Computer Science E-7
Exposing Digital Photography

Lecture 9: Digital Cameras
November 9, 2009

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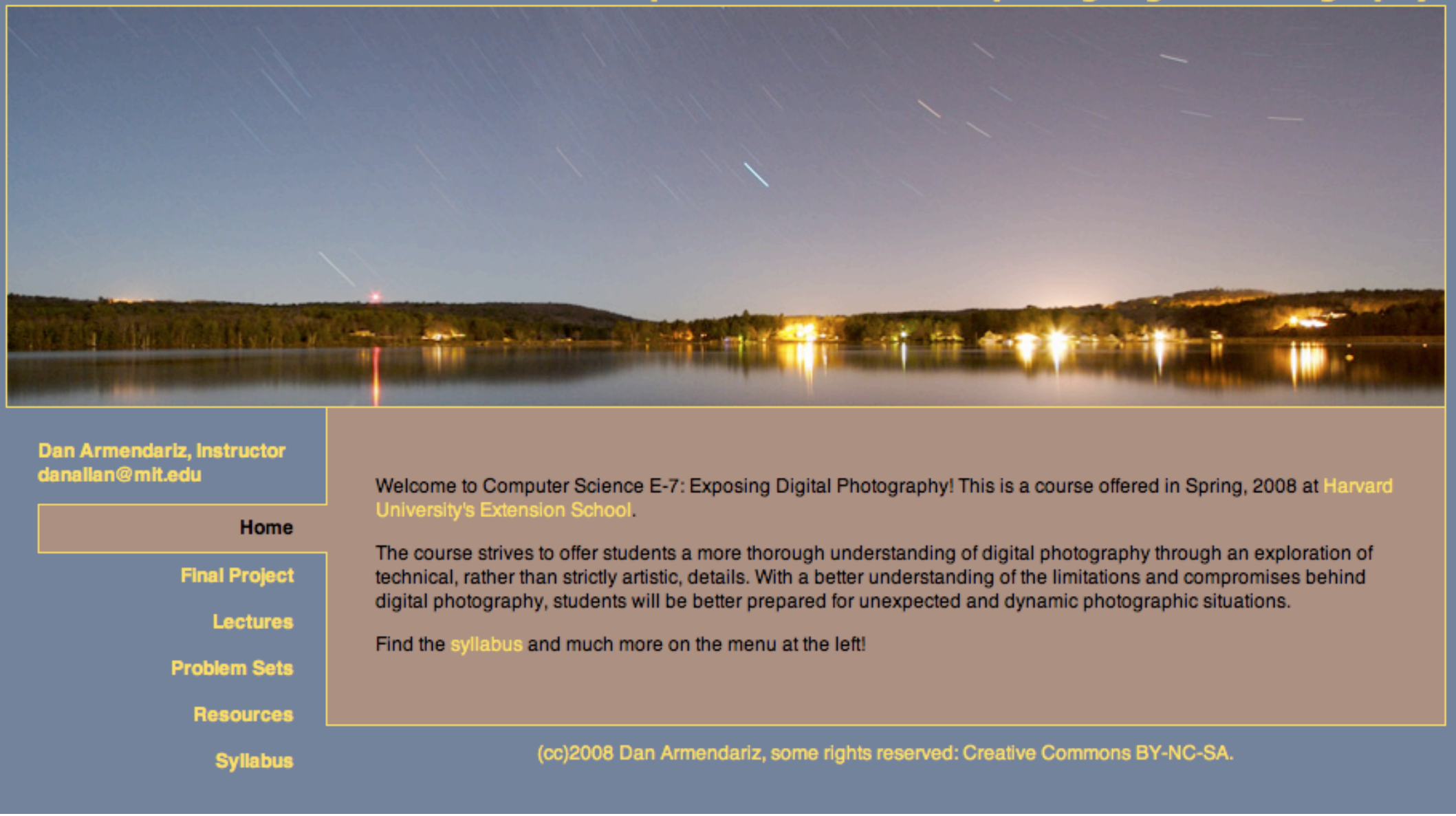


