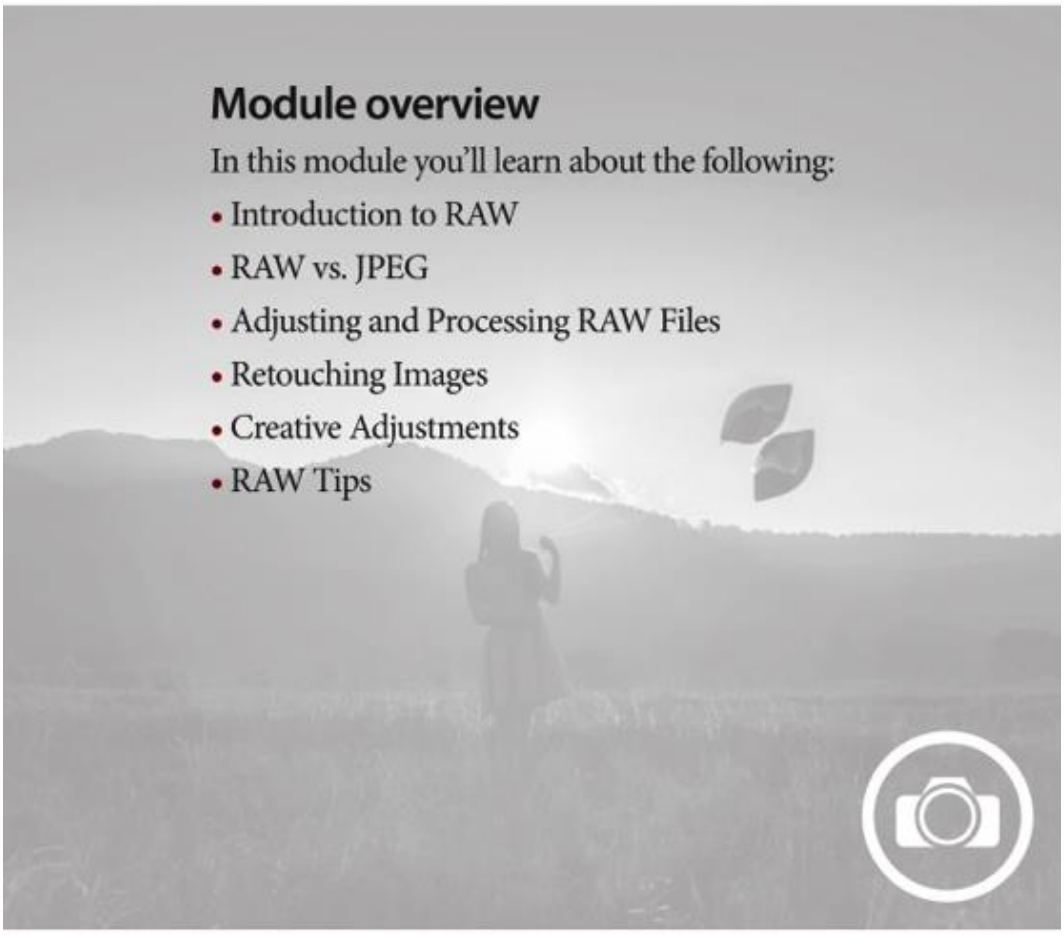
Module 8:
RAW



"A lot of photographers think that if they buy a better camera they'll be able to take better photographs. A better camera won't do a thing for you if you don't have anything in your head or in your heart."

Arnold Newman
(1918 – 2006)

Tip: to shoot RAW files, you will need to browse through the menu on your camera. Look for "image quality" there; you will have the option to shoot JPEG, RAW or both.

8.1 Introduction to RAW

The light that travels through your lens and hits the sensor is recorded and then compressed and processed into an image file. Called a JPEG file, this is the standard format for viewing, editing and sharing digital photographs, and all digital cameras use this image format.

There is also a second type of file format that is unique to DSLR cameras. It's called a RAW file; this is because it is the unprocessed, uncompressed data recorded by the camera's sensor. There is not a fixed name for these files because camera manufacturers create their own RAW format, such as CR2 (Canon), NEF (Nikon), ORF (Olympus), PEF (Pentax) and many more.

In this module, we'll look at the capabilities of RAW files and the level of control they give you over your images. The focus will be on "what" can be done as opposed to "how" it's done.

8.2 RAW v JPEG

If you do an Internet search for "RAW v JPEG", you will find hundreds of articles, blog posts and forum threads about which of these formats is the better.

Many photographers will only shoot RAW files but many will also just shoot JPEG files. So there's some difference of opinion on which is better; but the truth is, that it depends on you.

Let's look at the differences between the two formats.

RAW

Not an image file (they can only be processed using a computer).
A proprietary format (meaning that each format is different, depending on the manufacturer).
The complete (lossless) data from the camera's sensor.
Uncompressed, meaning much larger file sizes.
Higher in dynamic range (ability to display highlights and shadows).
Lower contrast.
Not as sharp.

JPEG

A standard format readable by any image software.
Compressed, meaning a smaller file size.
Lower in dynamic range.
Higher contrast.
Sharper.
Immediately suitable for printing, sharing, or posting online.
Able to be manipulated, though not without losing data.
Processed by your camera.

