Basic Digital Processing

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Isn't this Cheating ?

- With film
  - You sent film off to be processed and printed
  - You *could* process and print yourself (if very skilled and lots of equipment)
- With digital
  - You can let the camera process the image (JPG) (settings for colour balance, exposure etc)
  - OR you can make the processing decisions yourself depending on picture (RAW)
  - Or you can tweak the processing the camera has done (JPG processed)
- Custom processing much more accessible
  - Can still get it right in camera if you try hard

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Camera Settings – RAW or JPG

- RAW formats record all the basic image data captured by the camera
  - 12 or 14 bits per channel (RGB) per pixel
  - 4096 different intensity levels
- JPG images are produced by cameras from this basic data
  - 8 bits per channel per pixel
  - 256 intensity levels
  - Camera makes decisions about image in order to perform this conversion
  - Most cameras make reasonable decisions, and JPG is often good enough

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RAW Images vs JPG Images

- RAW Advantages
  - Higher image quality
  - Can preserve lots of highlight and shadow detail
  - User has control over white balance, colour space, exposure settings, sharpening and other image conversion parameters
  - Easier to edit without enhancing noise
  - Many different JPGs can be produced without destroying original 'negative'
- RAW Disadvantages
  - Larger (fewer images fit on card / disk)
  - No standard format
  - Slower and more complicated to process (JPGs can be printed / distributed direct from camera)

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Digital Workflow

- Few hard and fast rules
  - Many ways to do each adjustment
  - Most steps can be reordered
- Important to
  - Develop a routine workflow
  - Get familiar with some tools for each step
- With most tools, ***subtlety*** is the key
  - Spend 6 months learning how to use tools
  - Then 6 months learning not to

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Producing a Digital Print

- Steps
  - Image Capture
  - Rotation (Straightening) and Cropping
  - White Balance / Colour Balance
  - Adjusting Image Exposure
  - Colour Correction
  - Remove Dirt and Noise
  - Sharpening
  - Printing

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Image Capture – in Camera

- Use highest available resolution
- RAW / JPG
  - RAW images retain most dynamic range so most highlight detail, but need processing
  - Some cameras have large JPG + RAW option
- If using JPG and want to do digital processing
  - Reduce in-camera sharpening
  - Choose normal or natural for JPG processing mode
  - Don't use Vivid !

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Digital Images from Camera

- Use a card reader rather than connecting camera to PC (no battery issues)
- Copy files off card using Windows Explorer rather than any other software
- Eject the card before removing
  - Right-click on disk in Window Explorer and choose eject
  - Simple removal can corrupt images on card
- Make a backup on the PC before re-using the card
- When the pictures are safe
  - Replace card in camera bag
  - Re-format before use (when you need it)

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Organising Photos

- I have about 200,000 photos
- You can organise your photos by
  - naming them sensibly (keep unique id in name)
  - place them in folders according to session
  - group folders by year or topic
- You can use photo cataloguing software
  - Lightroom, Aperture, ACDSee, PhotoSupreme
  - Edit and search keywords for image
  - Edit and search metadata (location, date etc)
  - Add quality ratings etc and search on these

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Storing Photos

- I keep
  - Original image from camera (RAW or JPG)
    - **NEVER modify this**
  - If any significant edits made, a version containing details of changes which can be sharpened for print (PSD or TIFF)
  - Final copy for viewing (JPG)
- I keep two copies of everything
  - two separate sets of external disks (8Tb each)
  - One copy held away from the house and updated regularly

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Picture Formats

- RAW formats
  - Variety of proprietary formats (CRW, CR2, NEF)
  - Potential standard not widely adopted (DNG)
- PSD / PSP
  - Adobe / Corel proprietary formats
  - Store details of all layers etc
- TIFF
  - Saves multiple layers with lossless or no compression
- JPG
  - Compressed image format (much smaller than others)
  - Lossy – each time you edit and save, picture quality falls
- BMP, GIF
  - Don't use these for photos
- XMP
  - 'sidecar' file – stores information about the photo

