

Unit 54 Media

Task 1:

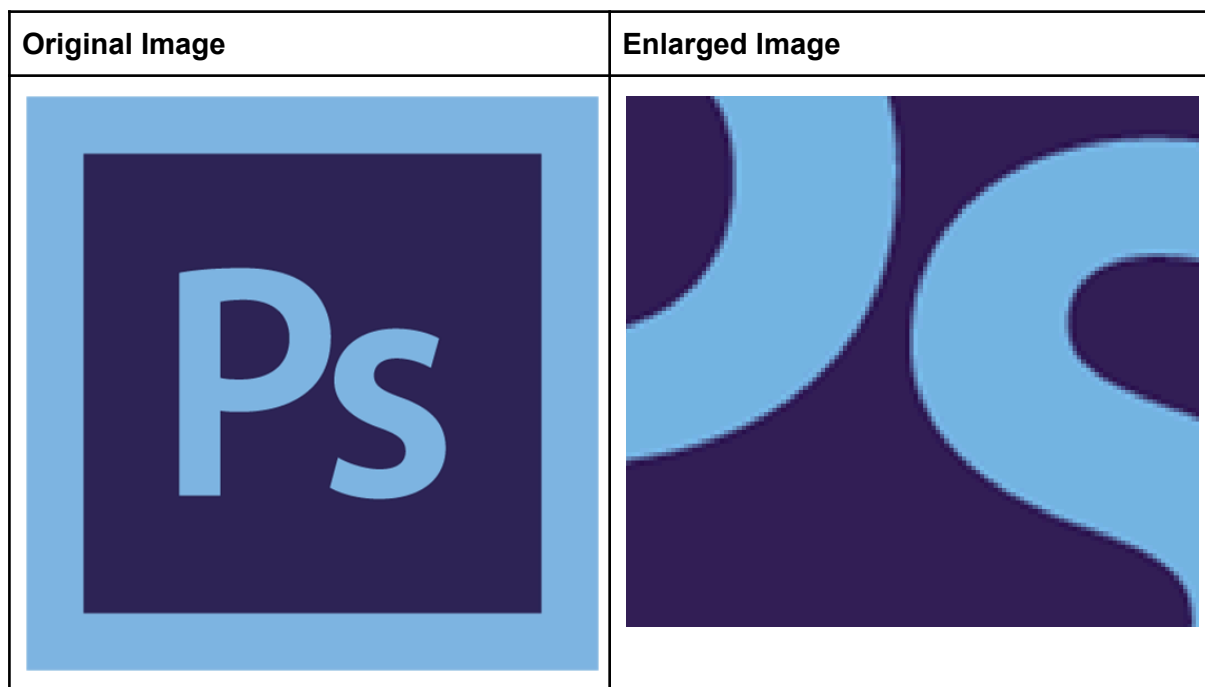
Image Files

Vector images

A vector image is made from mathematical equations from one point to another and is resolution independent which means when you zoom in or enlarge the image, it does not go blurry or lose resolution like a raster image. The image is scalable so that no matter what size you create it, the image quality stays the same. An example of a vector image is a PDF which can change size and shape without degrading the pixel quality.

Raster images

A raster image is one that uses bitmap which is binary digits, a set of pixels to compose an image. A JPEG is an example of a raster image because if you try to enlarge it or enhance it, the image can become unfocused and blurry. This is because it is resolution dependent so if the image is enlarged, the laptop would have to guess where the extra enlarged pixels would go, thus creating the blur.



Differences

The main difference between vector and raster images is that raster uses bitmap and is resolution dependent while vector is resolution independent. Another difference is how they are formed. A raster is formed from pixels while a vector is formed from mathematical calculations. This explains why if you zoom in on a raster, you get blurry tiny squares while on a vector, it is clear.