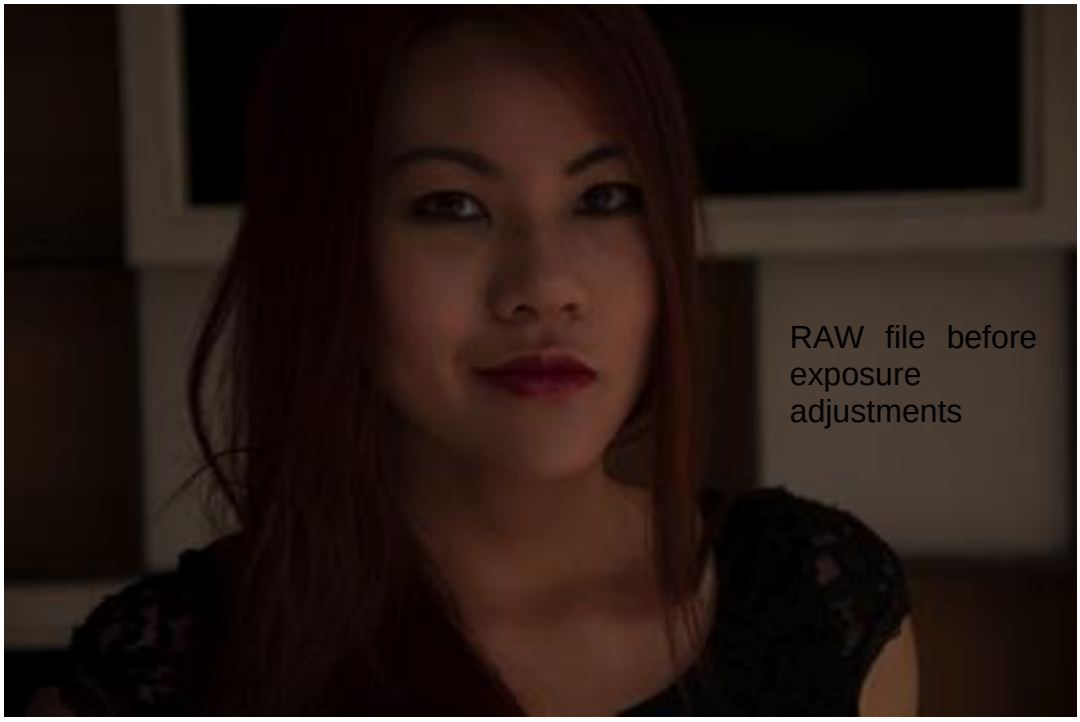
Tip: due to the size of RAW files, it helps to have a large memory card (64GB would be sufficient).

An external hard drive would also be helpful; this can either be used as a backup for your image files or be used to save hard drive space on your computer.

So each format has its advantages and disadvantages, and the decision to shoot RAW should be considered on a case-by-case basis. For example, if the photos need to be printed or uploaded quickly, then JPEG would be preferable. However, if time is not a factor and you want more control over the finished images, then RAW would be the better option.

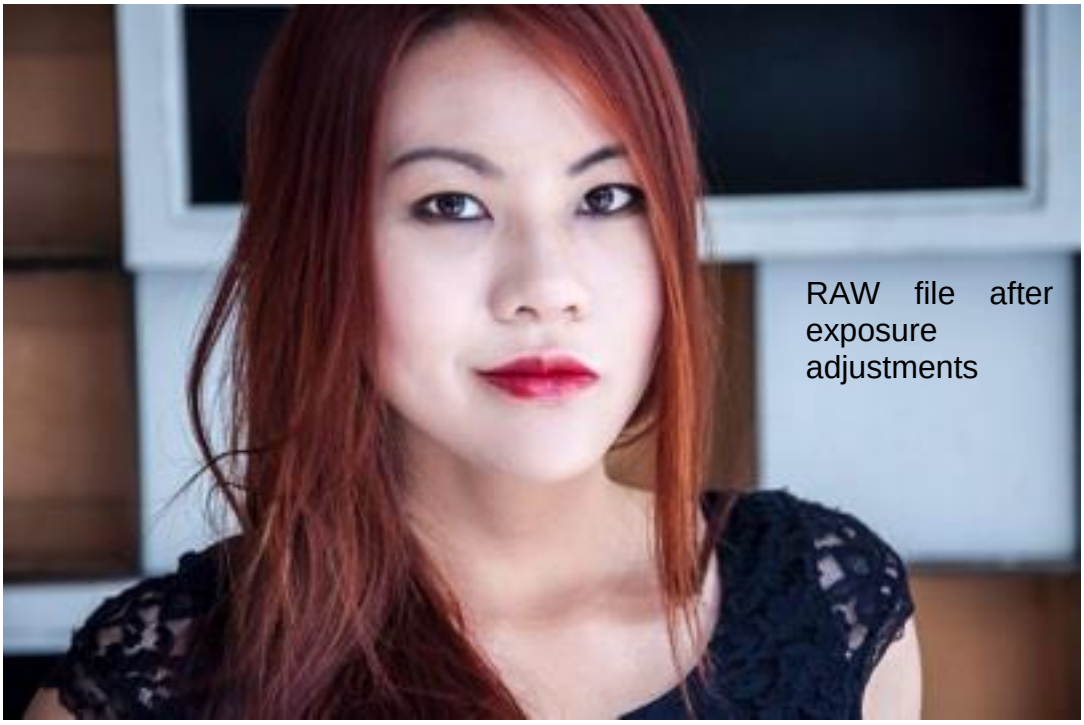
8.3 Adjusting and Processing RAW Files

One of the best things about RAW files is the amount of data they collect. In practical terms, this means that it is possible to fix some mistakes in post-production (software editing and adjusting of your files). Of course, it's better to get it right "in camera", but everyone makes errors and there will be times when you have a great image but the exposure is incorrect.



RAW file before exposure adjustments

Sometimes your light meter lets you down: you used the readings on the exposure level indicator, pressed the shutter and it's underexposed (too dark).



