CS 1033

MULTIMEDIA AND COMMUNICATIONS

Lab 3: Image Processing

Remember to have your memory stick or a place in the cloud ready to back up your work in every lab!

Learning objectives for this lab

- Cropping images
- Erasing unwanted parts of an image
- Changing the transparency of an image's background using eraser tools
- Superimposing/layering multiple images on top of one another
- Loading 360° images and changing the projection mode to view it properly
- Saving a design as both a vector graphic and bitmap
- Comparing vector and bitmap graphics in terms of file size and scalability
- Making and modifying elliptical selections on images
- Applying an effect to multiple layers simultaneously

Introduction

In the previous lab, you learned how to use Affinity Photo to perform some of the fundamental tasks in image processing and graphic design. Those tasks include loading an image, applying an Effect to an image, creating a graphic from a blank canvas using shapes, lines, text, and background colours, and adding outlines and borders.

This lab builds on the previous one, using some of the same tools and tips but also adding several new tools and introducing you to new concepts like 360° images and vector graphics. You will also learn how to merge multiple images on the same canvas.

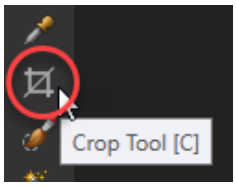
Glossary

crop	permanently cutting out a portion of a graphic around the edges
superimpose	layering multiple images on the same canvas, often using transparency so that the images merge effectively
vector graphic	a type of graphic that is stored as a series of points, lines, and mathematical formulas used to create geometric shapes
bitmap	a type of graphic that is stored as a grid of pixel cell colours; most image formats are bitmaps including JPG, PNG, and GIF
rasterize	converting an picture from a vector graphic to a bitmapped image

Activity 1

Cropping and erasing

1. Navigate to your **cs1033** folder on your memory stick or cloud storage (it should have been created last week) and create a folder called **lab03**. Within that, create a sub-folder called **images**.
2. Open: http://www.csd.uwo.ca/~bsarlo/cs1033/labs/lab03/images/. Download all the files into the images folder you just created.
3. In Affinity, click File > Open. In the Open window, navigate to **cs1033/lab03/images** and open *turtle.jpg*.
4. Name this layer "Turtle".
5. Hit File > Save As and save the file into **cs1033/lab03** with the name *act_1*.
6. Locate and select the Crop Tool near the top of the Tools Palette

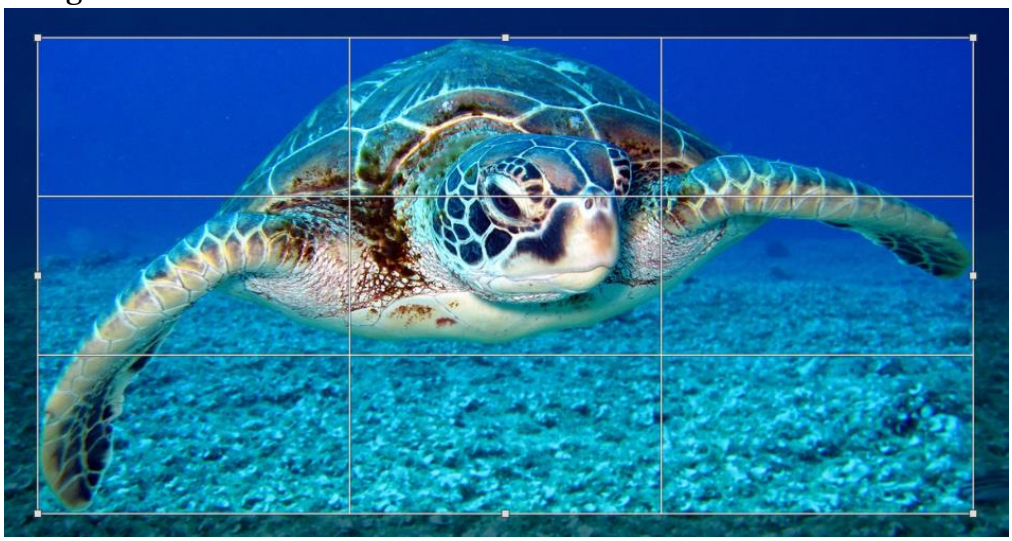


7. When you click this, a 3x3 grid is placed on the image. This grid is resizable and movable, and is used to indicate which part of the image will be staying and what will be cropped out. Whatever portion is contained in the entire grid (ignore the internal gridlines and just focus on the outer edges) will be kept.
8. Hover your cursor over the lower right corner square circled in the image below around the grid box so that you see a diagonal double sided arrow.

9. Click down and drag the mouse inward such that the grid goes to the right-most and bottom-most parts of the turtle.

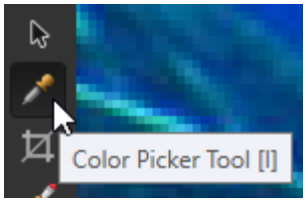
10. Do the same thing from the upper left corner and drag it so that the grid is including the entire turtle but not more.

11. The gridlines should now look similar to this:

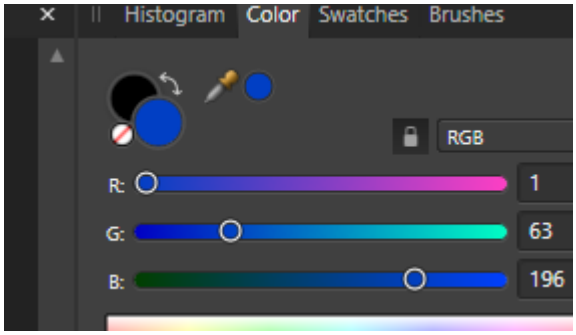


12. At the top, just below the Options Bar, there are 2 buttons: Apply and Cancel. Push the Apply button to crop the image given the gridlines you set.

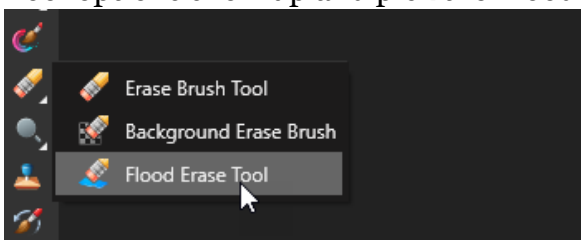
13. Affinity may zoom in closer upon completing this crop so if it looks a little pixelated, just zoom out to 100% in the Navigator panel.
14. Now we want to remove the water and ocean floor around the turtle but cropping can't help with this anymore since the turtle itself would get cropped too. Instead we will remove those parts by erasing them and leave the turtle as is.
15. Before we erase the water, let's take a sample of the colour of the water to use it later. Click on the Color Picker Tool near the top of the Tools Palette.



16. Move the cursor over the water (it will look like crosshairs) and click on the water in the image to get that shade of blue. This should change the Fill Colour Circle to be the colour of the water.



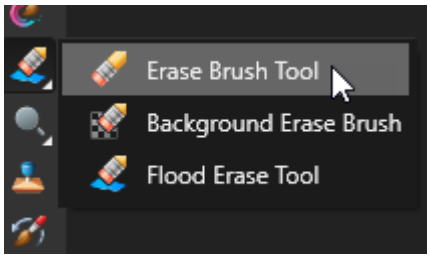
17. Now click and hold down the Eraser Brush Tool in the Tools Palette so the Erase Tool options show up and pick the Flood Erase Tool.



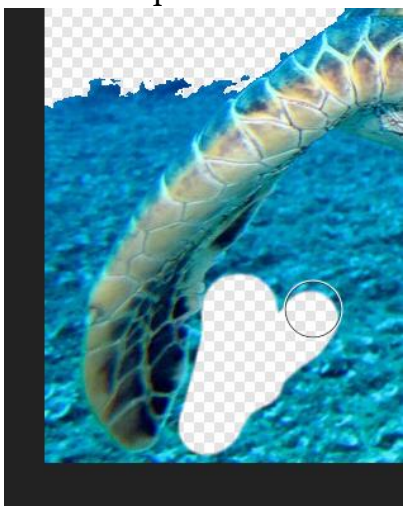
18. Notice at the top, below the option bar, the Tolerance is set to 20%. Click on the top left corner of the turtle image in the water area (not on the sea floor nor on the turtle). Notice that it erases parts of the turtles body. This is because it is looking for pixels in colour that are fairly close but not the exact same shade of blue as the water. This is not precise enough, it removes too many pixels.
19. Hit Ctrl+Z to undo this.
20. Now set the Tolerance to 0% and click on the water. Notice that now it only erases pixels that are that EXACT shade of blue. This is too precise.
21. Hit Ctrl+Z to undo this.
22. Now set the Tolerance to 10% and click on the water. This should just remove the water. 10% works well in this case. Your image should look like this:

23. Try to click on the seabed now to remove that with the tolerance still at 10%. This tool does not work well. Hit Ctrl+Z to undo this. Try changing the tolerance to 30% and click on the seabed again. Now we remove parts of the turtle. (Similar to the image below). This tool only works well if most of the pixels you are trying to remove are the same colour BUT they are quite different in colour from the pixels you are trying to keep.

