEE410

HOMEWORK 3

HALİME ÖZGE KABAK
180403001

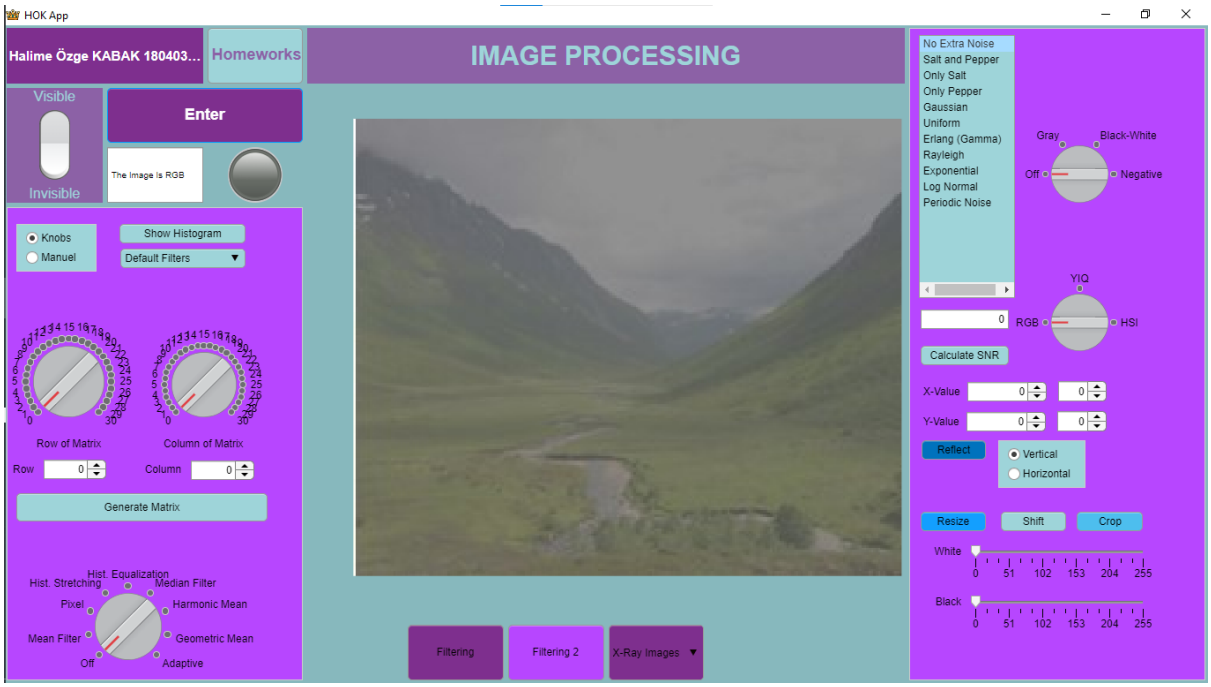
♦ MATLAB

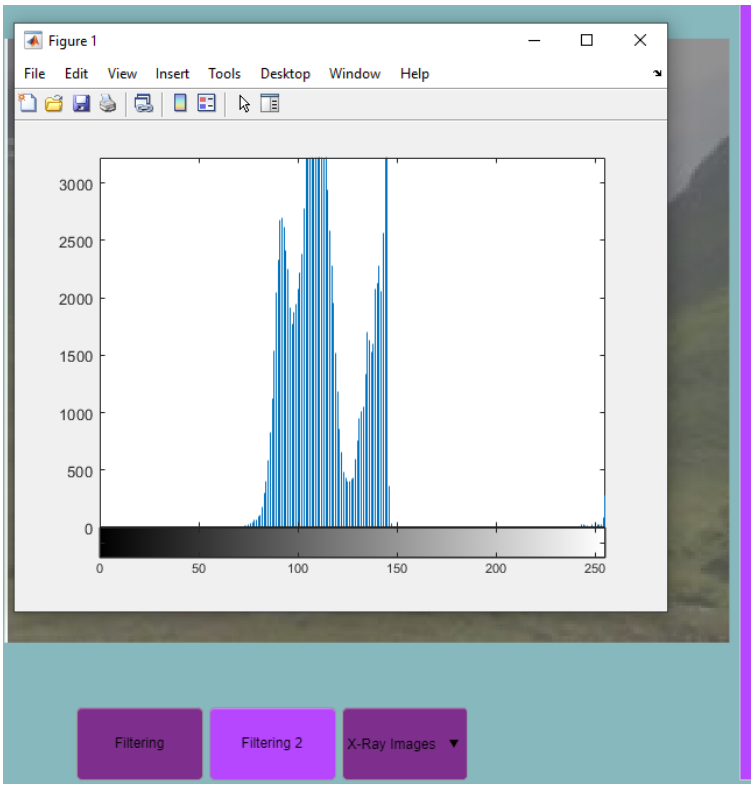
❖ This is my graphical user interface in MATLAB.



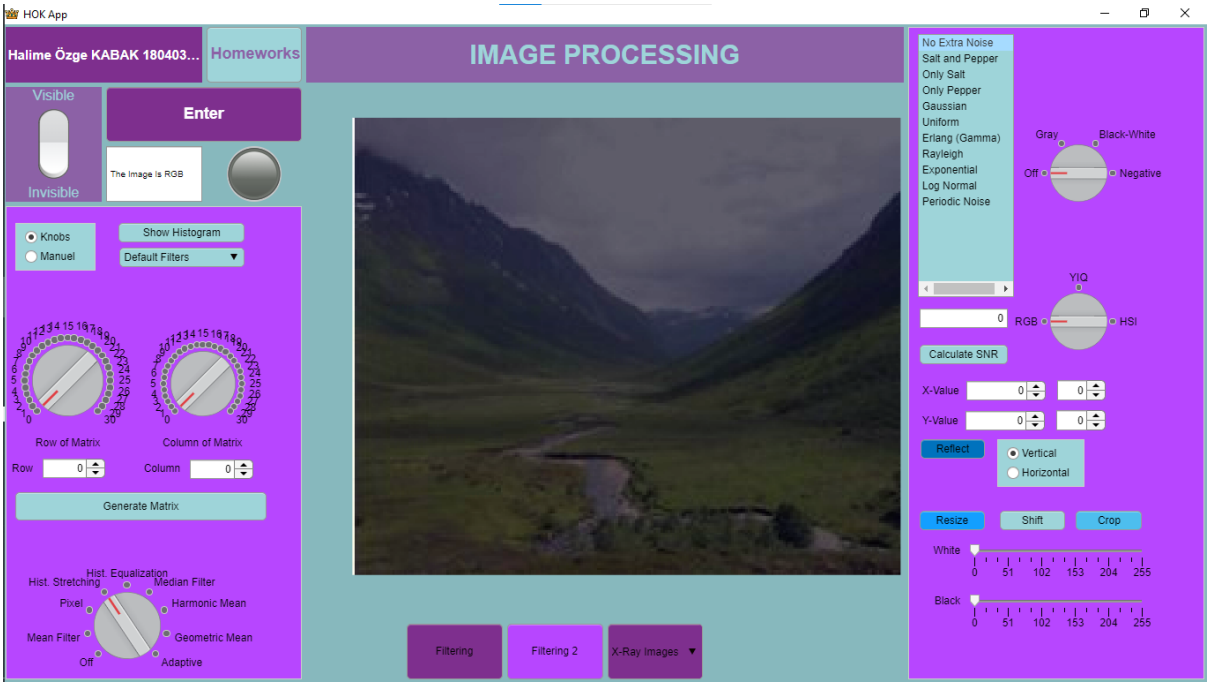
❖ In order to apply histogram stretching to the first picture in this assignment, I added histogram stretching feature to the knob where the filters are located. In addition, when the button I added is pressed, the histogram graph of the picture appears. These operations can be done for both RGB and gray images.

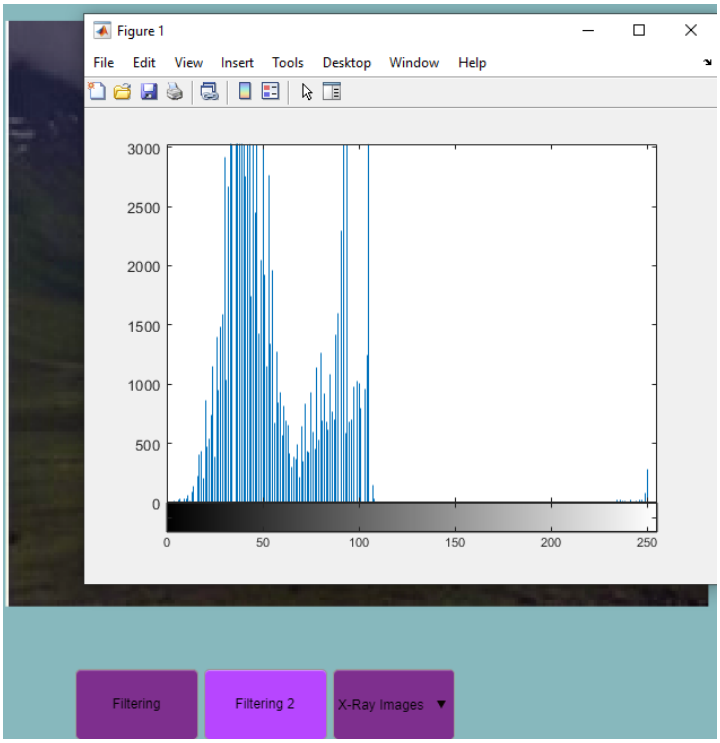
➢ **Initial Image and Histogram of the Image**