RAW file after exposure adjustments

Tip: expensive software is not required to edit and process RAW images.

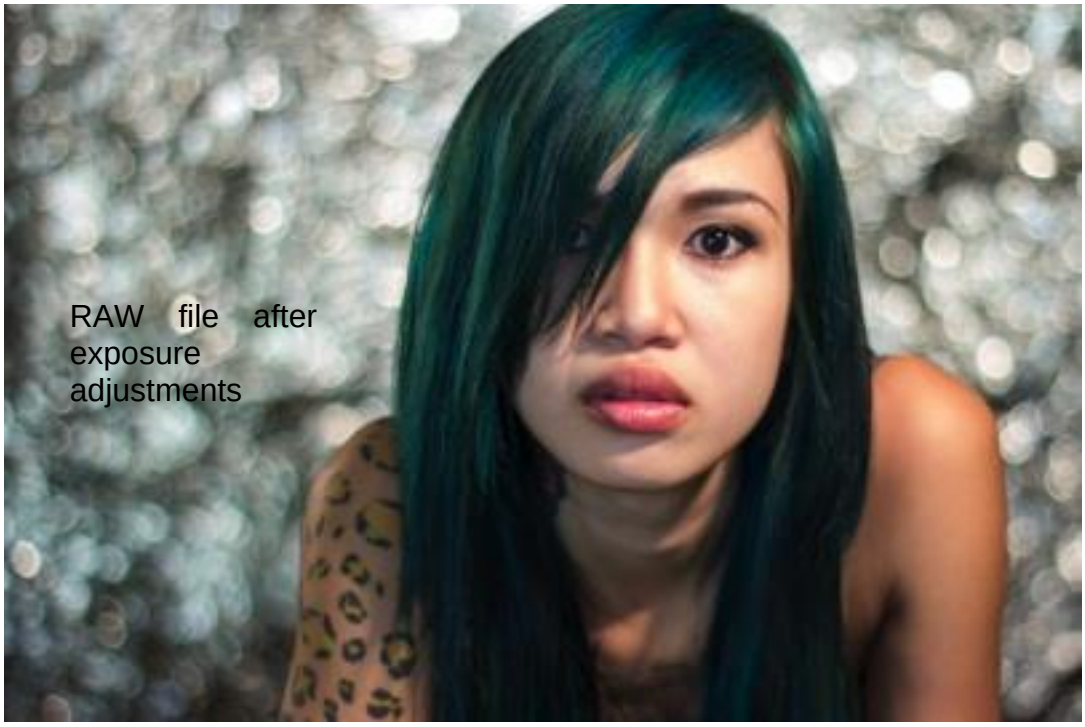
Open source (free) programs like GIMP also have RAW capabilities.

If you don't already have Adobe Photoshop or Adobe Lightroom, then Adobe Photoshop Elements might be a good option. It's a cheaper, stripped down version that's more user friendly, so great for beginners.

Using RAW editing software (in this case Adobe Camera RAW), it's possible to adjust the exposure levels without affecting the image quality too much. Of course, if you have to make extensive adjustments, this could degrade the image quality.

RAW file before exposure adjustments

Here we have the opposite problem using studio lights and not setting the exposure to compensate has resulted in an overexposed image. The shutter has allowed too much light in, creating "blown out" highlights (in this case the excessive amount of light in the background).



RAW file after exposure adjustments

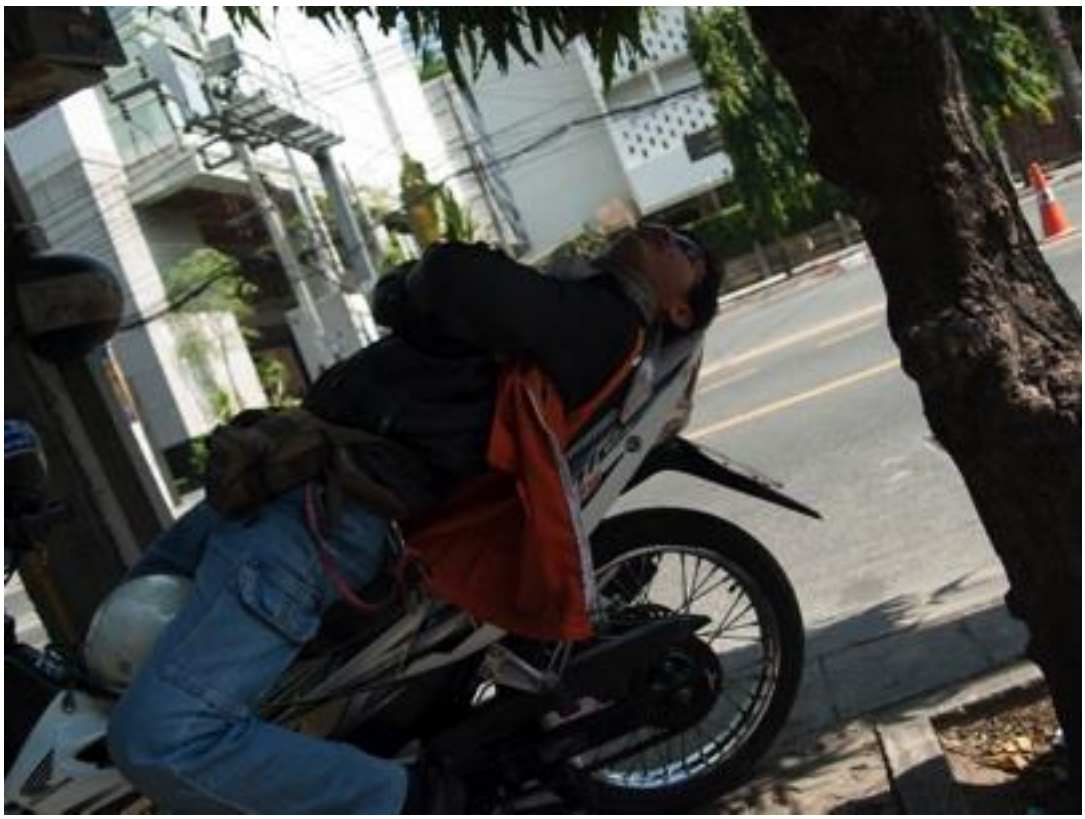
By using RAW editing software, it's easy to reduce the exposure to the correct level.