Source Code

Source code is any group of code which is written using programming that is 'human-readable' which means that it uses plain text. Source code of a program is designed to ease the work of the computer programmer's who assemble the code which then gets transformed into binary for the computer to understand and to execute depending on the action requested.

```
main( ) {  
    printf("hello, world");  
}
```

Identify the different Digital graphic file formats and describe the compatible software programs/applications for each file type, explaining and giving examples of the different ways you can use them with different programs/applications.

In addition identify the uses for different file formats, explaining what they are used for and who uses them, providing examples of the uses in the real world.

JPEG

A JPEG image stands for Joint Photographic Expert Group and is a commonly used platform of digital photography. The compression of a JPEG can easily be adjusted at one's will which allows a balance between storage size and image quality. A JPEG uses 'lossy compression' to alter image size and quality. One reason why people use JPEG is because not only is it the most likely searched image file on Google but because of the small amount of storage space it takes up which allows people to store many JPEGs on their device. A JPEG can be used in programs such as PowerPoint, Word, Excel, Prezi, Photoshop and Illustrator to name a few.

PNG

A PNG image stands for Portable Network Graphics which is a raster image format that uses 'lossless data compression' which is when original data can be reconstructed perfectly from the compressed data. It is the most used format on the internet that uses 'lossless data compression'. One reason why people use PNG is because the image quality does not change under compression ratio like a JPEG and it is possible to work with layered images. PNGs are used for creating logos, web page navigation, graphic text and engravings.

GIF

A GIF stands for Graphic Interchange Format and is formatted using the bitmap image format. It is either an animated image or a still, but the animated format is the most common and most used. They are compressed with Lempel–Ziv–Welch which is used to reduce the file size without degrading the visual quality. Different ways people tend to use a GIF is by posting them on social media sites to share with friends (which is the most common way) or email them to people.

TIFF

TIFF stands for Tagged Image File Format and is used to store raster graphics. TIFF is popular among the publishing industry and graphic artists. TIFF also uses Lempel–Ziv–Welch to compress file sizes. It is also a popular format for deep colour images which means it can store/compress over a billion colours. How people use it is through visual art created by themselves or others if it is being published.

PSD and AI

PSD stands for PhotoShop Document. Image formats such as JPEG, PNG and GIF can all be converted into a PSD. The PSD format is mainly used to provide an area for raster images to go. A limit to a PSD is that the PSD format can only be opened in PhotoShop which limits how or where people can access it. Examples of where and how people will use it is in Photoshop to improve or change an image.

AI stands for Adobe Illustrator Artwork which is similar to PSD is used in the same type of way to put JPEG and PNG images into an application to edit them to your desire Unlike PSD, programs that support AI are DrawPlus, Freehand and sK1.

Photoshop and Illustrator

Photoshop is a program that allows you to edit raster graphic photos such as JPEG. As a file format the extension is .PSD when your image is converted. The type of project we would use Photoshop for include image editing and advertisement creation. The tools in Photoshop include; pen tool which is used for creating paths and anchor points, shape tools which are used to create vector graphics, colour replacement tool which is used to change and highlight the colours in an image and 3D printing tools which are used to design 3D models from scratch. The benefits of Photoshop is editing photos can be done really easy and effectively, professional training and experience is not required to produce effective work and like a web browser you have tabs so it is easy to organise your photos. However, some limitations of Photoshop is that although it is easy to use, it is not for beginners so it may take some practice, it is very expensive so not beneficial to people who won't use it everyday and it takes up a lot of space and requires a well equipped computer.

Illustrator is a program that allows you to edit vector graphic photos such as PDF. As a file format the extension is .AI when your image is converted. The type of project we would use Illustrator for include creating logos, cartoons, graphics and fonts. The tools in Illustrator include; selection tools which are used for adjustments, layout changes, grouping and measuring objects, and positioning, paintbrush tools which are used for modifying the artwork with different brushes like calligraphic and scatter, pen tools which are used for lines and anchor points, and pencil tools which are used for drawing freehand lines. The benefits of Illustrator are that it works on any computer system including old computers from the 2000s, it is easy to create print based and web based graphics at the ready and Illustrator file size is small so doesn't take up too much space. However, the limitations of Illustrator is that there is little to no support for raster graphics, you will have to use Photoshop for that, due to the complex tools, it requires time and patience and it is expensive like Photoshop so you should only buy it if it is beneficial to you daily.