24. Hit CTRL Z to undo this.
25. We will use a different tool to remove the seabed. Click on the Erase Brush Tool this time.

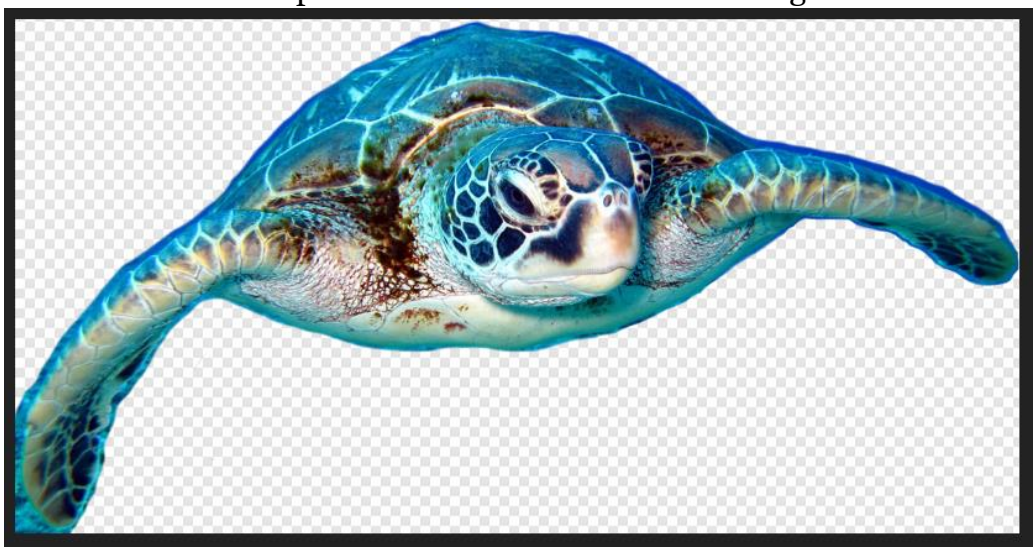


26. There are settings along the top under the Options Bar. Click the little white arrow beside Width (the leftmost setting) so that the slider panel pops up. Drag it over to 50 px. This is the size of the eraser we will be using.
27. Click down in the top left corner of the canvas and drag the mouse back and forth to erase the seabed pixels. Be careful not to erase any of the turtle while doing this. You can hold the mouse down as long as you like and keep erasing in long, continuous sequences. However, it's safer to let go every few seconds and start a new erasing sequence. If you ever accidentally erase part of the turtle, you have to hit Ctrl+Z to undo the mistake and it undoes the entire sequence so that's why shorter sequences are encouraged.



28. Continue erasing all the seabed floor, going close to the turtle but not erasing any part of it.

29. Once you have erased roughly all the unwanted portions of the image, change the eraser width down to 20 px and zoom in closer on the image using the Zoom tool in the Navigator panel to get closer to the turtle. Find any areas around the edge of the turtle that still have water and use this smaller eraser to refine it closer to the turtle. Note: the eraser size can be changed to any values you desire but note that it's usually easier to start with a thick eraser and then refine it later with a smaller eraser brush.
30. It doesn't have to be perfect but it should look something like this:



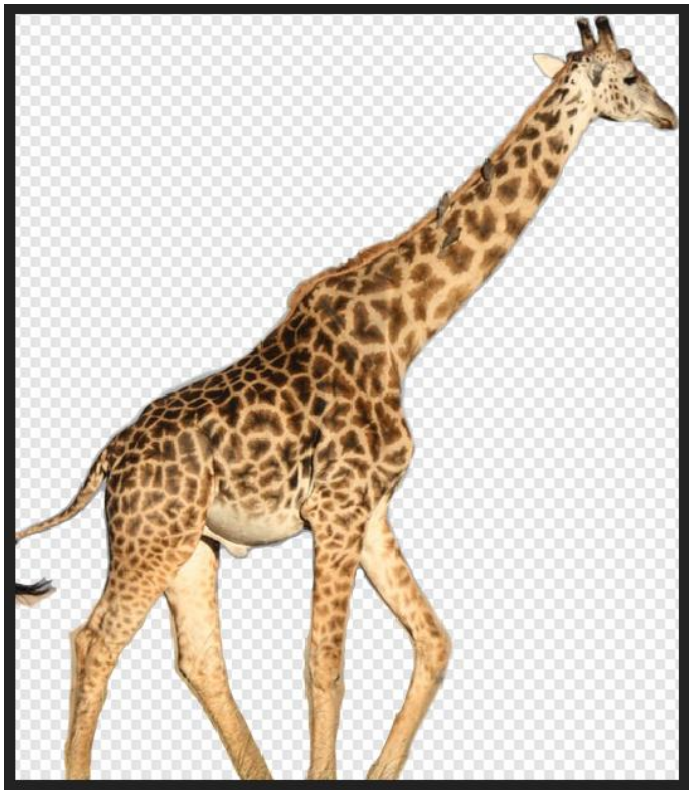
31. Add a new Pixel Layer and name it Blue Background.
32. Select the Flood Fill Tool. Click on the canvas to set the Blue Background layer to the water colour you picked earlier using the Color Picker Tool.
33. Now you will have to re-order the 2 layers with the Blue Background Layer below the Turtle layer so that the turtle is visible above the background.
34. The graphic should now look something like this:

35. Hit File > Save to complete this activity.

Activity 2

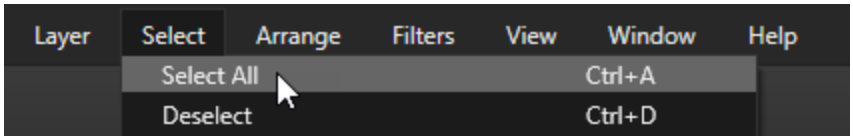
Superimposing images

1. In Affinity, open the files *people.jpg* and *giraffe.jpg*.
2. Click in the *people.jpg* tab and hit File > Save As. Save this image as a .afphoto file with the name *act_2* in your **cs1033/lab03** folder.
3. Name the Background layer of *act_2* as "People walking"
4. Repeat step 2 with the *giraffe.jpg* image and save this file (File >Save As) as an .afphoto file called *giraffe_work*.
5. Name this layer Giraffe
6. Crop the giraffe image to remove any excess boundaries around the outside of the giraffe.
7. Use the Flood Erase Tool (you will need to adjust the tolerance) and the Erase Brush Tool and the Zoom tool in the Navigator Panel to remove all the background around the giraffe so that you're left with just the giraffe itself. Use the tips given in Activity 1 to help with this task.
8. The result should look like this:

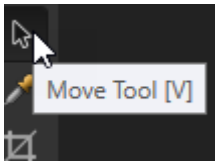


9. Hit File > Save.

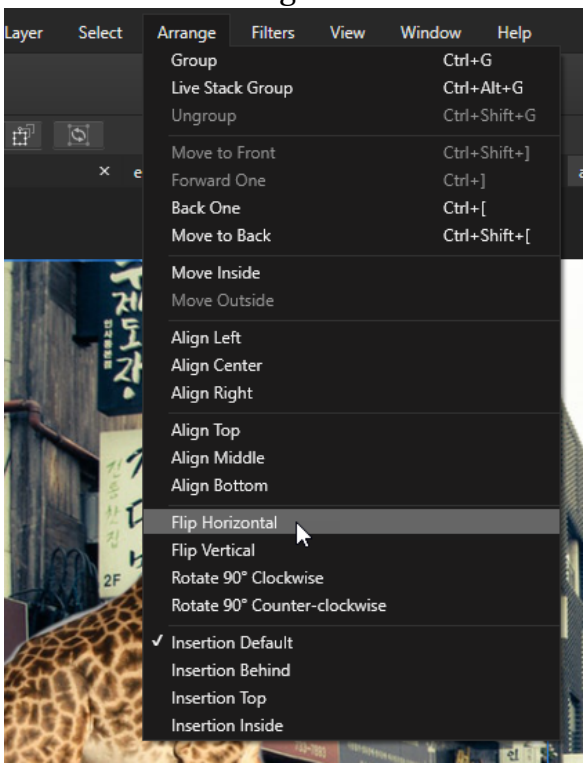
10. In the Menu Bar, click Select > Select All.