Even if your exposures are correct, you will still need to make some adjustments to your RAW files before saving them as JPEG files (for printing, uploading, etc.).

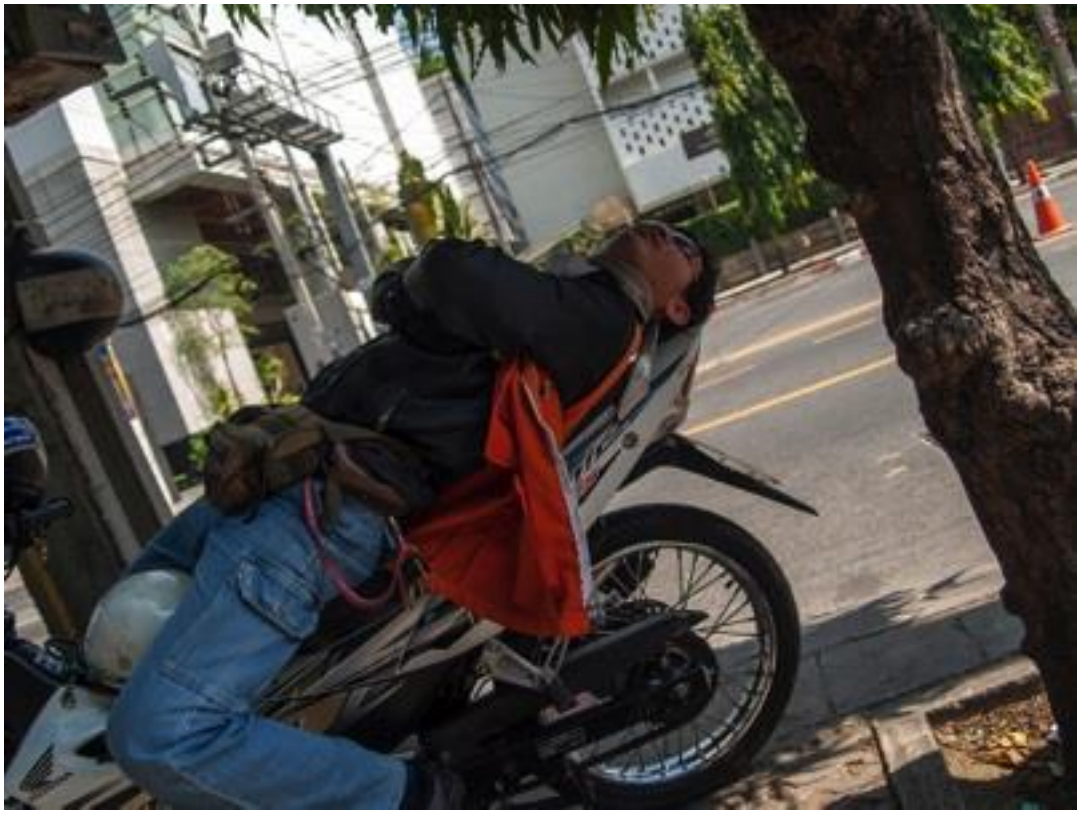
Tip: some photographers like to set their cameras to shoot RAW and JPEG simultaneously.

This can be a time saver (although not a storage space saver). If the exposure is correct and no post production is required, then the JPEG is ready to go. If any images do need fixing, then the RAW file is also there.

Let's look at an unprocessed RAW file.



In this case, the shadows are slightly too dark and some of the highlights are too bright. With RAW it's easier to fine tune any corrections needed.



In the adjusted and processed version, we can see that shadows have been reduced, revealing some details that were previously unseen (the tree on the left of the frame and the black leather jacket). The image has also been sharpened and the colour saturation has been increased.

