The Digital Darkroom

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Project Goals

- Digital camera features
- Thinking when you take photographs
  - Composition
  - Light
  - Using the features of your camera
- Editing digital images
  - Photoshop Elements
- Printing and mounting photographs
- Great photographers

My Expectations

- Attendance
  - Only one unexcused absence allowed
- Complete all picture-taking assignments
  - Generally two per week
  - Submit 5 digital images for each assignment
  - May be pictures you have taken earlier
- Submit prints for the final Chapman Gallery photo show

Schedule

- Morning
  - 9:30 to 11:30
  - Almost always hands-on Elements lessons
- Afternoon
  - 1:00 to 2:30 (when scheduled)
  - Usually lecture
- Every day
  - Picture taking
- The printed schedule is tentative.
  - It is probable that one or two morning sessions will need to be moved to an afternoon
Digital Cameras

- Light focused by the lens
- You see through viewfinder
- The diaphragm in the lens limits the amount of light reaching sensor
- Shutter opens to allow light through
- Image recorded on sensor
- Sensor information sent to computer in camera

Digital Camera Sensors

- Digital cameras use a sensor instead of film
  - Sensor made of photosites
  - Picture element corresponding to a photosite is a pixel
- Maximum Image resolution
  - Number of photosites in sensor
  - Expressed in millions of pixels
  - 6 Mpixel = 6,000,000 pixels

Image Resolution

- Current sensor resolutions
  - 3 MP to 16.7 MP ($7,000 for body only)
- Higher resolution improves image quality for large prints
  - Example: Inkjet printer
    - 200 pixels in image = 1 inch on print

Image Resolution

- Resolution also affects file size.
  - High resolution images are large
- Always shoot at the highest resolution allowed by your camera.
  - Large files don’t matter much these days
  - Memory cards are cheap
Sensor Size

- Sensors come in different sizes
- Relative sizes shown below

Color Depth

- Pixels covered by R, G, B filters
  - Intensity of signal at each pixel is converted to a digital value for its filter color
  - Interpolation: Computer in camera uses adjacent pixels to “guess” all three colors at each pixel

Sensor Size

- Why does sensor size matter?
- To get higher resolution with same sensor size:
  - Need more photosites
  - Packing more photosites into the same sensor size requires the smaller photosites
- Smaller photosites produce more noise
  - Random electrical signals matter more if a photosite is small and doesn’t receive much light
- Larger sensors can give higher resolution with less noise

Color Depth

- Tonal value of each color (R, G, B) is represented digitally in camera’s computer by a number
  - Common: 8-bit mode for each color \( (2^8 = 256) \)
    - Red: 0 – 255; Green: 0 – 255; Blue: 0 – 255
- 8-bit mode has over 16 million tones
Image Formats

- **JPEG**
  - Compressed
    - Smaller size, but some image loss
    - Different qualities possible
      - High quality JPEG images are good
- **Raw**
  - Data exactly as recorded by sensor
    - Processed later by the image editor, not the camera
    - Shooting settings can be changed after-the-fact
  - Uncompressed
  - Large files
  - Frequently 12-bit color (ca 70 trillion tones)
  - Not available for all cameras

Image Formats

- **TIFF**
  - Uncompressed
  - Large files
- **PSD**
  - Native Photoshop files
  - Uncompressed
  - Retain Photoshop editing information
  - **Always** use these when editing files

Before You Start Shooting

- Make sure your camera is set to its **highest resolution**
  - May be called “large.” It should equal the resolution of the camera’s sensor
- Make sure your camera is set to give the **highest image quality**
  - Probably JPEG
    - You may not want to try Raw at first, if it is available
    - May be called “fine,” superfine,” etc.
- **Read your manual** (or ask me) if you have a question.