Mention why we would use it for a particular project and why we use illustrator and what separates them. Talk about tools, compatibility, benefits features, limitations.

PDF

PDF stands for Portable Document Format which is used to display images, but more so text formats like essays and documents. The vector graphics in PDF use paths which are composed of lines and the outline of the text and the raster images in PDF are formatted as dictionaries, which are properties of the image, and streams, the image data. How people

use a PDF is through printing documents, viewing clear images and formatting and saving work to publish on a site.

SVG

SVG stands for Scalable Vector Graphics and is an Extensible Markup Language (XML) vector graphic for two dimensional images. SVGs allow vector graphic images, bitmap images and text. Most browsers like Internet Explorer, Firefox and Google Chrome. SVG graphical objects can be styled, transformed, grouped and composed into objects which have been previously rendered.

SWF

SWF stands for Small Web Format and is an Adobe Flash format used for vector graphics and multimedia. Examples of programs compatible with SWF is Illustrator, After Effects and Flash. SWF's main graphic wave is the path which is similar to PDF and SVG. It can create lines as well as rectangles and curves. SWF uses a binary stream format (which is a sequence of 'bits' such as 8 bit quantity) just like Quicktime. SWF can be used primary in Flash and Adobe related programs.

BMP

BMP file format is known as the Bitmap Image File which uses raster graphics to store bitmap digital images. It is capable of two dimensional images as both colour and monochrome using data compression. BMP files can be used and opened with Windows software and Windows Metafile. The Device Independent Bitmap defines DIB's (of which BMP is one of) in various colour formats and is an external format for BMP of which it can be used from.

Photoshop Screenshots (100%, 400%, 1600%)



In these three Photoshop images, the resolution has got worse with each increase in percentage. In other words, the pictures have gotten more 'blurry' or pixelated the more they are zoomed in. The reason for this is because the more an image is zoomed in or enlarged, the software and laptop would have to guess where the pixels go because the images are resolution dependent which means they lose resolution if it is tampered with such as enlarging.

Illustrator Screenshots (100%, 400%, 1600%)

Hello

Hello

Hello

In these three Illustrator images, as the percentage of the zoom has increased, the image

quality has not changed in terms of resolution unlike with Photoshop images. The reason for this is because these are vector images which means that they are resolution independent and are able to adapt to whatever size you make it because it is scalable. In this case, these images are better and more focused than the Photoshop one.

Now compare resolution and files sizes between these different file formats (JPG, PSD, TIFF, SVG, SVGZ, AI & PDF) illustrate with screen grabs & evaluate the various file formats in relation to the quality of the image, explain compression and explain via comparison the differences and similarities between the raster, vector and metafile file types.

Comparison between File Sizes and Resolutions:

Image compression is when data compression is applied to digital images in order to reduce storage size or transmission. It may be lossy (lose some part of the image like quality) or lossless (reproducing the image perfectly).



The differences is that for the PDF image, no matter how much you adjust the scale, it does not falter in quality. However, with the TIFF image, the more you adjust the scale the more pixels you see and the quality gets worse. Both come from Illustrator which shows the varying quality of the image depending on what file you choose to export it as.

A similarity found is between SVG and PDF images. Both have the same amount of quality and resolution because they are both resolution independent. This means they both reproduce the image perfectly with nothing lost from the image.

The positives of raster image like the JPEG is that the storage size of the image compresses down to make it easier and more accessible on your storage space.

However, a negative of raster image is it the fact it is resolution dependent which causes the blur look.

The positive of vector image like the PDF is that it is resolution independent so the quality is consistent. However a negative is that they are harder to use on encoding photos or videos.