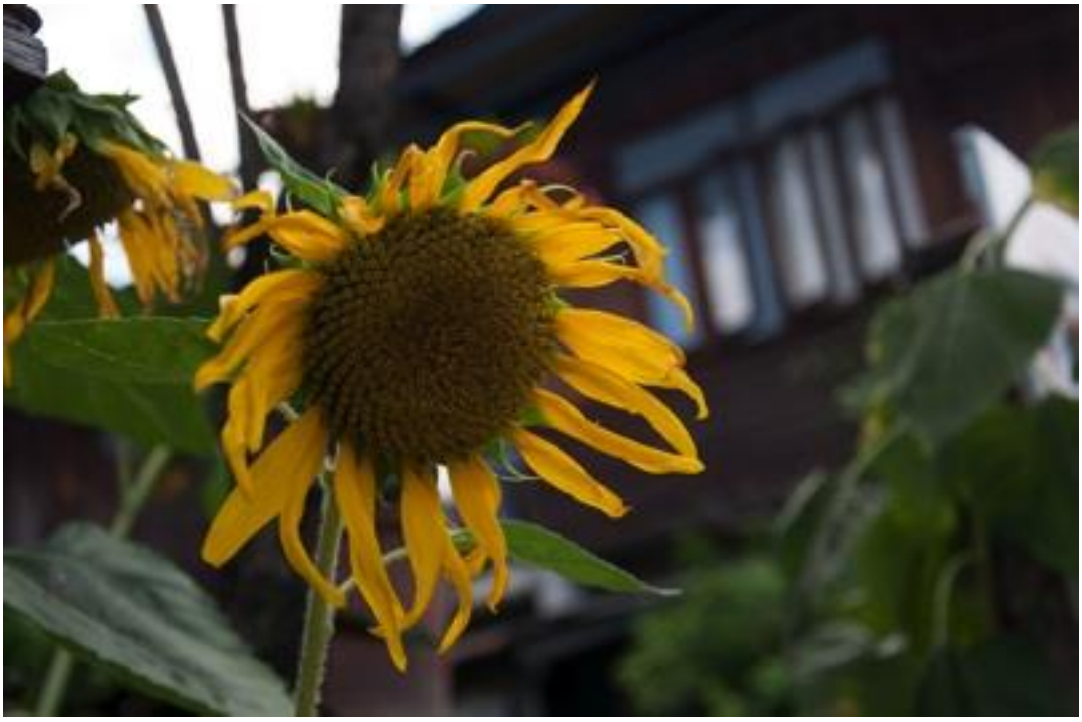
Tip: when you save a RAW file after making adjustments, a second file is also saved.

These files are called XMP and are known as a "sidecar" file. It stores all the information about the adjustments made to your RAW file, which means that it's possible to go back to the RAW later and reset it to its original configuration.

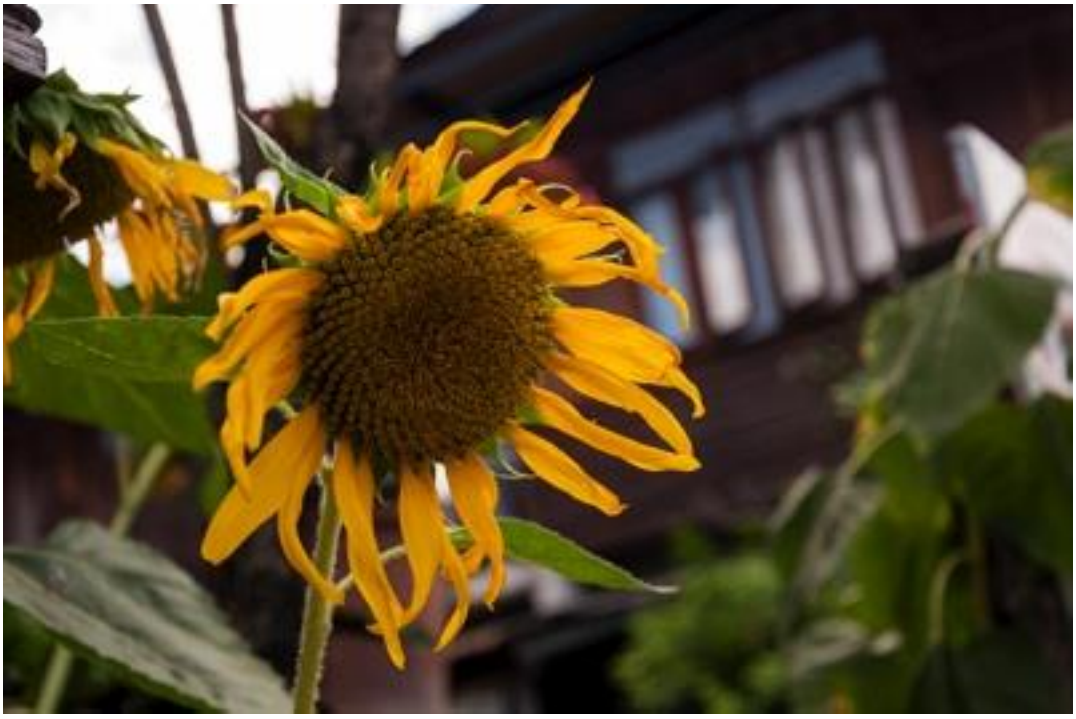
If you delete the xmp file, then the RAW file will revert to its original settings.

When you've finished editing your RAW file you will need to save it. This will convert it to a JPEG file. Every change you make to a RAW is saved in the XMP file.

Conversion from JPEG to RAW is not possible though, due to compression of the JPEG file. It's like baking a cake and then trying to separate the eggs, butter, flour and sugar – it's not possible.



In this example, the unprocessed file looks fine – so only minor adjustments are needed.