11. With the entire canvas selected, push Ctrl+C to copy it. NOTE: make sure the Giraffe layer is selected in the Layers panel or this won't copy properly.
12. Click into the *act_2* tab. Push Ctrl+V to paste the copied giraffe image into this canvas.
13. While the Giraffe layer is still selected, click on the Move Tool in Tools Palette

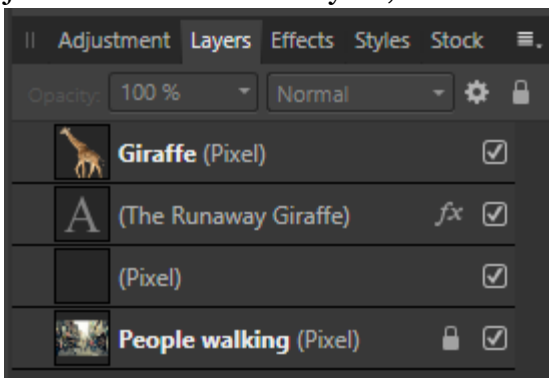


14. In the Menu Bar, click Arrange > Flip Horizontal so that the giraffe is facing the left instead of the right.

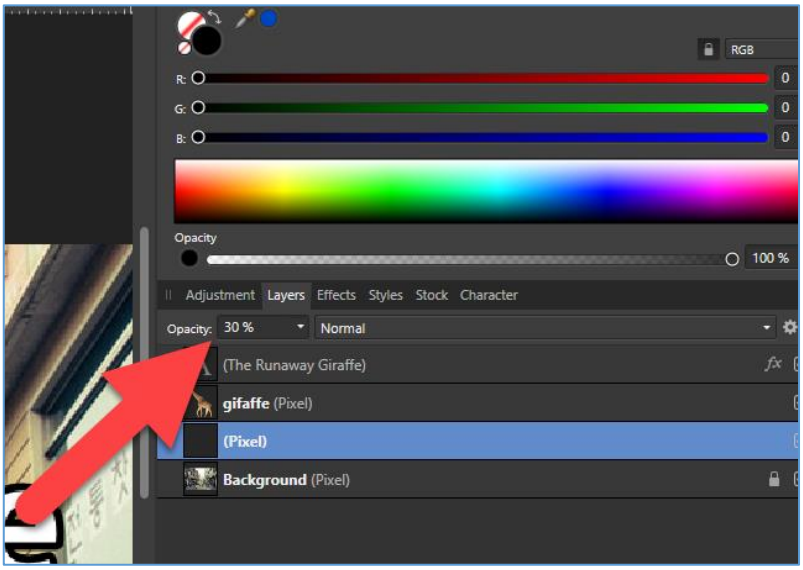


15. Use the Move Tool to place the giraffe picture in the bottom right corner.
16. Add white text "The Runaway Giraffe" near the top and set it to 96 pt. Notice that white text is difficult to read over light parts of the image so add a black outline to the text in the Effects (***fx***) panel.
17. The last thing we want to add is a black translucent layer. To do this, add a New Pixel Layer and drag it down so that it is directly above the People Walking layer but below the Giraffe and text layers (be careful not to drop it in another layer,

just make it between layers, not inside layers.



18. Change the fill colour to black but drag the opacity slider down to 30%. This will make the fill circle look gray instead of black.

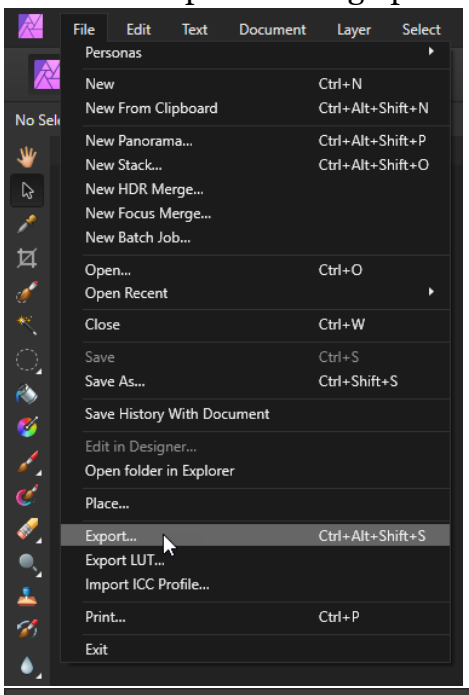


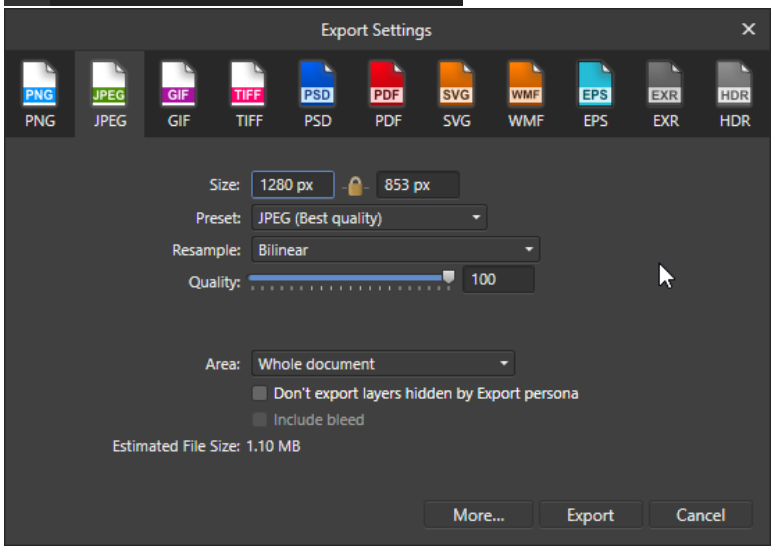
19. Make sure the new, empty pixel layer is selected in the Layers panel.
20. Select the Flood Fill Tool in the Tools Palette and click on the canvas to fill the layer with the semi-transparent black tint. Notice that it darkens the background image but not the text or giraffe. This was intentional and that is why we ordered the layers so that the giraffe and text are above this tint so that they are not darkened.

21. The finished product should look like this:

22. Hit File > Save.

23. Hit File > Export to bring up the Export Settings pop-up window.



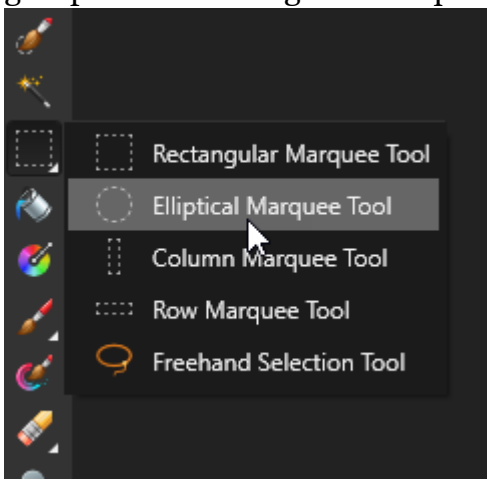


24. The Export Settings window is where you will choose which file format you want to export the image as. Select JPEG if it's not already selected and push the Export button at the bottom of the window.
25. You will then be prompted to give the file a name and choose where it will be saved. Navigate into **cs1033/lab03/images** and give it the name runawaygiraffe.jpg.

