Implementation of Morphological Operations on GrayScale Images and comparison with their built-in functions
Group Number: 2

Team Members:

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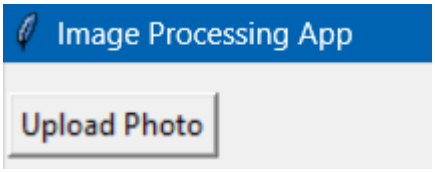
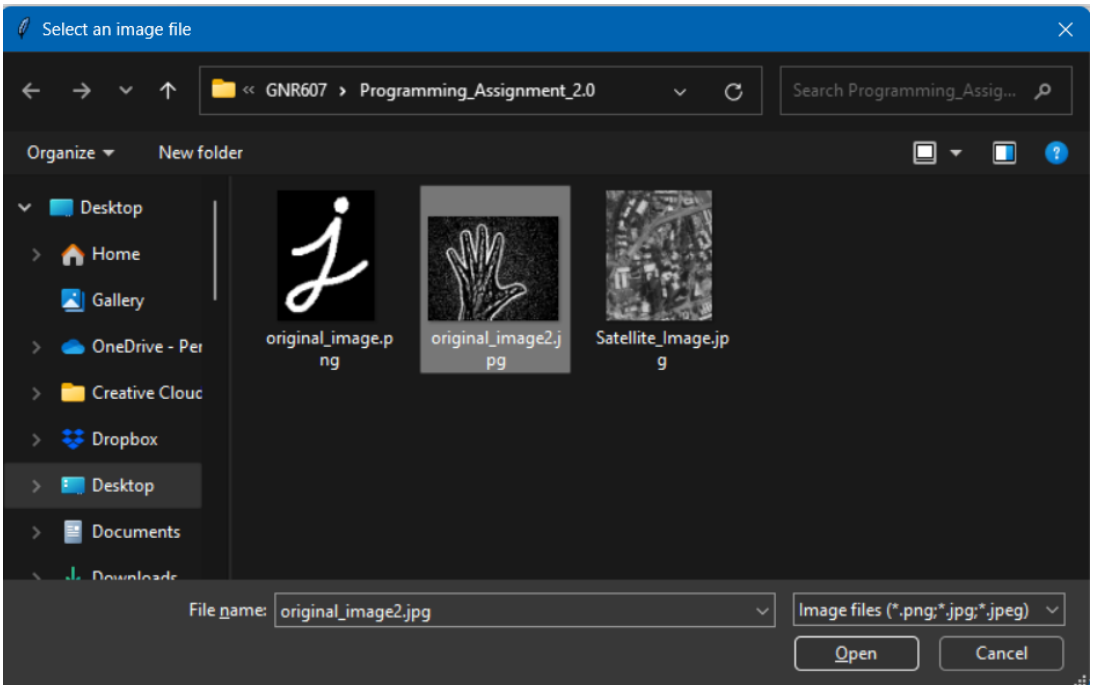
Steps to execute to get the image:

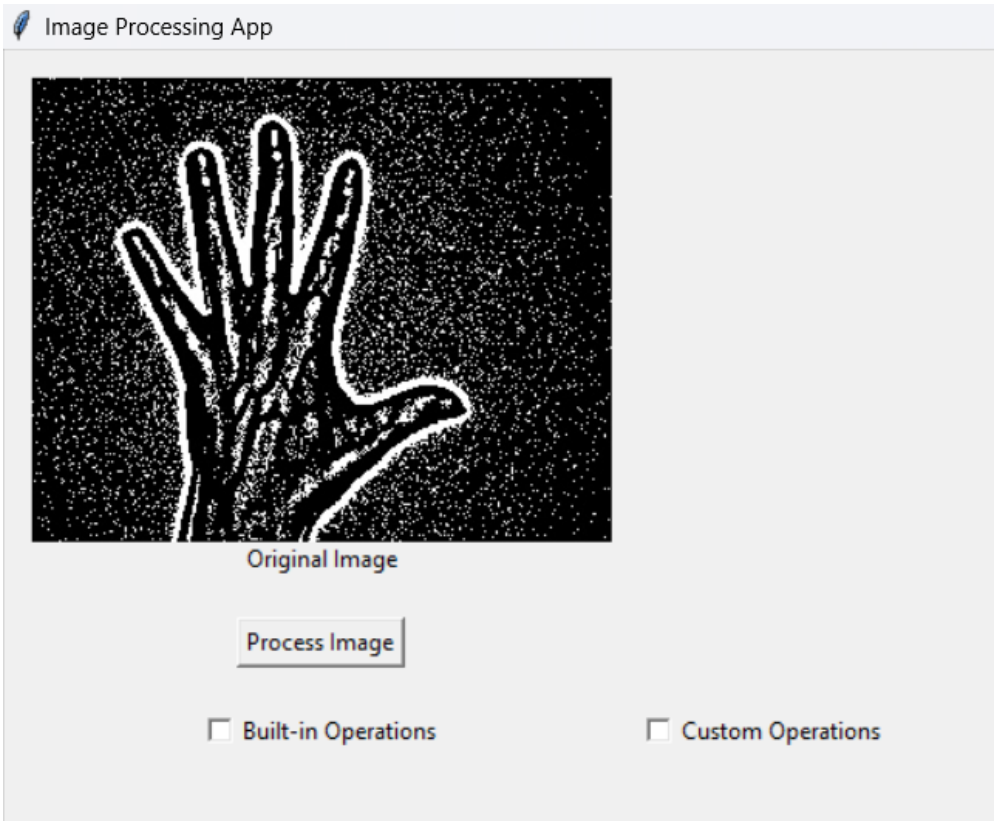
- Click on the **main.exe** file present in the dist folder.
- Then, click on upload photo



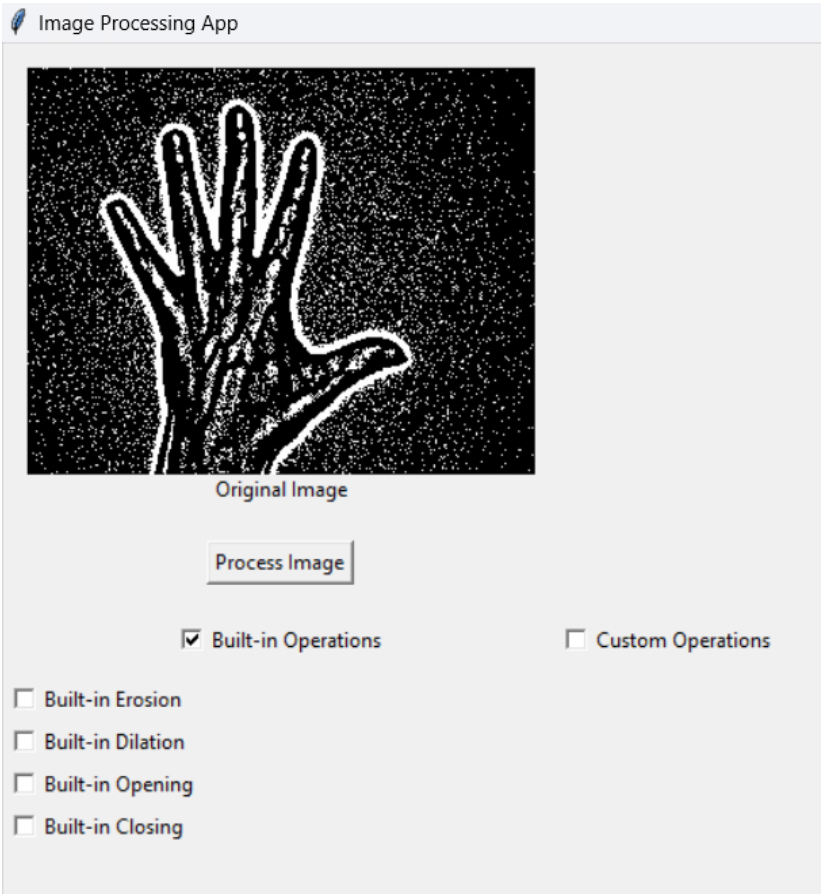
- Then, choose the grayscale image on which you want to apply these morphological operations.