Assignment 4

Website Theme

page: 62718E

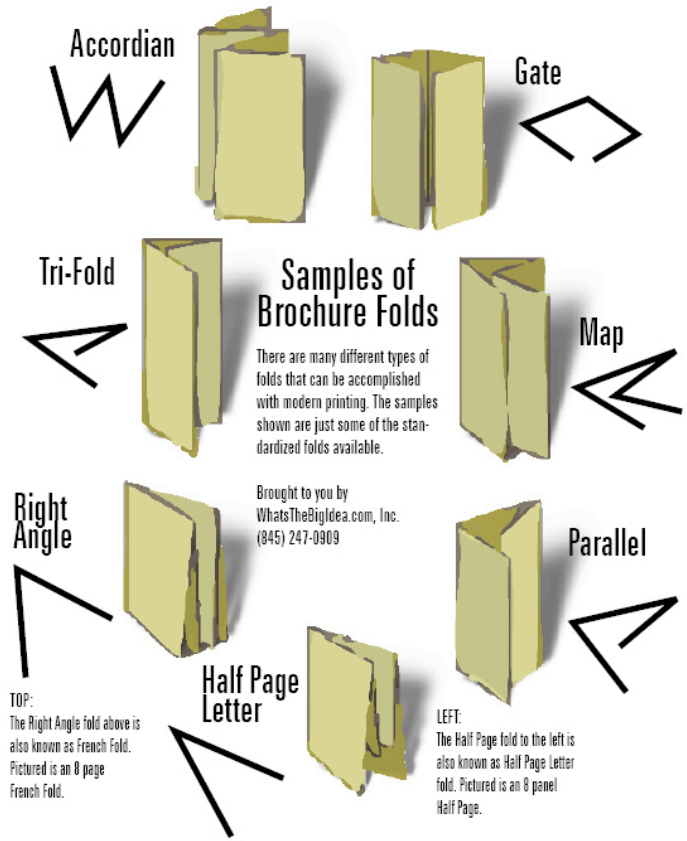
content: A17D71

highlight: FFDD46

text: 000000

Assignment 4

Color Scheme



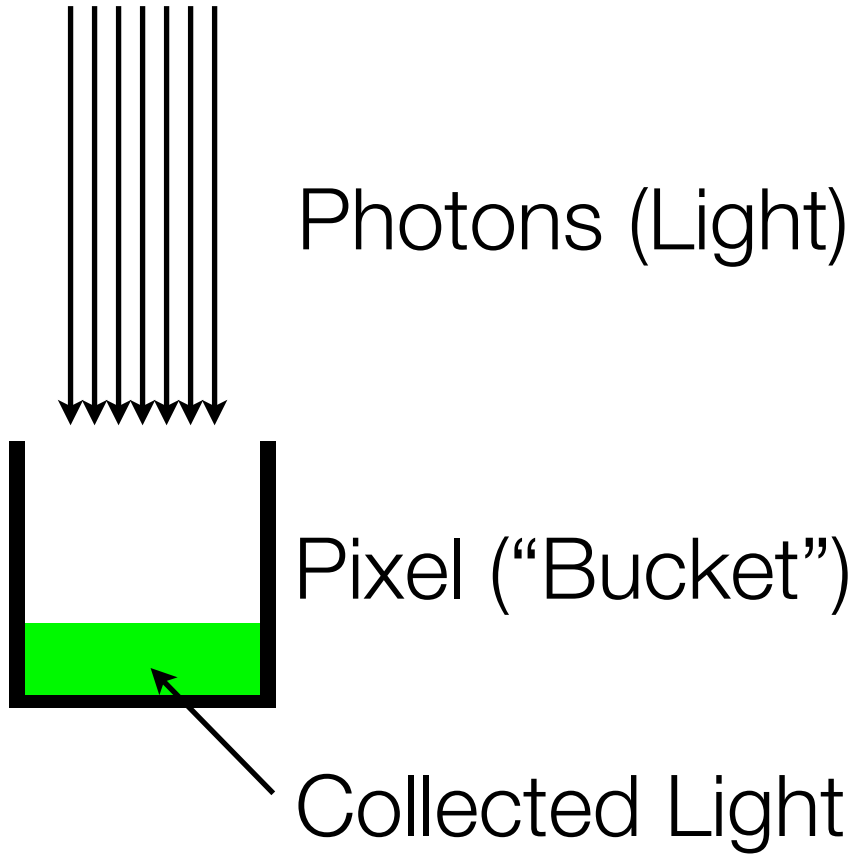
Final Project | Ideas

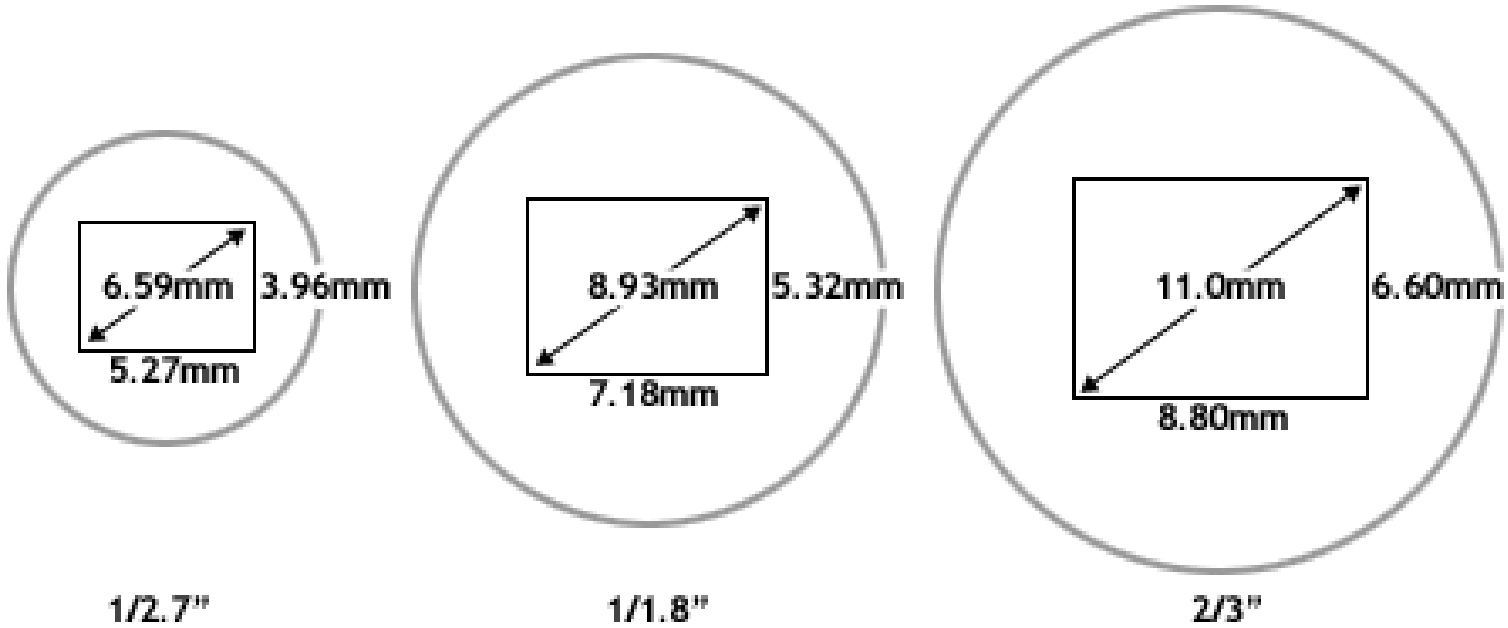
1/80s, ISO 400, f/10