Take a photo of yourself/someone with a DSLR of different image qualities/sizes, both the highest resolution and the lowest resolution (you can take the low resolution image with “photo booth”) - and use these TWO to illustrate & Explain:

That each image is made up of millions/thousands of separate pixels, each a different colour and one ‘square’, as there are millions then this is what allows the images to be such crisp, high resolution images (JPEG). Define the term pixel.

Digital image dimensions (3888 x 2522...) and the amount of pixels in your two different quality digital images, working out the MegaPixels and explaining the links between quality, and MP/cameras...

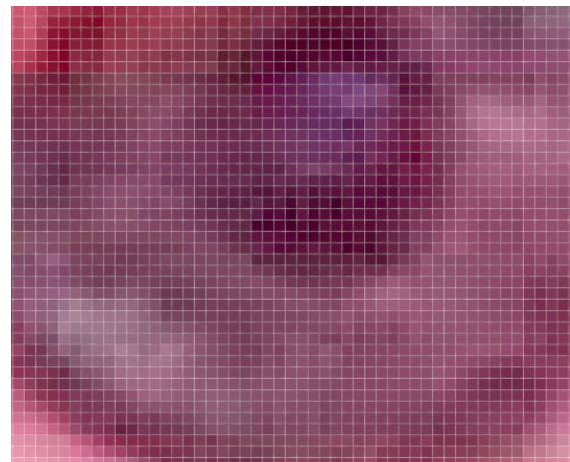
However a pixel itself can also be a variety of different qualities, this is determined by the bits per pixel (BPP), for example 1-bit, 4-bit, 8-bit and 24-bit

Explain using examples the difference between 1-bit, 4-bit, 8-bit and 24-bit images and how this affects the quality and size of the image you also need to make reference to technological change in image quality (i.e. 30 years ago 1bit, 4bit... were the ‘best’ quality of digital image)

To do this you will need to convert your highest quality DSLR photo in Photoshop ‘down’ to a 1-bit, 4-bit, and 8-bit image (it already is a 24 bit image)

Explain how 16.7 million colours, 24 bit digital images - i.e. high quality digital photographs are actually three x 8 bit, as “true colour” is has 3 ‘channels’ red, green and blue (RGB)

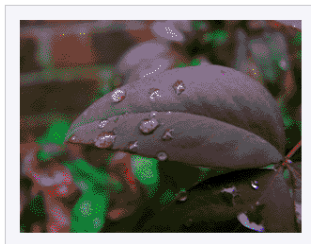
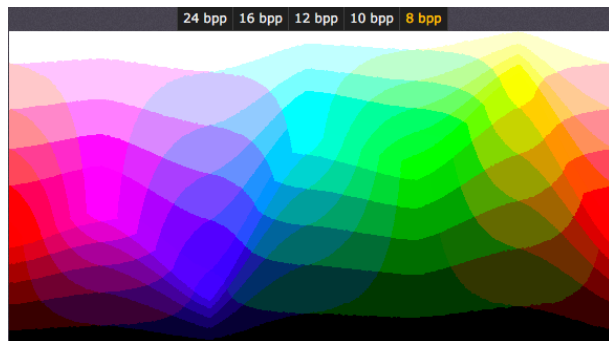
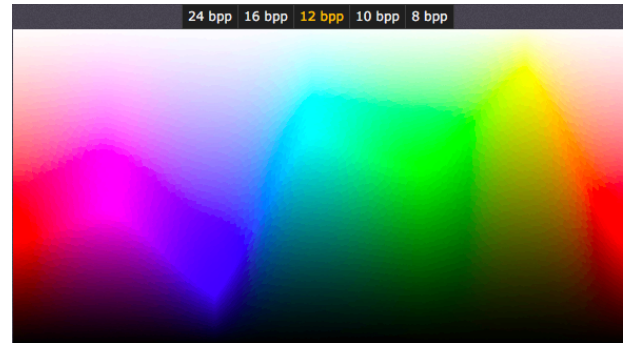
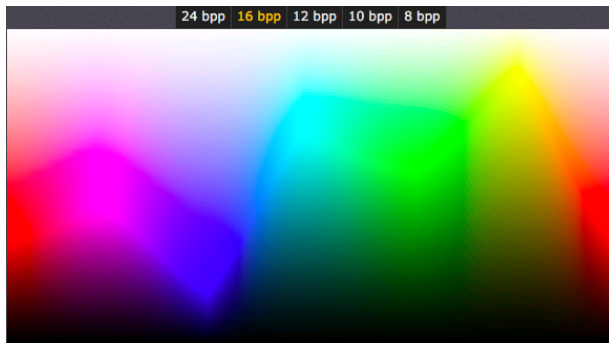
The term ‘pixel’ is a area of illumination on an image. An individual pixel is one of many when an image is composed. It is an individual ‘square’ used to make up an image. Every image is made up of pixels each with a different colour. A megapixel is one that equates to around one million individual pixels per image. A pixel itself can be different qualities like 1 bit, 4 bit, 8 bit and 24 bit which are the most common types. The image to the right is a showcase of how many pixels are in a close up, zoomed in image.