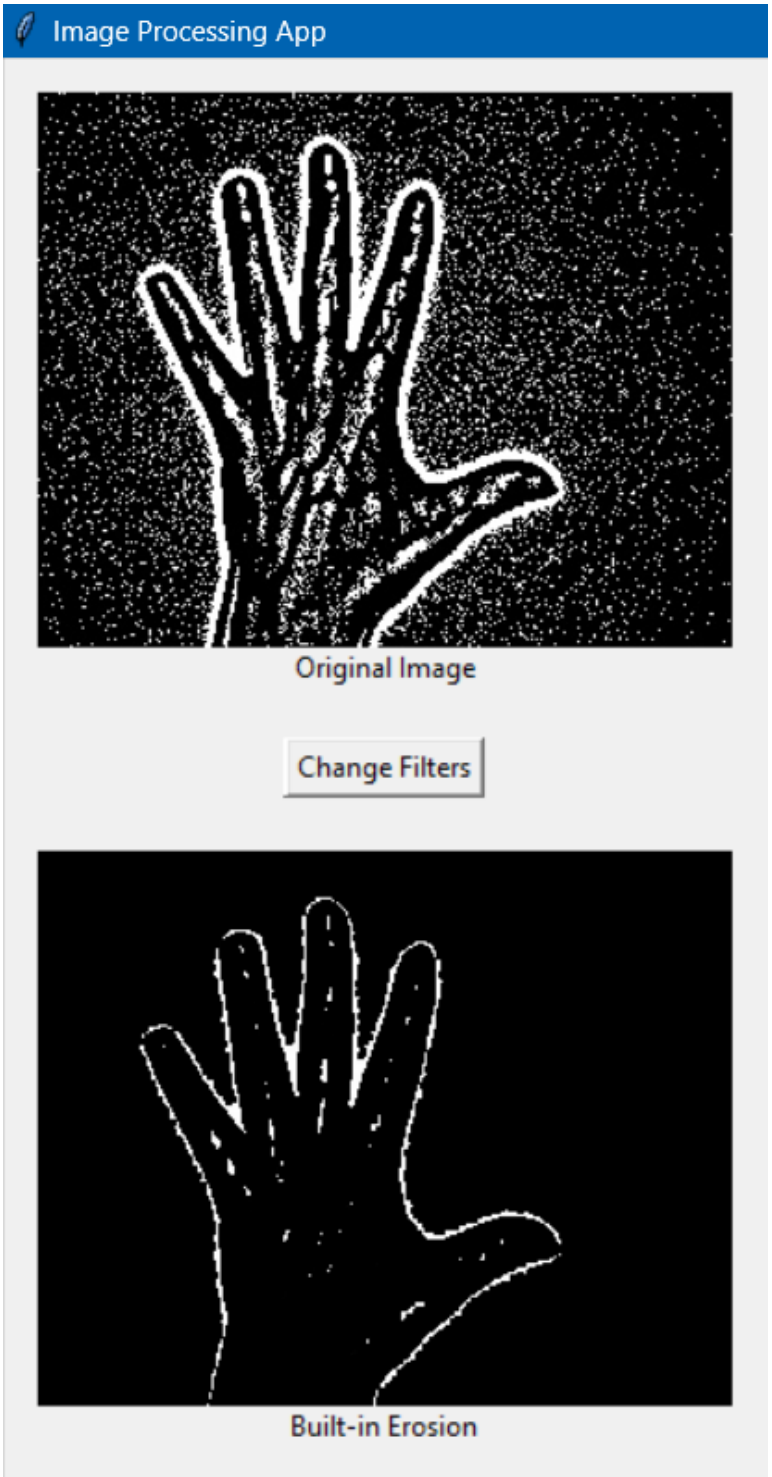
- When the image is successfully uploaded, it is displayed on the window. Along with it, **Built-in Operations and Custom Operations buttons** are displayed.



