Today: Finish Exposure, shutter speeds, ISO/Sensitivity

Result of binary knowledge minute paper

Not taught binary counting: 4
Got it in circuits class: 5
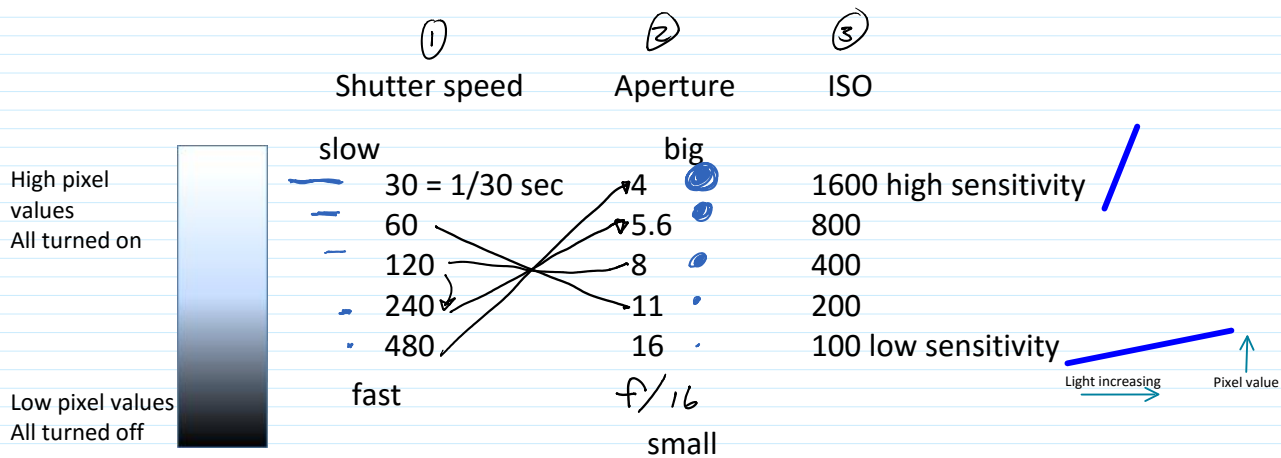In numerical methods, math or computer class:15
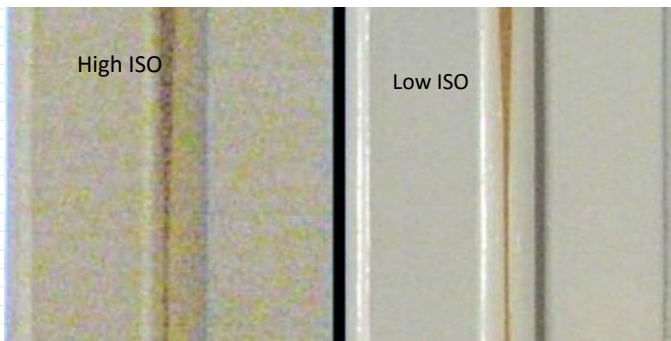In both circuits and comp methods: 7
In middle or high school: 2

Proper exposure = middle value on an average pixel

3 ways to control pixel values so far

①	②	③
Shutter speed	Aperture	ISO

	slow	big	
High pixel values All turned on	30 = 1/30 sec	4	1600 high sensitivity
	60	5.6	800
	120	8	400
	240	11	200
	480	16	100 low sensitivity
Low pixel values All turned off	fast	f/16 small	

