

TESTING AND ERROR HANDLING DOCUMENT

This document details our approaches to Exception Handling and Errors. It shows the changes we made to the base code/ found issues with and features we discussed and implemented. When it comes to testing we would try to test as we went and code in a way for less user input allowing for less tests required. Part of our process would be to hand a feature over to another team member to get peer tested and checked before we were content with the function of the feature. Along with Some JUnit testing I (Tyler) created this document to thoroughly test through all GUI/User features and have a documented list of questions to test when new features are added. This is not all the testing done as a lot was peer reviewed testing but I made this document as template and for a direction to go when implementing future JUnit testing and Continuous Integration.

Exception Handling and Other Error avoidance/prevention

Team Vista's approach towards errors was to limit user input to predetermined values. We all agreed very early on for the sake of time management and making a solid application that was not going to break under rigorous testing was to not allow the user to break the application. This is highlighted anywhere that a new feature is added.

When adding new filters we tried to keep user input to a minimum using sliders and spinners with lower and upper limits to make it so users could not put in absurd values or unexpected ones.

For exporting, opening and saving features the user aspect was unavoidable and therefore we tried to make it as bulletproof as possible with try/catch statements and methods to test user inputs before they are passed into the export, open or save features.

Changes to Original/Skeleton Code

Changes

Separation of create GUI into two, allowing for a new method createMenu to be called separately, allows for real time functionality of language selection

Making Limits for the image open feature to only accept images under 4k, this was due to the when testing we found trying to process different filters on large images could cause undesired

effects and had real problems when multiple operations were executed in conjunction (this was especially apparent with resizing the window). So as a group we decided to limit our file sizes to 3840x2160

Changes to any try catch that would just exit the program, we felt that there should be error messages and we implemented where appropriate with language support.

Other Things to Note

Save as Feature errors. This has been documented in the testing showing that saving in places with '.' in the file path will not work correctly we have implemented fixes for our export feature but the saveAs bug still remains

GreyScale error. When testing different file formats I stumbled upon an issue trying to grayscale Gifs as it would not execute the true intention. This has been noted and we are looking into if it's actually an issue but the gif format is still supported due to this being a small detail that we did not think would impact the overall usability of the extension within ANDIE.

FileActions Testing

Open Tests

1). **Opening a .JPEG file:** What happens when the user opens a .JPEG and what happens if filters are used on this file?✓

User Input - User opens a .jpeg file and manipulates the image with a filter and operation.

Expected Outcome - Should open without issue and should run the filters and operations in a reasonable time frame .

Actual Outcome - Everything seems to work smoothly no issues with .jpeg

Comments - Works as Expected

2). **Opening a .PNG file:** What happens when the user opens a .PNG and what happens if filters are used on this file?✓

User Input - User opens a .png file and manipulates the image with a filter and operation.

Expected Outcome - Should open without issue and should run the filters and operations in a reasonable time frame .

Actual Outcome - Everything seems to work smoothly no issues with .png

Comments - Works as Expected

3). **Opening a .BMP file:** What happens when the user opens a .BPM and what happens if filters are used on this file?✓

User Input - User opens a .bmp file and manipulates the image with a filter and operation.

Expected Outcome - Should open without issue and should run the filters and operations in a reasonable time frame .

Actual Outcome - Everything seems to work smoothly no issues with .bmp

Comments - Works as Expected

4). **Opening a .WEBMP file:** What happens when the user opens a .WEBMP and what happens if filters are used on this file?✗

User Input - User opens a .webmp file and manipulates the image with a filter and operation.

Expected Outcome - Should open without issue and should run the filters and operations in a reasonable time frame .

Actual Outcome - Doesn't work as expected

Comments - We came to a decision as a group that it wasn't necessary to support.


5). **Opening a .GIF file:** What happens when the user opens a .GIF and what happens if filters are used on this file?✓

User Input - User opens a .gif file and manipulates the image with a filter and operation.

Expected Outcome - Should open without issue and should run the filters and operations in a reasonable time frame .