Photo by Dan Armendariz, 2006

Digital Cameras

Dynamic Range

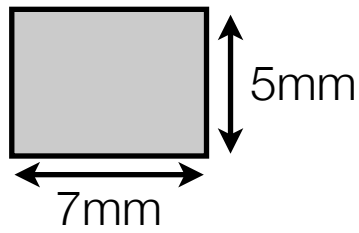

Photons (Light)
Pixel (“Bucket”)
Collected Light

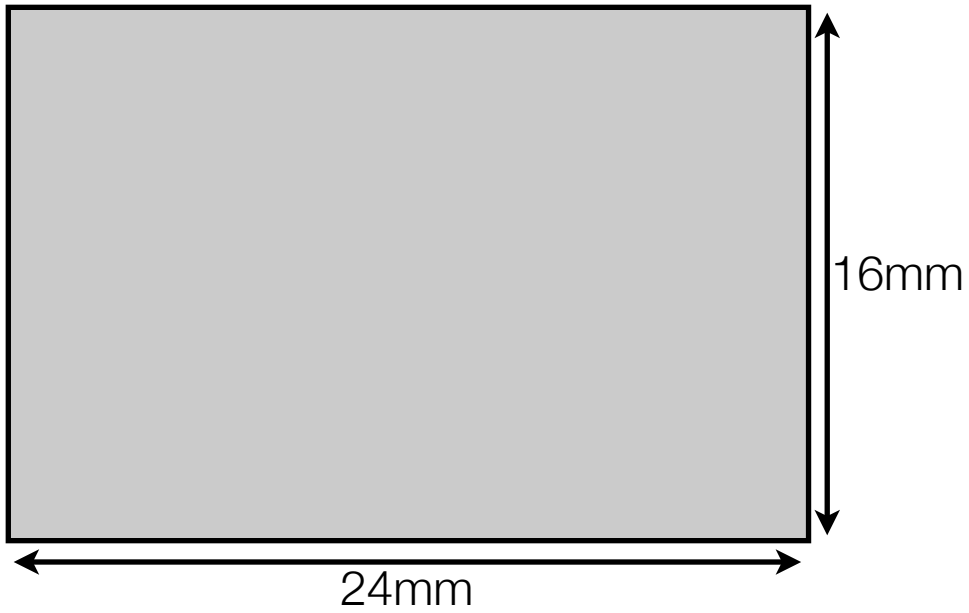


Modified image from http://www.dpreview.com/news/0210/02100402sensorsizes.asp

Digital Cameras

Sensor Sizes





1/2.5”

