

DIGITAL PHOTOGRAPHY

PROF. CLAUDIA JACQUES

BASED ON PROF. TSCHAMPEL & FERRANTO PRESENTATION

DIGITAL PHOTOGRAPHY



CAPTURE

- camera controls
- lighting
- working with your subject



POST PRODUCTION

- everything else that happens after the moment the image is taken off your memory card

Photography is all about **LIGHT**
whether you are working digitally or with film.

THE DSLR

DIGITAL SINGLE LENS REFLEX

ANALOG VERSES DIGITAL

HOW THE CAMERA WORKS

THE DSLR

What is DIGITAL SINGLE LENS
REFLEX camera?

DSLR: DIGITAL SINGLE LENS REFLEX

- the photographer sees exactly the same image through the **viewfinder** that is exposed to the internal light sensor



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...awesome. What is a viewfinder?



**DSLR:
DIGITAL SINGLE LENS REFLEX**

Most digital cameras have both a
VIEWFINDER



DSLR:
DIGITAL SINGLE LENS REFLEX

Most digital cameras have both a
VIEWFINDER
and
an **LCD screen**

The screen is wired directly from the
image sensor, hence its ability to
show your picture through the LCD
screen.



DSLR: DIGITAL SINGLE LENS REFLEX

- the photographer sees exactly the same image through the viewfinder that is exposed to the internal light sensor
- can adjust everything including the shutter speed, aperture and ISO setting by turning dials, pushing buttons or adjusting settings features in the menu.



THE CAMERA BODY



In contemporary cameras the controls are “buried” within the menus of the camera’s electronic displays.

The LCD display contains all of your camera’s settings in both picture and playback modes.

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- you to change the lens on your camera, giving you greater versatility.

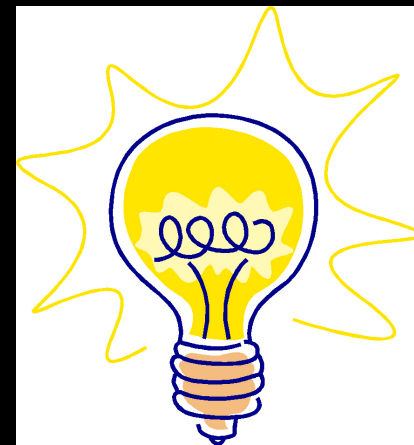
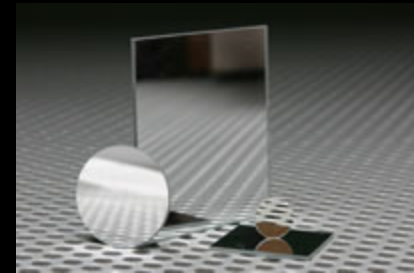
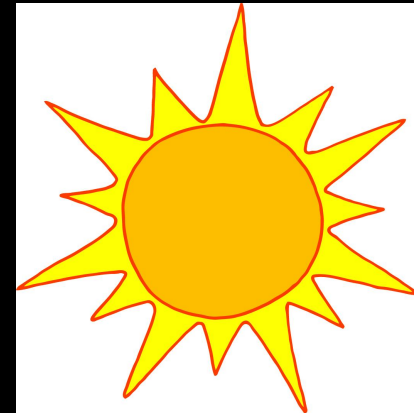
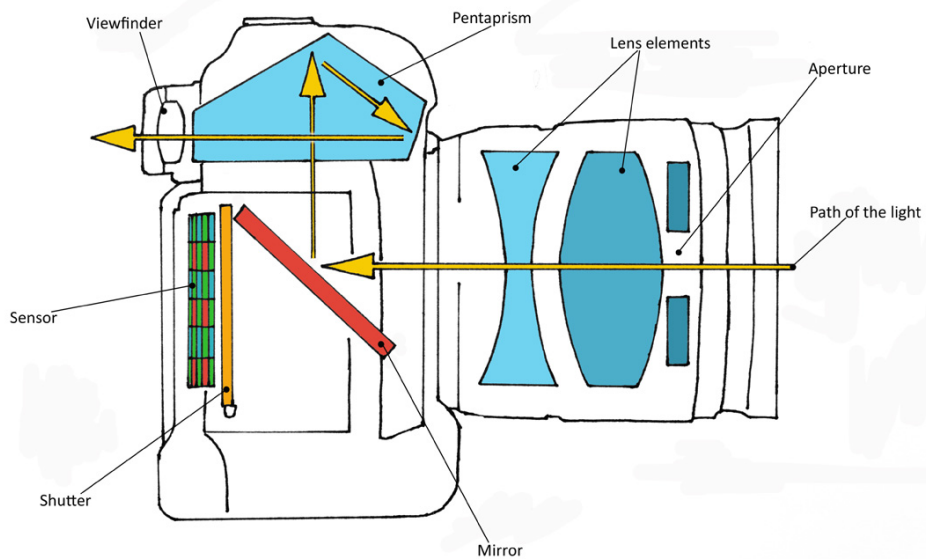


THE **DSLR**

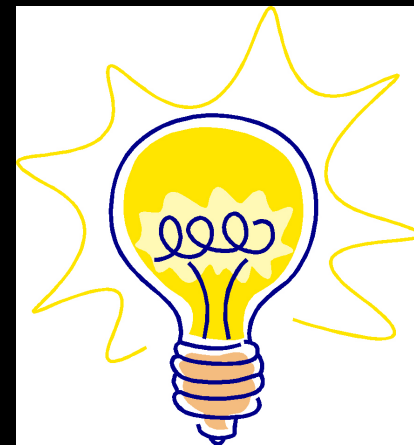
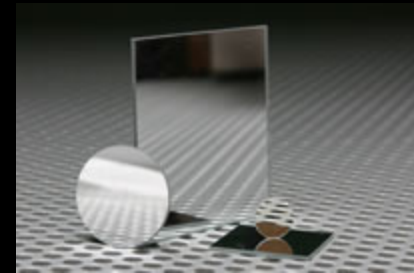
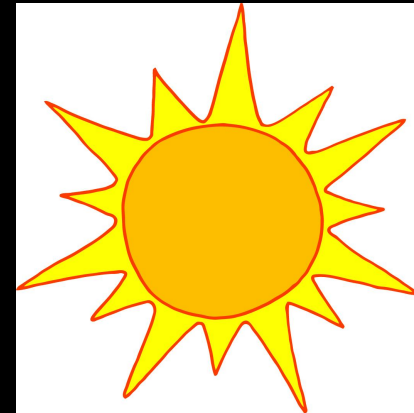
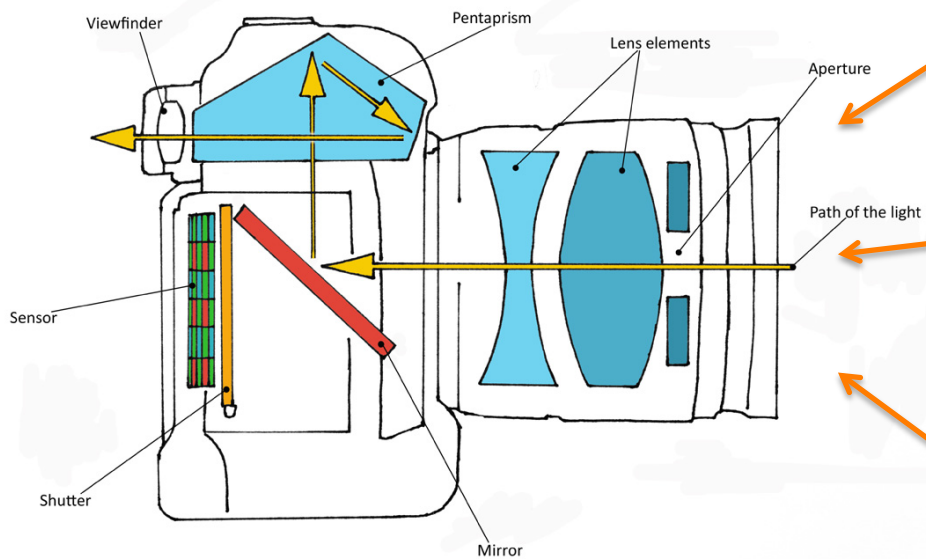
How does a **DIGITAL SINGLE LENS REFLEX** camera work?

