Computer Science 194-23
The Art and Science of Digital Photography

Lecture 2: Software Tools & Light
February 4, 2013

danallan@eecs.berkeley.edu
barsky@cs.berkeley.edu
michael.ball@berkeley.edu

Staff email: cs194-23@imail.eecs.berkeley.edu
Cameras

Location of the Focal Plane

Image from http://www.dpreview.com/reviews/canoneos40d/page7.asp
Cameras

Exposing SLRs
<table>
<thead>
<tr>
<th></th>
<th>Red</th>
<th>Green</th>
<th>Blue</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-bit</td>
<td>8-bit</td>
<td>8-bit</td>
<td></td>
</tr>
</tbody>
</table>
## 16-bit TIFF

<table>
<thead>
<tr>
<th></th>
<th>Red</th>
<th>Green</th>
<th>Blue</th>
</tr>
</thead>
<tbody>
<tr>
<td>16-bit</td>
<td>16-bit</td>
<td>16-bit</td>
<td>16-bit</td>
</tr>
</tbody>
</table>
Flag images from http://www.worldatlas.com/, copyright © Graphic Maps.

Bits & Bytes  Compression
Bits & Bytes: Lossless vs Lossy Compression

Photo by Dan Armendariz, 2007
<table>
<thead>
<tr>
<th>Name</th>
<th>Compression</th>
<th>Color</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>JPG</td>
<td>Lossy</td>
<td>24-bit</td>
<td>No</td>
</tr>
<tr>
<td>GIF</td>
<td>Lossless</td>
<td>8-bit*</td>
<td>Yes</td>
</tr>
<tr>
<td>PNG</td>
<td>Lossless</td>
<td>24-bit</td>
<td>Yes**</td>
</tr>
<tr>
<td>PSD</td>
<td>Unknown (lossless)</td>
<td>48-bit</td>
<td>Yes</td>
</tr>
<tr>
<td>TIFF</td>
<td>Lossless</td>
<td>48-bit</td>
<td>No</td>
</tr>
</tbody>
</table>

* GIF contains an 8-bit palette (or subset of colors) from a 24-bit set of colors
** Some older software does not properly display transparency in PNG files
Software Tools

Available Tools
Software Tools

Photo Organization
Software Tools
Photo Organization

Folders, Projects
Photo Organization

Ratings, “Stacks”
Keywords

- Actions
- Car
- iView Media Pro
- People
- Personal
- Photo specs
- Stock categories
- Technology
- United States
- Wedding
- Work
Photo Organization

My way or the highway!
Photo Organization  Backing up
Software Tools

Interacting with a camera
Software Tools

RAW Processing
Software Tools | Photoshop!
The Eye

In a nutshell
The Eye

Image from http://en.wikipedia.org/wiki/Fovea
<table>
<thead>
<tr>
<th>Rods</th>
<th>Cones</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Night vision</strong></td>
<td><strong>Day vision</strong></td>
</tr>
<tr>
<td><strong>More sensitive to light</strong></td>
<td><strong>Less sensitive to light</strong></td>
</tr>
<tr>
<td><strong>Not in fovea</strong></td>
<td><strong>Concentrated in fovea</strong></td>
</tr>
<tr>
<td><strong>22 times as many rods than cones in retina</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Monochromatic stimulus</strong></td>
<td><strong>Trichromatic (color) stimulus</strong></td>
</tr>
<tr>
<td><strong>Preference to detect motion</strong></td>
<td><strong>Preference to detect detail</strong></td>
</tr>
</tbody>
</table>

The Eye  | Rods & Cones

27
The Eye

Rods & Cones

Image from http://en.wikipedia.org/wiki/Trichromacy
Cameras

Similarity to the Eye