6 MP

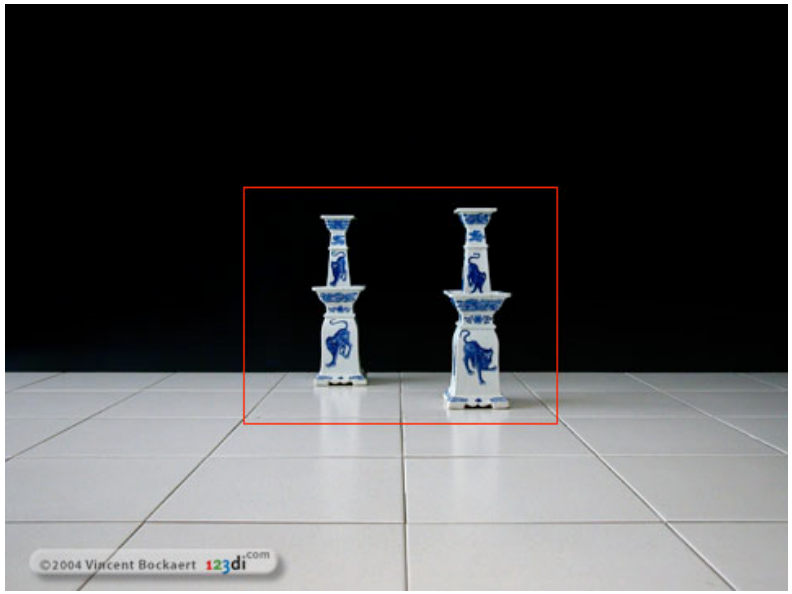
APS-C (SLR-sized)

6 MP

Sensor Sizes

Size of the pixels in each?

1.



2.

3.

4.