Actual Outcome - Everything seems to work smoothly no issues with .gif

Comments - Works as Expected

6). **Opening a .PDF file:** What happens when the user opens a .PDF and what happens if filters are used on this file? 



User Input - User opens a .pdf file and manipulates the image with a filter and operation.

Expected Outcome - Should open without issue and should run the filters and operations in a reasonable time frame .

Actual Outcome - Doesn't work as expected

Comments - We came to a decision as a group that it wasn't necessary to support.

Save As Tests

1). **Saving Files in unusual places:** What happens when the user saves in different locations without a file extension?  

User Input - User opens and manipulates an image in ANDIE and proceeds to save it in the H drive on the local lab/uni network leaving it without a file extension specified.

Expected Outcome - Should save as expected.

Actual Outcome - Nothing appears in the location that the file was saved. No error pop ups showed up when trying to

Comments - This was tracked down to the file system of the H:\ drive using dots in it and the methods to save without an extension search the file path for no dots before defaulting to a certain extension. Note: This was found when bug testing the export feature. We have added an work around for the export but this still remains for the save as feature

Export Tests

1). **Not adding an extension to the file:** What happens when the user exports and doesn't add an extension to the file?  

User Input - Have an image opened and edited in ANDIE and then user exports with a file name not including a file extension.

Expected Outcome - Should display an error.

Actual Outcome - Seems to do nothing at all.

Comments - Should either display an error pop up box or default to a certain file size (may require extra testing to see all file types work. Update: added feature to force user to choose from a preset selection of

2). **Opening a .JPEG file:** What happens when the user exports a .JPEG and what happens if filters are used on this file?✓

User Input - User exports a .jpeg file.

Expected Outcome - Should export without issues, retaining all operations performed on it in the ops file.

Actual Outcome - Everything seems to work smoothly no issues with .jpeg

Comments - Works as Expected

3). **Exporting a .PNG file:** What happens when the user exports a .PNG and what happens if filters are used on this file?✓

User Input - User exports a .png file.

Expected Outcome - Should export without issues, retaining all operations performed on it in the ops file.

Actual Outcome - Everything seems to work smoothly no issues with .png

Comments - Works as Expected

4). **Exporting a .BMP file:** What happens when the user exports a .BPM and what happens if filters are used on this file?✓

User Input - User exports a .bmp file.

Expected Outcome - Should export without issues, retaining all operations performed on it in the ops file.

Actual Outcome - Everything seems to work smoothly no issues with .bmp

Comments - Works as Expected

5). **Exporting a .WEBMP file:** What happens when the user exports a .WEBMP and what happens if filters are used on this file?✗

User Input - User exports a .webmp file.

Expected Outcome - Should export without issues, retaining all operations performed on it in the ops file.

Actual Outcome - Doesn't work as expected

Comments - We came to a decision as a group that it wasn't necessary to support.

6). **Exporting a .GIF file:** What happens when the user exports a .GIF and what happens if filters are used on this file?✓

User Input - User exports a .gif file.

Expected Outcome - Should export without issues, retaining all operations performed on it in the ops file.

Actual Outcome - Everything seems to work smoothly no issues with .gif

Comments - Works as Expected

7). **Exporting a .PDF file:** What happens when the user exports a .PDF and what happens if filters are used on this file?✗

User Input - User exports a .pdf file.

Expected Outcome - Should export without issues, retaining all operations performed on it in the ops file.

Actual Outcome - Doesn't work as expected

Comments - We came to a decision as a group that it wasn't necessary to support.

Language Settings Tests✓

This has been covered mostly using JUnit testing. For the 'changeLang' and 'getTranslated' Methods these tests proceed to hand the changLang method a string to change to e.g. maori and then would use the getTranslated method to change a hardcoded value to compare it with another hardcoded value using the asserts equal method. As for the interface due to time constraints it was done here using manual testing.

1). **User updating language in real time:** When the user changes language does all the Menu bar within ANDIE Update?✓

User Input - Navigate to the language settings in the File Menu and change the language to spanish and click the ok button.