Photography is all about **LIGHT**
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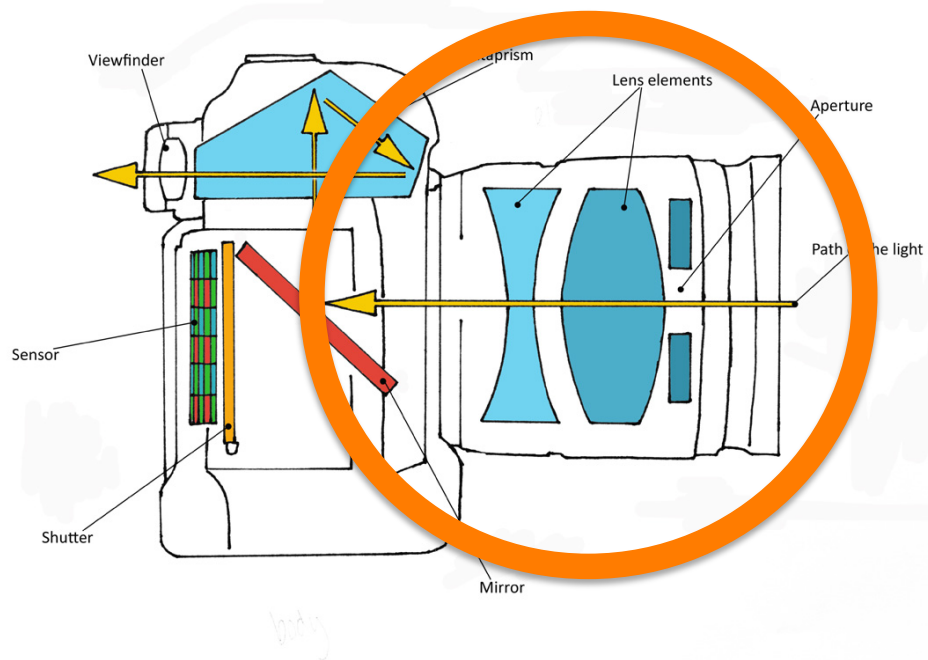
THE CAMERA BODY : capturing light



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THE CAMERA BODY : capturing light



LENS

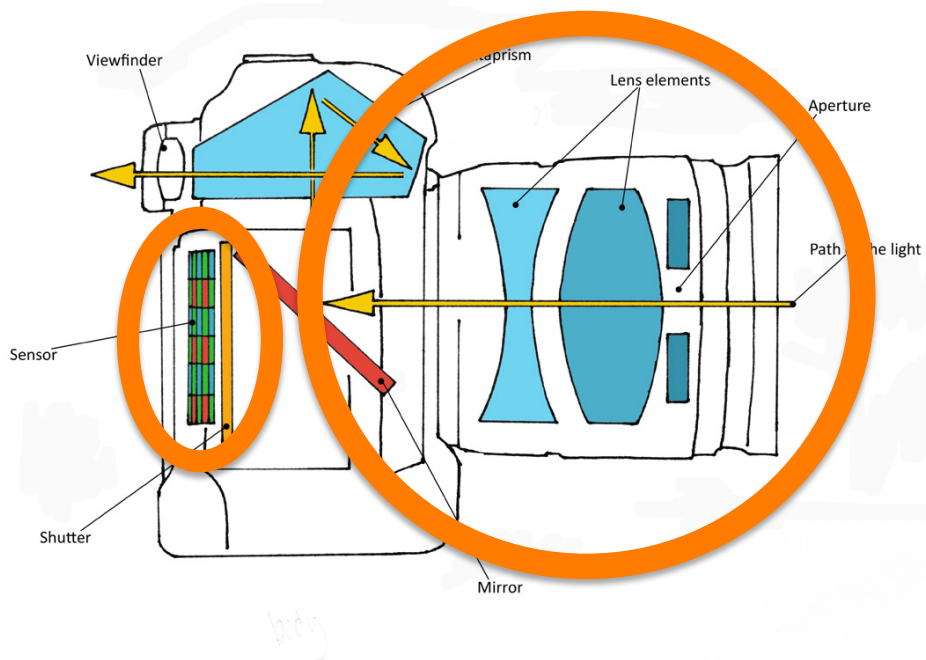
The lens is the most important element in the camera, and thus the most expensive. Its function is to collect and bend light rays into focus onto your CCD sensor allowing you to get a sharp image of whatever you photograph.

APERTURE

Aperture adjusts the amount of light reaching the sensor.