Activity 3

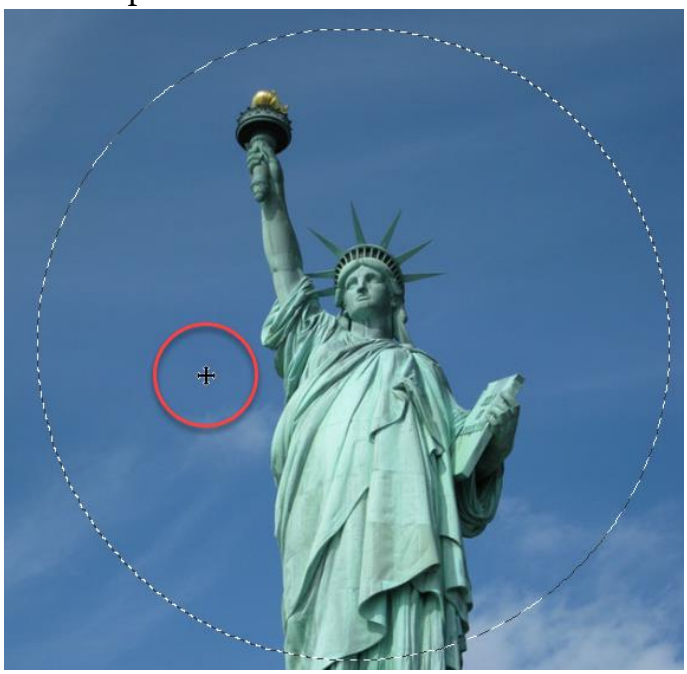
Elliptical selections for superimposing images

1. Close any open tabs in Affinity, and then open *nyc.jpg*, *cabs.jpg*, and *liberty.jpg*.
2. In *liberty.jpg*, select the Elliptical Marquee Tool which is part of the same tool group as the Rectangular Marquee Tool.

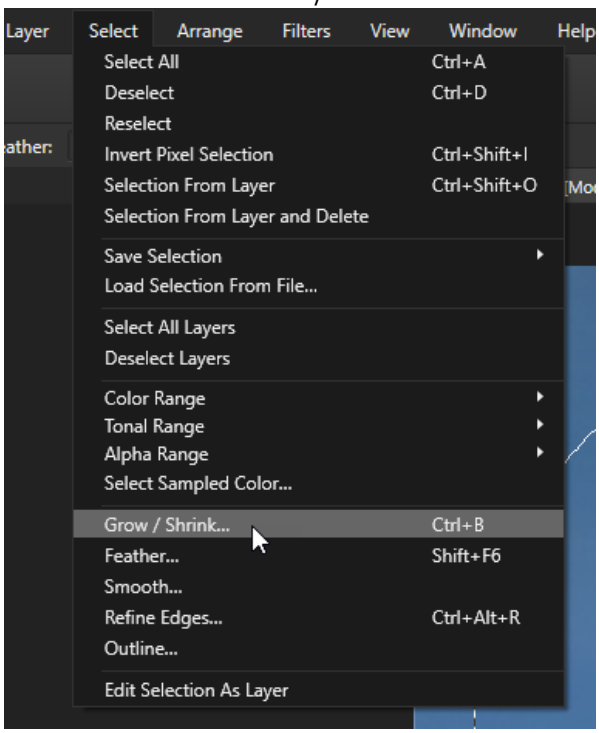


3. Click down near the top left corner of the image and drag down and to the right. Hold Shift while you drag to force the selection to be a perfect circle rather than an elongated ellipse.

4. Don't worry if your circle selection isn't placed quite correctly from the start. You can still move the selection! When you let go of the mouse to finish making the selection, your cursor will turn into crosshair arrows which allows you to move the selection. Click down on the circle and drag it around until you are happy with the position.



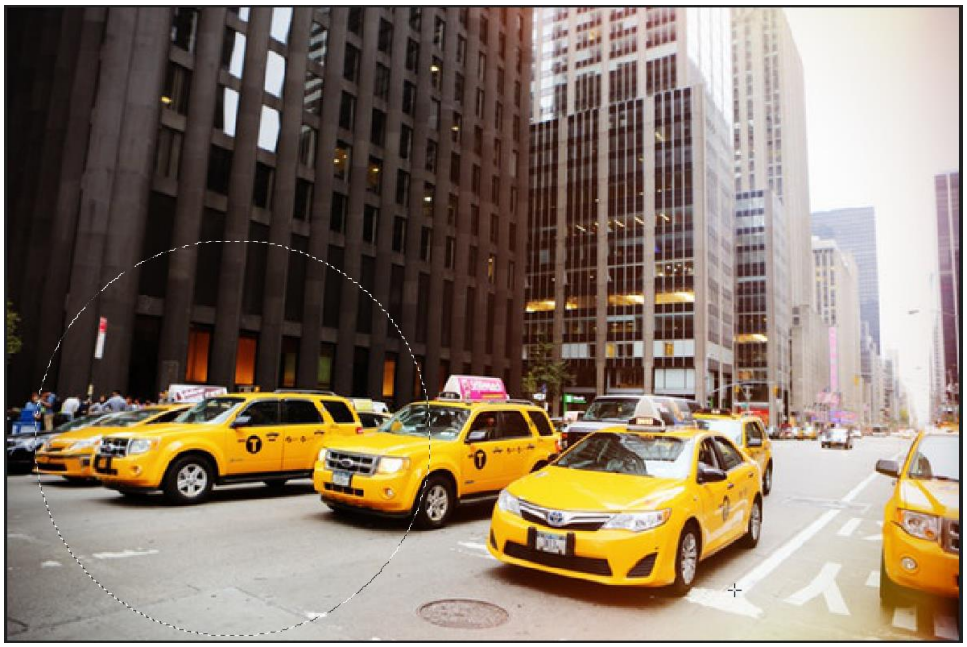
5. You can also change the size of the selection. In the Menu Bar at the top, click Select and then Grow / Shrink.



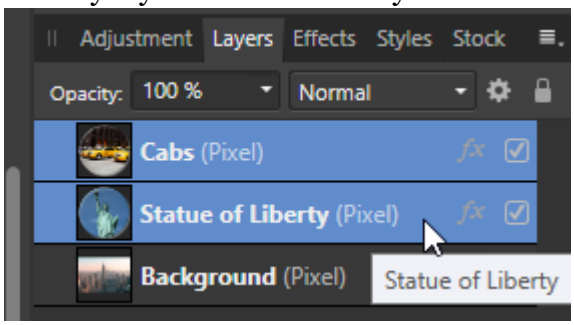
6. In the Grow/Shrink Selection window, drag the Radius slider to the left a bit to about -20px. Check the "Circular" box at the bottom of this window to help maintain the circular nature of the selection. Press Apply.
7. Hit Ctrl+C to copy the selection.
8. Click into the *nyc.jpg* tab and hit Ctrl+V to paste the selection of the Statue of Liberty.
9. Rename this layer to be Statue of Liberty
10. While clicked on the Statue of Liberty layer, click on the Move Tool and use the blue corner selection circles to make the pasted image 300px by 300px.
11. Using the Move Tool, place the Statue of Liberty image in the top right corner.

12. Hit File > Save As and name this file *act_3* into **cs1033/lab03**.

13. Click into *cabs.jpg* image tab. Use the Elliptical Marquee Tool to make a selection that includes a cab or two.

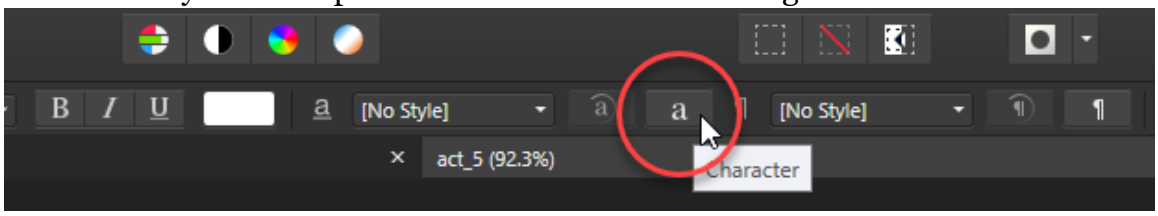


14. When you are happy with your circular cab selection, copy it and then paste it into *act_3*.
15. Resize this pasted cab image to be about 300 px by 300 px. Place it in the top left corner of the NYC skyline image,
16. Name this layer "Cabs".
17. With this Cabs layer still selected, hold the Shift key and click on the Statue of Liberty layer so that both layers become selected together.