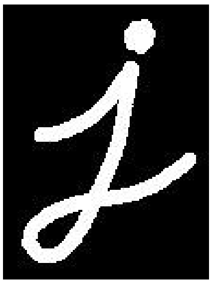
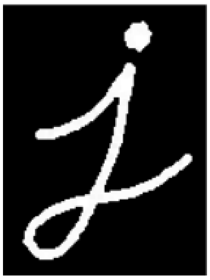
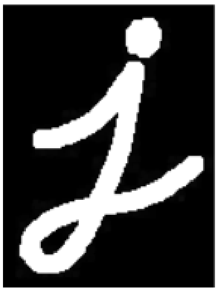
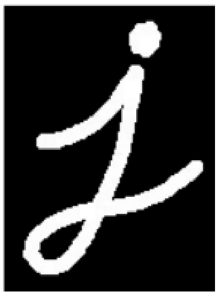
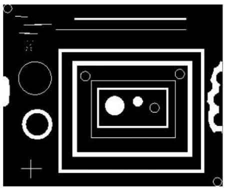
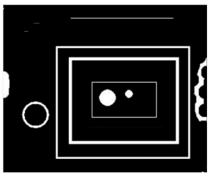
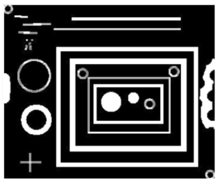
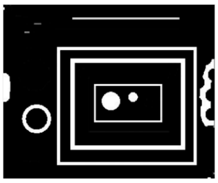
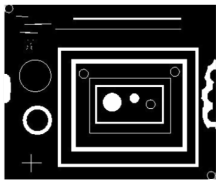
- When you check **Built-in operations,** a window for the inputs of kernel pop-up and after giving the kernel matrix values, click on **Set Builtin Kernel**.
- The functions of Erosion, Dilation, Opening and Closing will be applied to the original image using **built in operations** and **users builtin kernel**
- Similarly, when you click on **Custom Operations,** a window for the inputs of the kernel will pop-up and after giving the kernel matrix values, click on **Set Custom Kernel**.
- The functions of Custom Erosion, Custom Dilation, Custom Opening and Custom Closing will be applied on the original image using the **implemented operations created by us** and **users custom kernel**.

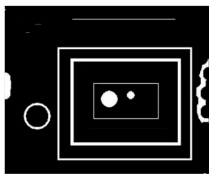
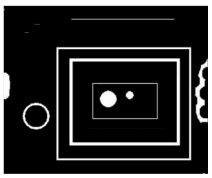
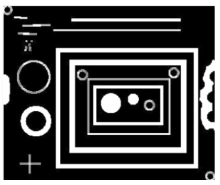
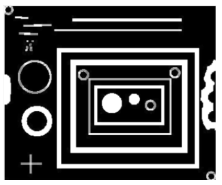


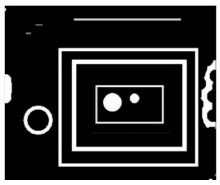
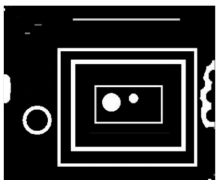
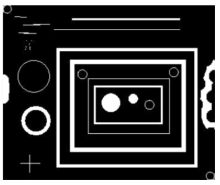
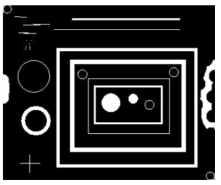
- After clicking on the required operations you want to see on your image, click on **Process Image.**
- All the operations that you have selected will be performed on the image and displayed on the interface.



- Use the **Change Filters button** to navigate back to the checklist of operations that you want to perform and select them again.

Original Image	Eroded Image	Dilated Image	Opening Image	Closing Image
				
				
				
				

Output Eroded Image	In-built Eroded Image	Output Dilated Image	In-built Dilated Image
			
			
			
			

Output Opening Image	In-built Opening Image	Output Closing Image	In-built Closing Image
			
			
			
			

The kernel that has been used in the built-in functions and the implemented function is a 3x3 matrix.

Note:

For the application, to work correctly, some guidelines

1. Give the inputs of the kernel 1s and 0s
2. Give all the inputs of the kernel. When the dialog box is shown up.

3. Once selected the checkbox, you must give the kernel values. Otherwise, there would be a problem.
4. If at all, you have not followed the above guidelines, restart the application and you are good to go.