

• March 26 Notes

- Final exam: converting letters to numbers = **encoding** - user ASCII [tool]
- ASCII: 127 characters - 8 bit
- First digit: 0 > parity bit for error detection > single bit error therefore 127 characters. First bit limits to 127 characters

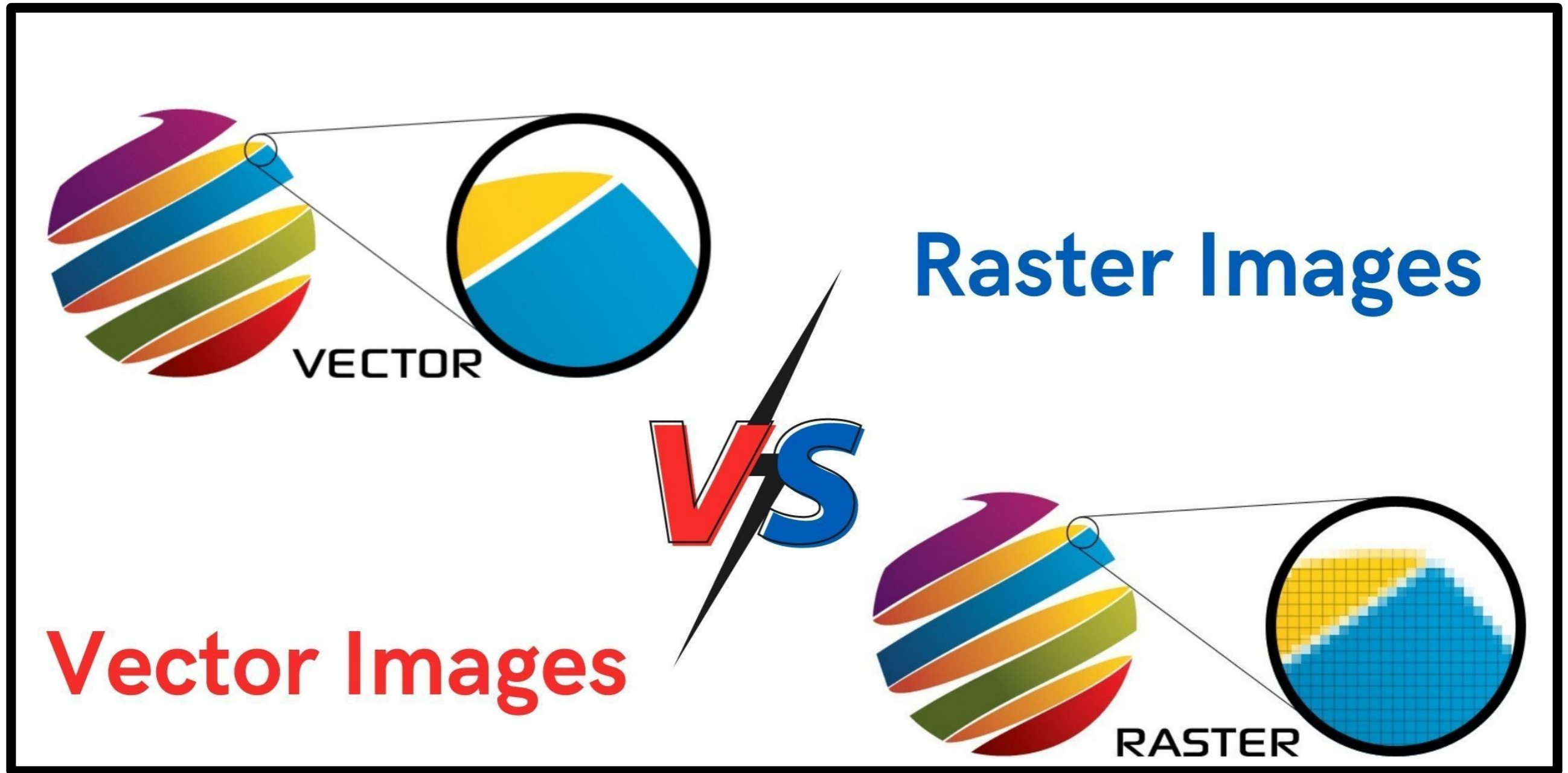
- Other languages have additional characters
- Process goes from a letter to a decimal to binary which is then sent out