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Photo-Editing Software

- Adobe
  - Creative Cloud Photography c. £10 per month (Lightroom and 'full' Photoshop)
  - Photoshop Elements 2021 – £87
    - Recent versions have more 'Intelligent Tools' and 'Guided Edits' and less control
- Corel
  - Paintshop Pro Photo 2021 – £67
- Freeware (varying levels of capability) e.g. Picasa
- Up to year I used Lightroom 6.0 and Photoshop Elements 12.0
  - Review and catalogue all images in Lightroom
  - Select c. 40% of my images for basic processing in Lightroom
  - < 5% get edited in Elements (difficult edits and competition images)
  - BUT most of what you can do in Lightroom can be done in Elements

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Photoshop Elements Layout

- Menu
- Toolbar
  - Stacked Tools
  - Toolbar Controls
- Windows Menu
  - Tools which can be docked in Panel bin
- Panel Bin
- Photo Bin

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Importing / Opening Images

- Photoshop Elements has Organiser
  - Provides similar tools to Lightroom Library
- Open files you want to edit (Open with…)
  - RAW images open automatically in Raw Editor
  - File / Open in Camera Raw to edit other formats in Raw Editor

<Open Image 1>

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Demonstration of Processing Steps

- Show what the different steps can achieve
- Not actually how I would edit an image
  - I tend to start from a RAW image
  - I would use Layers much more in editing, but that is too complicated for this demo

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Rotating and Cropping

- Reasons for rotating
  - Horizons / shore-lines don't look horizontal
  - Background items don't look level
  - Flower pots don't look level
  - Walls or Posts don't look vertical
- Correcting
  - Use crop tool or straighten tool
  - Don't be afraid to add picture area at corners
  - Better than a crop which is too tight
  - Often easy to clone picture into corners / edges
  - Straightening verticals…

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Adjusting Exposure

- Understanding a Histogram
  - Good histograms and bad histograms
- Adjusting the exposure to optimise tonal range
  - Not every picture should have full tonal range
  - Set exposure so image looks right (often bright is good)
- Fixing the white point
  - highlights and specular highlights
- Fixing the black point
- Using curves
  - More power, more control
  - Simple version in Elements

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Adjusting Exposure – Examples

- Correcting under-exposure
- Correcting over-exposure
  - More is possible with RAW images
- Localised exposure corrections
- Correcting contrast
  - Contrast – spreads tones of whole image
  - White and black points (Levels in PSE)
  - Shadows / Highlights
- Adjusting mid-tone contrast using curves
  - Very sensitive
  - subtle S-shape usually helps

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White Balance

- Fixing the colour balance
  - Camera's auto white balance isn't always accurate
  - Especially in mix of natural and artificial light
  - Tools in RAW Editor
- Best before adjusting exposure
  - Before I started working with RAW images I did it later <Open Image 2>
- If working with JPG
  - use Adjust Colour / Remove Colour Cast
  - Finer adjustment possible using Levels or Hue (and Saturation)
- Adjusting colour saturation
  - Small adjustment makes invisible improvement
  - Large adjustment obtrusive
- Selective colour correction (Hue)
  - Pipette tool

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Removal of Noise

- Causes
  - Very little light recorded for pixel (dark area or high ISO)
  - Variations in RGB levels recorded for pixels
- Luminance noise and colour noise
- Removing noise
  - Noise filters or blur filters in PSE
  - Results in loss of detail
  - Don't use on the whole picture
    - Use selectively with large feathering
  - Localised darkening can help

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Using the Clone Tool 

- Removing dirt etc
  - 'Spotting' using clone tool or healing brush
  - Copy and paste parts of image – then can rotate
- Removing distracting picture elements
- Can select region where changes are allowed
- Alt-click to select source
- Controls
  - Aligned / non-aligned
  - Vary size and softness of brush
  - Can vary opacity
  - Can vary mode – try colour, luminosity

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Selections – Why ?