CCD = Charge-coupled device

THE CAMERA BODY : capturing light



LENS

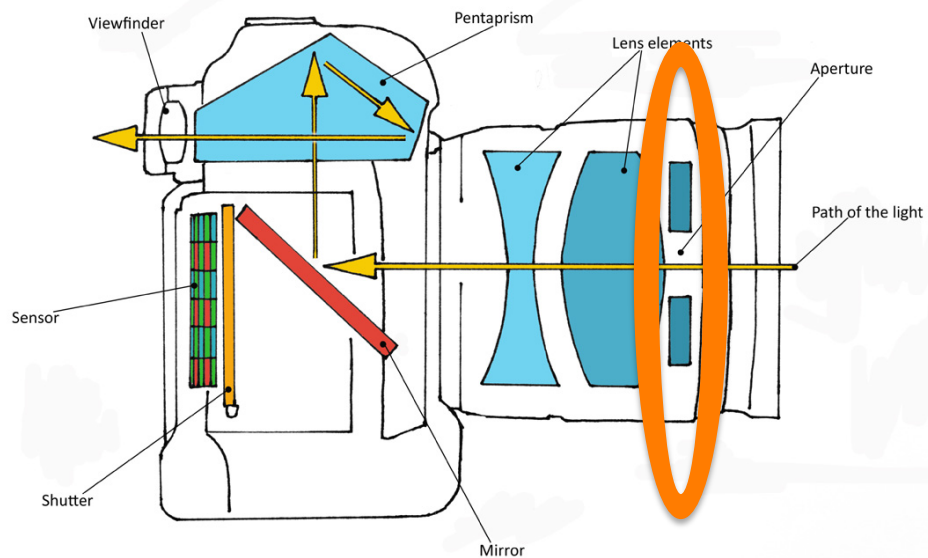
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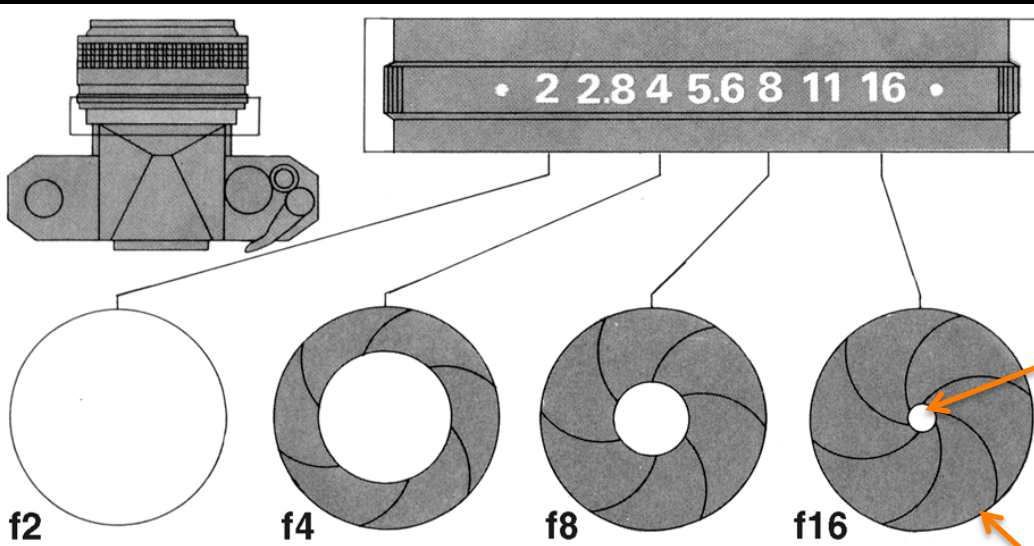
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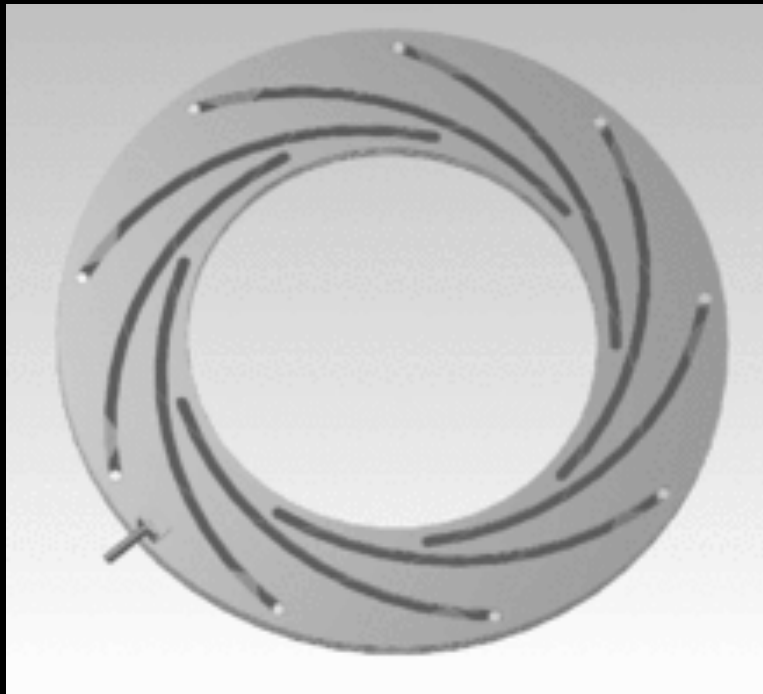
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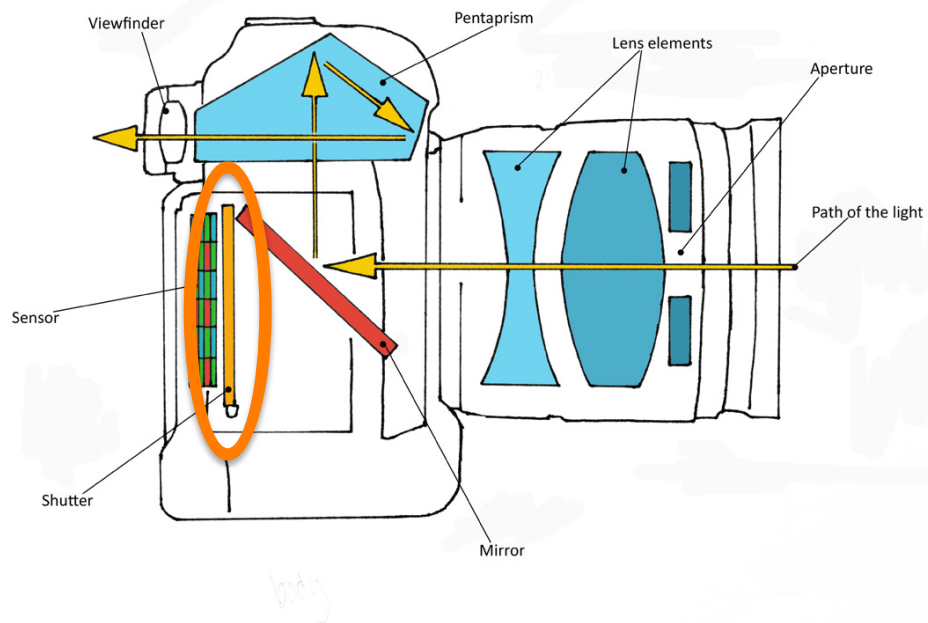
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THE CAMERA BODY : capturing light



SHUTTER

The shutter is a pair of curtains or segments of overlapping blades just in front of the light sensor. They open to let the light in when the shutter release button is depressed. The shutter remains open for the precise amount of time determined by the shutter speed.

SHUTTER SPEED

Controls the length of time the shutter stays open during exposure.

SHUTTER RELEASE BUTTON

Depressed slightly it controls your autofocus.

THE CAMERA BODY: capturing light



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ANALOG VERSES DIGITAL
HOW THE CAMERA WORKS



ANALOG DATA

- Physical media
- continually changing
- Record: sound encoded as grooves in wax disc



DIGITAL DATA

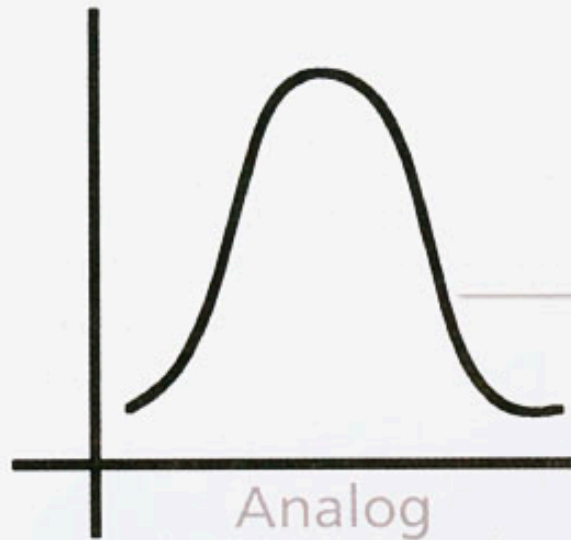
- Electronic media
- discrete units or pulses
- .mpg: sound encoded as electronic pulses



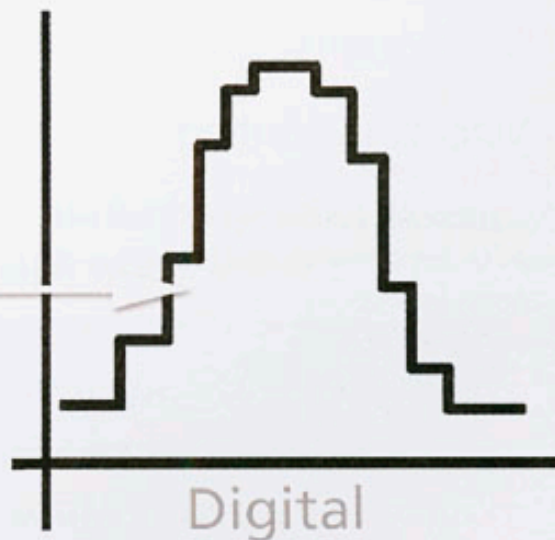
ANALOG DATA
physical
"continuous"



DIGITAL DATA
electronic
discrete units or pulses



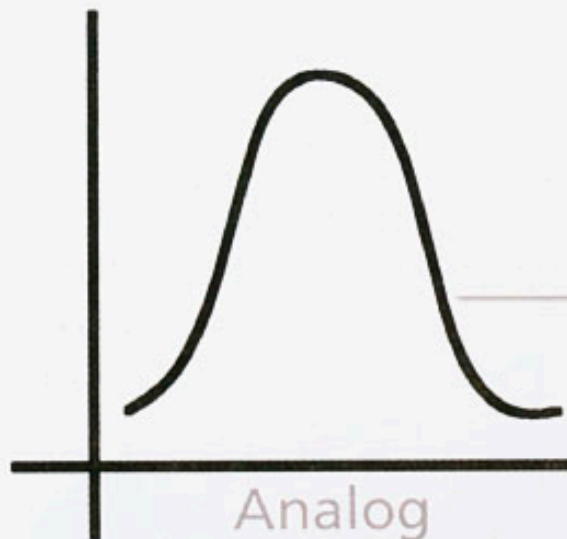
Analog
(continuous tone)