Expected Outcome - The menu bar should now display in spanish rather than english

Actual Outcome - It does display it spanish all titles and menus have updated as expected

Comments - This is acceptable however when playing around I have noticed that a commit one of my teammates put in did not have a pop up box displaying translated language, this was an easy fix but it is noted that we should have one final sweep through the code checking all menus, dropdowns and popups have implemented the getTranslated Method.

2). **User selecting a language and exiting:** What happens when it is selected but the ok button is not pressed/ exit icon is used?✓

User Input - Navigate to the language settings in the File Menu and change the language to spanish and then use the exit icon in the top right corner.

Expected Outcome - Should exit the LanguageSettings Popup and not change anything.

Actual Outcome - Does as expected, nothing changes.

Comments - This is expected as the changeLang method does not execute unless the ok button is clicked using the combobox as an input to the method.

3). **Changed Language Remains on Restart:** If a user changes the language will it stay that way if they restart the application?✓

User Input - User changes the Language to Maori from the Language Settings Menu and quits the application and then restarts it

Expected Outcome - Should retain the Maori language for all menus and buttons even once restarted.

Actual Outcome - Does as expected, keeps Maori when the application is restarted.

Comments - Also checked logging user on and off and it keeps preferences, changing pc does not

Filter Tests

Mean Filter Tests✓

1). **Applying filter to nothing:** What happens when its applied when there is no image actively open?✓

User Input - User navigates to the Mean filter without an image previously opened and inputs a value into the jspinner and presses ok

Expected Outcome - Error message pops up and informs user there is no image

Actual Outcome - Error message pops up and informs user there is a missing image

Comments - Works as expected

2). **Checking upper limit:** What happens when a user inputs a greater value than allowed?✓

User Input - User selects an image and navigates to the Mean filter. Using the mouse to input a value of 15 which is above the maximum of 10 and clicks ok

Expected Outcome - Filter should recognize user puts in a larger amount than allowed and default to the closed available amount of 10 and then applies

Actual Outcome - Filter changes to 10 and then applies to the image

Comments - Works as expected

3). **Checking lower limit:** What happens when a user inputs a lower value than allowed?✓

User Input - User selects an image and navigates to the Mean filter. Using the mouse to input a value of -20 which is below the minimum of 1 and clicks ok

Expected Outcome - Filter should recognize user puts in a smaller value than allowed and default to the closed available amount of 1 and then applies

Actual Outcome - Filter changes to 1 and then applies to the image

Comments - Works as expected

4). **Checking non-number input:** What happens when a user inputs a value that is not a number?✓

User Input - User selects an image and navigates to the Mean filter. Using the mouse to input a value of abcd which should not be usable

Expected Outcome - Filter should recognize user puts in a non value and should error out?

Actual Outcome - Filter does not recognise a value of abcd then proceeds to default to a value of 1 and apply the filter to the image.

Comments - Defaults to 1, should be discussed if this should put an error message up or this is expected. Update: Discussed and agreed upon that this is how we want it.

SharpenFilter Tests✓

1). **Applying filter to nothing:** What happens when its applied when there is no image actively open?✓

User Input - User navigates to the Sharpen filter without an image previously opened and presses ok on the pop up menu

Expected Outcome - Error message pops up and informs user there is no image

Actual Outcome - Error message pops up and informs user there is a missing image

Comments - Works as expected

GaussianBlurFilter Tests✓

1). **Applying filter to nothing:** What happens when its applied when there is no image actively open?✓

User Input - User proceeds to the Gaussian Filter without an image previously opened and inputs a value into the jspinner and presses ok

Expected Outcome - Error message pops up and informs user there is no image

Actual Outcome - Error message pops up and informs user there is a missing image

Comments - Works as expected

2). **Checking upper limit:** What happens when a user inputs a greater value than allowed?✓

User Input - User selects an image and navigates to the Gaussian filter. Using the mouse to input a value of 15 which is above the maximum of 10 and clicks ok

Expected Outcome - Filter should recognize user puts in a larger amount than allowed and default to the closed available amount of 10 and then applies