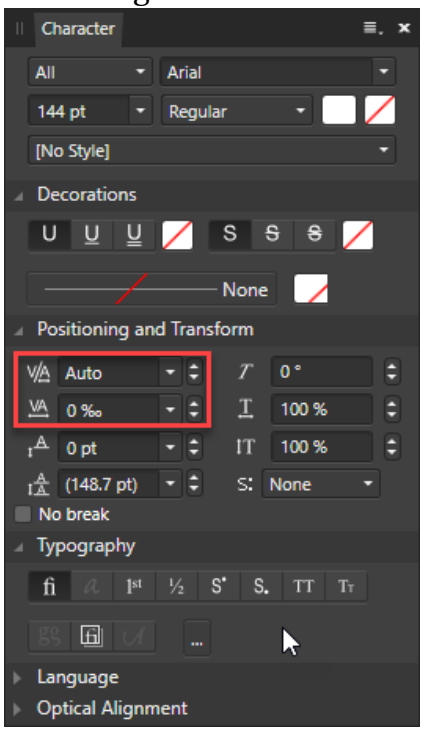


18. Click on the "fx" button to bring up the Effects window.
19. Check the box beside Bevel/Emboss
20. Click on the Bevel/Emboss option to show the relevant settings.
21. Change the Type to "Emboss" and drag the Radius slider to around 20 px.
22. Close the Effects window.
23. Notice that the effect is applied to both the cabs and Statue of Liberty because we selected both layers together when adding the effect.
24. Select the Artistic Text Tool and add the words "New York City is fun!". This text should go near the bottom of the canvas. Set the text colour to white and the font size to 72 pt.

25. At the top, below the Options Bar, find the Character button, which is letter 'a' icon) and click it to bring up a pop-up window or it will bring up the Character tab in the Layer names panel with numerous text settings.

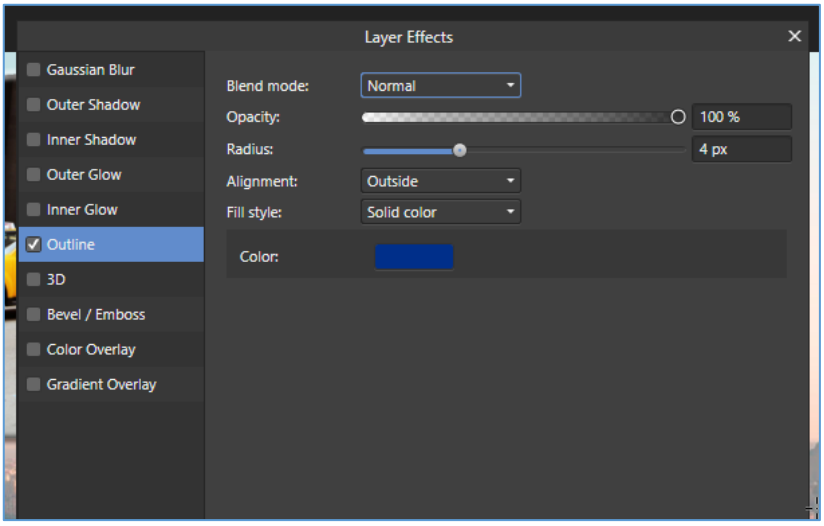


26. The first two settings under the Positioning and Transform heading are for Kerning (space between two characters) and Tracking (space across a line). If you hover your mouse over them, a tool tip will tell you which is Tracking and which is Kerning.



27. Click between any two characters in your text and look at the Kerning value.
28. Click between the 'Y' and 'o' and then set the Kerning value to -50%. This should remove some space between these two letters.
29. Now highlight all of the text and set the Tracking value to 30% to space out the entire line of text.
30. Change the font type to "Berlin Sans FB Demi".
31. Use the Move Tool to roughly center this text horizontally across the canvas.
32. Using the same steps for adding “New York City is fun!”, add an another text layer using the Artistic Text Tool with the words "Created by **StudentLastName, StudentFirstName (UWO ID)**". For example, if your name is John Smith and you UWO ID is jsmith246 then you would type “***Created by Smith, John (jsmith246)***”. Select a font size for this text so that it is roughly as wide as your “New York City is fun!” text.

33. Use the Move Tool to roughly center the text below the first text layer.
34. Check that the last text layer is still selected in the Layers panel. If not, click it now to select it.
35. Hold the Ctrl key and click on the “New York City is fun!” layer so that both text layers are selected together.
36. Click the "fx" button to bring up the Effects window. Check the box beside Outline and click on that tab to show the relevant settings.
37. Set the Radius to 4 px and use a dark blue Color.



38. The finished graphic should roughly look like this:

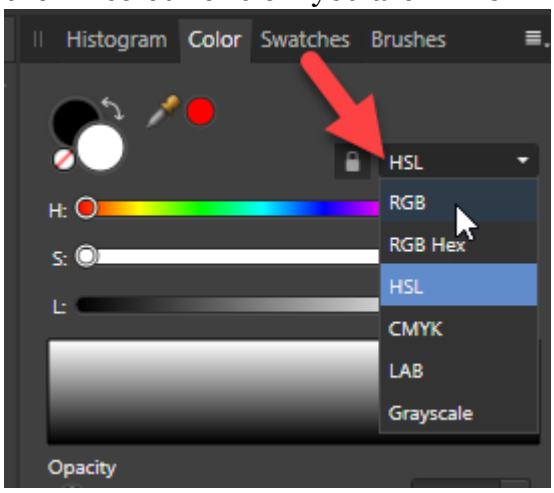
39. Hit File > Save.
40. Export the graphic as a JPEG with the name newyork.jpg into **cs1033/lab03/images**

Activity 4

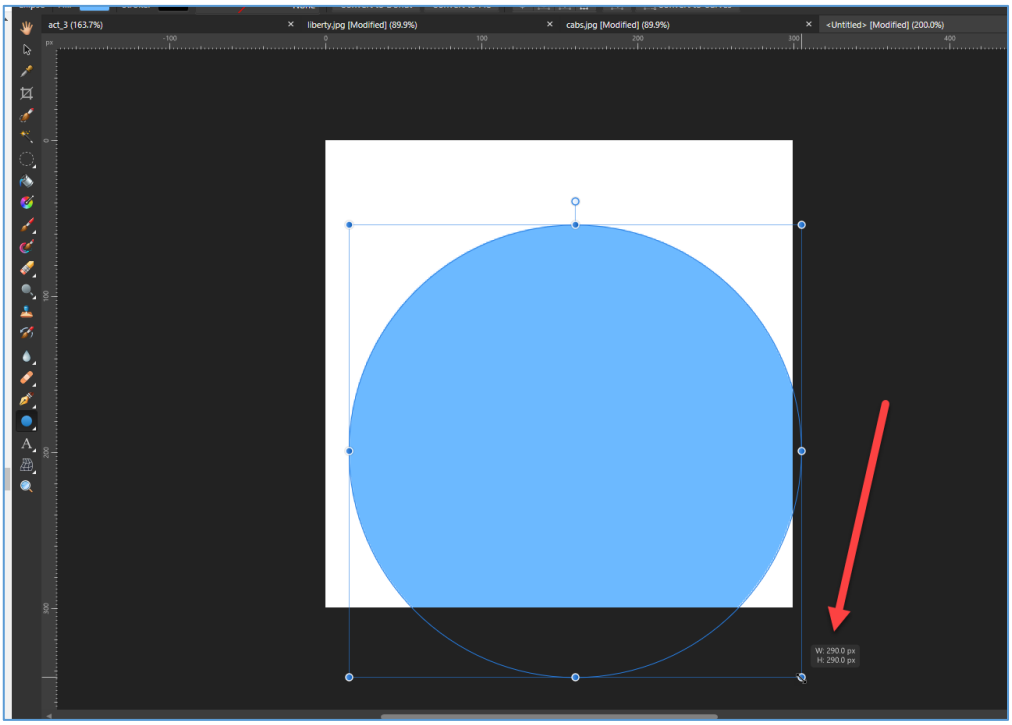
Vector graphics

In this activity, you will be making a logo using shapes. The finished graphic will be exported in both a vector format and a rasterized format for comparison purposes.