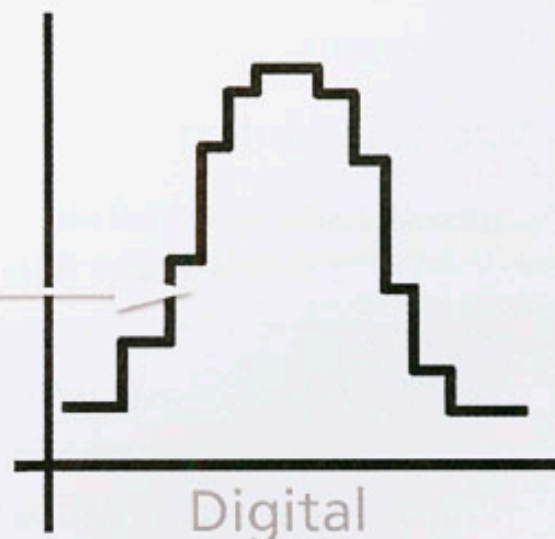
Digital
(specific tones)



WHAT ARE THE IMPLICATIONS FOR YOU AS A PHOTOGRAPHER?



Analog
(continuous tone)



Digital
(specific tones)



With film you can have an infinite number of tones.
Shooting digitally you can only produce a specific number of tones.



You are collecting digital data- your “pictures” are made up of thousands of little bits of information.

DIGITAL DATA

Composed of discrete units or pulses



- Binary : either off or on
- BIT = “binary digit”
 - smallest unit of computer memory
 - “OFF” state or “ON” state
 - Can represent a black or white pixel on a monitor (“0” or “1”)
- BYTE: group of eight bits
 - Can represent 256 colors or shades of gray per pixel on a monitor

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1 Bit



can be

0

or

1



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00000000 01010101 11111111
8 Bits 8 Bits 8 Bits

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SINGLE LENS REFLEX
ANALOG VERSES DIGITAL
HOW THE CAMERA WORKS

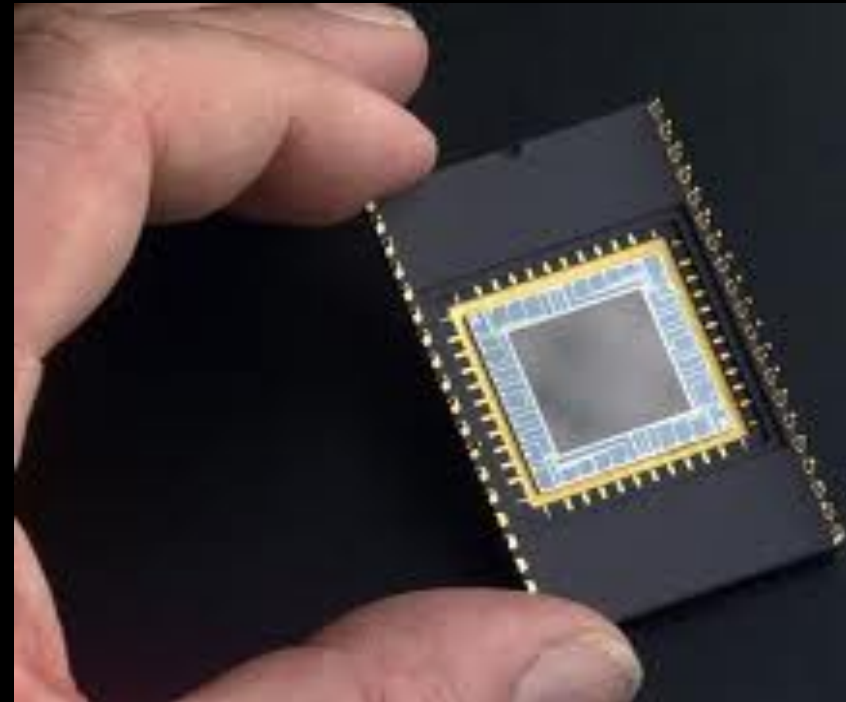
Image Sensor

Pixels

Camera Resolution

Bit Depth

File Formats



Instead of film, a digital camera has a sensor that converts light into electrical charges.

IMAGE SENSORS

- a digital sensor is a grid of cells called *photodiodes*
- each photodiode can collect light and measure the amount of light that falls on it during an exposure.
- after the exposure the measurements from all the photodiodes on the sensor are converted to digital numbers, arranged on a grid of rectangular colored boxes, and stored on the camera's memory card. The sensor is then cleared for the next exposure.