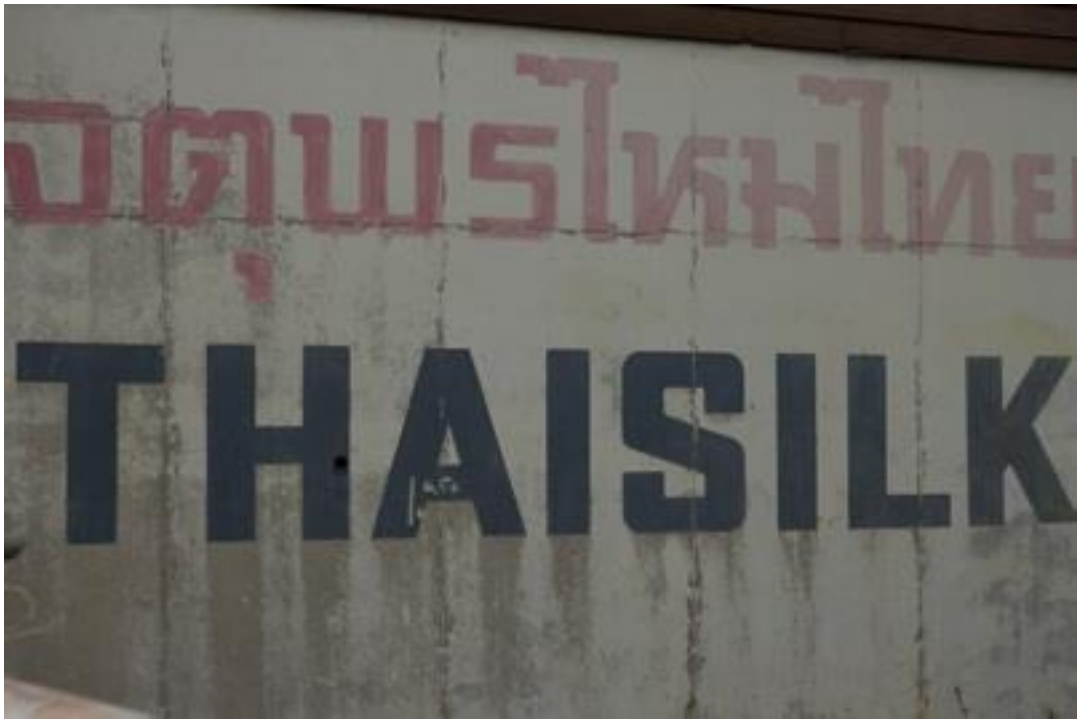


The contrast, saturation (the amount of colour) and sharpness have been slightly increased. By making these minor adjustments, the image has more impact.

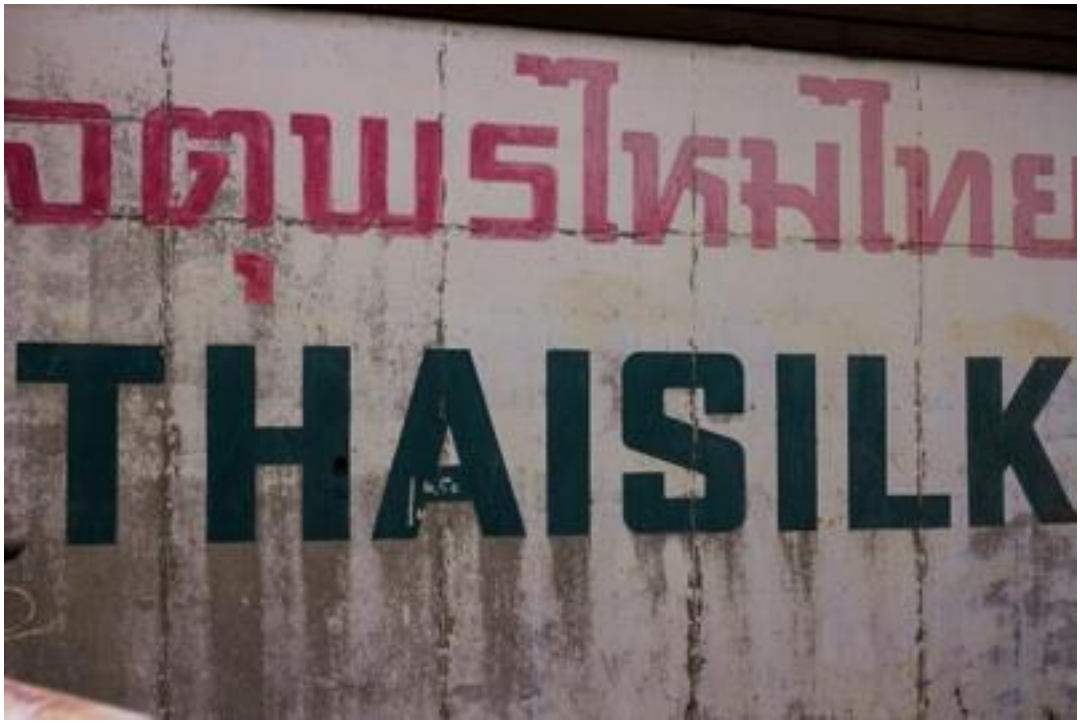
Tip: due to the large amount of information contained in RAW, the continuous shooting speed is usually reduced in RAW instead of JPEG.

A speed of 6 shots per second with JPEG can be reduced to 2 or 3 per second with RAW.

If you have to shoot fast, continuous shots, then JPEG is preferable.



Here the image is flat and lacking in contrast, sharpness and saturation.



Several adjustments were made here. Firstly, the white balance was corrected. Then the sharpness was increased and finally some of the individual colours were adjusted (in this case the reds and blues) and all of the colours were given an increase in saturation.

Tip: even if your white balance setting was initially correct, try the auto adjustment setting.

The difference will usually be slight, but sometimes you'll find a small change in colour temperature can make a big difference.

One thing that cannot be adjusted with JPEG files is white balance. However, with RAW files it's possible to adjust the white balance and even fine tune the colour temperature.

As mentioned in Module 6, changing the white balance by increasing or decreasing the colour temperature can drastically change the look and feel of a photograph. In this example, the white balance is correct, but with the RAW file it's possible to make some extreme adjustments.

Here the colour temperature has been drastically increased to give the image a much warmer feel. The orange tones give the impression of a summer's day.