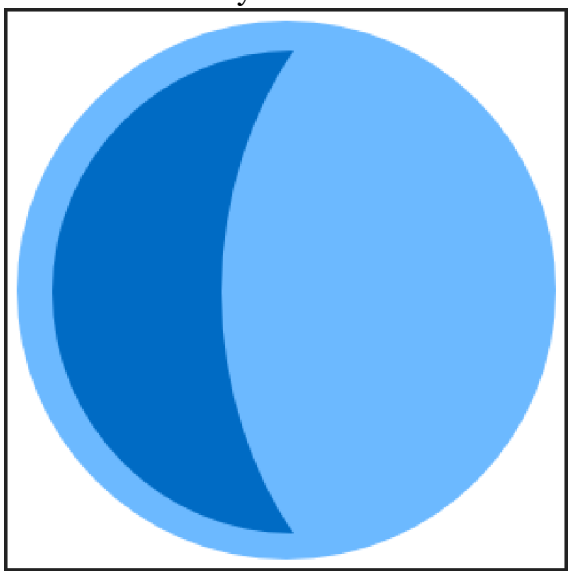
1. In Affinity, create a new file. Set both the Page Width and Page Height to 300 px.
2. Set the fill colour to light blue: RGB (108, 185, 255). Click on the dropdown near the fill colour circle if you are in HSL mode and switch to RGB mode:



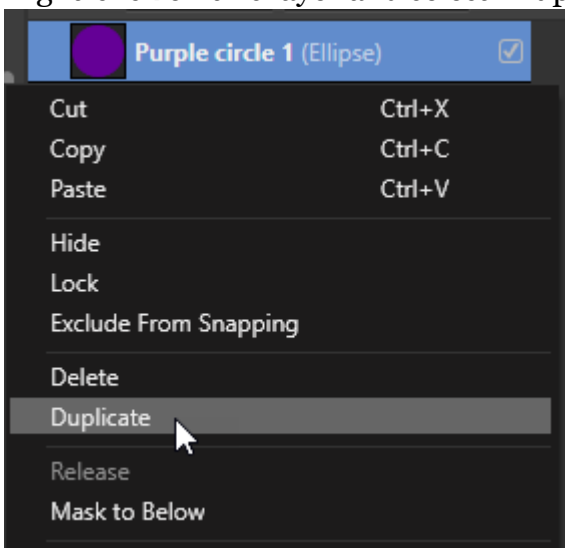
3. Use the Ellipse Tool from the Shapes Tools to draw a circle from the top left corner to the bottom right corner, filling nearly the entire size of the canvas. Move your mouse left and right to make a thin oval and a fat oval and release when you are near a circle.
4. Hit Ctrl+Z and this time hold down the Shift Key while drawing your circle, notice that it only allows you to draw a circle (not an oval). Try to fill up most of the canvas with a blue circle
5. While you are drawing the circle, look at the little window showing the size and make it 290 px by 290 px.



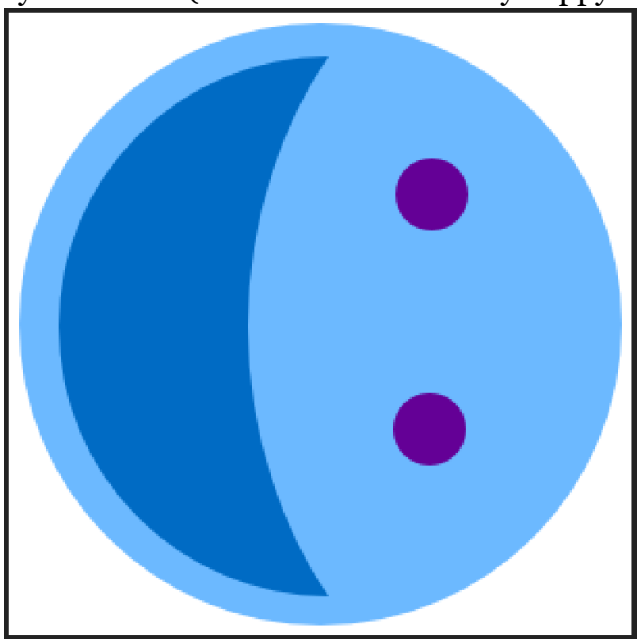
6. If your circle is partially over the edge, use the Move Tool to move it fully on the canvas roughly centered (try to have about 5 px of white space around it).
7. Name this Ellipse layer "Big Circle".
8. Hit File > Save As and save this file with the name *act_4* in **cs1033/lab03**.
9. Select the Crescent Tool in the shapes menu under Ellipse Tool.
10. Draw a crescent moon shape on top of the big circle.
11. While this crescent shape is still selected, change the fill colour to medium blue: RGB (0, 107, 196)
12. Resize the crescent shape to make it similar to the image below
13. Use the Move Tool to place the crescent moon near the left of the circle like this and name this layer Blue Moon:



14. Re-select the Ellipse Tool and draw a small circle.
15. Use the Move Tool to place this circle about 1/3 down from the top and a little right of center horizontally.
16. With this small circle still selected, change the fill colour to purple: RGB (100, 0, 150).
17. Name this layer "Purple Circle Top"
18. Right-click on this layer and select "Duplicate"

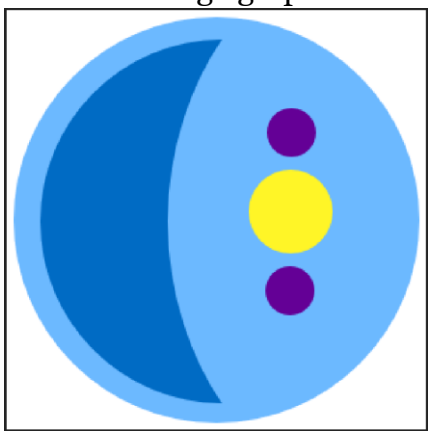


19. Now you should see two consecutive layers with the same name and thumbnail. Click on one of them and change the name to "Purple Circle Bottom".
20. Use the Move Tool to move this second purple circle straight down from its original placement (where the first purple circle is) so that it looks roughly symmetrical (it also looks like a very happy face on its side!)



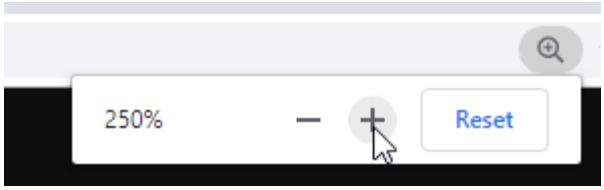
21. Now use the Ellipse Tool to draw one final circle between the two purple circles. Make this circle 60 px by 60 px.

22. With this layer selected, change the fill colour to yellow: RGB (255, 245, 39)
23. Name this layer "Yellow Middle Circle".
24. The overall logo graphic should now look like this:

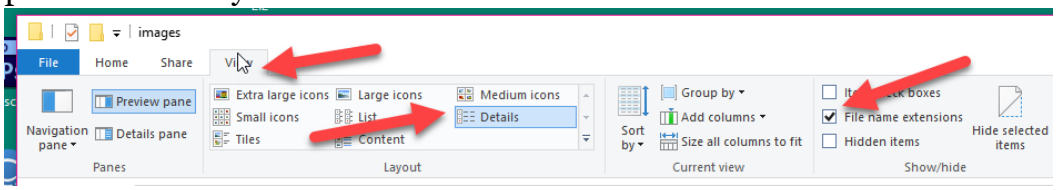


25. Hit File > Save to save these changes.
26. Hit File > Export to bring up the Export Settings pop-up window.
27. Select PNG if it's not already selected and push the Export button at the bottom of the window.
28. Navigate into **cs1033/lab03/images** and save the file with the name logoPNG.png.
29. Repeat the File>Export steps above but this time choose JPEG format and name it logoJPG.jpg.
30. Repeat the File>Export steps above but this time choose SVG format and name it logoSVG.svg.
31. In the Windows File Explorer, navigate to **cs1033/lab03/images**. You should see the 3 logo files there among other images.
32. Open Google Chrome in another window.
33. Drag *logoPNG.png* into Google Chrome and drop it in the open tab.
34. Open another new tab in Google Chrome and drag *logoJPG.jpg* onto this new tab and drop it.
35. Open a third tab in Google Chrome and drag *logoSVG.svg* onto this new tab and drop it.
36. Chrome should now have 3 tabs open, one with each of the different logo formats. Click into each tab one at a time to see the finished images. Look in the title property in the tabs and see that the JPG and PNG ones show the image size (300 × 300) but the SVG does not show a size. You will also notice that the SVG logo fills the browser window while the other 2 formats are fairly small in the browser.
37. In the PNG and JPG tabs, click the magnifying glass icon near the top of Chrome and push the + symbol to zoom in until the image fills the browser window

