

# TCS007A: Digital Imaging

Module1: Intro to Digital Imaging and Photoshop

# Workshop Overview

Day1 –

## Module 1-

Introduction to Digital Imaging & Photoshop  
Understanding Raster and Vector images  
Understanding how computers represent color  
Introduction to Photoshop interface and basic

tools

Exercise: Rothko

## Module 2-

File types and workflow best practices  
Introduction to the Selection Tool  
Exercise: Mondrian/Miro

## Module 3-

Layers and Compositing

Day12–

## Module 1-

Introduction to Digital Darkroom

## Module 2-

Filters and Effects

## Module 3-

Text and Vector Shapes

Final project – Illustrate Poem

# Instructor

Jesse Smith

Currently Ph.D. Student in Computer Graphics, Animation

Previously worked as web designer/developer

Mostly use Photoshop to create slides and infographics

# Workshop Format

2 Days, 10 hours

Class time will be split between:

- Short lectures about digital imaging fundamentals
- Photoshop class demos (you can watch or follow along)
- Plenty of time for you to experiment Photoshop

Short quiz at beginning of second day (open book, open internet)

# Grading Policy

Quiz – 20%

In-Class Assignments (between 6 and 8 total) – 80%

# Module 1

Introduction to Digital Imaging & Photoshop

Understanding how computers represent images

Understanding how computers represent color

Introduction to Photoshop interface and basic tools

Exercise: Rothko

# What do we mean by Digital Imaging?

Processing, optimizing, storing, and displaying images using a computer

# What Problems Can you Avoid By Understanding Digital Imaging Basics?

- Files too big
  - Unable to quickly load, share online, or transfer to USB



5MB



700KB



# What Problems Can you Avoid By Understanding Digital Imaging Basics?

- **Compressing files incorrectly**
  - When compressing files, poor resolution or visible artifacts occur



# What Problems Can you Avoid By Understanding Digital Imaging Basics?

## Images don't 'pop'

Photos are under or overexposed, contain unnecessary/distracting details, or need other tweaks.



# What is Photoshop?



Imaging editing software developed by Adobe

Crop

Resize

Global Image Corrections on whole image

Local Image Corrections on specific pixels

Industry standard photo editing software

GIMP Open-source alternative

Photoshop Elements Light-weight alternative

Illustrator Vector-specific alternative

# Module 1

Introduction to Digital Imaging & Photoshop

Understanding how computers represent images

Understanding how computers represent color

Introduction to Photoshop interface and basic tools

Exercise: Rothko

# How do computers represent images?

## Bitmaps/ Rasters

Pixels





# How do computers represent images?

## Bitmaps/ Rasters

### Pixel

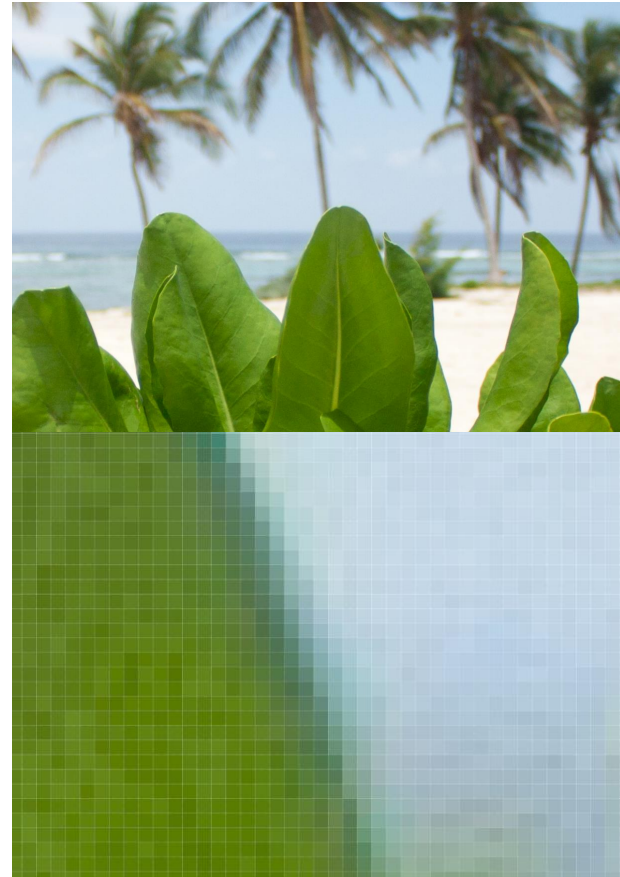
A tiny square dot, the smallest unit of information in an image

### Resolution

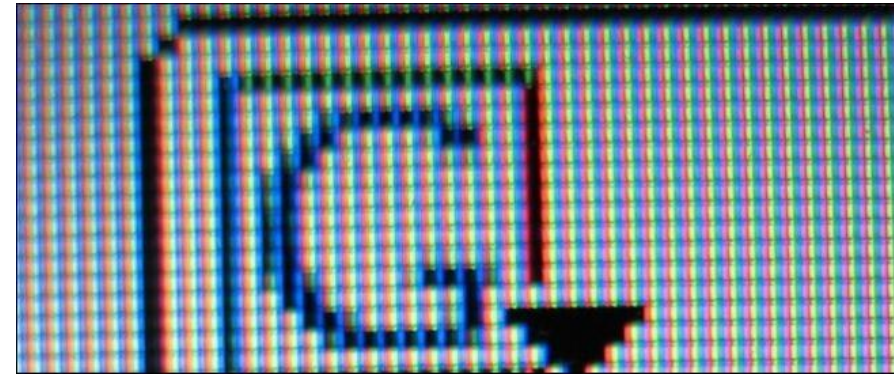
Number of pixels per unit length

E.G. 72ppi means 72 pixels per inch, and each pixel is 0.013 inches wide and tall