These screenshots are the 8 bit, 10 bit, 16, bit and 24 bit images to showcase the different types of colour that can be seen in each type of image. Approximately 16.7 million colours can be seen in a 24 bit image while only 256 colours can be seen in an 8 bit. The reason a 24 bit has 16.7 million colours is because it is 256 times itself three



times which makes a 24 bit image. The technological changes over time of images is that years ago, 1 bit was considered to be the best image quality. However, now we know overtime that this is not the case as colour depth/bit depth (this is the number of bits in a single pixel) has shown us the advancements in image quality. For example, the ZX Spectrum home computer released in the UK in 1982, pictures were shown in 2 colour format which is from the RGB colour model. The RGB colour model is a colour model where three colour channels red, green and blue come together to produce an array of different colours.



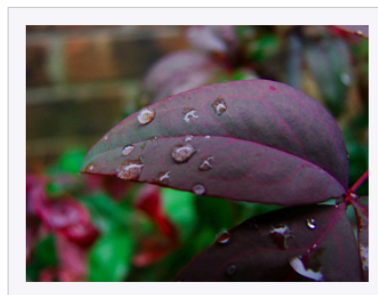
4 bit.png
16 colors
13 KB (-87%)



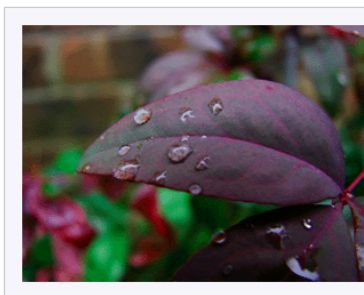
2 bit.png
4 colors
6 KB (-94%)



1 bit.png
2 colors
4 KB (-96%)



32 bit.png
4,294,967,296 colors
98 KB



8 bit.png
256 colors
37 KB (-62%)

Cut out the photo of yourself/someone - use either 'magnetic lasso' or 'magic wand' or 'quick selection' tools in Photoshop to cut out the image, and place on a transparent background and then save the file as a PNG.

Add this image to the text you already have in Photoshop.

In Photoshop enlarge the photo part of the image and export as a PDF

Open the PDF in 'Preview' and 'Acrobat Reader' zoom in, explain what happens to the text and what happens to the image, explain that this is because a PDF is a metafile which can 'host' both raster and vector information.

In Photoshop zoom in on the same image, explain what happens to the text and what happens to the image, explain that this is because in Photoshop the image is not yet exported as a PDF so does not have the capacity to show raster and vector information; only raster as Photoshop is a raster based programme.



What happens to the quality in the above PDF images zoomed in 400% and 800% is that because it is a PDF, it can host both raster and vector information which is why the image quality does not falter when zooming in.

In Photoshop, the vector information is not shown because it has not yet been exported which is why the image looks poor in quality compared to the PDF.