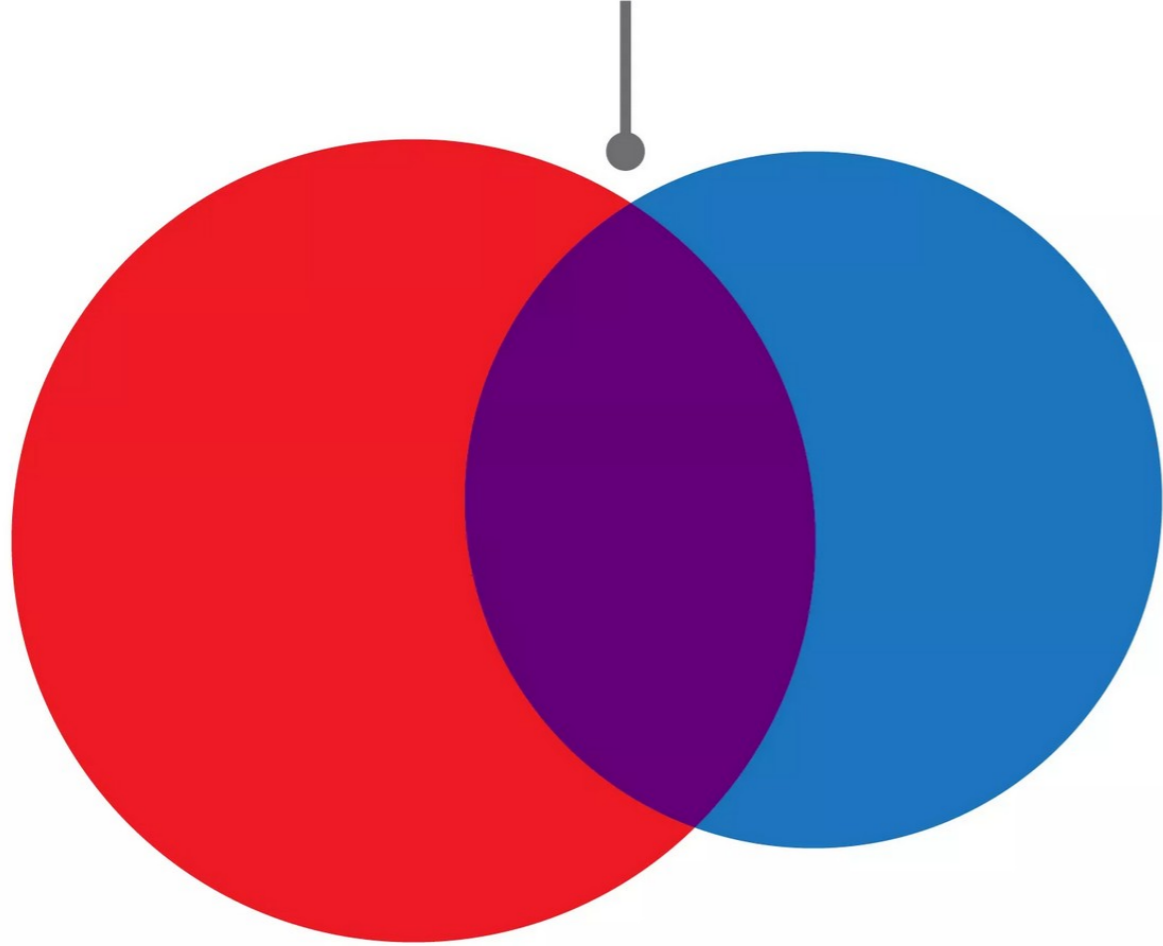
- Letters are DIGITAL since they are discrete > only 26 of them, ie: a, b, c, d, e, f
- Analog systems have an infinite amount of options:
 - color infinite number of shades
 - audio has infinite number of notes

