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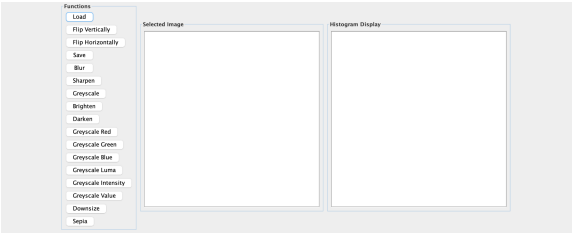
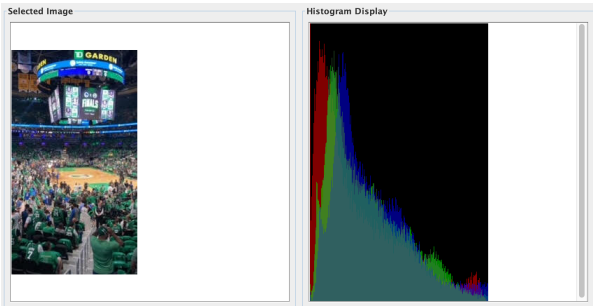
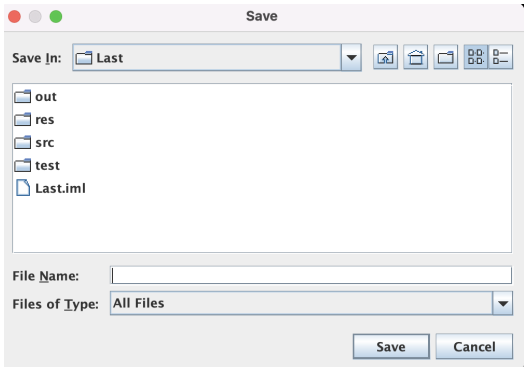
Project Description
This project represents a basic image processing program. Files with the PPM format (images) can be loaded into the program. Once loaded, various image manipulating functions can be used on the images with the help of different commands. These operations include flipping operations, dim/brighten operations, and color-conversion operations. Added operations are Blurring, Sharpening, greyscaling with transform, and sepia, and downscaling image operations.
>
Interacting with the GUI
First, the user should navigate to the Main class and run the main method. This will prompt the program to run. Running the Main class will lead you to the interactive user interface as shown below.



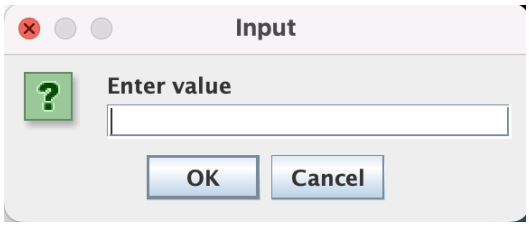
>
> To perform any manipulation on an image, you have to first load in an image of either PPM, PNG, or JPG format using the Load button.
>
>**Load** give you the option to load an image as shown below.
>
> Once an image is loaded, it will show in the Selected Image panel as shown below with the TDgardenPhoto.PPM image. The Histogram Display panel will also load a histogram corresponding to the loaded image showing the amount of RGB values.
>



> **Flip Vertically:** allows the user to vertically-flip the loaded image and the action is shown in the “Selected Image” panel.
> **Flip Horizontally:** allows the user to vertically-flip the loaded image and the action is shown in the “Selected Image” panel.
>
> **Save:** allows the user to save the loaded image by selecting the location using the pop up shown below.



> **Brighten:** allows the user to brighten an image by typing a certain value. The change is shown directly in the “Selected Image” panel along with the change in the Histogram graph correlating to the new amount of RGB values.



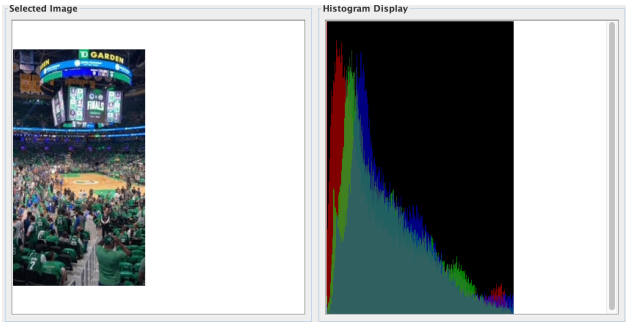
>
> **Darken:** Similar to Brighten, allows users to dim an image by typing a certain value. The change is shown directly in the “Selected Image” panel along with the change in the Histogram graph correlating to the new amount of RGB values.
>
> **Greyscale Red:** allows the user to convert an image to the red grayscale type and display it on the “Selected Image” panel as well as change the Histogram graph correlating to the new amount of RGB values.
>
> **Greyscale Green:** allows the user to convert an image to the green grayscale type and display it on the “Selected Image” panel as well as change the Histogram graph correlating to the new amount of RGB values.
>
> **Greyscale Blue:** allows the user to convert an image to the blue grayscale type and display it on the “Selected Image” panel as well as change the Histogram graph correlating to the new amount of RGB values.
>

> **Greyscale Luma:** allows the user to convert an image to the luma grayscale type and display it on the “Selected Image” panel as well as change the Histogram graph correlating to the new amount of RGB values.
>
> **Greyscale Intensity:** allows the user to convert an image given a grayscale intensity and display it on the “Selected Image” panel as well as change the Histogram graph correlating to the new amount of RGB values.
>
> **Greyscale Value:** allows the user to convert an image given a grayscale value and display it on the “Selected Image” panel as well as change the Histogram graph correlating to the new amount of RGB values.
>
> **Sepia:** allows the user to apply a sepia filter to an Image and display it on the “Selected Image” panel as well as change the Histogram graph correlating to the new amount of RGB values.
> **Downsize:** allows the user to downsize an image given the downsize percentage factor and display it on the “Selected Image” panel as well as change the Histogram graph correlating to the new amount of RGB values.