Describe how you cut out the photo (and the other possible ways to cut out the photo - you could have used, magnetic lasso, polygonal lasso, magic wand, quick selection) save the file as a PNG (explain why PNG what PNG is and how is 'portable' - into Illustrator and Preview).

The photo was cut out using the magnetic lasso tool. This is a tool which allows you to trace around the photo without the need for too much accuracy. You can trace loosely around an image and the magnets will latch onto what it thinks you want to cut out. It is the easiest tool



for cutting out part of an image if you don't mind the occasional mishap. The polygonal lasso tool is used for drawing freeform selection which are based on straight polygonal shapes. The rectangle marquee tool works the same way but is limited to 4 sides. The polygonal lasso tool allows you to create unlimited sided shapes as well as allow you to move in any direction. The magic wand tool allows you to select the pixels of an image based on tone and colour which is unlike other Photoshop tools that select using shapes and sizes. Magic wand looks at a selected image pixels and colour and selects the pixels that share the same or similar colours. The quick selection tool is similar to magic wand in that it also selects pixels based on colour. However, it also looks at different textures which is useful for selecting

shape edges. It is used more like a brush which makes it easier to handle. The reason we save these types of images as PNG is because a PNG image does not change the quality like a JPEG does. It is also considered 'portable' in Illustrator and Preview because it uses 'lossless data compression' so that the data can be reconstructed almost exactly, from the compressed data.

In Illustrator 'Place' the cut out PNG photo draw a rectangle, change the 'fill' of this, place behind photo to prove portability of the transparency (show 2 different ways: right click and arrange and using layers, sub-layers etc).

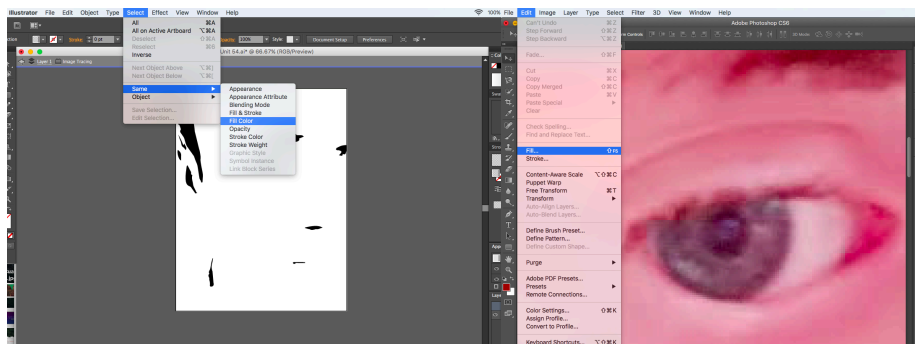
'Live trace' your cut-out image - in order to vectorize it (describe the key aspects necessary to carry out this task - 'ignore white' etc). Make clear the differences between Illustrator and Photoshop that become apparent (fill is in a different place, bounding box (always present), layers, sub-layers, paths - hence constant ease of editing all aspects of Illustrator files/documents).

With this image, I have used the cut out image from the magnetic lasso and placed it over a green, rectangle background which was created using the shape tool and placed behind the cut out. How to live trace an image is to use the default option of going



to 'Object' 'Live Trace' 'Make' in Illustrator which should create an automatic live trace image. The tracing options are 'Preset' which is when you are given an automatic live trace. 'Mode' which specifies a colour you want to use. 'Threshold' which generates black and white tracing where all pixels lighter than the threshold are changed to white while those darker are black. 'Palette' which is used to generate colour and grayscale which can be selected under the swatch library. 'Raster' which specifies the display of bitmap components of the object and 'Vector' which specifies the tracing result. Both of these settings are not saved in the tracing preset.