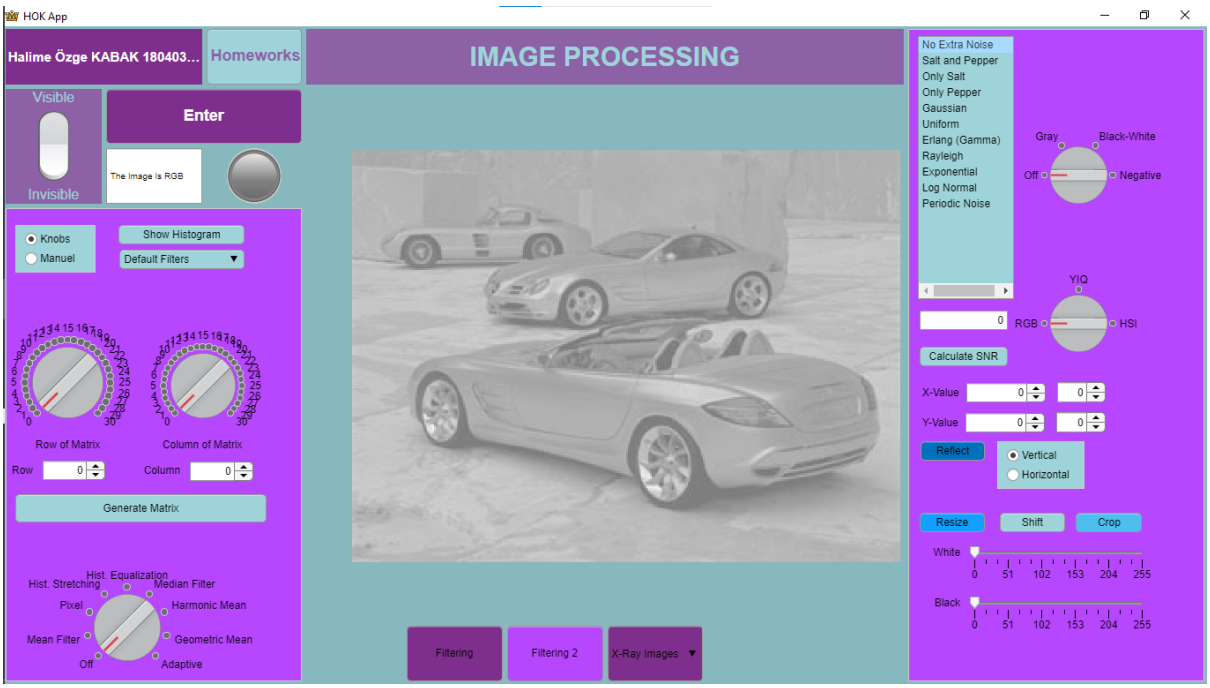
➢ After Histogram Stretching





- In order to apply histogram equalization to the pictures in this assignment, I added histogram equalization feature to the knob where the filters are located. These operations can be done for both RGB and gray images.

➢ Initial Images and Their Histogram Graphs



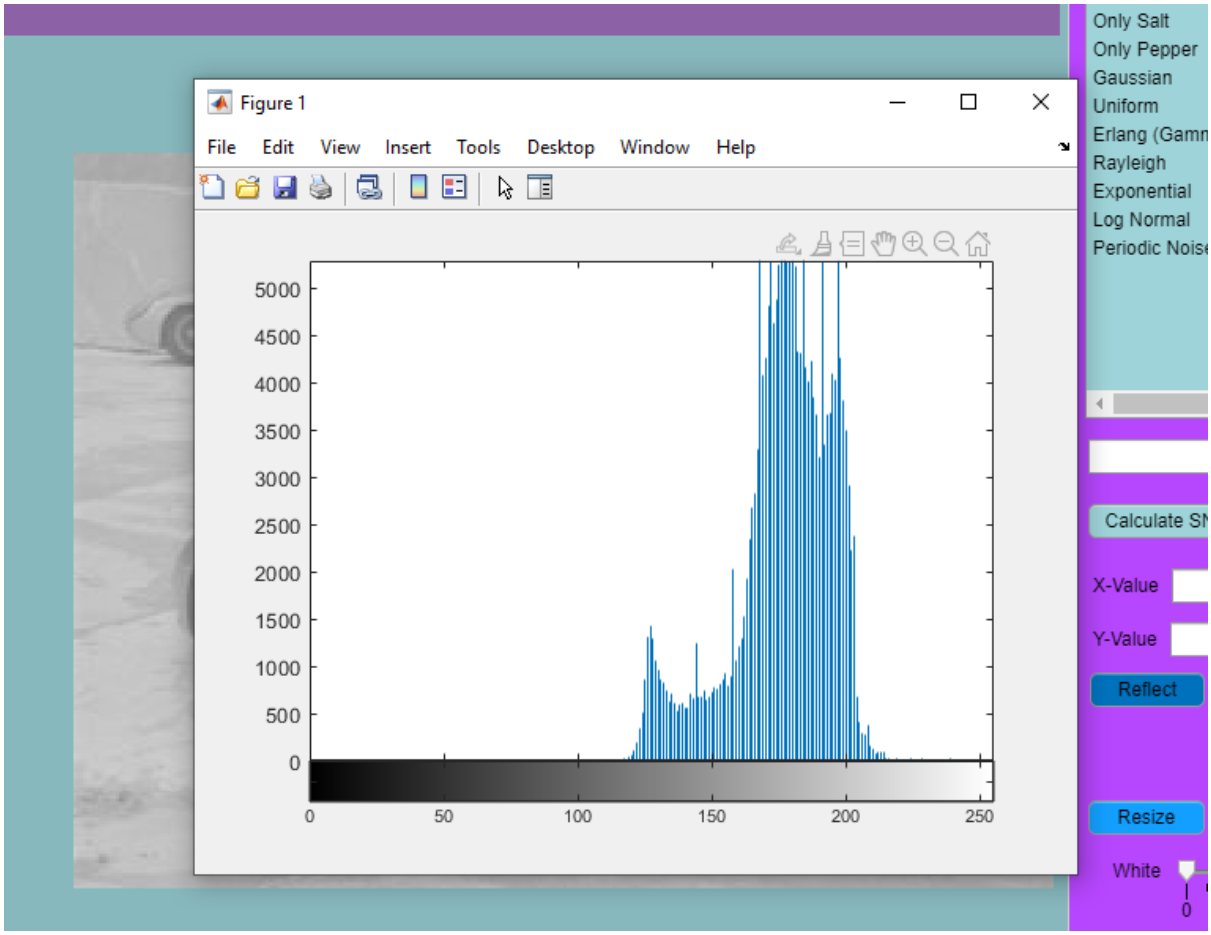
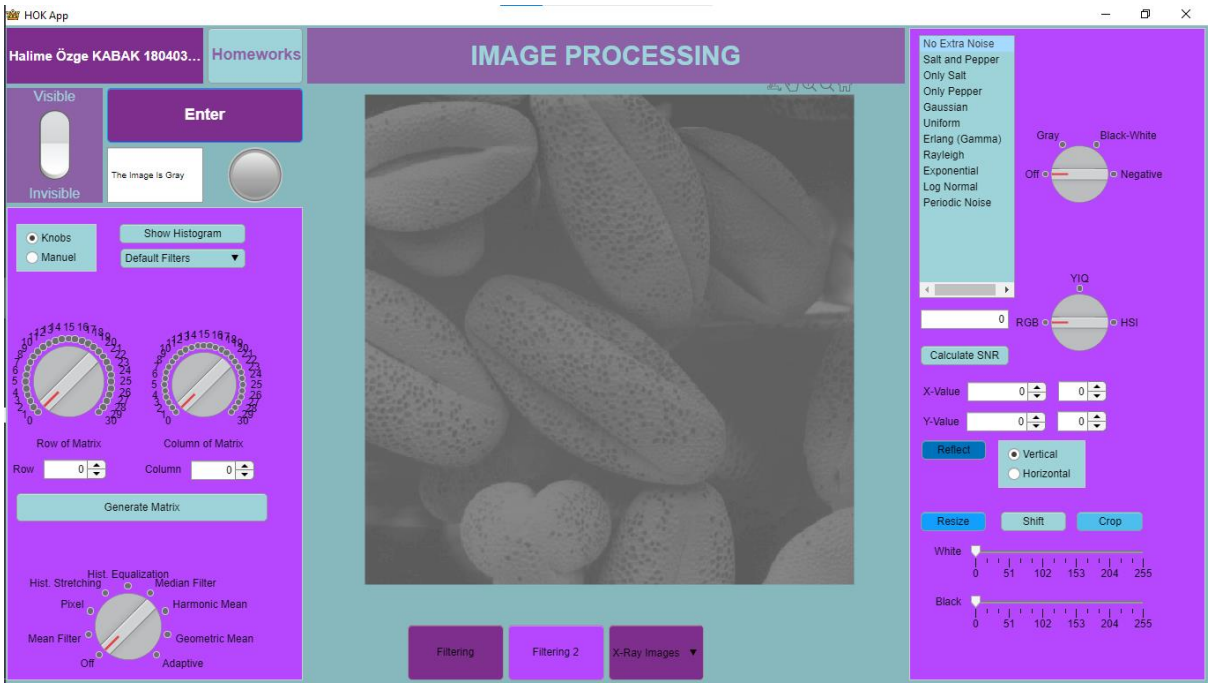


Figure 1
File Edit View Insert Tools Desktop Window Help
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
0 50 100 150 200 250
Only Salt
Only Pepper
Gaussian
Uniform
Erlang (Gamn
Rayleigh
Exponential
Log Normal
Periodic Nois
Calculate SN
X-Value
Y-Value
Reflect
Resize
White
0


HOK App
Halime Özge KABAK 180403...
Homeworks
IMAGE PROCESSING
Visible
Invisible
Enter
The Image is Gray
Knobs
Manuel
Show Histogram
Default Filters
Row of Matrix
Column of Matrix
Row
Column
Generate Matrix
Hist. Stretching
Hist. Equalization
Median Filter
Pixel
Harmonic Mean
Mean Filter
Geometric Mean
Off
Adaptive
Filtering
Filtering 2
X-Ray Images
No Extra Noise
Salt and Pepper
Only Salt
Only Pepper
Gaussian
Uniform
Erlang (Gamma)
Rayleigh
Exponential
Log Normal
Periodic Noise
Gray
Black-White
Off
Negative
YIQ
RGB
HSI
Calculate SNR
X-Value
Y-Value
Reflect
Vertical
Horizontal
Resize
Shift
Crop
White
Black
0 51 102 153 204 255