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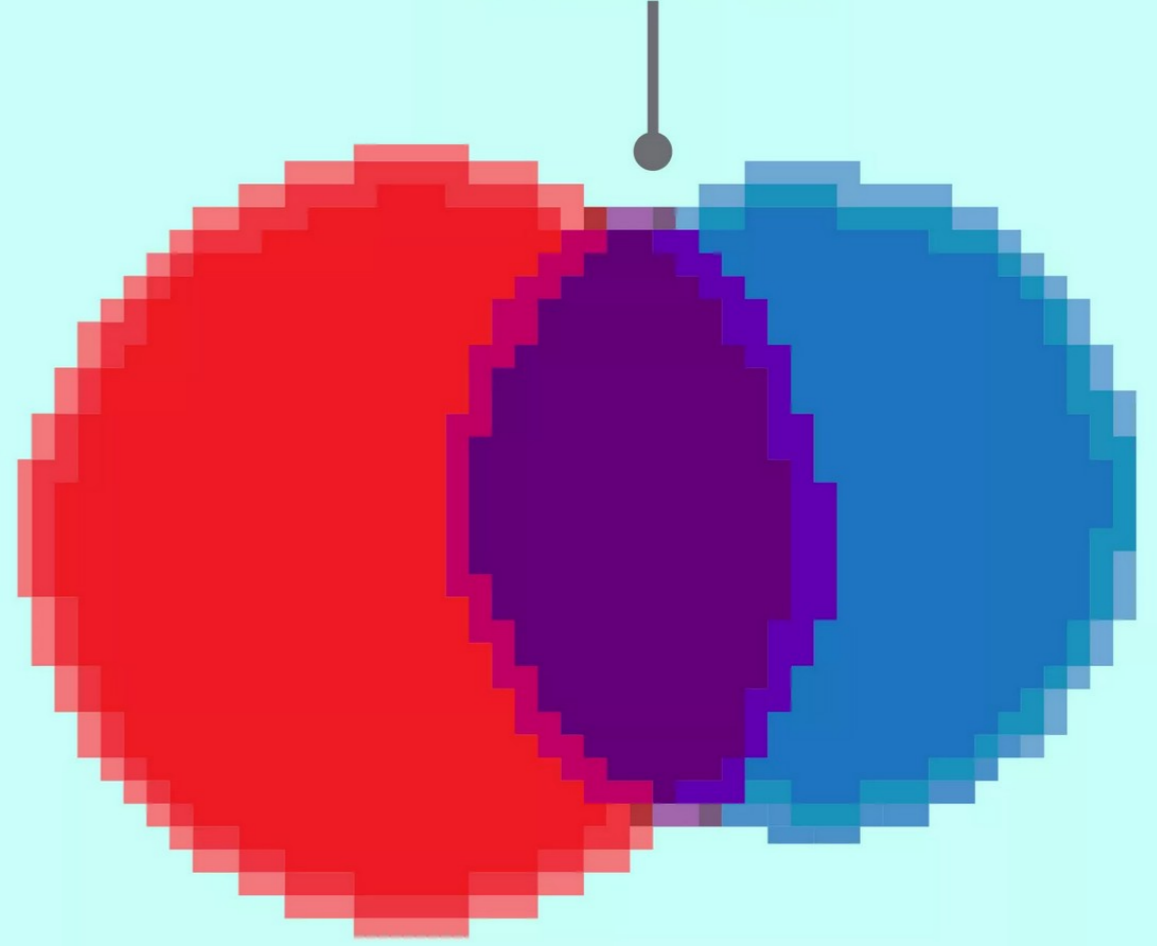
- 2 Types of Graphics:
 - Raster: most familiar
 - Vector