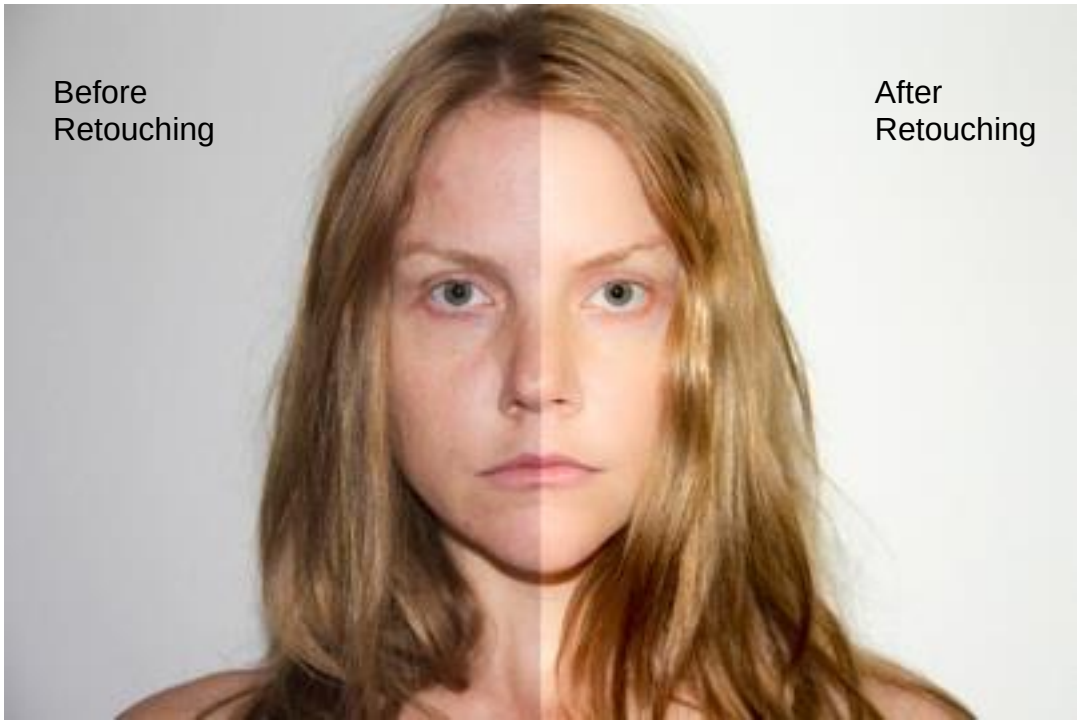
Tip: don't be afraid to experiment with all of the different settings and features that come with your RAW editing software.

Digital editing is non-destructive (meaning that any changes can be undone). If you don't like the changes you've made, it's easy to undo them.

Going to the other extreme and reducing the colour temperature can give your images a cool, crisp look. By making manual adjustments, you'll be able to see which setting looks right, depending on what mood you're trying to create.

8.4 Retouching Images

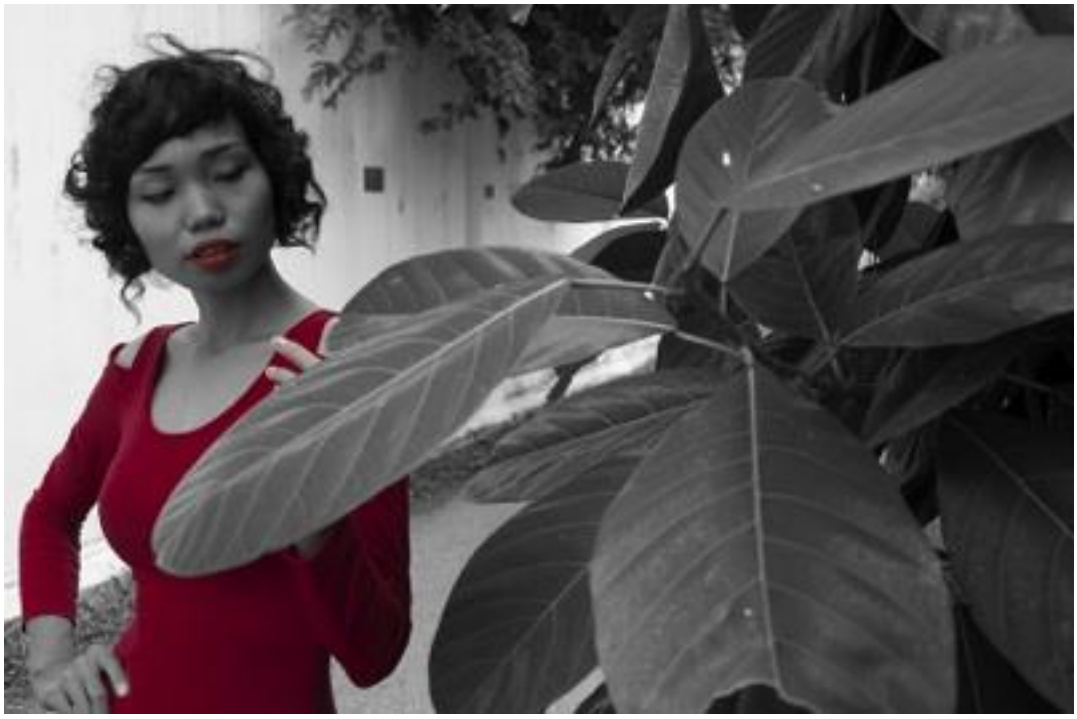
Despite what you might think from looking at fashion magazines, no one has perfect skin and most photos you'll see in magazines have been retouched. This is not a new thing: before digital photography, artists would be hired to paint and airbrush over imperfections.