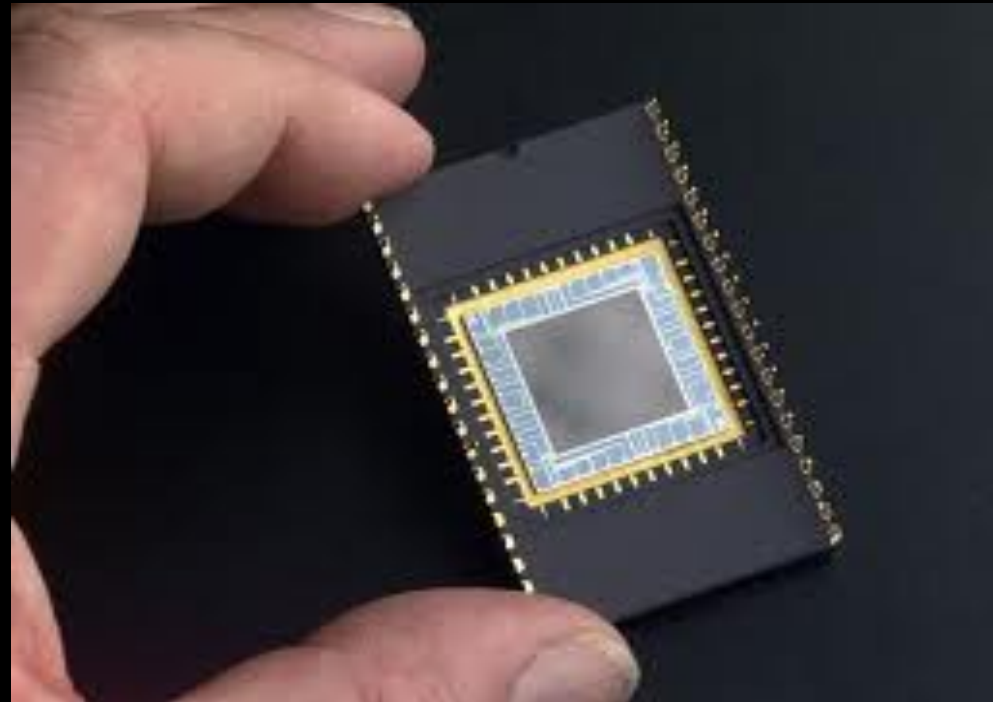


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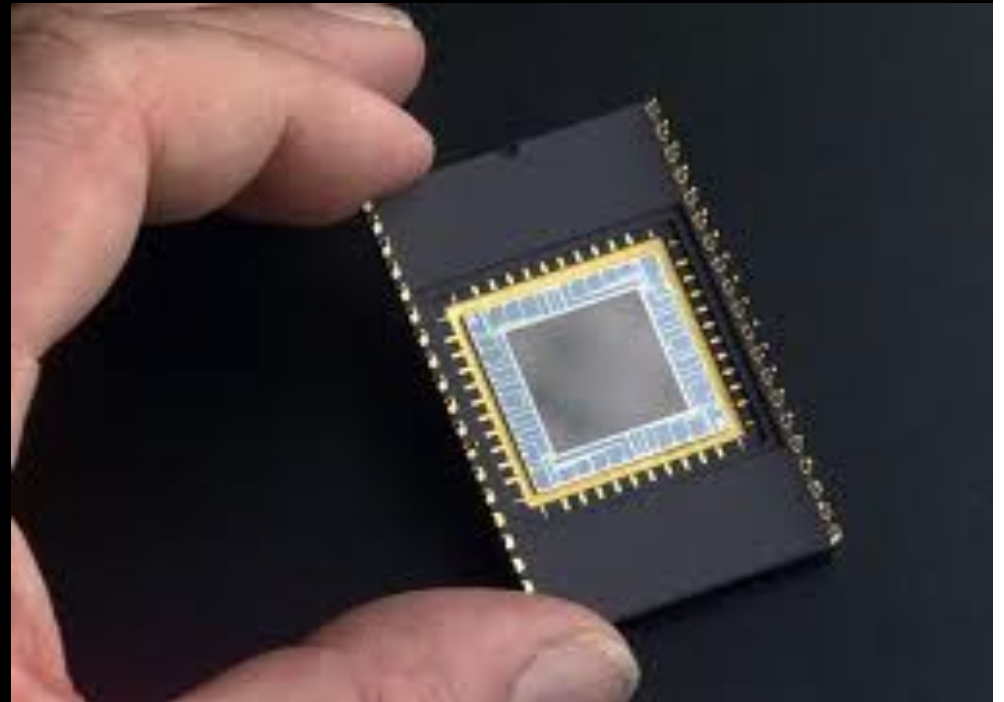
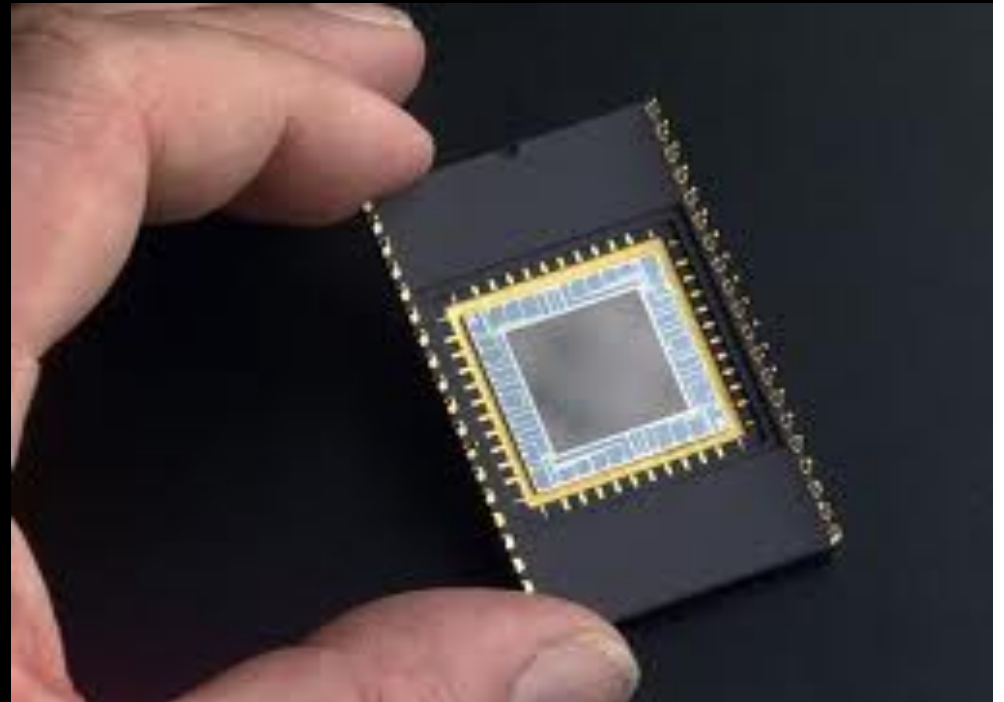
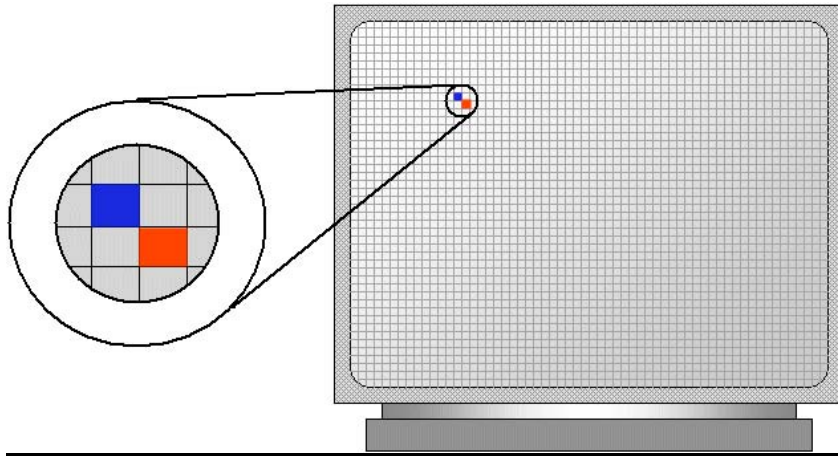


IMAGE SENSORS

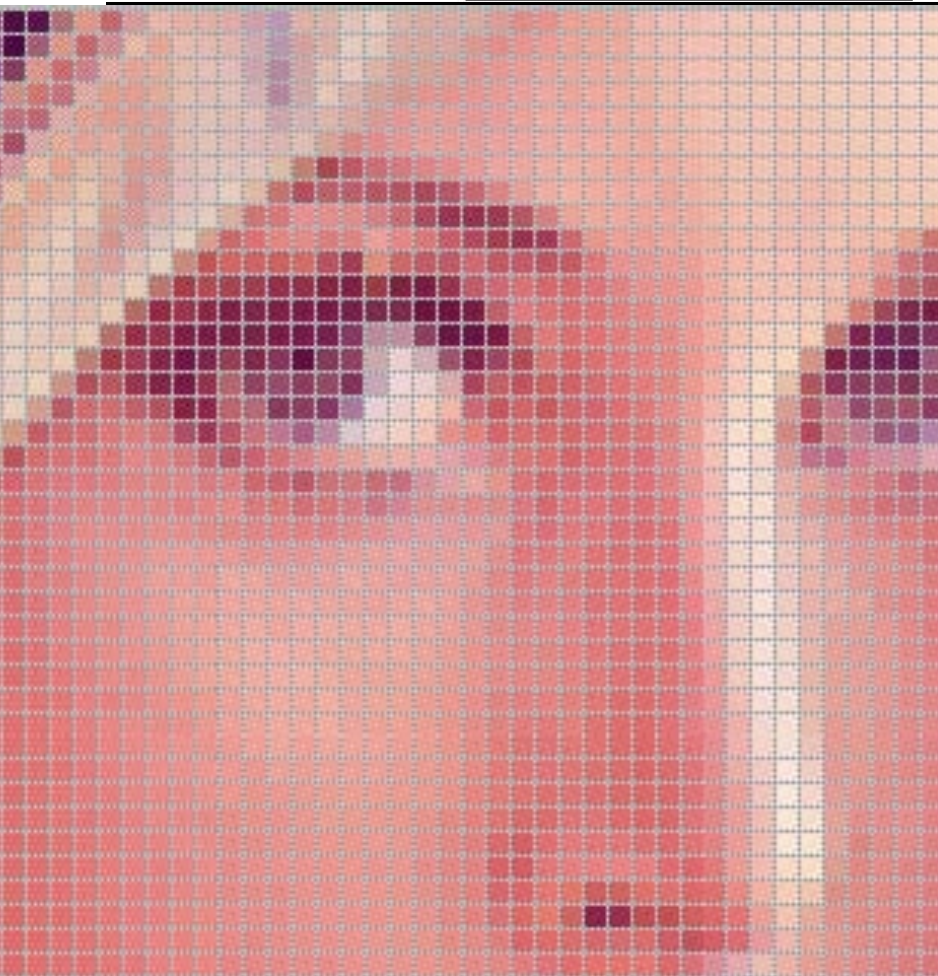
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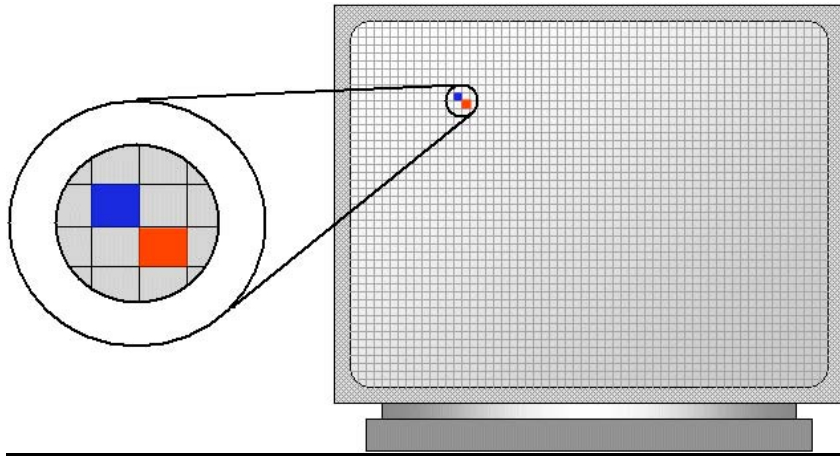