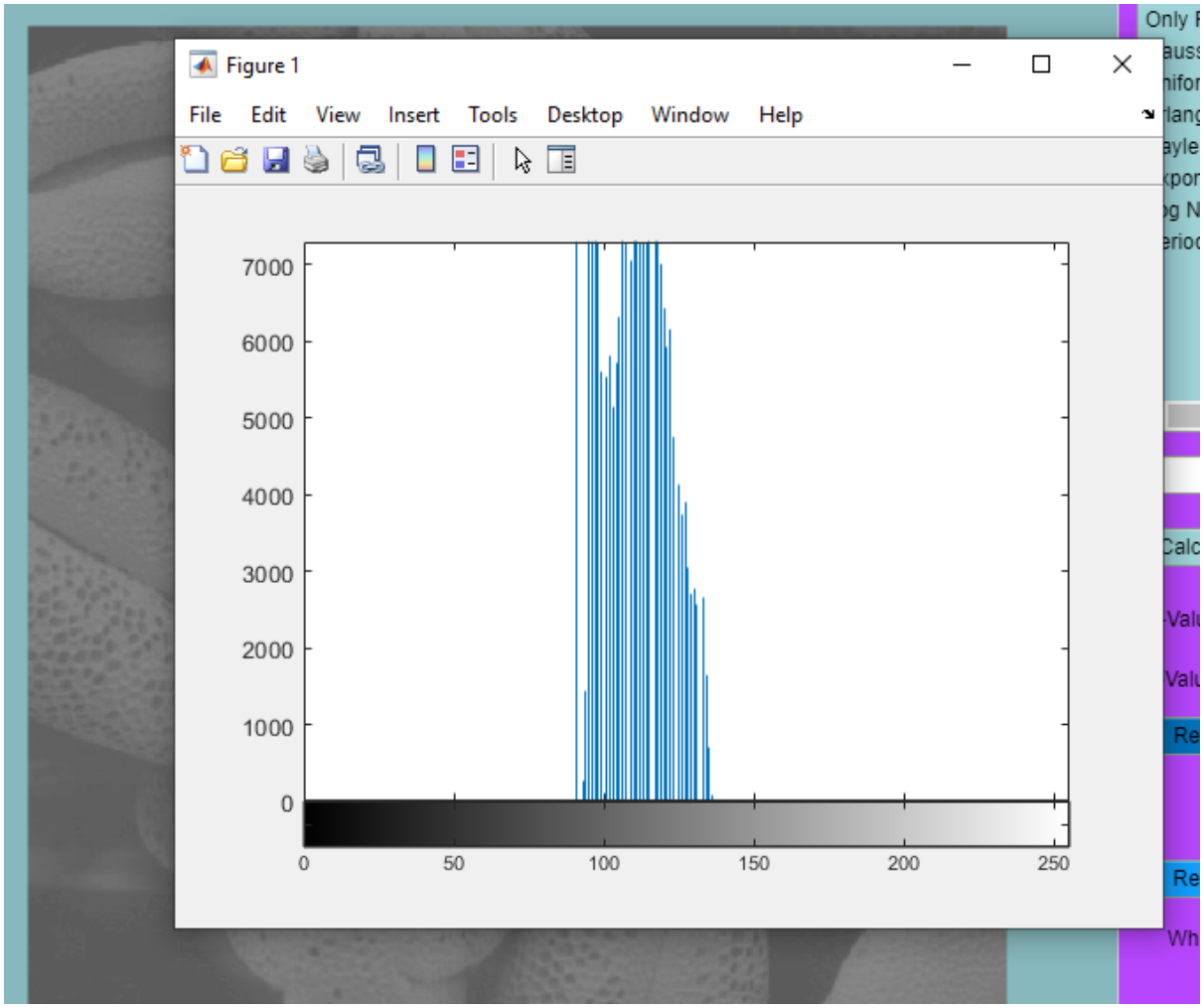


Figure 1
File Edit View Insert Tools Desktop Window Help
7000
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3000
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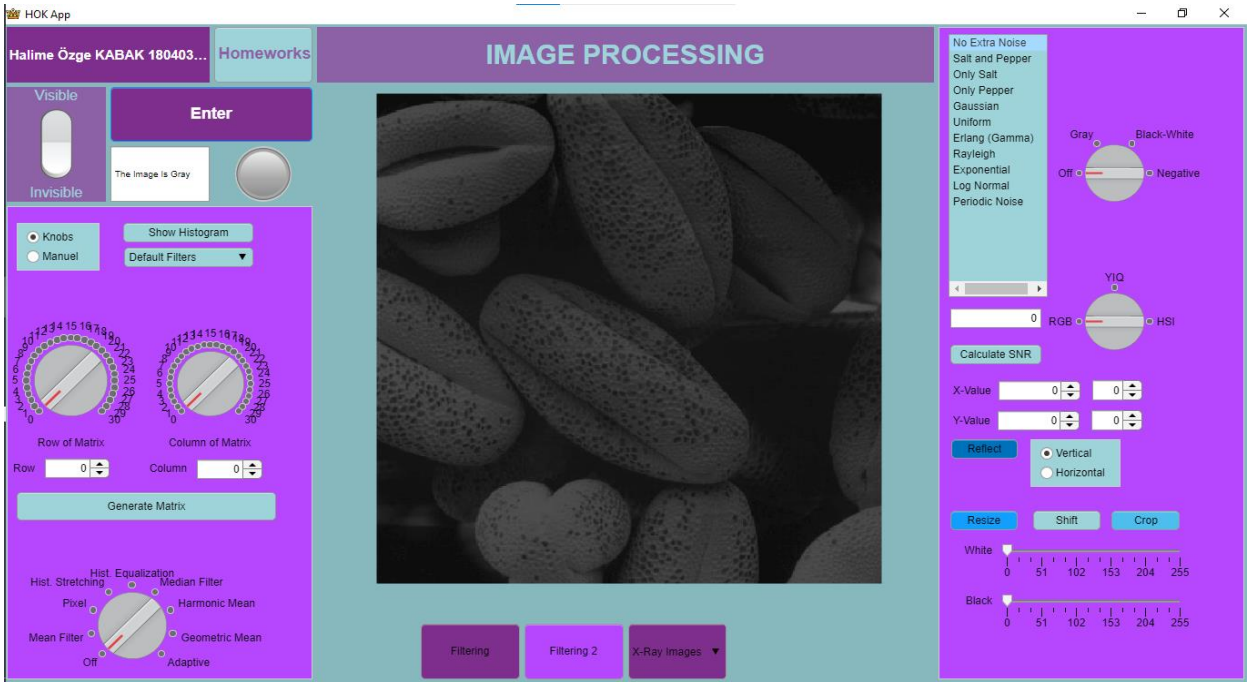
0 50 100 150 200 250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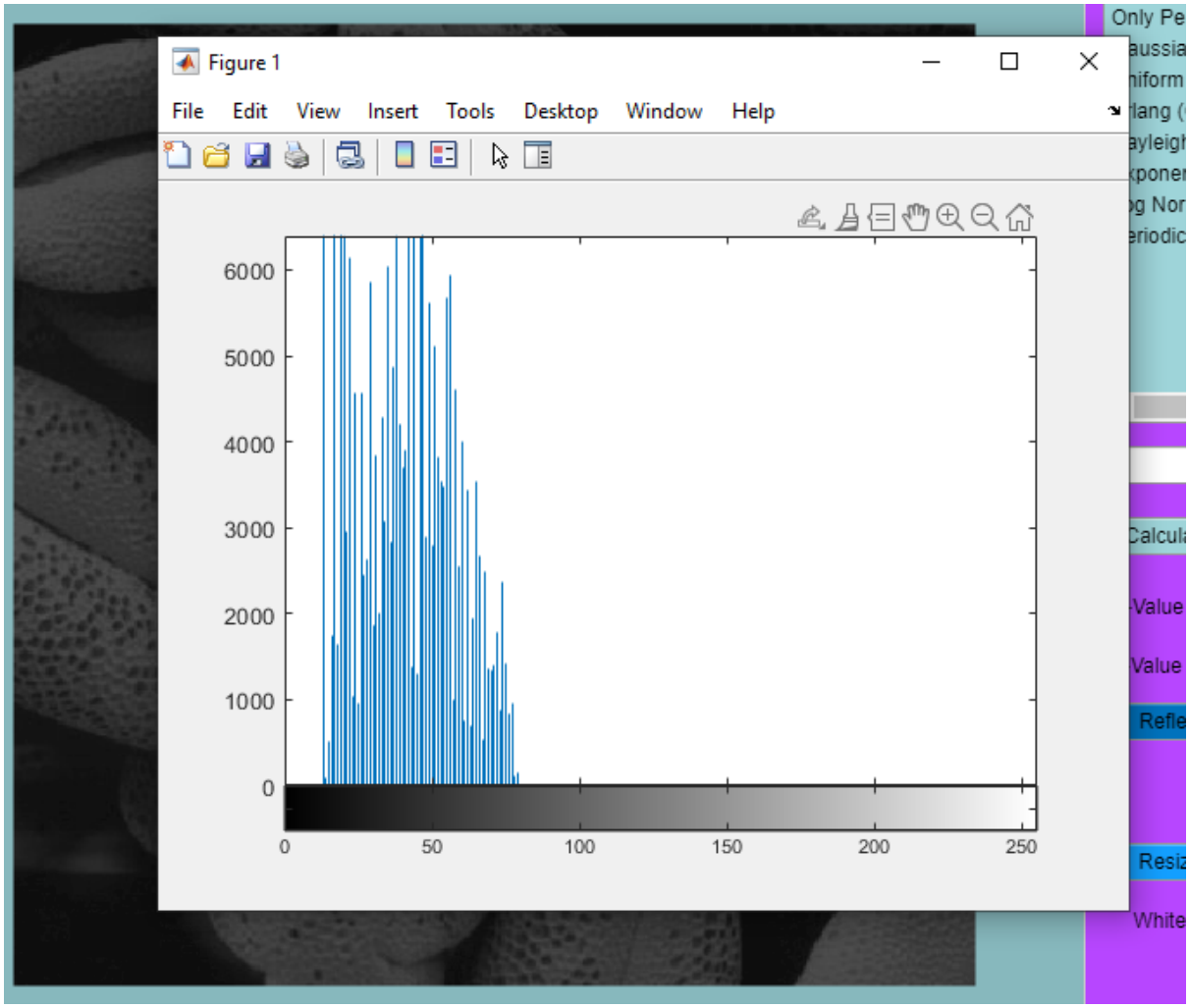
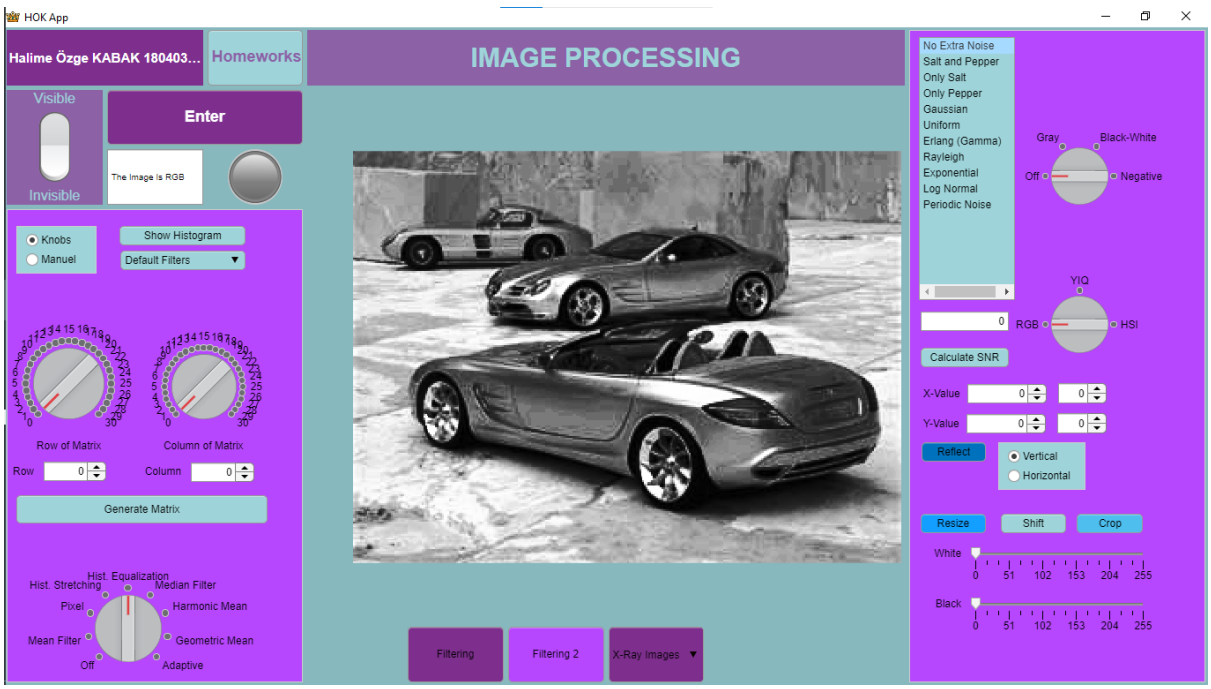
Y-Value
Reflect
Vertical
Horizontal
Resize
Shift
Crop
White
Black
0 51 102 153 204 255