1. 33mm. 2. Crop of #1. 3. 80mm from same distance. 4. 33mm & closer

Images from http://www.dpreview.com/learn/?/Glossary/Optical/Perspective_01.htm

Sensor Sizes

Focal Length and Perspective

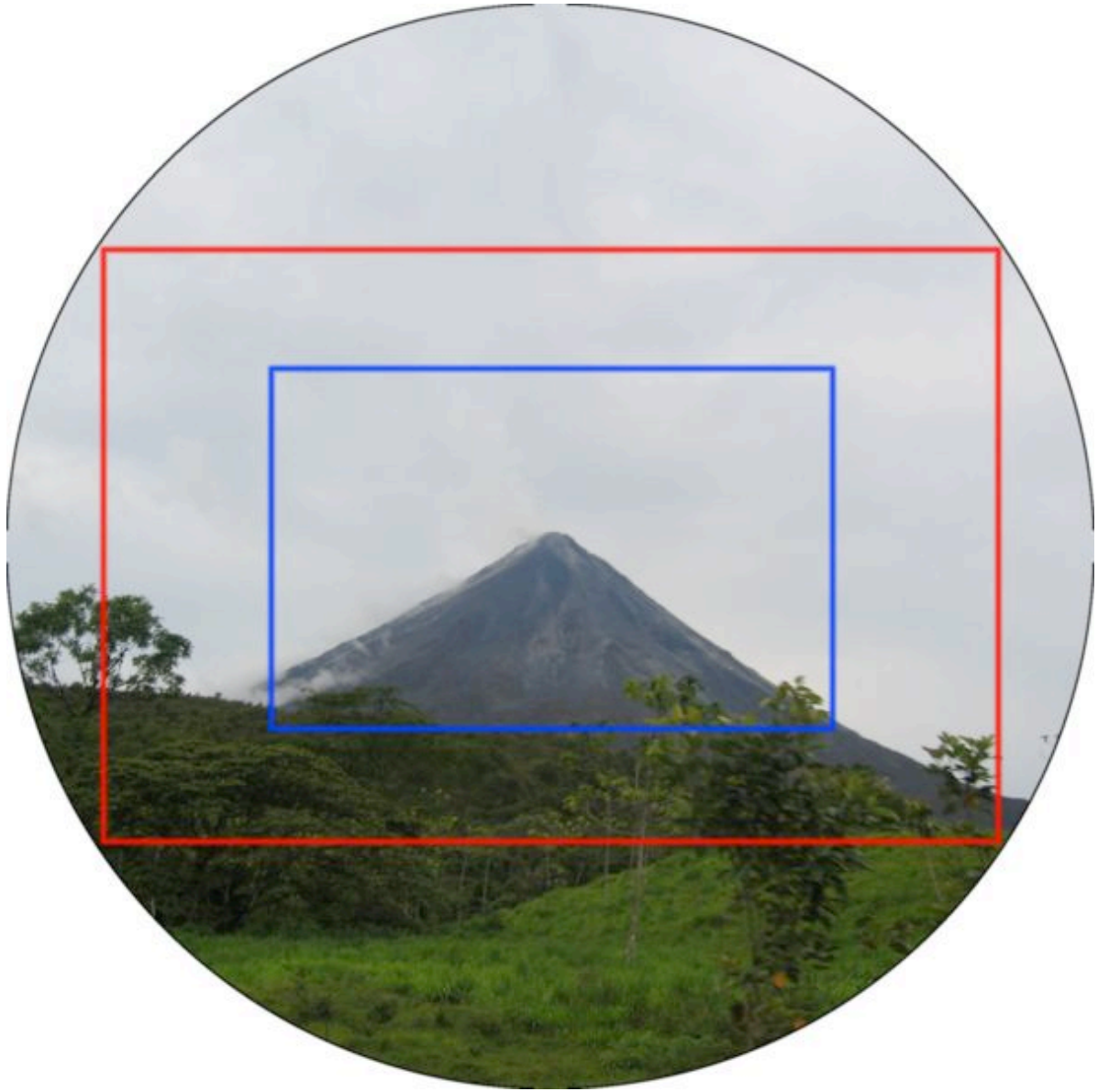


Image from http://en.wikipedia.org/wiki/Crop_factor

Sensor Sizes

Focal Length and Perspective

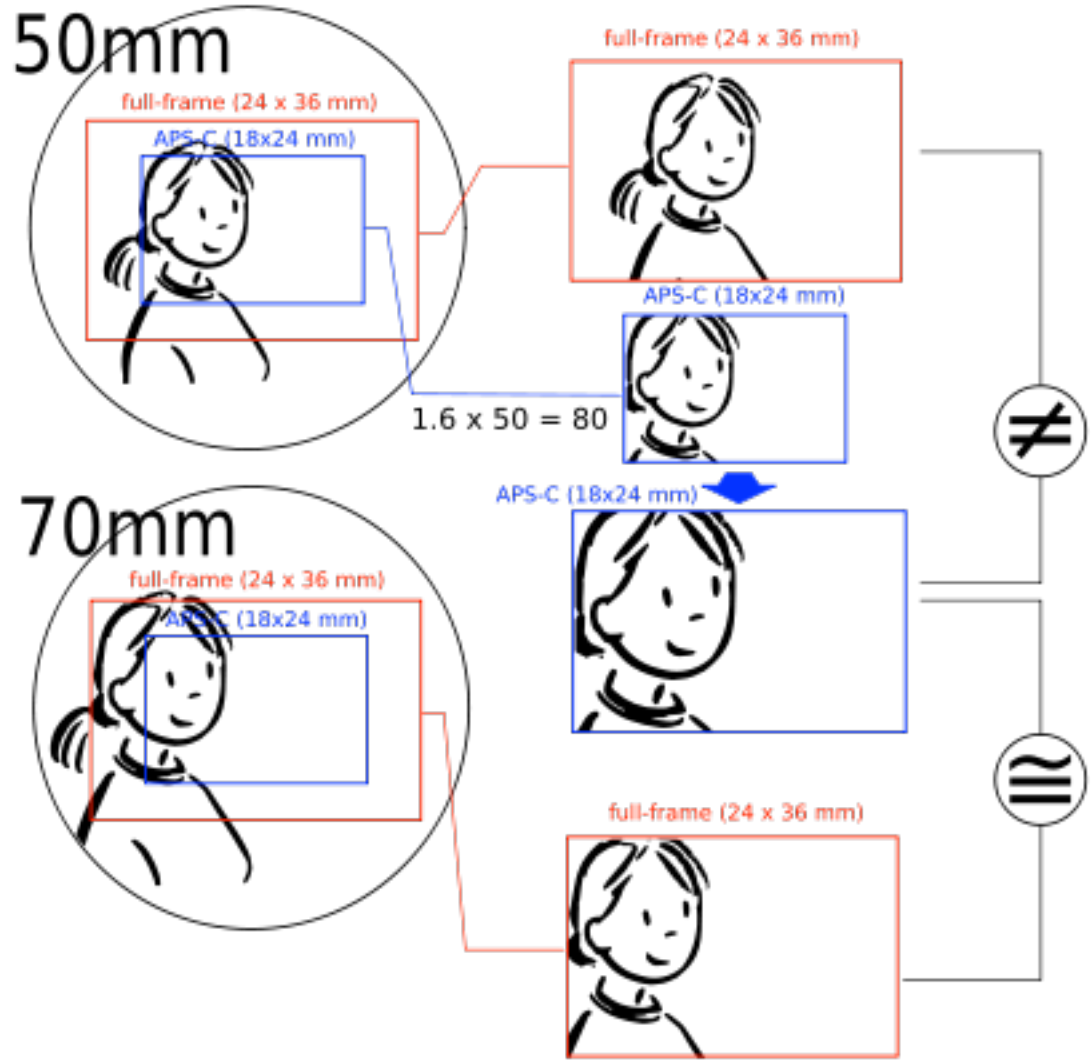