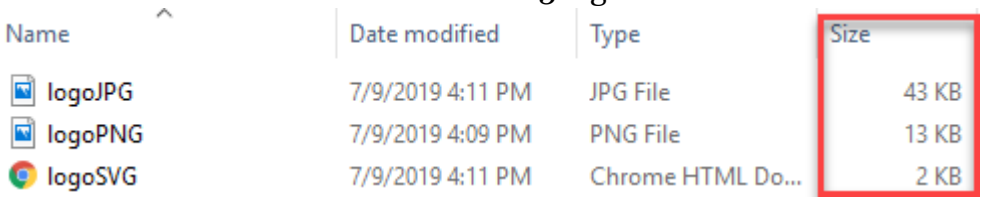
(probably around 250% to 300%)



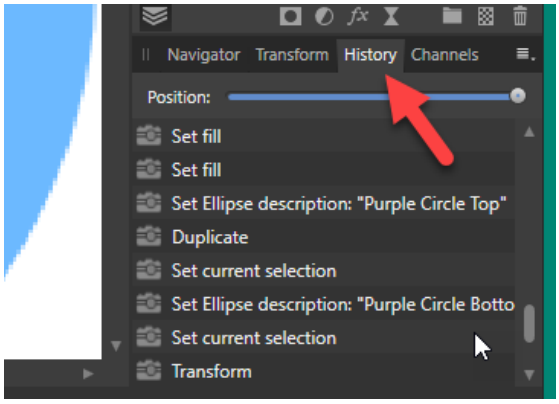
38. Now the 3 images should look roughly the same size, but notice that that the PNG and JPG are blurry and pixelated while the SVG is perfectly smooth and clear.
39. The reason for the difference between SVG and the other formats is that SVG is a vector graphic (SVG stands for Scalable Vector Graphics) meaning it is composed of lines, points and mathematical formulas that draw and redraw as you resize the geometric shapes rather than a grid of pixel cells. Because of this, the vector graphics don't have any set size and don't lose quality if they are made very large unlike their bitmapped/raster graphic counterparts.
40. Go back to the File Explorer and click on the View tab. Make sure that Details is picked for the layout and File name extensions is checked as show below:



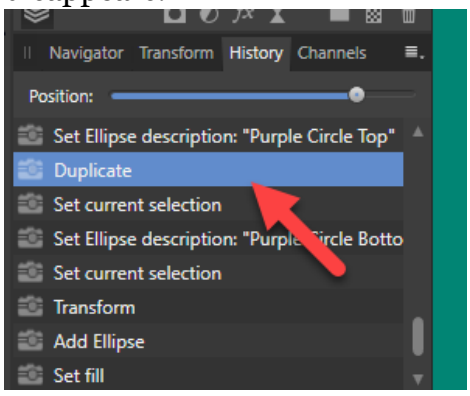
41. Now look at the file size of each of these 3 logo files.



42. In the File Explorer, right-click on logoSVG.svg and select Open with > Brackets. If for some reason Brackets isn't an option, you can alternately open it with WordPad or NotePad.
43. The entire image is composed of just a few shapes and they are all encoded there mathematically. Some of this file may look like gobbled-gook but you will see the layer names, RGB colour codes, and sequences of numbers that look confusing but are really just representing the size and location of the shapes.
44. Go back into Affinity and make sure act_4 tab is selected and you can see your logo.
45. Sometimes you want to go back a few steps and don't want to have to keep hitting Ctrl+Z. Affinity allows you to undo several steps at once or redo several steps at once using the History Panel. Select the History Tab from the lower right corner.



46. Scroll up and down you should see all the steps you took to create your logo. One of the steps you did was duplicate the purple circle. Find the Duplicate step and click on it. Notice that everything you did AFTER making the second eye disappears.

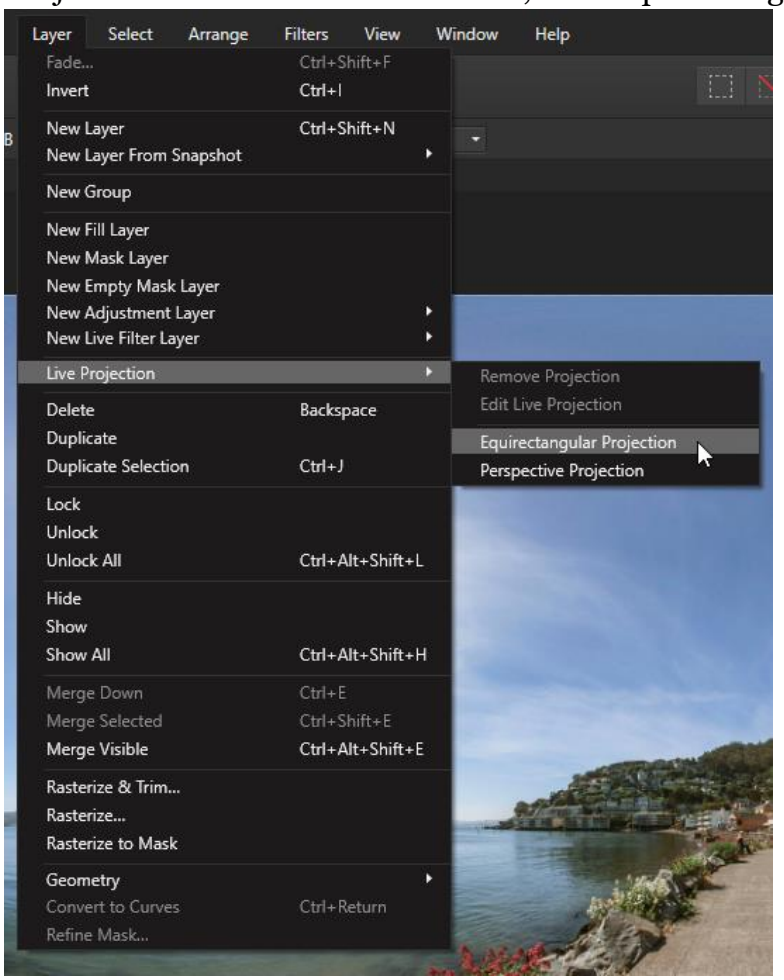


47. Now scroll down from Duplicate till you see Transform (this is when you moved the eye down) and click on Transform, then the purple eye should reappear.
48. Now scroll down to the very bottom of the history items and every step you did should reappear.
49. Use the History panel to do a more precise undo or redo than Ctrl+Z.

Activity 5

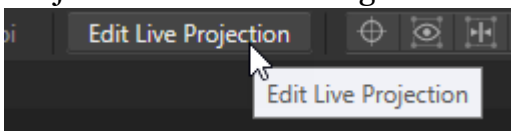
360 degree images

1. Open *panorama.jpg* in Affinity.
2. This picture may look strange to you. It kind of looks like it was taken from a fisheye lens. The reason it looks like this is that it's a 360° image.
3. Using the View Tool (the hand icon along the left at the top of the Tool Box), click down on the image and drag to the side. This just moves the whole image to the side rather than rotating your view of the image as you may have expected.
4. In the Menu Bar at the top, click Layer. In the Layer menu, hover over Live Projection and then in the sub-menu, click Equirectangular Projection.

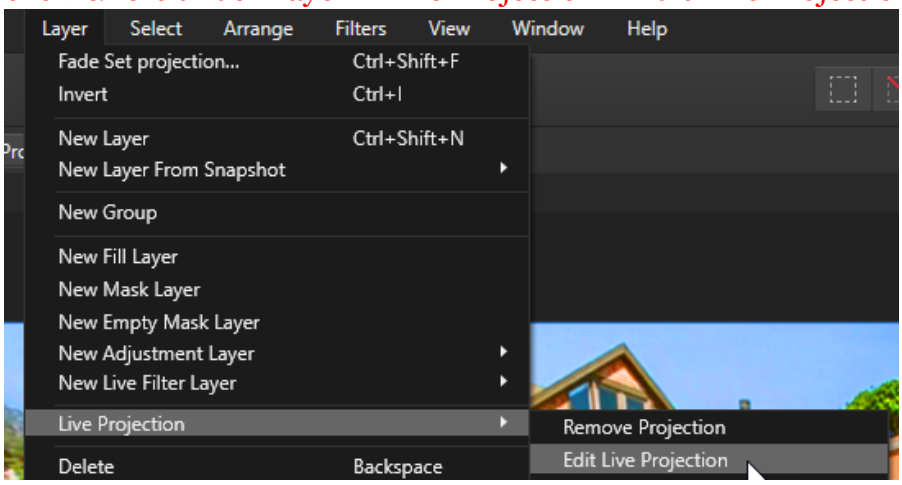


5. Now click down on the image and drag your mouse around to rotate your view of the image. Drag it around for a minute or two to get comfortable with the perspective and controls.
6. The colours are a little faded so we will apply an HSL adjustment to the image.