➢ **After Histogram Equalization**



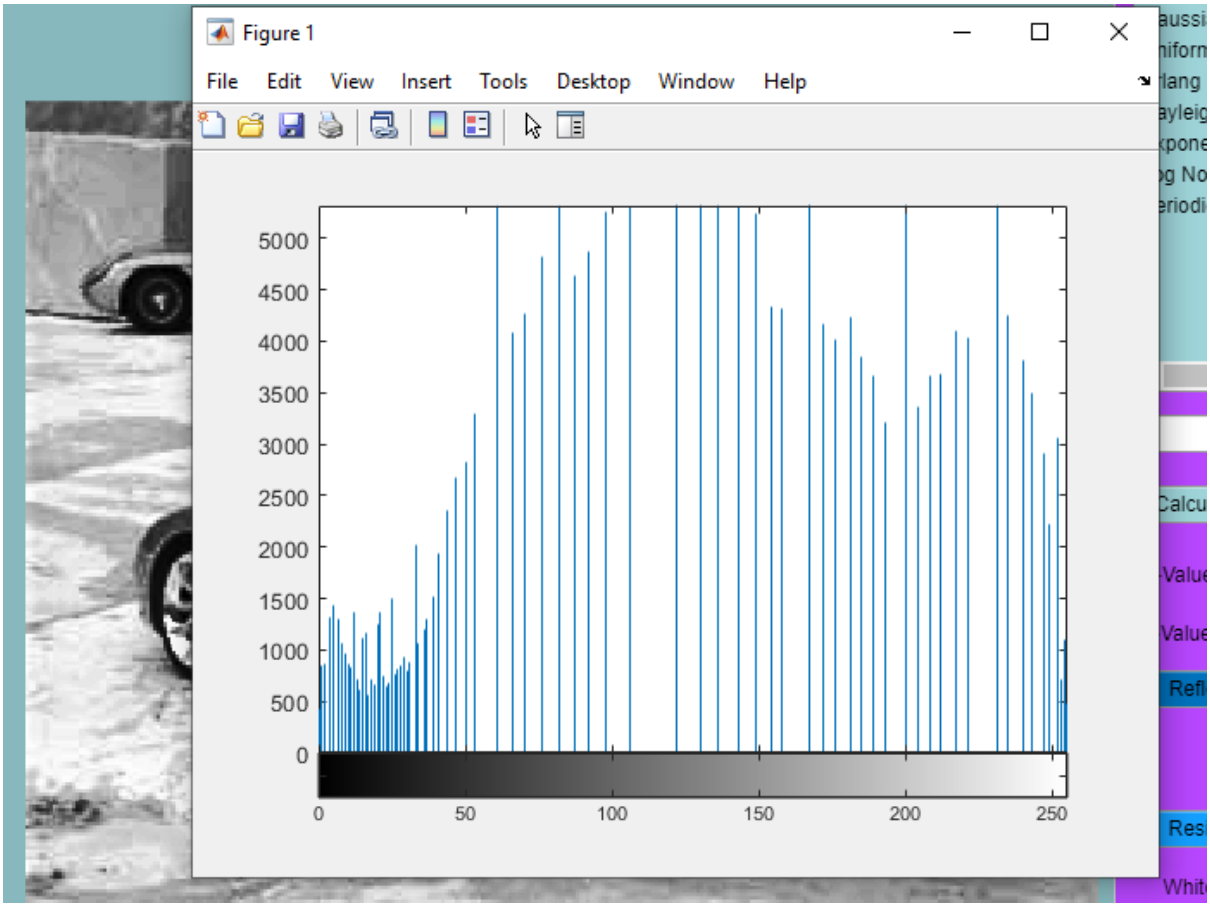


Figure 1
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5000
4500
4000
3500
3000
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1000
500
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0 50 100 150 200 250