Image from http://en.wikipedia.org/wiki/Crop_factor

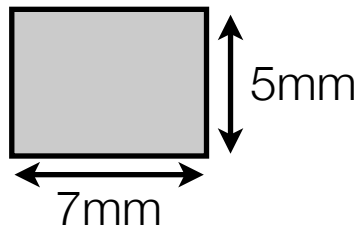
Sensor Sizes

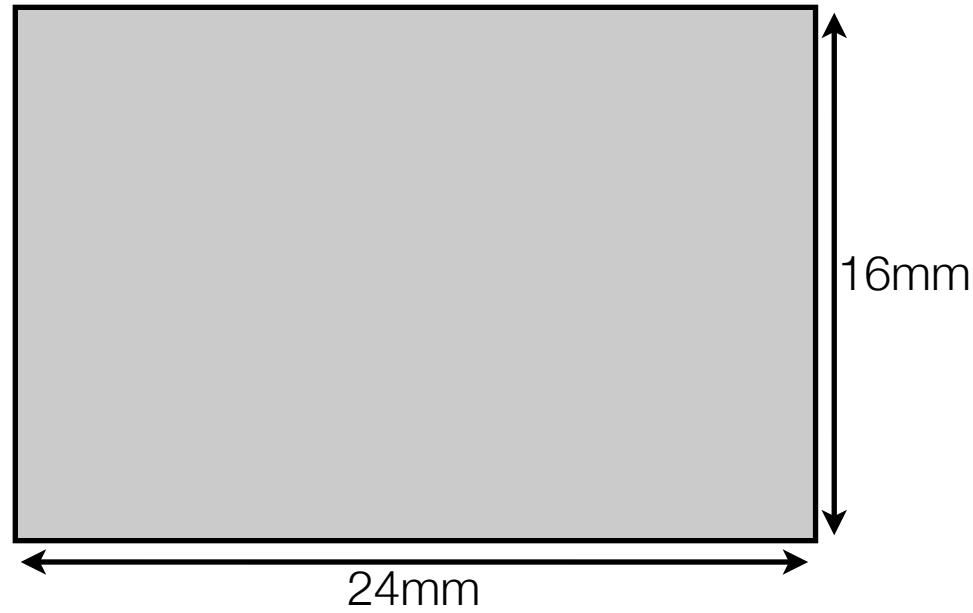
Focal Length and Perspective

Image from http://en.wikipedia.org/wiki/Crop_factor

Sensor Sizes

Focal Length and Perspective





1/2.5”

0.5 MP

APS-C (SLR-sized)

6 MP

Sensor Sizes

Same size pixels.. still dark?