Vector



Raster



AI

EPS

CGM

BMP

TIFF

PCX

PDF

SVG

CDR

GIF

PNG

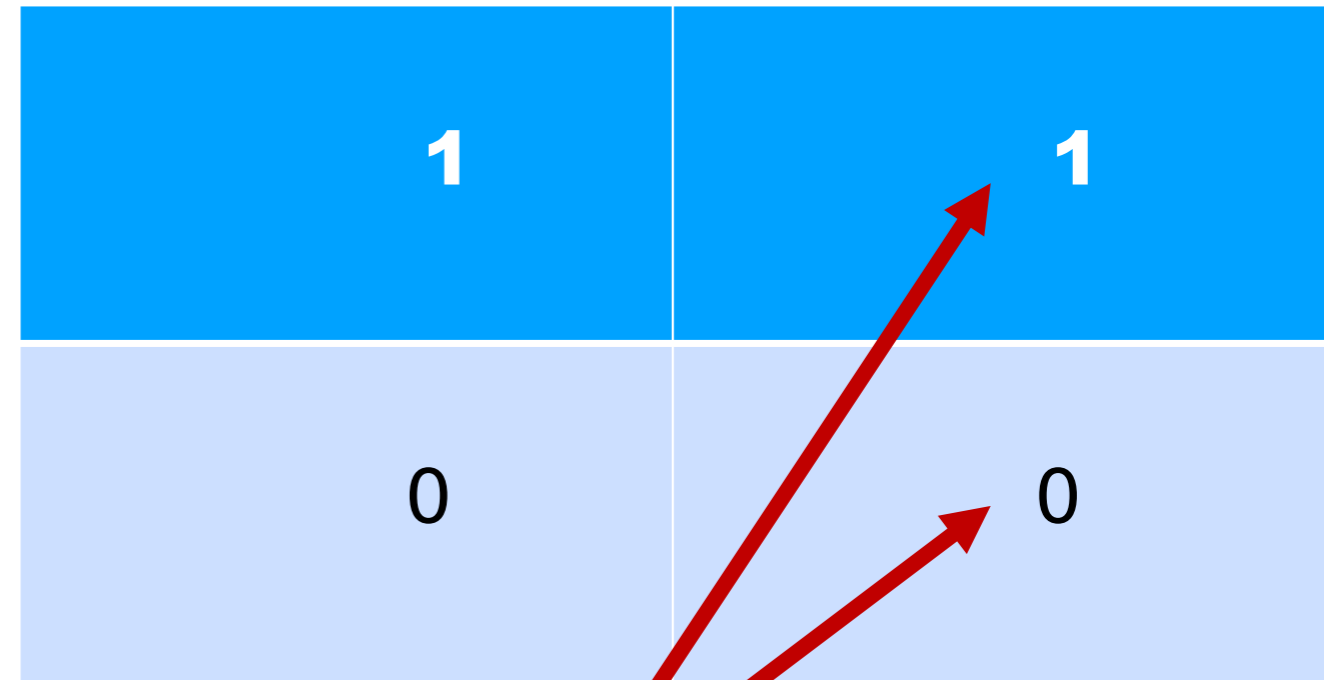
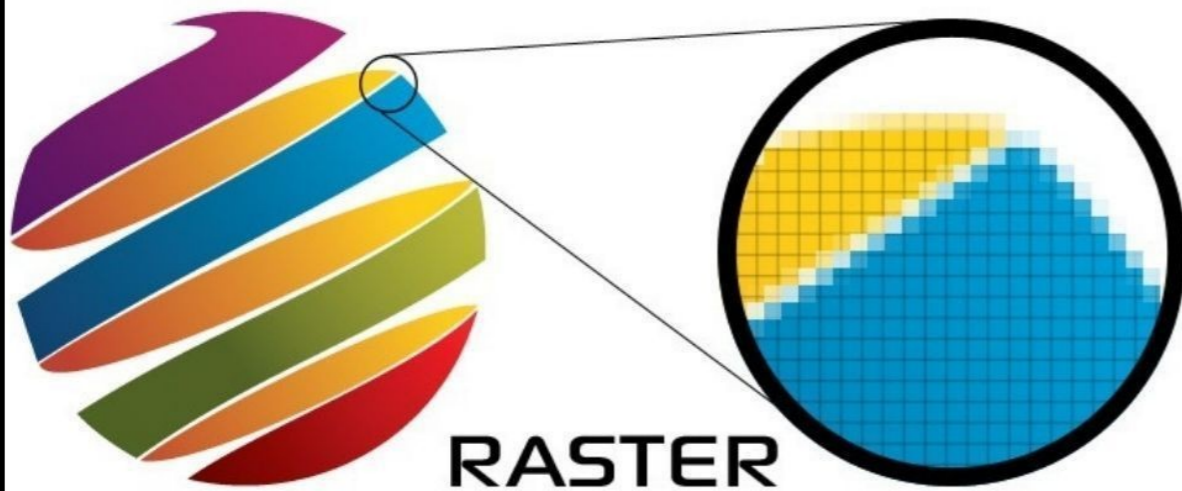
JPEG

File types

Raster Graphics:

- Turn pixels on
- Pixel: smallest graphics unit
- 10x10 grid = 100 pixels

Raster Images



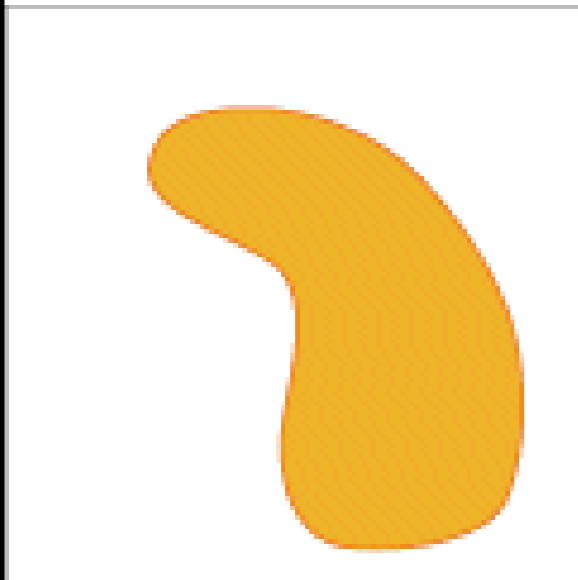
Color

Send: 1100
4 bits

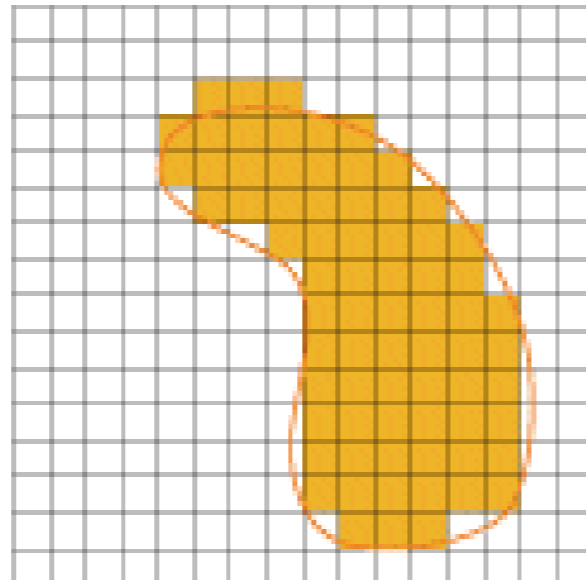
Raster Graphics:

- More pixels to get more detail
- Increase pixels, increase quality

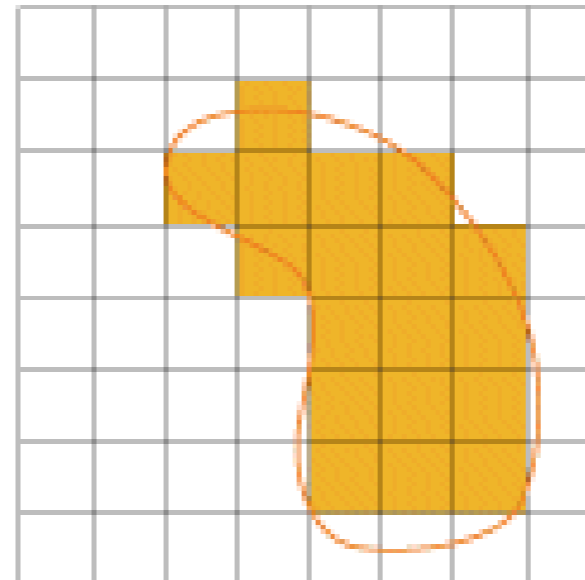
71 m²
polygon



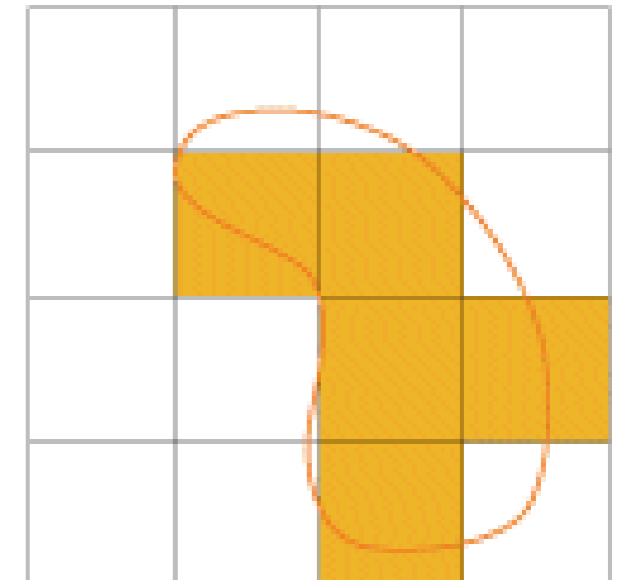
73 m²
1 m cell
16 x 16 cells



72 m²
2 m cell
8 x 8 cells



80 m²
4 m cell
4 x 4 cells

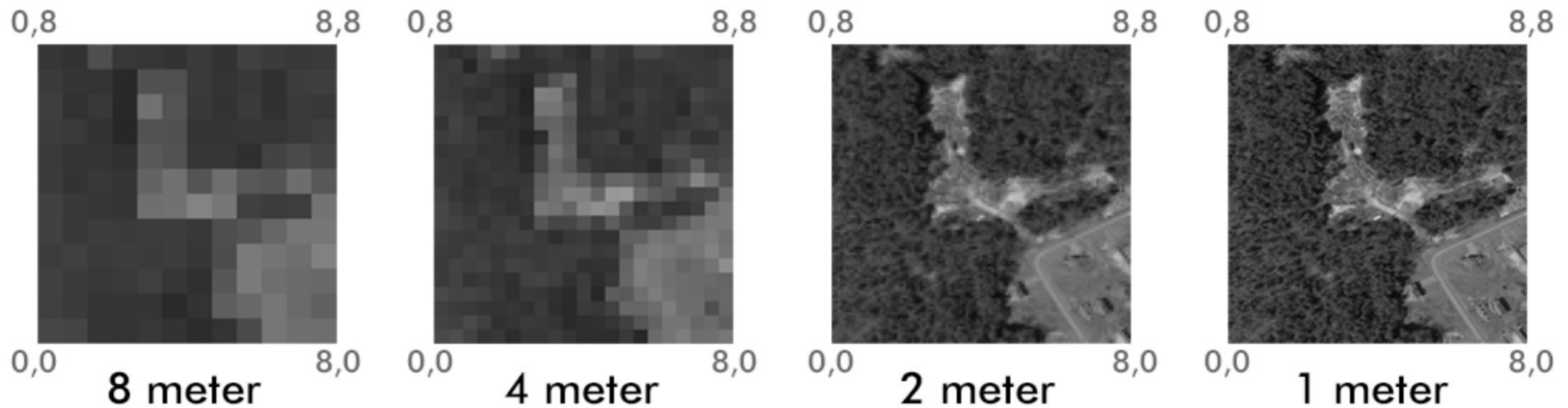


- Smaller cell size
- Higher resolution
- Higher feature spatial accuracy
- Slower display
- Slower processing
- Larger file size