PHOTODIODE = PIXEL

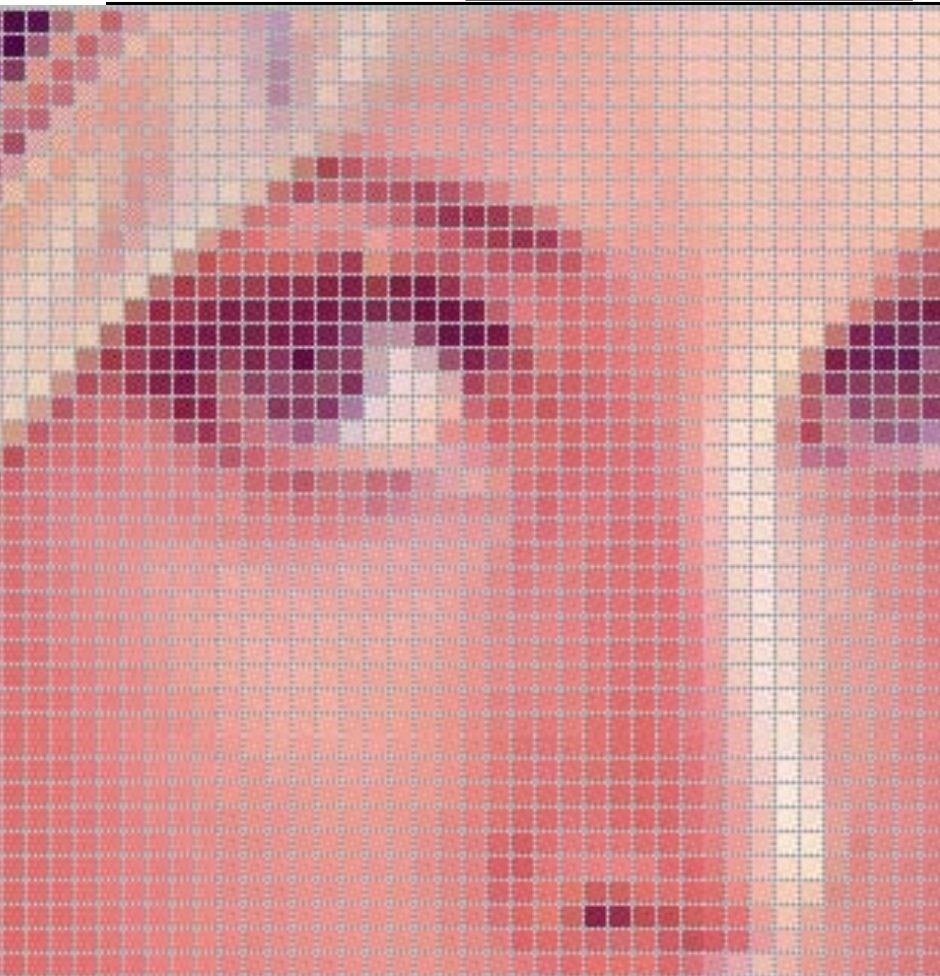
- each photodiode's digital number is a measure of the lightness or darkness (value) of a single square is called a pixel.
- photodiode's are known as pixels.
- pixels are set in a grid.
- each pixel represents a single block of color and tone.
- grouped together the pixels create the shapes and details in your image.