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Mean Filter
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HSI
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X-Value
Y-Value
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Horizontal
Resize
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Crop
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Black
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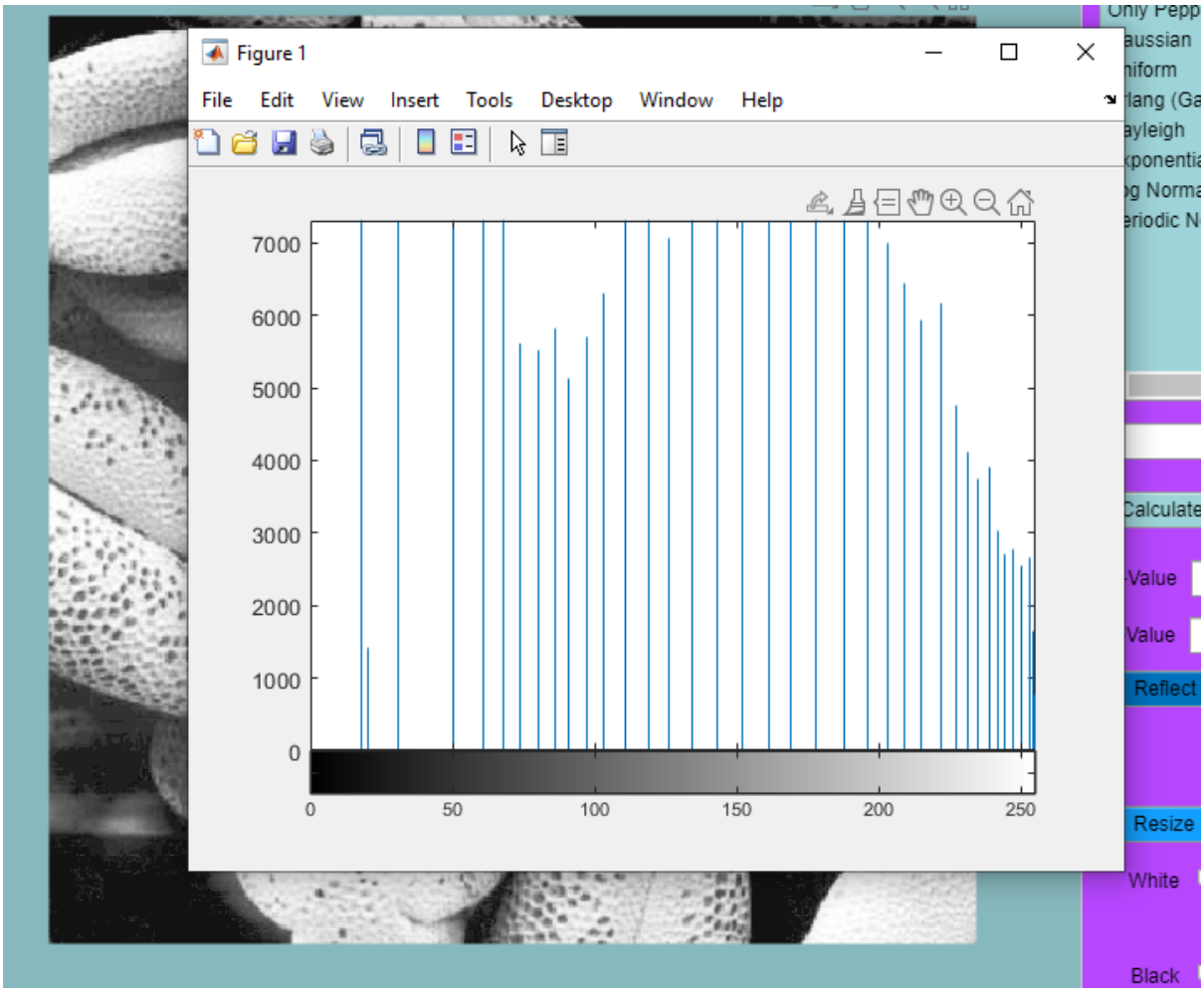
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5000
4000
3000
2000
1000
0
0 50 100 150 200 250
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Value
Value
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RGB
HSI
Calculate SNR
X-Value
Y-Value
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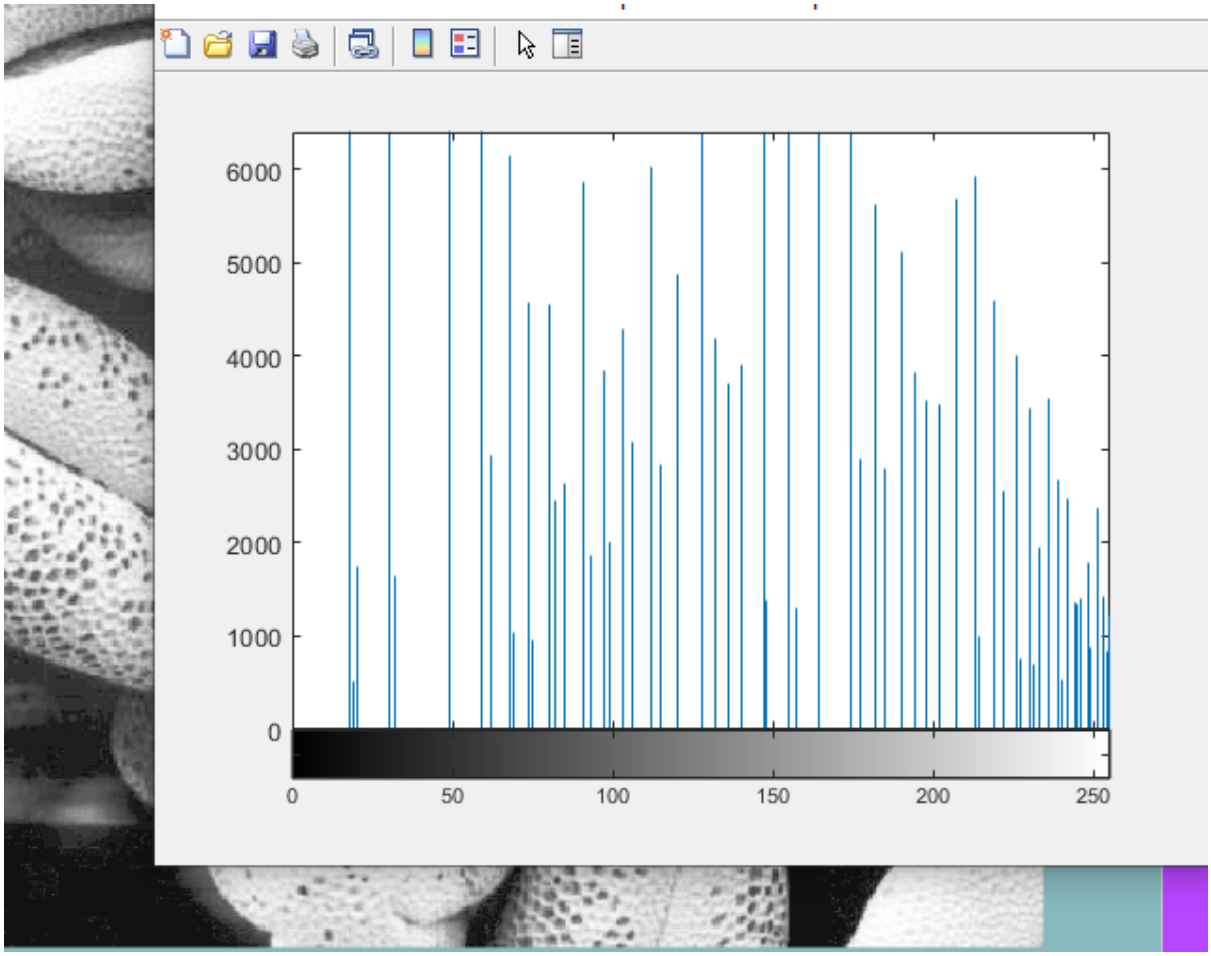
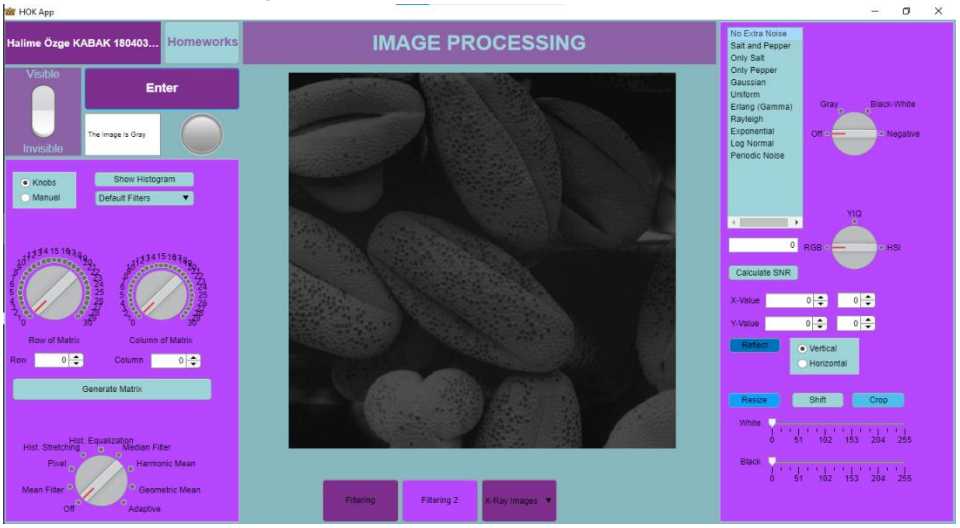
Vertical
Horizontal
Resize
Shift
Crop
White
Black
0 51 102 153 204 255

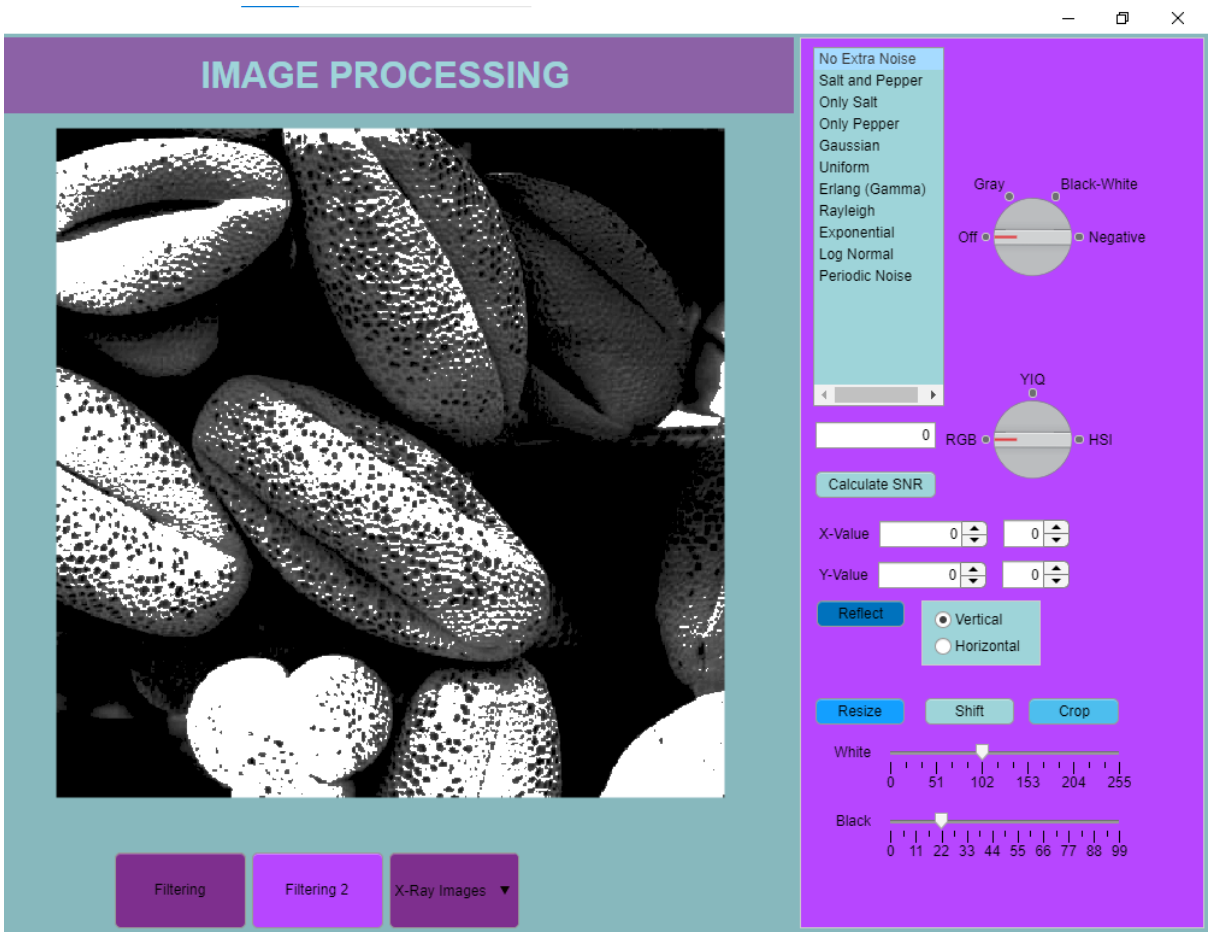


- In the last step, the black and white ratio of the given pictures had to be changed according to the user's request. I added 2 sliders to achieve this. The white slider can be set to any value between 0 and 255, but the black slider must always be 3 lower than the white slider. Therefore, the maximum value of the black slider changes when the white slider is moved. For example, if the value of 100 is selected with the white slider, the user will be able to select a maximum of 97 with the black slider.