The differences between Illustrator and Photoshop in regards to live trace is that one, 'Fill' is in a different place. In Illustrator it is under 'Select' whereas in Photoshop it is under 'Edit'. The 'Layers' are located in the same place on both softwares. Another difference is the 'Bounding Box' is always shown in Photoshop but Illustrator provides the options to either show or hide it. The option for 'Paths' is shown under 'Object' in Illustrator and provides more options whereas in Photoshop it is under 'Window' and has less options.



After 'Placing' the cut out PNG photo you need to 'Live trace' this image (in B&W and Colour) - in order to vectorise it.

You should take screenshots of the B&W and Colour vectorized images not zoomed in where you can see the whole image.

Then zoom in, to about 3200% and screenshot the zoomed in part of the image and then you should try to describe the look of the vector images when zoomed in (shapes, flat colours without tone or gradient...).

You should also compare the B&W and Colour vectorized images - which looks better and why? AND then explain, using this as an example, how vector images do not lose resolution, but they do lose 'definition' and become a series of shapes and lines, and flat colours, which (unlike a raster based image) lacks tonal depth.

The black and white zoomed in vectorised image to 3200% only shows to colours with little to no tone, depth or gradient. The coloured image offers more tones and shades of colour. This goes with both the black and white and coloured zoomed out images. The coloured image looks better because more detail can be found in the face based on the colour tones and shapes compared to the black and white image where only two colours are seen. This is because of 'Threshold' where the lighter colours are converted to white and the darker are

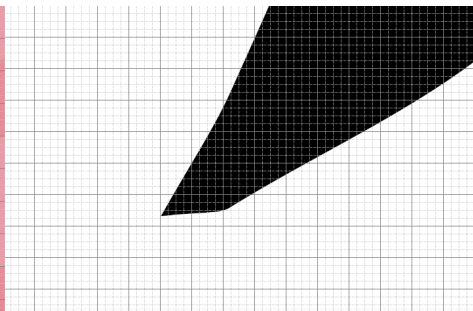
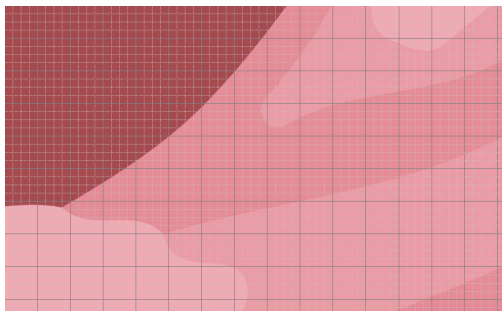


black rather than different shades like the coloured image. How vector images do not lose resolution is because the image is scalable and

resolution independent so it does not rely on resolution to affect quality. However, they do lose definition which means it becomes shapes and lines that, unlike a raster image, lack tone and depth. In this case though, the coloured example has more depth and tone than the black and white though these are considered 'flat' colours which means there is solid ink coverage with no halftones or gradations.



The amount of pixels in the zoomed in raster image is 4x4 per grey square which means there are over 135 individual pixels in the image below. The raster image shows more tone and detail compared to the black and white image. From this, I have turned a digital photo into an art style drawing which means that the black and white is a better vector image and the coloured image is the better raster image.



**Compare the
raster and
vector**

zoomed in part of the image - adding grid lines in Photoshop to help you - you should then be able to compare the amount of pixels (picture elements - in their thousands) compared to the amount of shapes (parts or elements of the vector image between 20 -100) in Illustrator and how this is obviously part of the reason why the raster image is better quality and shows more tone and detail.

Eventually you should conclude that this is because we have vectorized a raster digital image - making a digital photo into a digital drawing/illustration - hence the B&W is a better looking vector image as the best colour image is the photo - because photos are more realistic than drawings.

Experiment with exporting your Illustrator work as different file types - comparing file sizes, file quality in addition to compatibility with other applications and web browsers (SVG, SVGZ, PDF etc).

Magazine format:

T3- Technology magazine that focuses on specs, models and looks and prices.

Cosmopolitan- Fashion magazine focusing on models, clothes advice and sex/life tips.

Total Film- Film/TV magazine focusing on reviews, previews, and news.