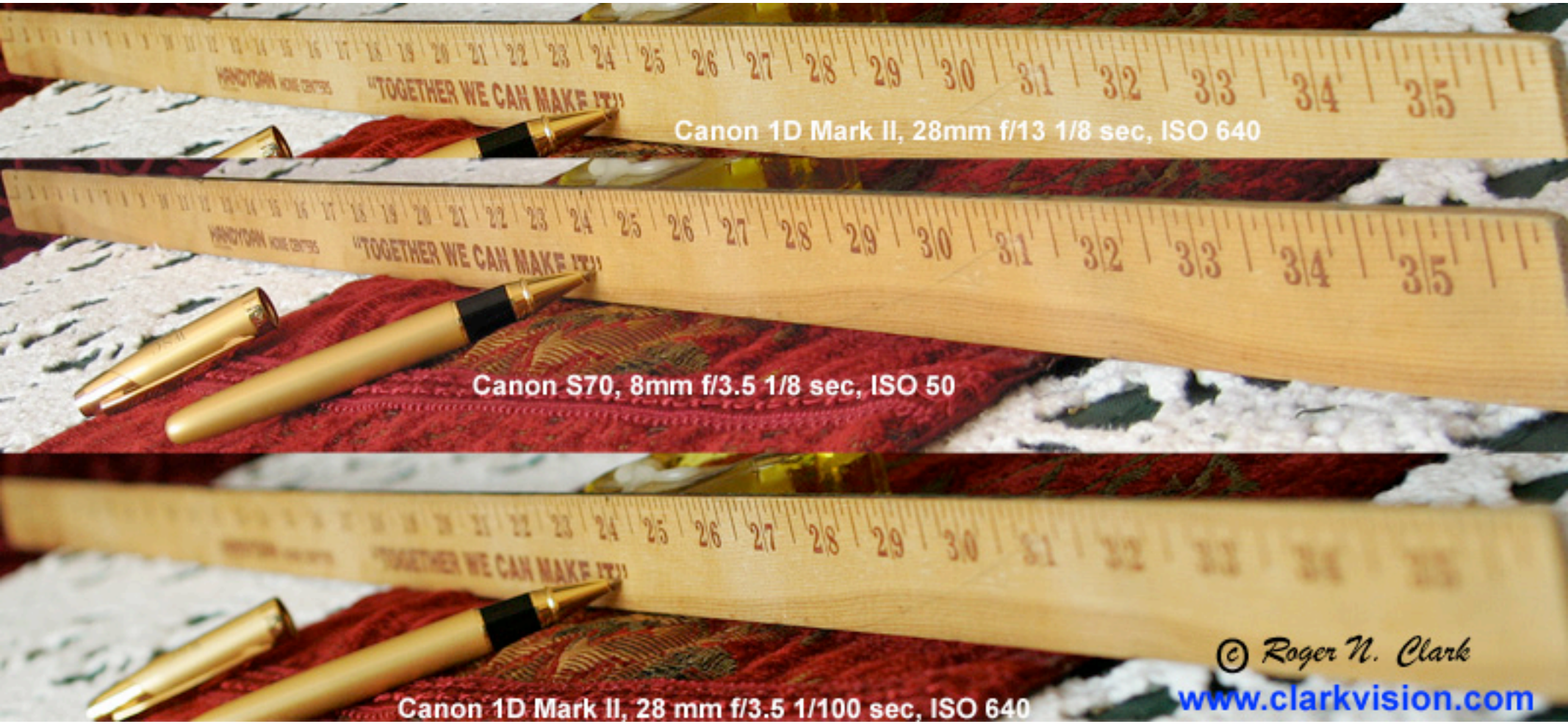
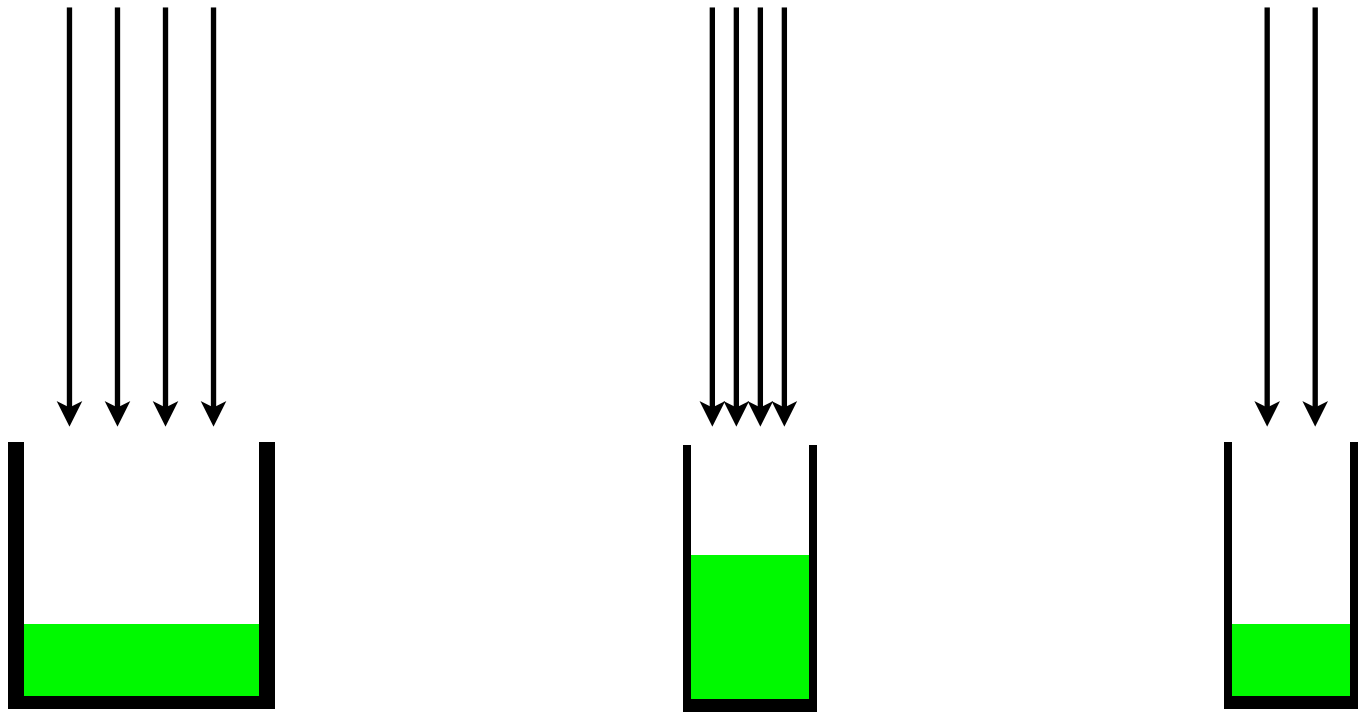