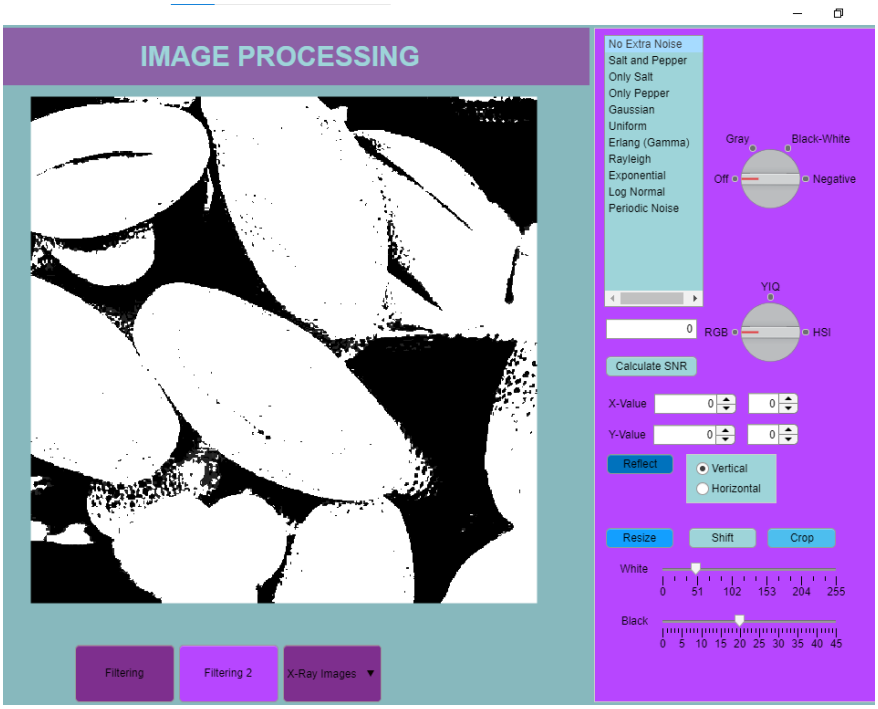
➢ Initial Image

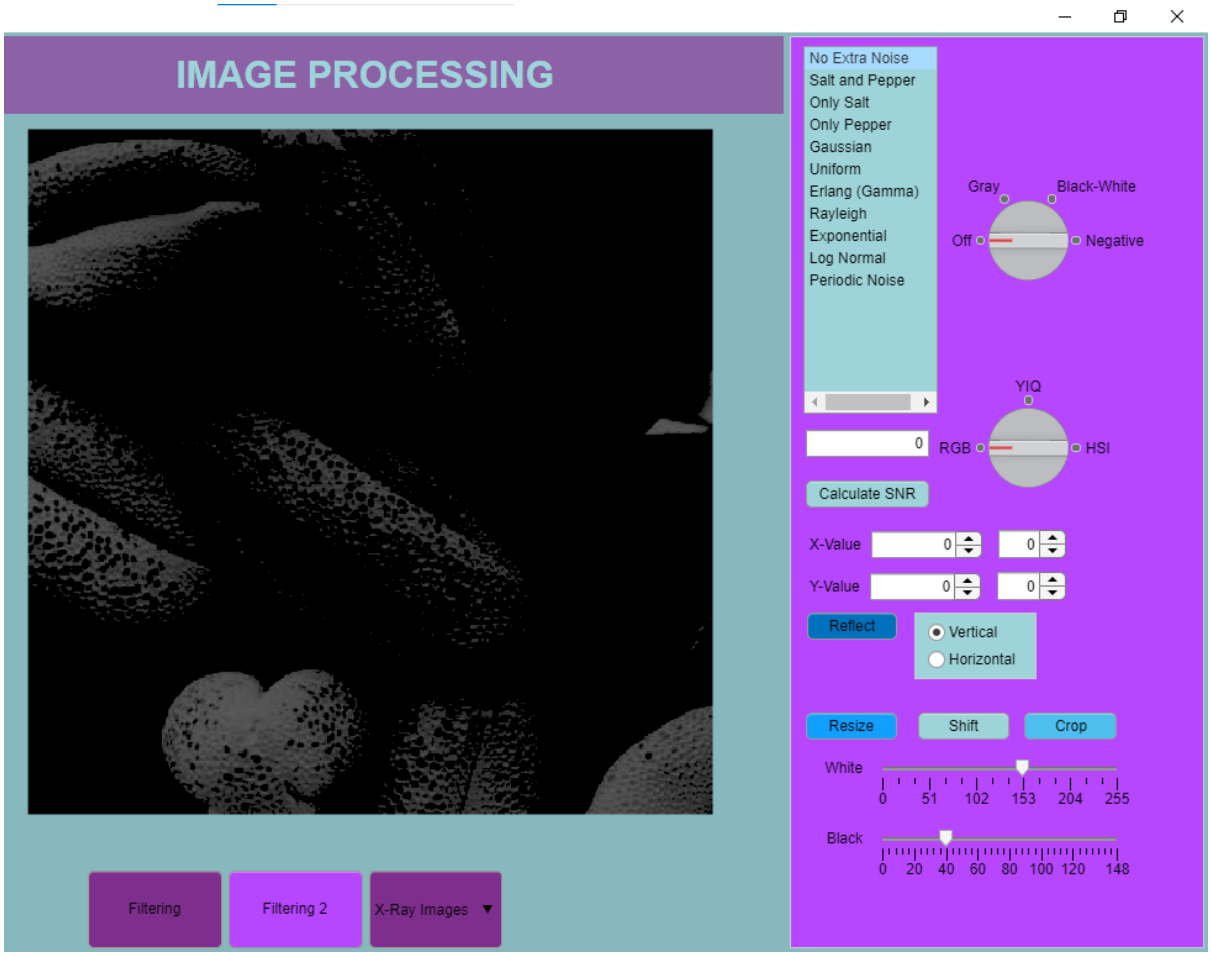


- **Black Value=22, White Value=102**



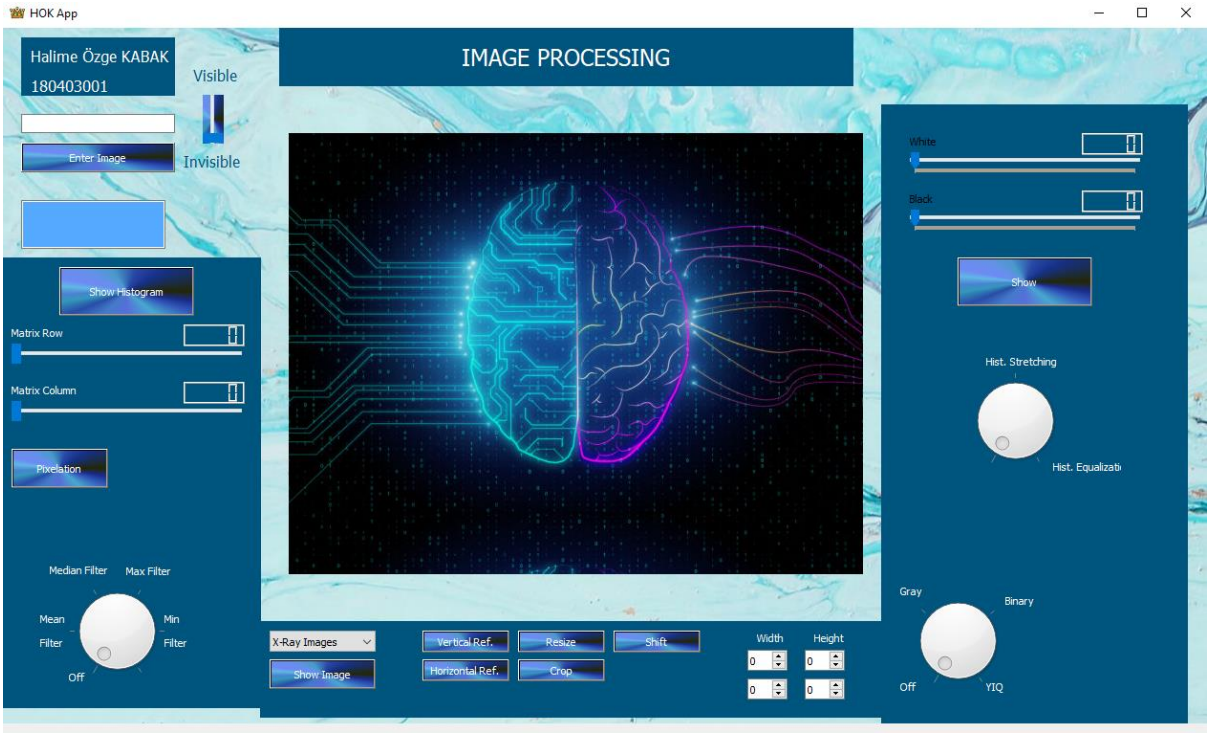
- **Black Value=20, White Value=51**





♦ PyQT

❖ This is my graphical user interface in PyQT.