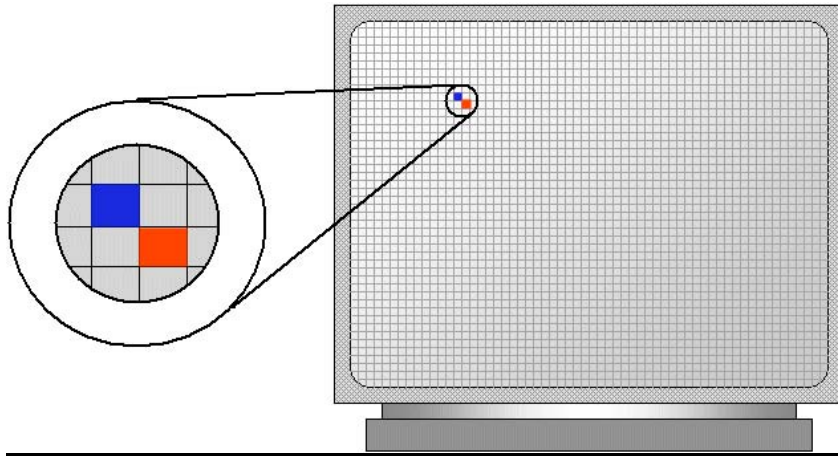




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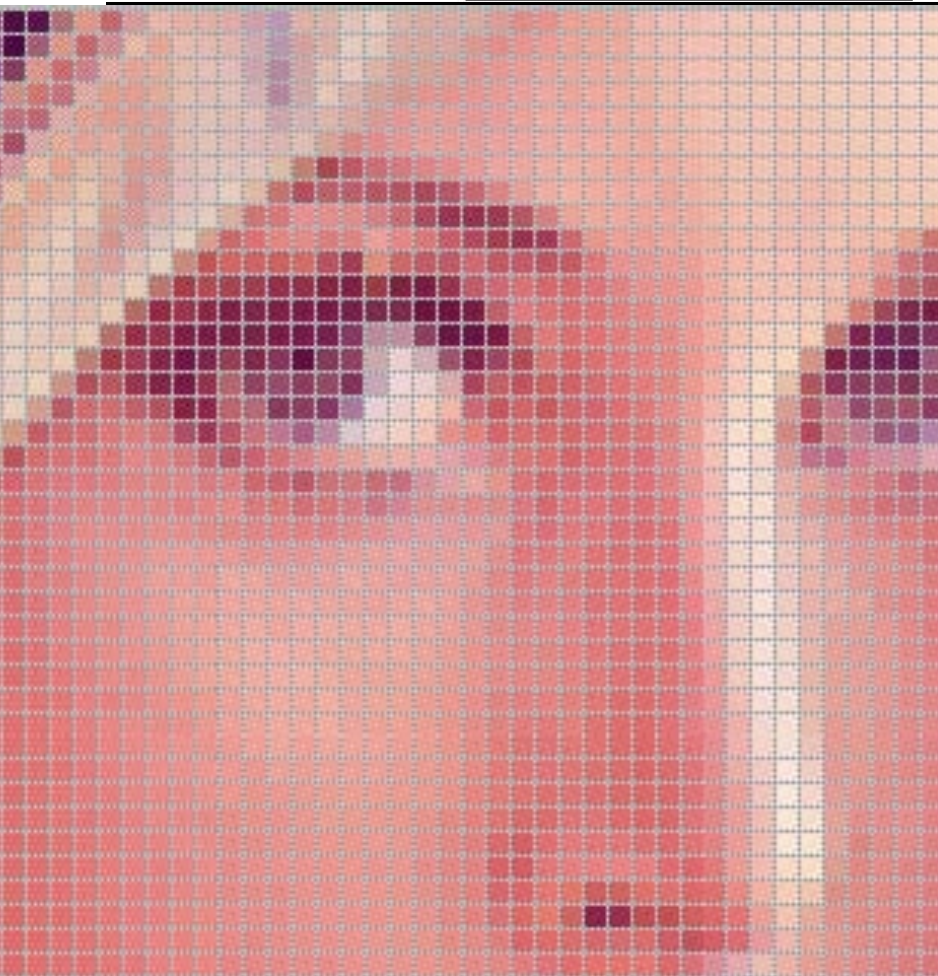
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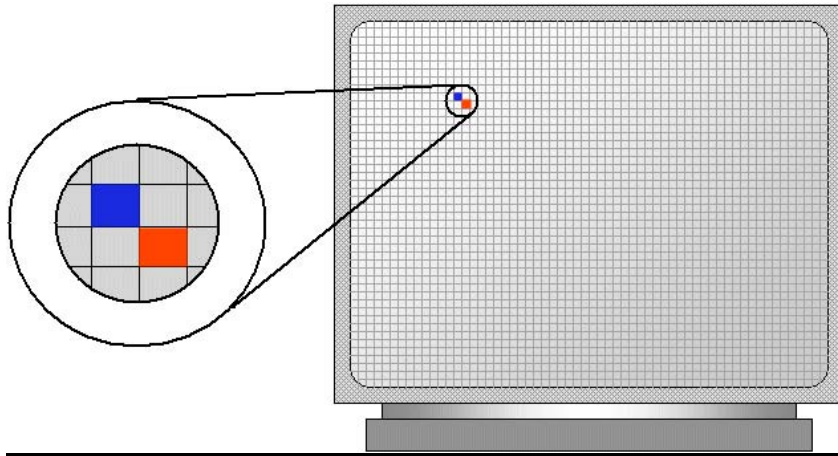




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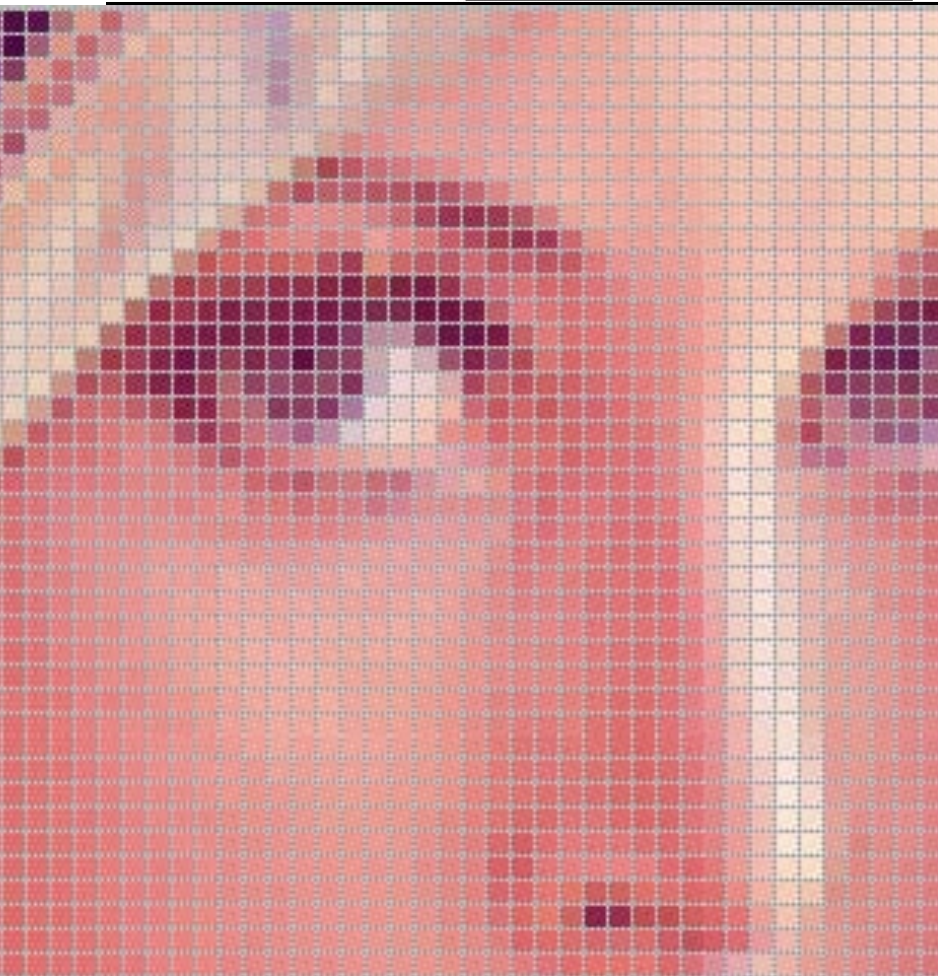
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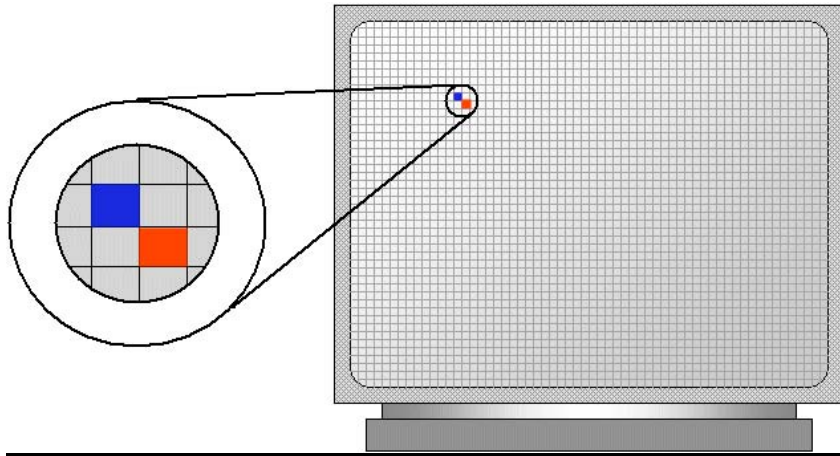