Image from http://www.clarkvision.com/photoinfo/dof_myth/

Sensor Sizes

Depth of Field

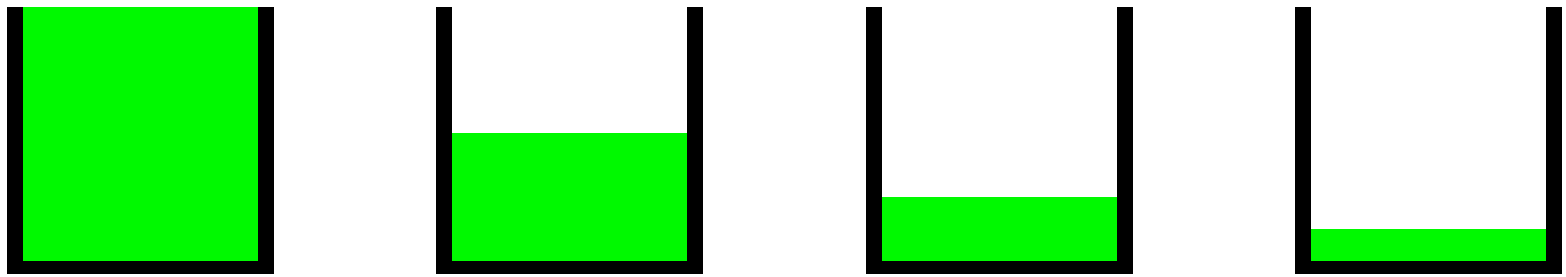


Sensor Sizes | Pixel Size

$$\text{Dynamic Range} = \frac{\text{Biggest Signal (full “bucket”)}}{\text{Smallest detectable signal}}$$

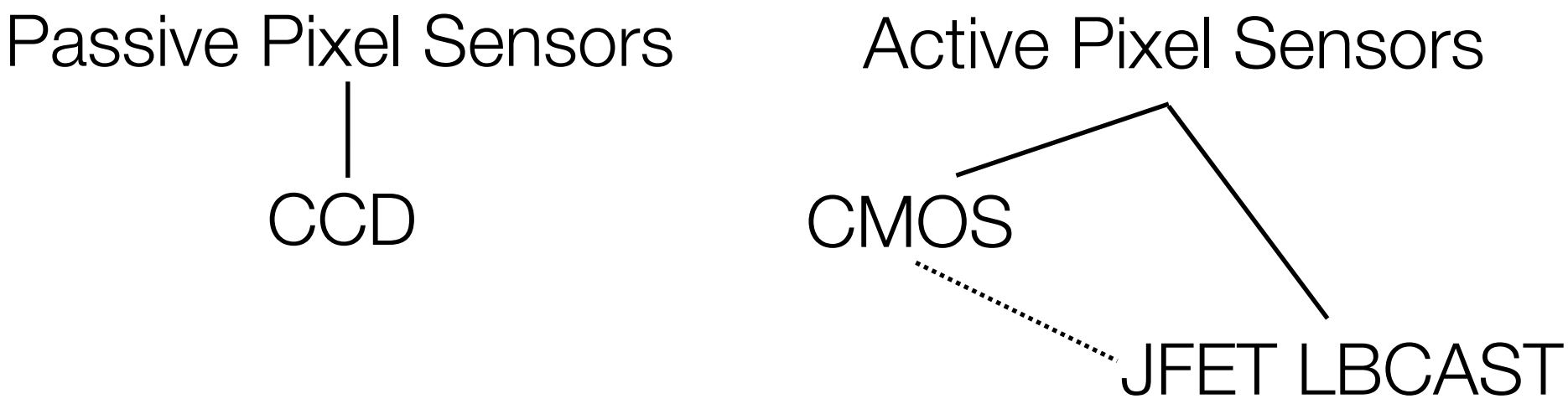
Dynamic Range

Simplified Calculation



Dynamic Range

Full capacity of pixels at ISOs


Passive Pixel Sensors
CCD
Active Pixel Sensors
CMOS
JFET LBCAST

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