7. In the Adjustments panel (near the Layers Panel), add an HSL adjustment. Keep the Hue and Luminosity at their default values but increase the Saturation to 70%. Close the HSL window.
8. It doesn't matter where in the picture you are looking; you should see the colours look more vibrant with this adjustment.
9. You won't be able to pan around the image now that you have been editing it.
10. Click back into the Layers panel and select the Background layer, which is the image itself.
11. At the top, under the Options Bar, you should see a button that says "Edit Live Projection". Click that to get back into the editing mode.



NOTE: if you don't see this button, you can also go through the menu system to click it. It is under Layer > Live Projection > Edit Live Projection.

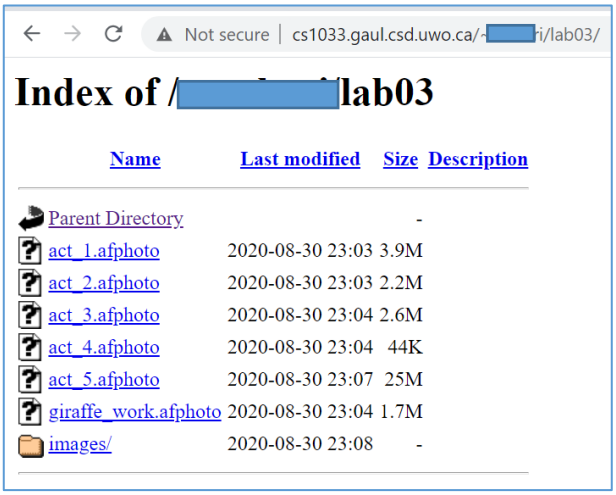


12. Back in the projection mode, pan around and see that the colours of the entire image have been enhanced from the HSL adjustment.
13. In the Layers panel, un-check the HSL Shift Adjustment layer to hide it. Then click it again to show it again. Notice the difference in colours as you do this at any angle on the image.
14. Hit File > Save As and save this file with the name *act_5* in **cs1033/lab03**.

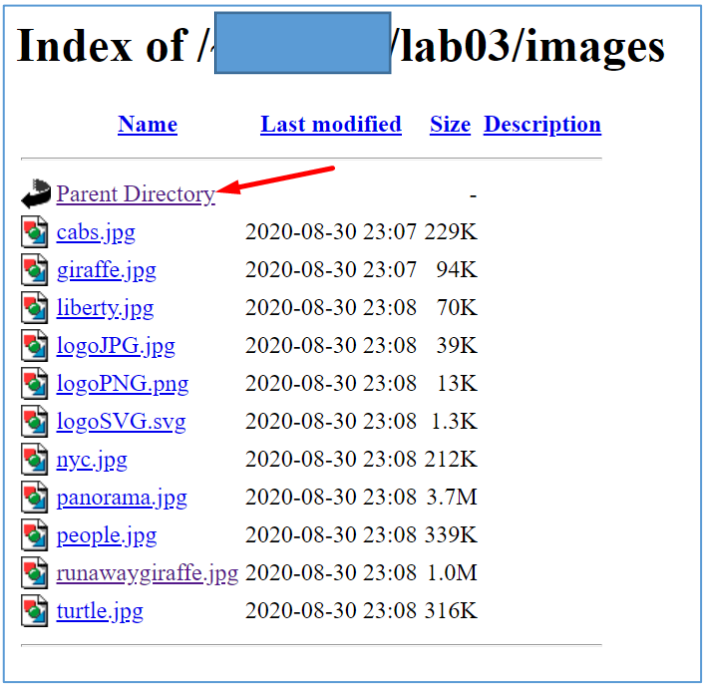
Uploading lab03 Folder

Now we are going to upload your Lab3 activities to a webserver to make sure they actually work.

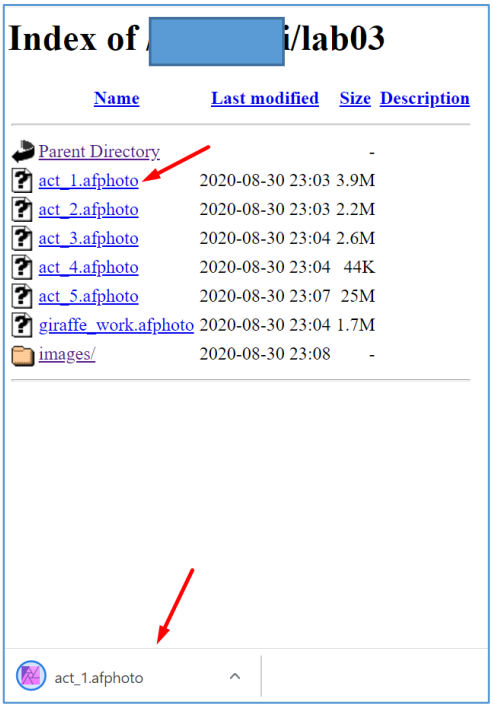
1. Use the Windows search tool (magnifying glass at the bottom of the Windows bar) to find and open WinSCP. You will be connecting to the Gaul server to upload the webpage to a webserver in order to test the webpage you just created on the World Wide Web and make sure it looks correct.
2. Enter the following information into WinSCP:
    a. File protocol: SFTP
    b. Host name: cs1033.gaul.csd.uwo.ca
    c. Port number: 1033
    d. User name: Your Western User ID
    e. Password: Your Western Password
3. Click Login.
4. When connected, you should see your lab01-lab02 folder (called a directory in WinSCP) that you created over the past weeks on the Remote side (right panel). On the Remote side (the right side), create a new directory (folder) called **lab03**. Make sure this folder has its Permissions set to 0755. This is usually the default, but if, for some reason it's different, change it to 0755 now.
5. Click into the **lab03** folder.
6. In the Local side (left panel), navigate to **F:/cs1033/lab03**. Select all the work you've completed (affinity files and **images** folder) and drag them across to the Remote side to upload it.
7. Open a new tab in Google Chrome and go to:
   http://cs1033.gaul.csd.uwo.ca/~**youruserid**/lab03
   where **youruserid** is your own Western username.
8. If you have uploaded correctly, you should see something like this:



9. Now click on the ***images*** folder in your browser to make sure your images were uploaded and then click on the ***Parent Directory*** to go back up to your ***lab03*** folder:



10. Then click on each of your **.afphoto** file links to make sure the link works. If the links work, the files will attempt to download as shown here:



11. If all files attempt to download, then you have done this step correctly and are ready to submit your links to Owl.

Lab3 OWL Submission

1. In your Internet browser, go to https://owl.uwo.ca and login with your UWO username and password.
2. Go to your CS1033 OWL site.
3. On the left-side panel, click on **Week By Week**. Click on the **Week 3** button, then click on the **Lab 3** button, this will take you directly to **the Lab 3** submission area in Owl.
4. In the textbox under Submission, copy and paste your submission link which is:
    a. http://cs1033.gaul.csd.uwo.ca/~**youruserid**/lab03
    b. http://cs1033.gaul.csd.uwo.ca/~**youruserid**/lab03/act_1.afphoto
    c. http://cs1033.gaul.csd.uwo.ca/~**youruserid**/lab03/act_2.afphoto
    d. http://cs1033.gaul.csd.uwo.ca/~**youruserid**/lab03/images/runawaygiraffe.jpg
    e. http://cs1033.gaul.csd.uwo.ca/~**youruserid**/lab03/act_3.afphoto
    f. http://cs1033.gaul.csd.uwo.ca/~**youruserid**/lab03/images/newyork.jpg
    g. http://cs1033.gaul.csd.uwo.ca/~**youruserid**/lab03/act_4.afphoto
    h. http://cs1033.gaul.csd.uwo.ca/~**youruserid**/lab03/images/logoPNG.png
    i. http://cs1033.gaul.csd.uwo.ca/~**youruserid**/lab03/images/logoJPG.jpg
    j. http://cs1033.gaul.csd.uwo.ca/~**youruserid**/lab03/images/logoSVG.svg
    k. http://cs1033.gaul.csd.uwo.ca/~**youruserid**/lab03/act_5.afphoto
5. Click on Submit.

Remember to save all your Lab03 folder on your backup memory stick or cloud storage!