- Anything you can do to the whole image…
- Many actions better on just part of image
- Copying…
- Localised Adjustments to
  - Exposure
  - Colour
  - Blurring and noise removal
  - Cloning
  - Sharpening

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Localised Adjustments

- Cloning and copying
  - Dirt, background distractions, dead flowers
  - Remove Spots etc
- Localised Exposure
  - Brighten or darken small areas slightly
  - Brighten Eyes, Teeth
  - Add a vignette
- Noise reduction best on background
- Sharpening best on sharp areas

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Selection Tools

- Rectangular / Elliptical Marquee
- Lasso / Polygonal Lasso / Magnetic Lasso
- Quick Selection Tool / Selection Brush
- Magic Wand

- Layers and Masks…

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Selections – Controls

- Combine Mode
  - New / Add / Subtract / Intersect
- Feathering – softens edge
- Anti-aliasing – smooths edge
- Sample All Layers
- Invert selection
- Expand or Contract
- Lots of more complicated tools to modify selection

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Before Sharpening

- Make all other adjustments
  - Other adjustments have a tendency to exaggerate sharpening
- Save image AS
  - Do not want to make future adjustments on top of sharpening
- Resize image to intended output size (pixels)
  - Resizing after sharpening can produce artefacts
- Think about which parts of the image need sharpening
  - Camera has probably sharpened JPG images already
  - Sharpening doesn't improve blurred backgrounds
  - Can emphasize noise
- Know why you are sharpening
  - For viewing on the screen, keep sharpening to minimum
  - For printing
    - Depends on print size and paper – gloss paper needs more
    - Crisp prints may require sharpening beyond comfortable viewing

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Using the Unsharp Mask Tool

- What does it do ?
  - Makes things look sharper
- How ?
  Finds and emphasizes edges with tonal contrast
  - Darkens pixels to dark side of edge
  - Lightens pixels to light side of edge
- Can be used to increase local contrast
  - set low amount and high radius
- After Sharpening
  - Print
  - If you want a sharpened version to display
    - **save it as a separate version !**

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Unsharp Mask Parameters

- Three Parameters:
  - Radius (pixels)
    - How wide the effect should spread from the edge
    - Larger values mean wider halos
    - Vary depending on image (fine detail => use lower radius)
  - Threshold
    - How large the tonal contrast needs to be before applying effect
    - Normally, leave small (0, 1)
    - If noise or film grain is being sharpened badly, increase (5, 10) OR sharpen selected areas only
  - Amount
    - How much contrast to add at edges
    - Vary this to find the appropriate value
    - Depends on image (more for scans than digital camera images)
    - Depends on objective – printer media etc

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Printing

- The last step
  - For many people, the most difficult
  - Workshops given on printing alone
- Materials
  - Printers usually work pretty well out of the box
  - Always use manufacturer's ink
    - If you change, choose a good product and stick to it
  - Experiment with paper types
    - Use good quality paper
    - Use a high printer Quality setting (experiment)

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Image Size

- Always print full resolution version of image
  - Let Elements scale to fit page
- The important thing is the resolution in ppi
  - Prefer c. 300 ppi – I often use 360 or 240
  - Can get away with 180 ppi
  - Below this, quality deteriorates

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Printing – Dealing with Problems

- If you can't get a print which you are happy with ?
  - Stop, go away and cool down for (at least) two days
  - Start again
    - work very slowly and calmly
    - write down what you do
    - identify part of your image which shows the problem
    - do test prints on A6 scraps of paper (A4 cut into 4)
    - change one setting at a time – improvement or not ?

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Printing – Other Options

- Don't forget many firms ready to print your digital images
  - Their printers may handle problems you have:
    - Blues / purples / pinks
    - Monochrome / black and white
- Online printing services are very quick
  - Photo book services can be outstanding
- Bespoke Printer Profiles
  - For your printer and favourite papers
  - Give best quality colour results

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