- Larger cell size
- Lower resolution
- Lower feature spatial accuracy
- Faster display
- Faster processing
- Smaller file size

- Cut down resolution of picture to send through Internet faster
- Decreasing resolution will merge some of the pixels

Raster over the same extent, at 4 different resolutions



- Grayscale > 3 bits
- $2^3 > 8$ - number of options
- 8 shades of gray - Increase the amount of data sent



- 24 bits > hundreds of millions of colors
- File gets bigger with 24 bits

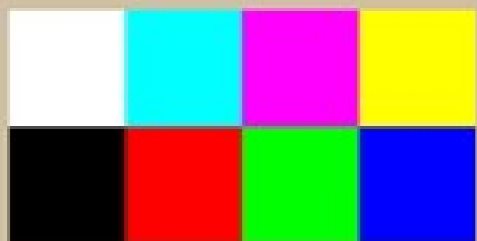
24 bits

24 bits

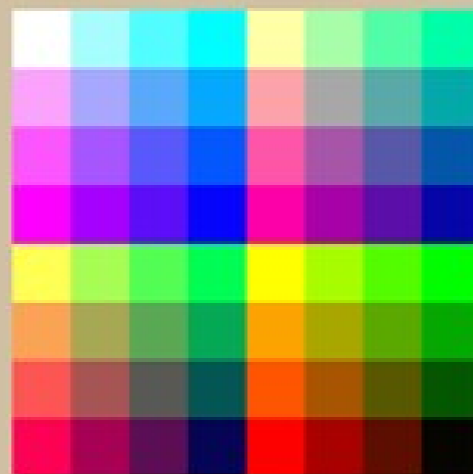
24 bits

24 bits

1 bit channel