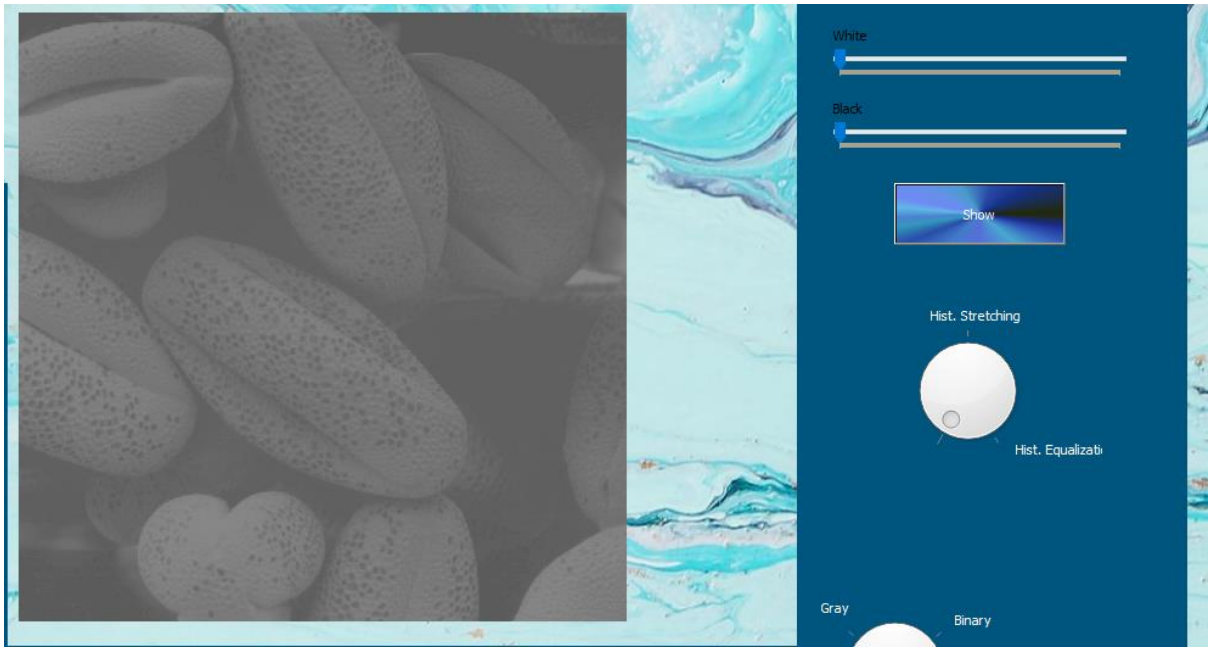
❖ In order to apply histogram stretching to the first picture in this assignment, I added a dial for histogram stretching feature. These operations can be done for both RGB and gray images.

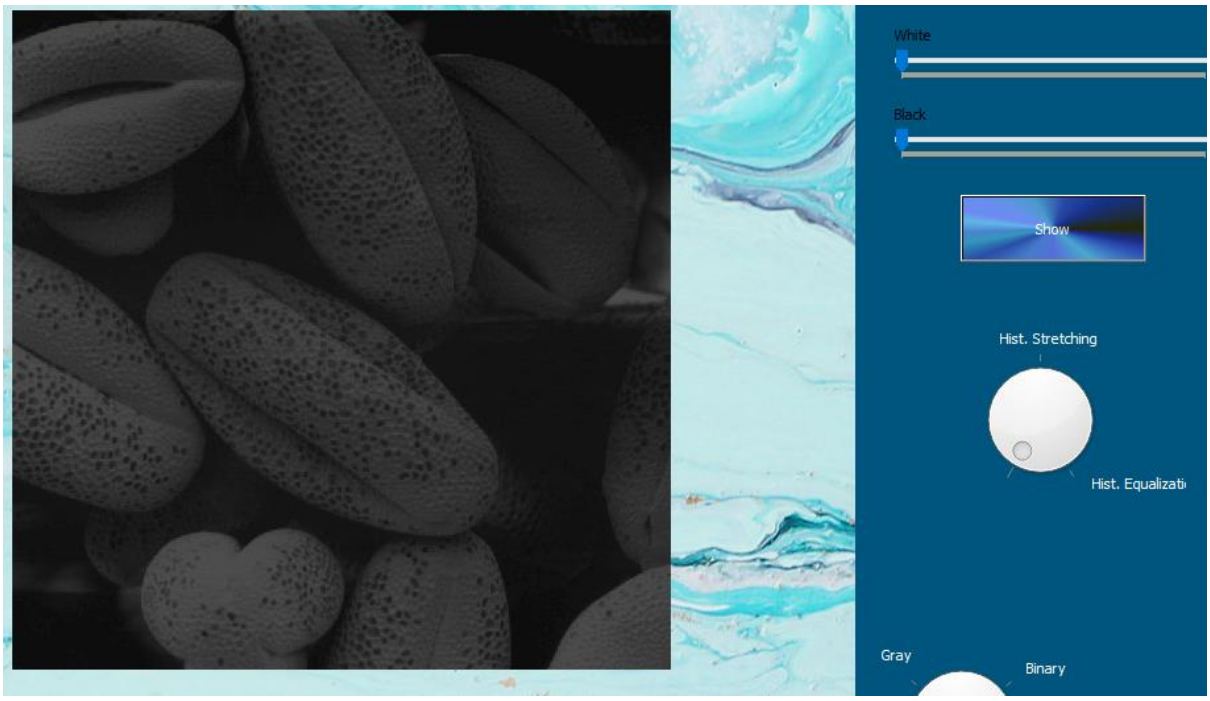
➢ Initial Image

➢ After Histogram Stretching

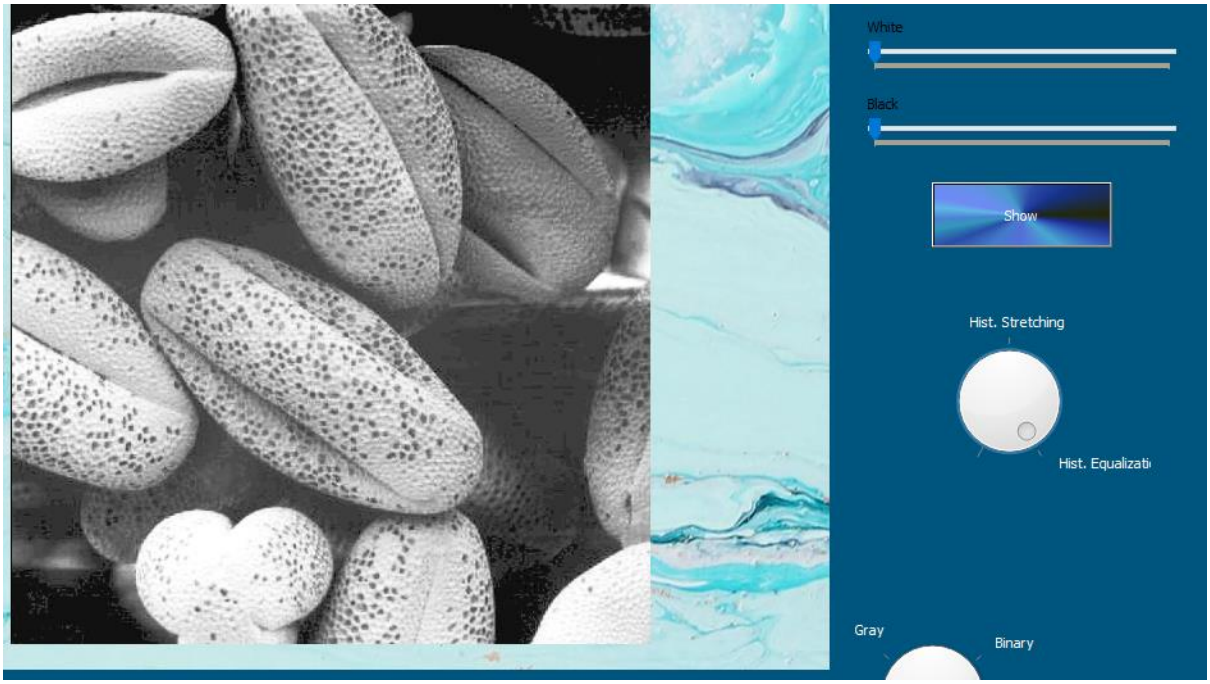
❖ In order to apply histogram equalization to the pictures in this assignment, I added a histogram equalization feature to the dial of histogram stretching feature. These operations can be done for both RGB and gray images.