Light increasing   Pixel value

Other implication of ISO: Noise

High ISO   Low ISO

http://en.wikipedia.org/wiki/Image_noise#Low_and_high-ISO_noise_examples

$$$$ in camera buys less noise at high ISO

Autoexposure programs (AE)
Wide variety. Stay away if you can.
Semi -automatic programs are better.
Av = aperture priority. You choose the aperture, camera will choose shutter speed. ISO might be automatic too.
Tv = Time priority; you set the shutter speed and ISO, camera AE will choose the aperture.
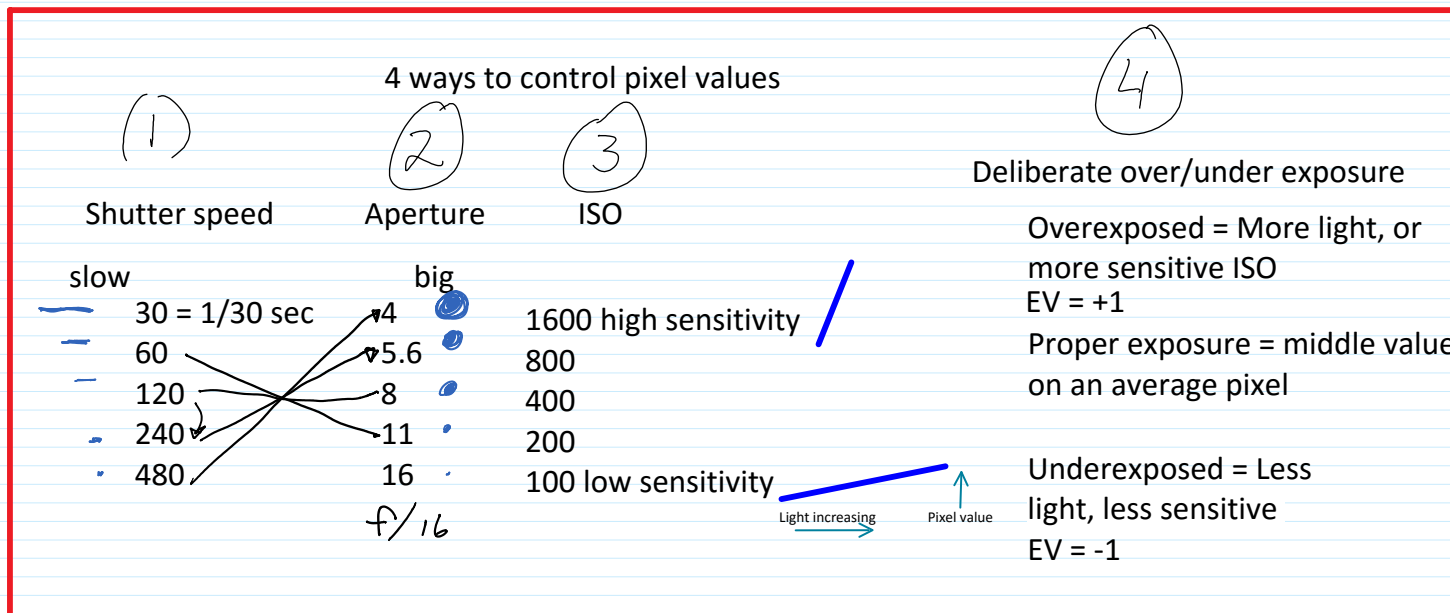M = Manual (maybe). You choose both aperture and shutter speed. Meter will tell you if exposure is OK.

±   to set over/under exposure

Lighten image, overexpose compared to AE suggestion +++
Darken, underexpose compared to AE, -----

4 ways to control pixel values

① Shutter speed   ② Aperture   ③ ISO

④ Deliberate over/under exposure

slow   big
30 = 1/30 sec   4   1600 high sensitivity
60   5.6   800
120   8   400
240   11   200
480   16   100 low sensitivity

f/16

Light increasing   Pixel value

Overexposed = More light, or more sensitive ISO
EV = +1
Proper exposure = middle value on an average pixel

Underexposed = Less light, less sensitive
EV = -1

List the side effects of each method, beyond the effect on exposure:
Shutter speed: motion blur at slow speeds
Aperture: low depth of field at large aperture
ISO: Noise at high ISO
Deliberate under/over: Camera will change one or more of the other three settings, with attendant side effects.