2/channel
8 colors total



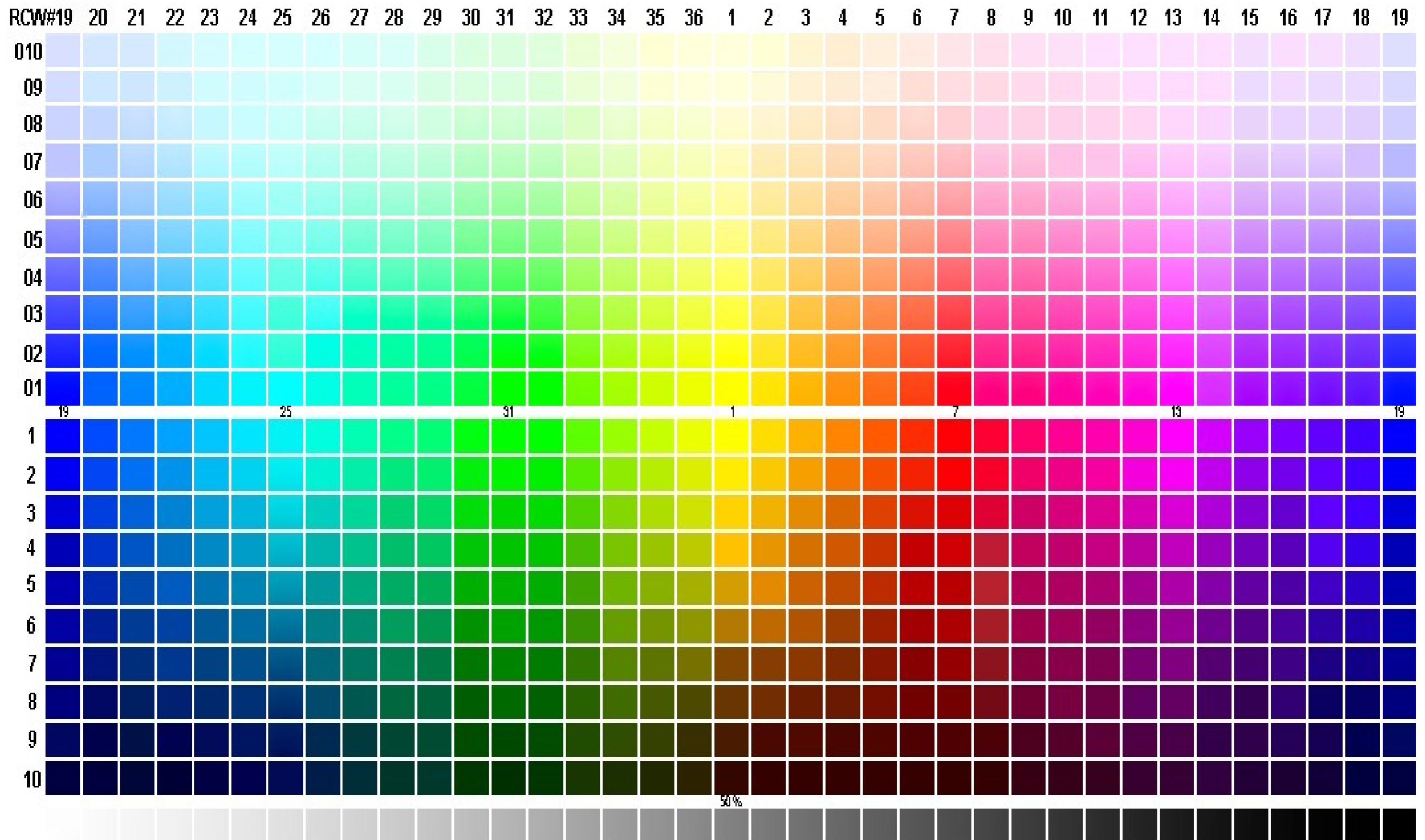
2 bit/channel
4/channel
64 colors total



3 bit/channel =
8/channel =
512 colors total

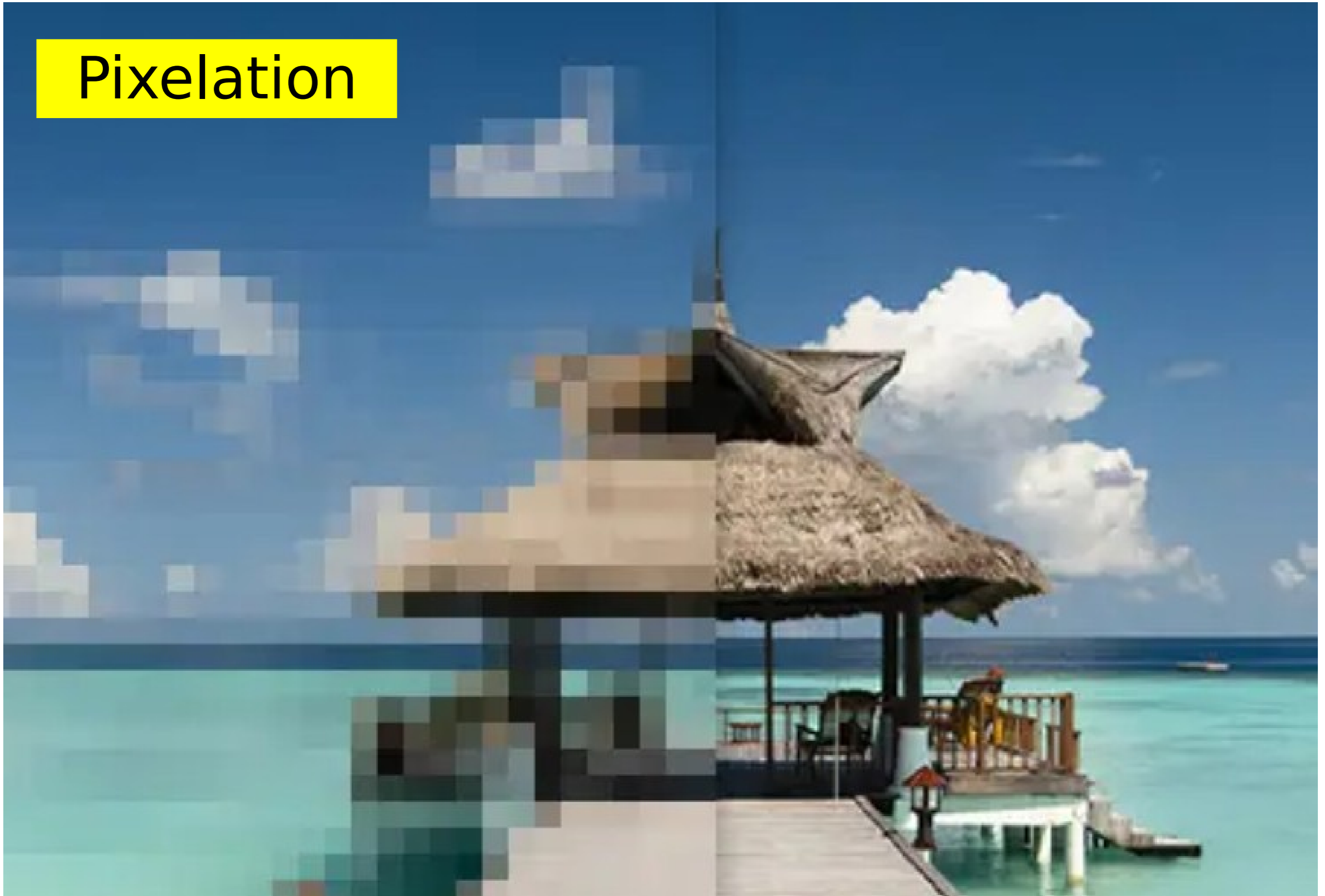


- 24 bits > hundreds of millions of colors
- File gets bigger with 24 bits



- Stretch out a picture > can see individual pixels aka Pixelation

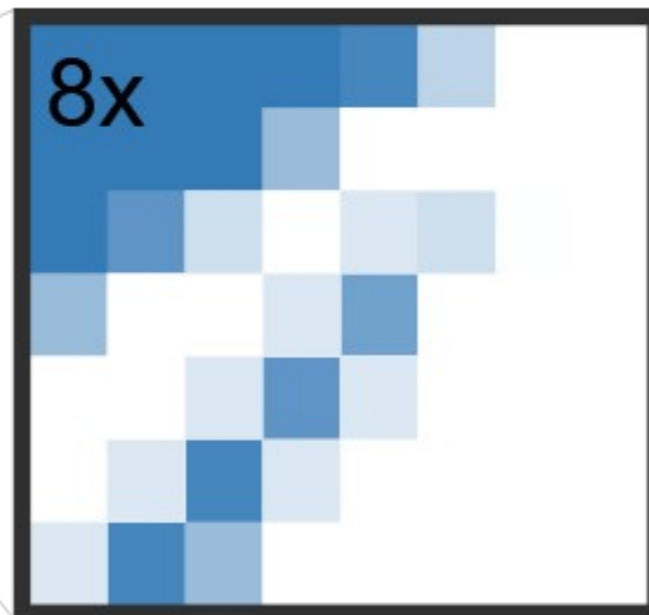
Pixelation



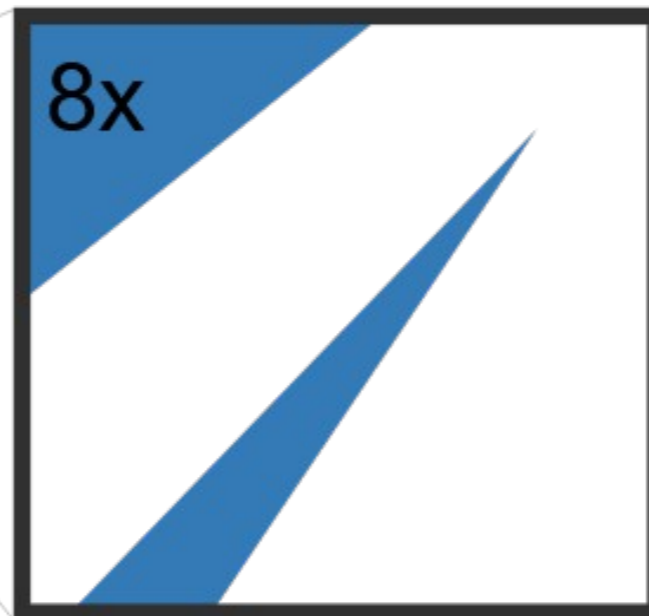
- Pixels times bits = picture size

Number of bits	tones per channel per pixel	total possible tones
8 bit	256	16.78 million
10 bit	1,024	1.07 billion
12 bit	4,095	68.68 billion
14 bit	16,383	4.39 trillion
16 bit	65,532	281 trillion

- Vector graphics
- Computer fills in from start to end
- Used by Adobe Illustrator
- Primarily used for logos ie: Ralph Lauren polo horse



Pixel



Vector



- Video > moves at 30 fps

- Video resolution =

Picture size [pixels x bits] x fps x time of video [seconds]

Video Resolution Chart

Resolution	Name	Aspect Ratio	Pixel Size
SD (Standard Definition)	480p	4:3	640x480
HD (High Definition)	720p	16:9	1280x720
Full HD (FHD)	1080p	16:9	1920x1080
2K (Quad HD)	2K or 1440	16:9	2560x1440
4K or Ultra HD (UHD)	4K or 2160p	1:1.9	3840x2160
8K (or Full Ultra HD)	8K or 4320p	16:9	7680x4320