Actual Outcome - Filter changes to 10 and then applies to the image

Comments - Works as expected

3). **Checking lower limit:** What happens when a user inputs a lower value than allowed?✓

User Input - User selects an image and navigates to the Gaussian filter. Using the mouse to input a value of -20 which is below the minimum of 1 and clicks ok

Expected Outcome - Filter should recognize user puts in a smaller value than allowed and default to the closed available amount of 1 and then applies

Actual Outcome - Filter changes to 1 and then applies to the image

Comments - Works as expected

4). **Checking non-number input:** What happens when a user inputs a value that is not a number?✓

User Input - User selects an image and navigates to the Gaussian filter. Using the mouse to input a value of abcd which should not be usable

Expected Outcome - Filter should recognize user puts in a non value and should error out?

Actual Outcome - Filter does not recognise a value of abcd then proceeds to default to a value of 1 and apply the filter to the image.

Comments - Defaults to 1, should be discussed if this should put an error message up or this is expected.

MedianFilter Tests✓

1). **Applying filter to nothing:** What happens when its applied when there is no image actively open?✓

User Input - User proceeds to the Median filter without an image previously opened and inputs a value into the jspinner and presses ok

Expected Outcome - Error message pops up and informs user there is no image

Actual Outcome - Error message pops up and informs user there is a missing image

Comments - Works as expected

2). **Checking upper limit:** What happens when a user inputs a greater value than allowed?✓

User Input - User selects an image and navigates to the Median filter. Using the mouse to input a value of 15 which is above the maximum of 10 and clicks ok

Expected Outcome - Filter should recognize user puts in a larger amount than allowed and default to the closed available amount of 10 and then applies

Actual Outcome - Filter changes to 10 and then applies to the image

Comments - Works as expected

3). **Checking lower limit:** What happens when a user inputs a lower value than allowed?✓

User Input - User selects an image and navigates to the Median filter. Using the mouse to input a value of -20 which is below the minimum of 1 and clicks ok

Expected Outcome - Filter should recognize user puts in a smaller value than allowed and default to the closed available amount of 1 and then applies

Actual Outcome - Filter changes to 1 and then applies to the image

Comments - Works as expected

4). **Checking non-number input:** What happens when a user inputs a value that is not a number?✓

User Input - User selects an image and navigates to the Median filter. Using the mouse to input a value of abcd which should not be usable

Expected Outcome - Filter should recognize user puts in a non value and should error out?

Actual Outcome - Filter does not recognise a value of abcd then proceeds to default to a value of 1 and apply the filter to the image.

Comments - Defaults to 1, should be discussed if this should put an error message up or this is expected.

Colour Testing

GreyScale Testing✓

1). **Applying feature to nothing:** What happens when its applied when there is no image actively open?✓

User Input - User proceeds to the Grayscale feature without an image previously opened and presses ok

Expected Outcome - Error message pops up and informs user there is no image

Actual Outcome - Error message pops up and informs user there is a missing image

Comments - Works as expected

Contrast and Brightness

1). **Applying feature to nothing:** What happens when its applied when there is no image actively open?✓

User Input - User proceeds to the Contrast and brightness features without an image previously opened and presses ok

Expected Outcome - Error message pops up and informs user there is no image

Actual Outcome - Error message pops up and informs user there is a missing image

Comments - Works as expected

In contrast and brightness we used a JSlider for when the user wants to implement the percentage or adjustment values. This is so the user can't enter a value out of the bounds we have set which would destroy or distort the image.

TransformActions Testing

Flip Tests✓

1). **Flipping Horizontally:** Checks that the Horizontal Flip works as expected and can be used to revert back to original✓

User Input - User navigates to the Transform menu and uses the Flip Horizontal button. Then use the exact same button again to flip it back.

Expected Outcome - Should flip mirrored on the horizontal axis but the ending output of pressing the button twice should give the exact same image as it has started with.

Actual Outcome - When the button is pressed twice output is the same as it began with.

Comments - Works as expected.