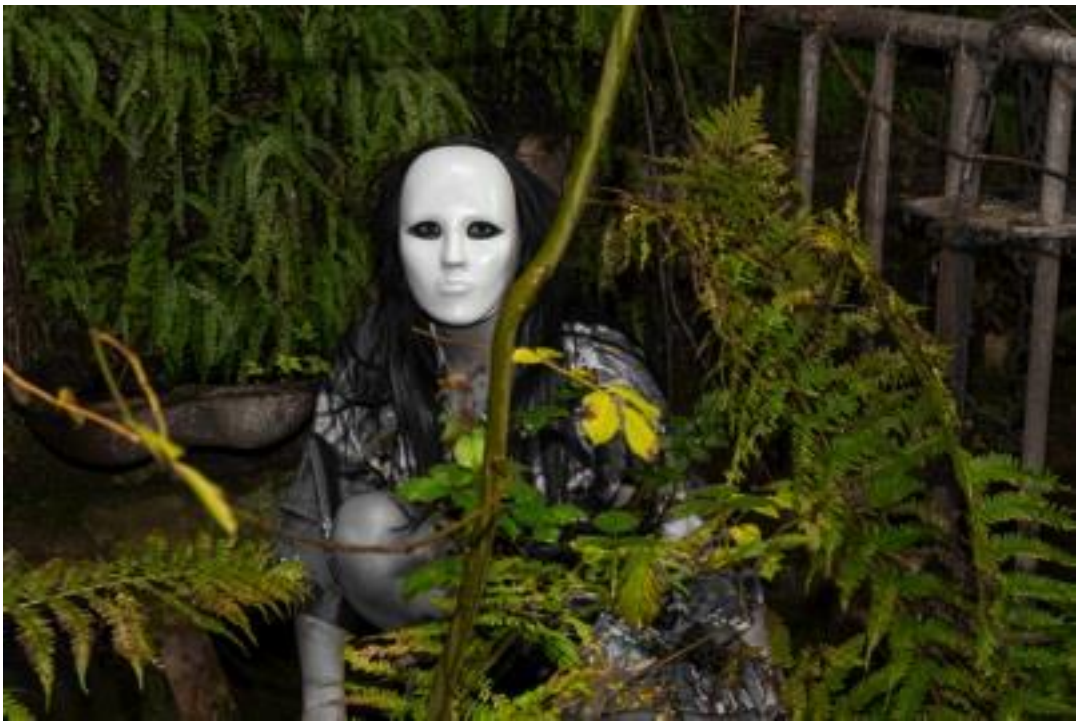
The principle is similar today – using digital brushes, it's possible to remove blemishes and smoothen skin. The only difference is that it's a lot easier doing it digitally.

8.5 Creative Adjustments

Editing RAW files is not just for correcting mistakes or fine-tuning settings. It's also possible to do some creative editing. RAW files have so much information that it's possible to adjust individual colours.



This might look like a black and white image that's been digitally painted on, but it's actually a colour image. With the exception of red, all the colours have been removed using RAW editing software.



For trees and plants, try removing all of the colours except for green and yellow.

Tip: don't listen to the "purists" who tell you, "using digital editing is cheating, you should get it right in the camera".

Just gently remind them of the pre-digital days when photographs were created in a darkroom and techniques like burning and dodging were used to lighten and darken different areas of the photograph.

Solarisation and multiple exposures were used to create surreal images.

Painting and airbrushing was used to retouch photographs.

Throughout the history of photography, people have used the technology available to them to enhance and alter their images, so there's no reason why you can't do the same.

Tip: when you shoot in RAW, it can be easy for fix minor mistakes – but don't get into the mind set of shooting things haphazardly and thinking it can be fixed later.

Working on your technique and getting things right "in camera" will save you hours hunched over a computer trying to fix your mistakes.

There are also things that RAW cannot fix, such as motion blur and camera shake.

If you become more accustomed to controlling individual colours, then you can literally create something "out of this world".

Remember though, just because you can do something, it doesn't mean that you have to do it.

8.6 Summary

- RAW files are uncompressed data recorded by your camera's sensor.
- They are much larger than JPEG files, so they take up more memory space.
- RAW files give you more options when it comes to editing (making corrections and/or adjustments).
- JPEG files can be edited, but this can affect the image quality.
- RAW files are good for shooting portraits, especially if retouching is required.
- JPEG files are good for shooting sporting events or any fast-moving action.
- If you're not sure which one to use, set your camera to shoot JPEG and RAW.
- It doesn't matter what other people say about which format is better, the decision is yours. If you decide that RAW is time-consuming and unnecessary, then don't use it.

Assessment 8

1) True or False? All digital cameras use the same RAW file format.

2) Is it possible to convert a RAW file to a JPEG file?

3) Is it possible to convert a JPEG file to a RAW file?

4) True or False? Manual white balance adjustments are only possible with RAW files.

5) If you were shooting fast-moving action, which file format would be preferable?

6) If you were shooting portraits, which file format would be preferable?

7) Which format is better for editing?

8) True or False? If you delete the xmp file, it will convert the RAW file back to its original settings.

9) Is it possible to fix RAW files that are incorrectly exposed?

10) Is it possible to fix RAW files that have blur caused by camera shake?

8.8 Assignment

Set you camera to shoot RAW files and photograph anything you want.

After shooting, view your image files and select any that might be incorrectly exposed. Open them using RAW editing software and try to fix the exposure by using the exposure setting tool (this is usually a slider that can be moved from side to side – left to decrease and right to increase).

Try using the other manual settings, such as contrast, highlights, shadows, clarity and vibrancy. Make small manual adjustments and see what this does to your image.

Remember, if you don’t like the changes you’ve made, it’s easy to undo them and start again.