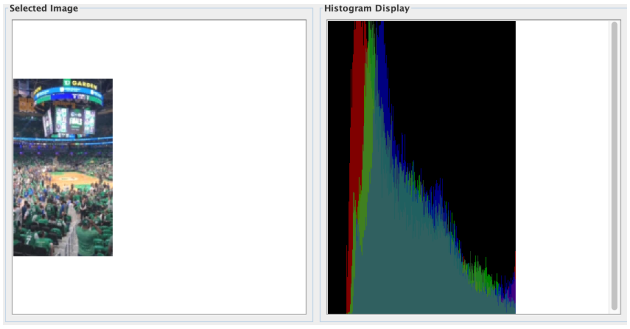
*At least one image must be loaded into the program using the load function before any manipulation or saving can be done. Images cannot be saved by a client if there is nothing in the library.

*The below images shows the before and after of the brighten and downsize function performed using a factor of 25 on the TDgardenPhoto.PPM image along with the histogram created once these actions are performed.

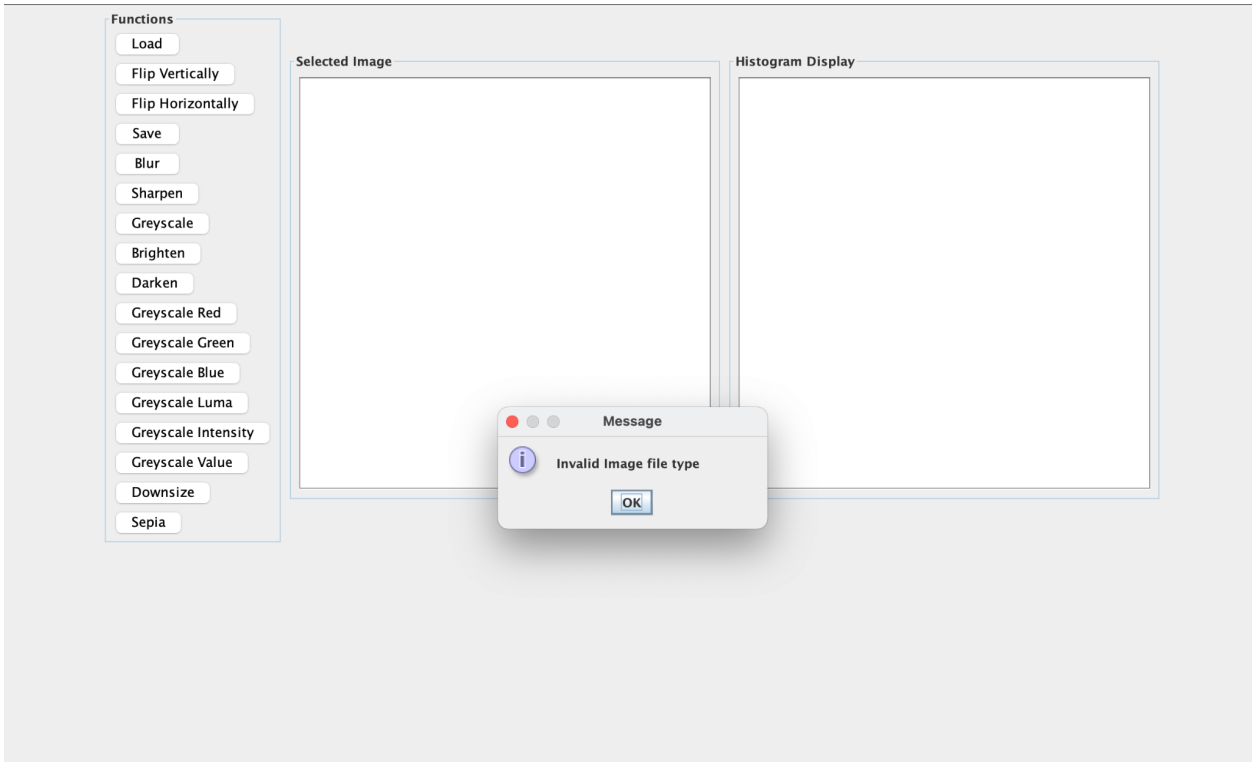
Before:



After:



The GUI also displays a pop up message for invalid inputs for instance selecting a file that is not of the required image type would display this popup:


Functions
Load
Flip Vertically
Flip Horizontally
Save
Blur
Sharpen
Greyscale
Brighten
Darken
Greyscale Red
Greyscale Green
Greyscale Blue
Greyscale Luma
Greyscale Intensity
Greyscale Value
Downsize
Sepia
Selected Image
Histogram Display
Message
Invalid Image file type
OK