2). **Flipping Vertically:** Checks that the Vertical Flip works as expected and can be used to revert back to original✓

User Input - User navigates to the Transform menu and uses the Flip Vertical button. Then use the exact same button again to flip it back.

Expected Outcome - Should flip mirrored on the vertical axis but the ending output of pressing the button twice should give the exact same image as it has started with.

Actual Outcome - When the button is pressed twice output is the same as it began with.

Comments - Works as expected.

Resize Tests✓

1). **Check Scaling of Images:** What happens when it is scaled to the max value?✓

User Input - User e an image in Andie and proceeds to use the scale feature to 1000% (which is the max) and then proceeds to do it again.

Expected Outcome - Expected to keep on scaling the image as long as the user keeps using the resize feature.

Actual Outcome - The first 1000% resize works fine then the second resize starts to lag out the system and runs into a java heap error.

Comments - This should have an upper limit sending a error message when this is reached to avoid the image getting to large to handle

ImageRotation Tests✓

1). **Check Image Rotation Left:** Will the image rotate to the left as expected?✓

User Input - Navigating to the Rotate Left button within the Transform Menu. Proceed to press the button 4 times checking the image is cycling left rather than right and it should end with the same orientation.

Expected Outcome - After 4 clicks of the Rotate Left button the output should be exactly the same as the original input.

Actual Outcome - Image Rotates the correct way (left) and finishes in the same position after 4 clicks.

Comments - Works as expected, each 90 degree rotation is visually rotating as expected.

2). **Check Image Rotation Right:** What happens when it is rotated right?✓

User Input - Navigating to the Rotate Right button within the Transform Menu. Proceed to press the button 4 times checking the image is cycling right rather than left and it should end with the same orientation.

Expected Outcome - After 4 clicks of the Rotate Right button the output should be exactly the same as the original input.

Actual Outcome - Image Rotates the correct way (right) and finishes in the same position after 4 clicks.

Comments - Works as expected, each 90 degree rotation is visually rotating as expected.

Other Testing

Large and Small Image Tests✓

1). **Opening Large Files Test:** What happens when a 8k image is opened?✓

User Input - Using the open feature trying to open an image

Expected Outcome - Opens image scales to screen?

Actual Outcome - Does not scale to screen but will open fine

Comments - Opens fine but applying filters easily breaks the application (Discuss maybe adding an upper limit to image sizes to avoid this issue, further testing might be required to see what a maximum image size would be). - Updated to Only allow images of up to 2160 x 3840

Undo/Redo Tests✓

1). **Undo Lower Limit Test :** What happens when you go too far back?✓

User Input - keep using the undo button even when there are no more actions to do

Expected Outcome - An error message letting the user know that you cannot go back further.

Actual Outcome - Error message displaying "Missing Image."

Comments - This is acceptable, lets users know that reverting again would remove image however does not actually remove it

2) **Redo Upper Limit Test :** What happens when you go too far back?✓

User Input - keep using the redo button even when there are no more actions to do

Expected Outcome - An error message letting the user know that you cannot go any further.

Actual Outcome - Error message displaying "Illegal action."

Comments - Not sure if acceptable?

Ease of Use/ Accessibility Features

Feature - Closing the Language Settings Combo box when language has been submitted with the 'ok' button.

Fix - Discussing in the group we decided to not implement it because a user who is not very familiar with the application might not be able to navigate back to the Language Settings and currently it gives the user the option to change back if the change was an accident.

Feature - We Should add pop ups rather than shutting down the application every time a try catch fails.

Fix - Implemented.

Feature - Language features combo box popup should be centered so it does not cover the menu bar so you can see your changes and not have to drag the box to see what's happening.

Fix - Fixed.

Feature - Doing lots of testing, having some toolbar buttons could come in handy.

Fix - Talked as a group and decided to add the most used features but hold off till part two where a toolbar is a requirement before implementing all features.

Feature - MAke it more accessible for users who may not have great knowledge of computers by adding button prompts for saving to allow the user to choose an extension from a list rather than having to remember it.

Fix - Implemented but the ability to save manually by writing in the box is still available as we thought the user should be allowed choice.