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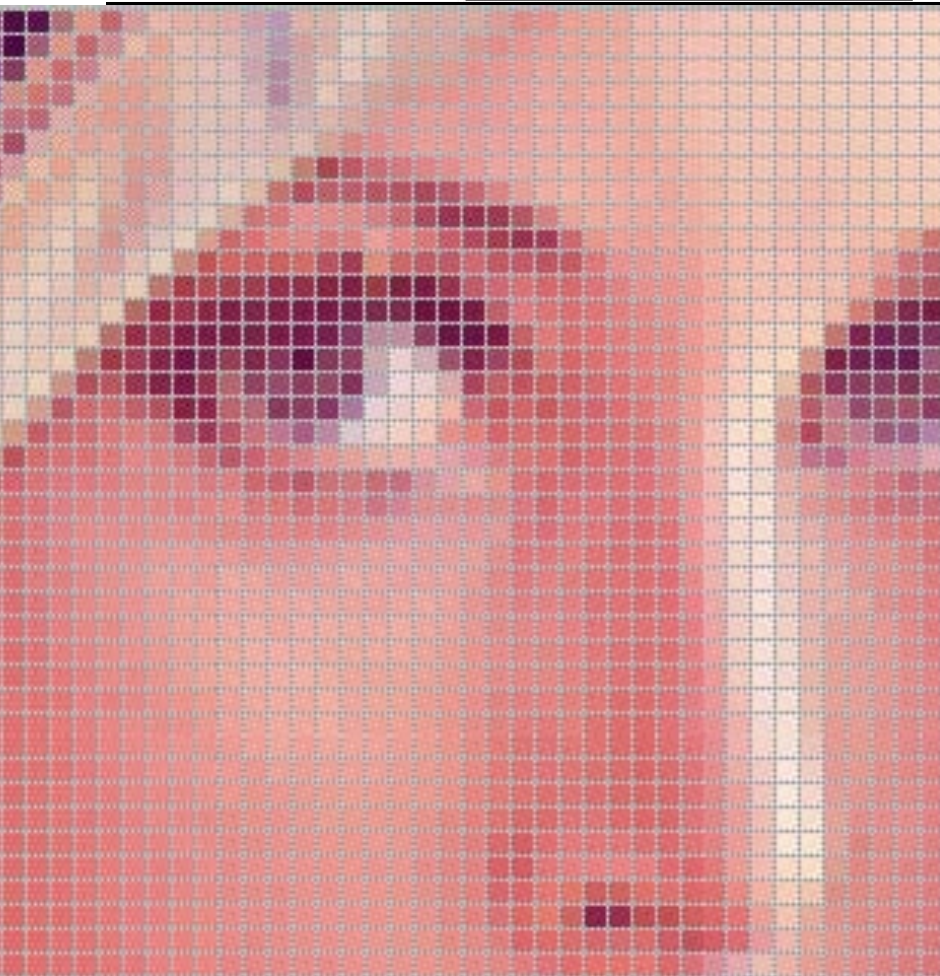
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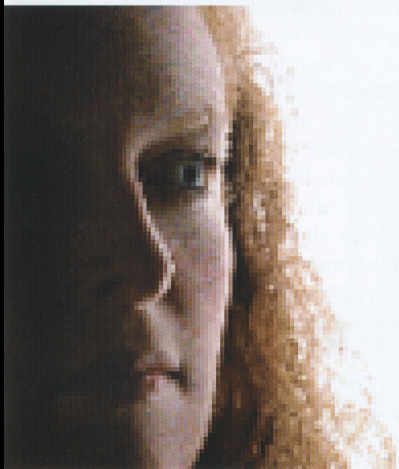




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PIXELS AND RESOLUTION

- more pixels are needed for finer images.
- resolution measures the fineness of an image
- ppi = pixels per inch
- always be sure to capture your image at the highest size and resolution possible.

CAMERA RESOLUTION + the myth of the MEGAPIXEL:

Megapixels vs. Maximum Print Size Chart

Megapixels	Pixel Resolution*	Print Size @ 300ppi	Print size @ 200	Print size @ 150**
3	2048 x 1536	6.82" x 5.12"	10.24" x 7.68"	13.65" x 10.24"
4	2464 x 1632	8.21" x 5.44"	12.32" x 8.16"	16.42" x 10.88"
6	3008 x 2000	10.02" x 6.67"	15.04" x 10.00"	20.05" x 13.34"
8	3264 x 2448	10.88" x 8.16"	16.32" x 12.24"	21.76" x 16.32"
10	3872 x 2592	12.91" x 8.64"	19.36" x 12.96"	25.81" x 17.28"
12	4290 x 2800	14.30" x 9.34"	21.45" x 14.00"	28.60" x 18.67"
16	4920 x 3264	16.40" x 10.88"	24.60" x 16.32"	32.80" x 21.76"
35mm film, scanned	5380 x 3620	17.93" x 12.06"	26.90" x 18.10"	35.87" x 24.13"

*Typical Resolution. Actual pixel dimensions vary from camera to camera.

photo.tutsdb.com

- the amount of detail that a digital camera can capture is called resolution, and it is measured in pixels.
- more pixels = more detail
- the pixel count is measured in megapixels.

IMAGE QUALITY



RESOLUTION and BIT DEPTH

The amount of information in a digital image-- and therefore its technical quality-- is determined by both the number of pixels and the number of possible values each pixel can hold.



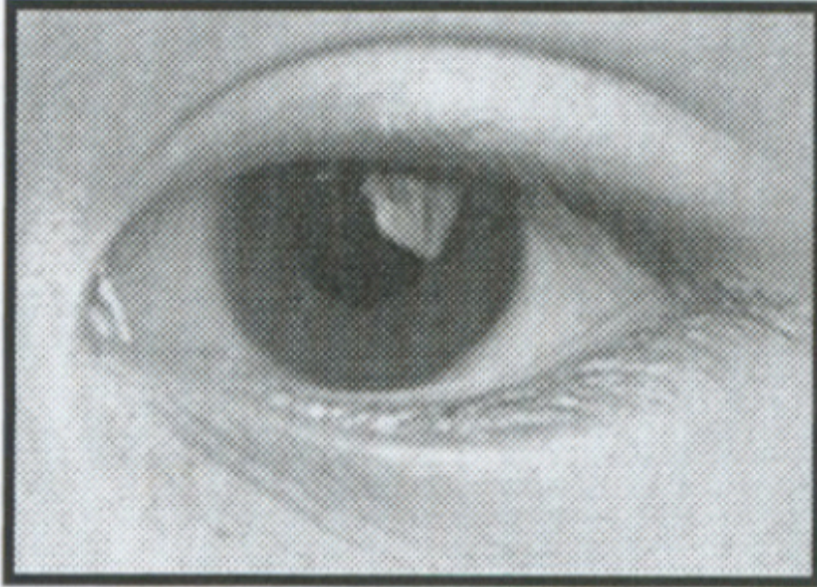
OFF

ON

BIT DEPTH

quantifies how many unique colors are available in an image's color palette

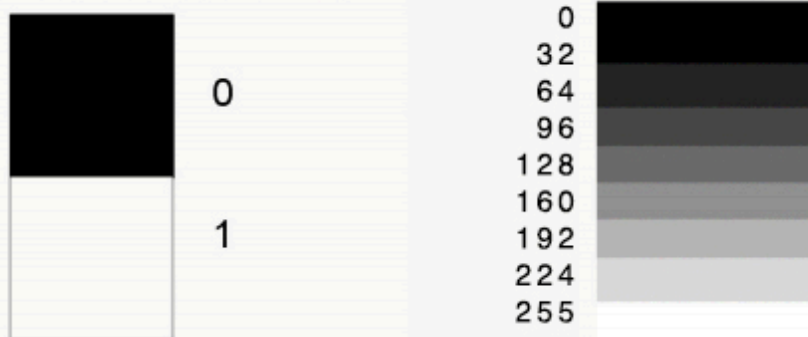
- the higher the bit depth of an image= the more colors it can store
- a 1 BIT image can only show two colors (black and white)



BIT DEPTH

quantifies how many unique colors are available in an image's color palette

- the higher the bit depth of an image= the more colors it can store
- an 8 BIT image can represent shades of gray (one channel)
- from 0 (black) to 255 (white), 256 tones provide excellent black and white rendition





BIT DEPTH

quantifies how many unique colors are available in an image's color palette

- an 24 BIT image can represent 16,777,216 colors
- a color digital image is made up of three images, one red, one green and one blue (RGB)
- with 8 bits each, those three colors can each have 256 different shades



You should always be shooting in RAW, at the highest possible file size & image quality that your camera will allow.

COMMON FILE FORMATS

- **Filename extension**
The three-character suffix found after a file's name
- **.dng**
 - camera raw file, contain “raw” or unprocessed data from the image sensor
- **.jpg**
 - Compressed for web, email, online photo services
 - Save your files as .jpg before printing in lab (smaller file, faster print)
 - LOSSY image degrades slightly each time it's saved in .jpg format
- **.psd Photoshop document**
 - Working file – preserves Photoshop layers, selections, edits, etc.
- **.gif**
 - 256 or fewer colors
 - Used extensively for flat, hard-edged web graphics
- **.tiff**
 - Used for print graphics – more flexible than .eps

*The camera is an instrument that teaches people
how to see without a camera.*

- Dorothea Lange

PHOTOGRAPH!!!!