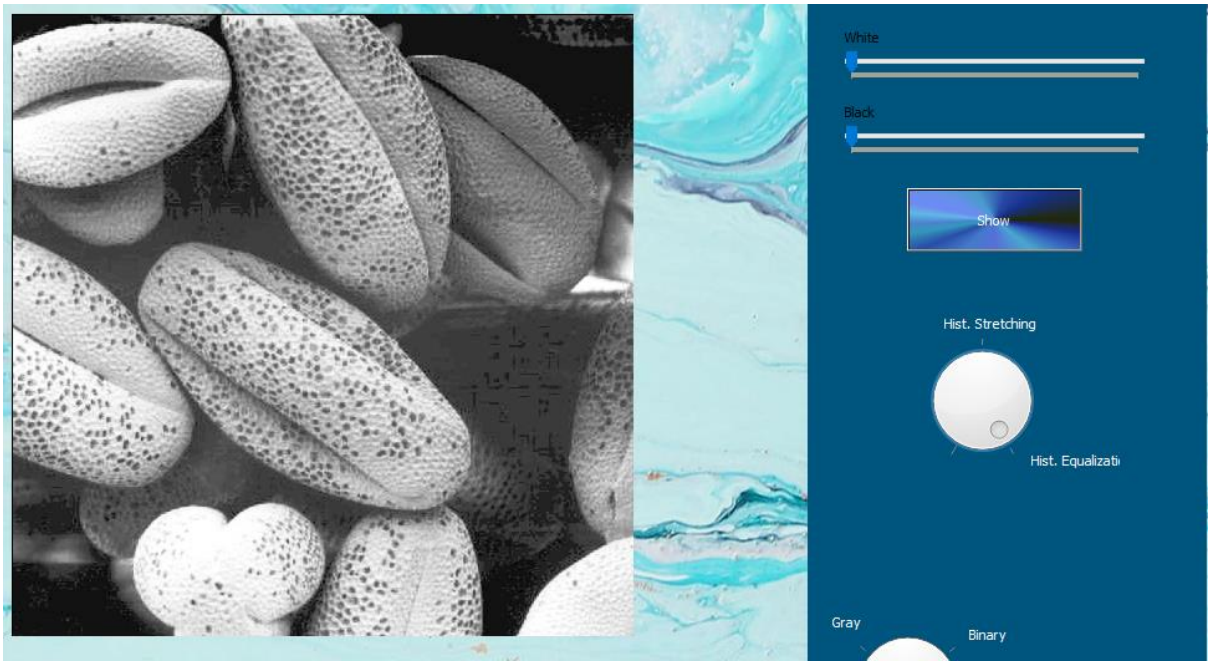
➢ Initial Images


White
Black
Show
Hist. Stretching
Hist. Equalizati
Gray
Binary


White
Black
Show
Hist. Stretching
Hist. Equalizati
Gray
Binary

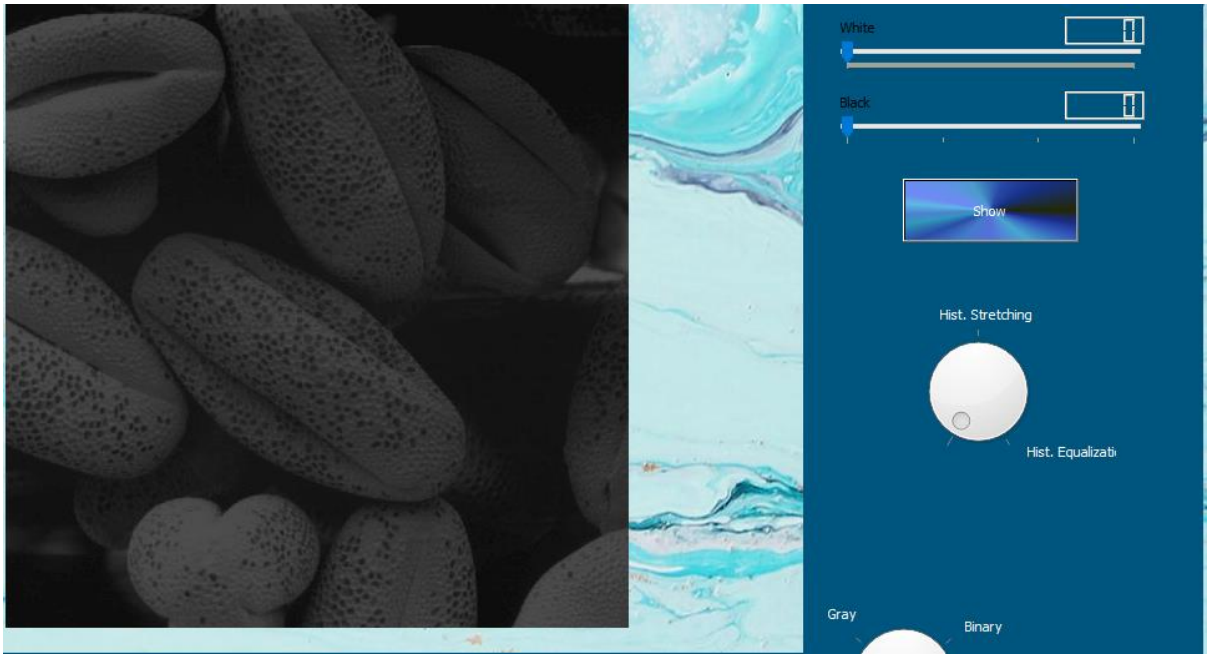
➢ After Histogram Equalization



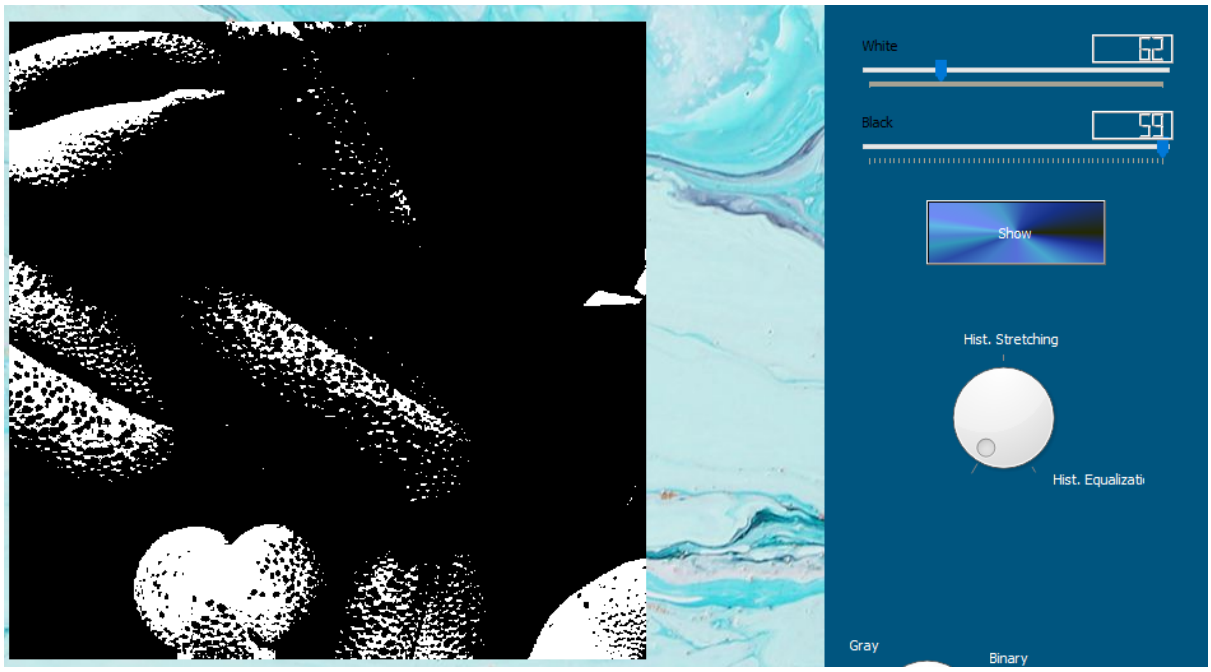
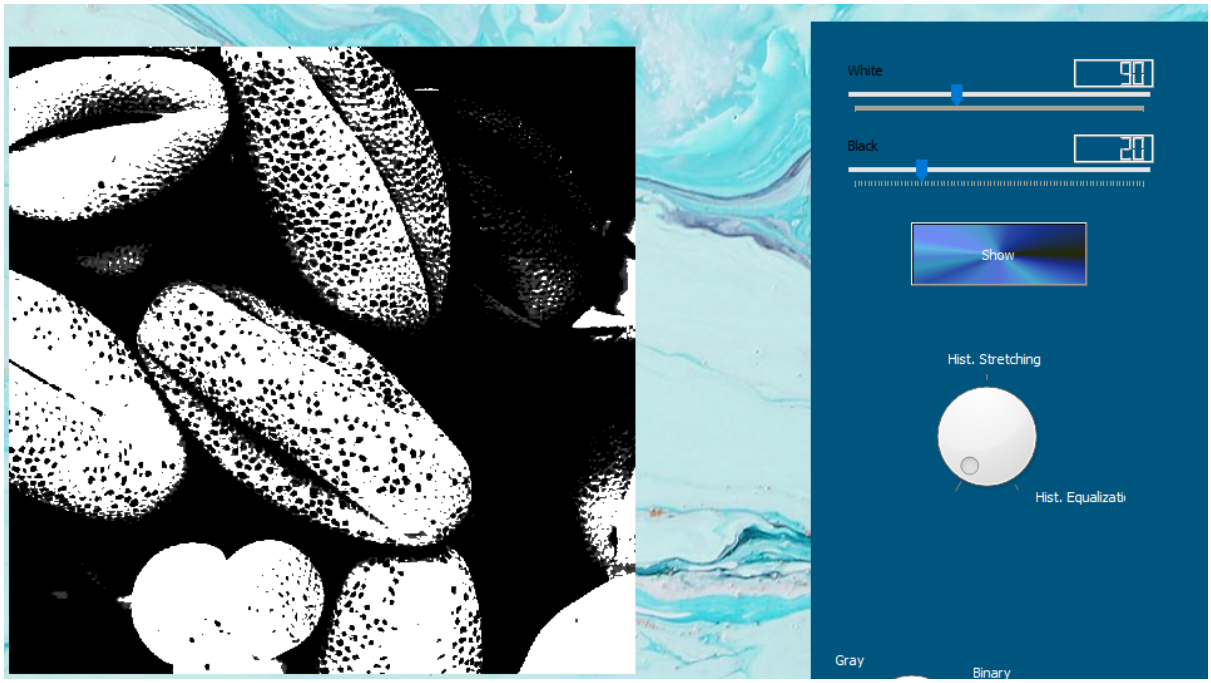


- In the last step, the black and white ratio of the given pictures had to be changed according to the user's request. I added 2 sliders to achieve this. The white slider can be set to any value between 0 and 255, but the black slider must always be 3 lower than the white slider. Therefore, the maximum value of the black slider changes when the white slider is moved. For example, if the value of 100 is selected with the white slider, the user will be able to select a maximum of 97 with the black slider.

➢ Initial Image



➢ Black Value=59, White Value=62



- **Black Value=20, White Value=90**