Image Size = Number of Pixels \* Resolution



# Image Pixels vs Monitor Pixels



Monitor Pixels- Physical objects with fixed size, fixed maximum resolution

Image Resolution > Monitor Resolution

All details of image cannot be displayed. Image will look fine, but file size is larger than necessary

Image Resolution < Monitor Resolution

Image pixel will take up multiple screen pixels. May make image look stretched or blocky.

Image Resolution = Monitor Resolution

Contains all details of image in smallest file size possible.

# Example Device Pixel Densities

DEVICE	RESOLUTION	PIXEL DENSITY (PPI)
iPhone 6 Plus	1,920 x 1,080	401
iPhone 6	1,334 x 750	326
iPhone 5	1,136 x 640	326
iPhone 4	960 x 640	326
iPad mini with Retina Display	2,048 x 1,536	326
iPad with Retina Display	2,048 x 1,536	264



For monitors, ~72-96ppi is good



300ppi  
8.9MB



72ppi  
700KB



36ppi  
216KB

# Vectors- Pixel-less image representations

Mathematics Representation of image using points, lines, basic geometric primitives and equations.

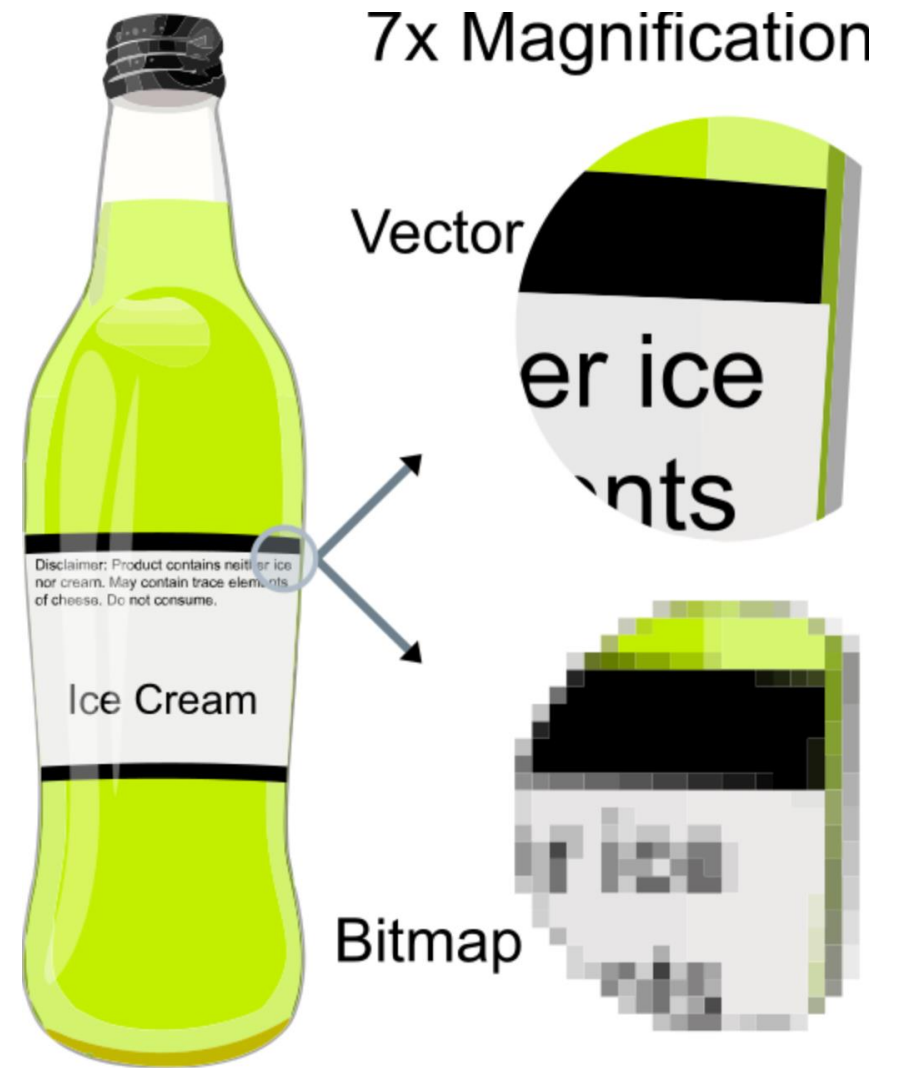
No concept of pixels or resolution- computer calculates and redraws the image every time the view point changes.

Infinite zoom without losing clarity.

Good for elements that must always be crisp (logos, text)

Bad for things that cannot be easily described with lines and shapes (like photographs)

Some support in Photoshop, but Adobe Illustrator is dedicated tool for vector images.



# Module 1

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# How Do Computers Represent Color?

## Using Bits

How computers store information- either 0 or 1

More bits per pixel mean more different colors in your picture

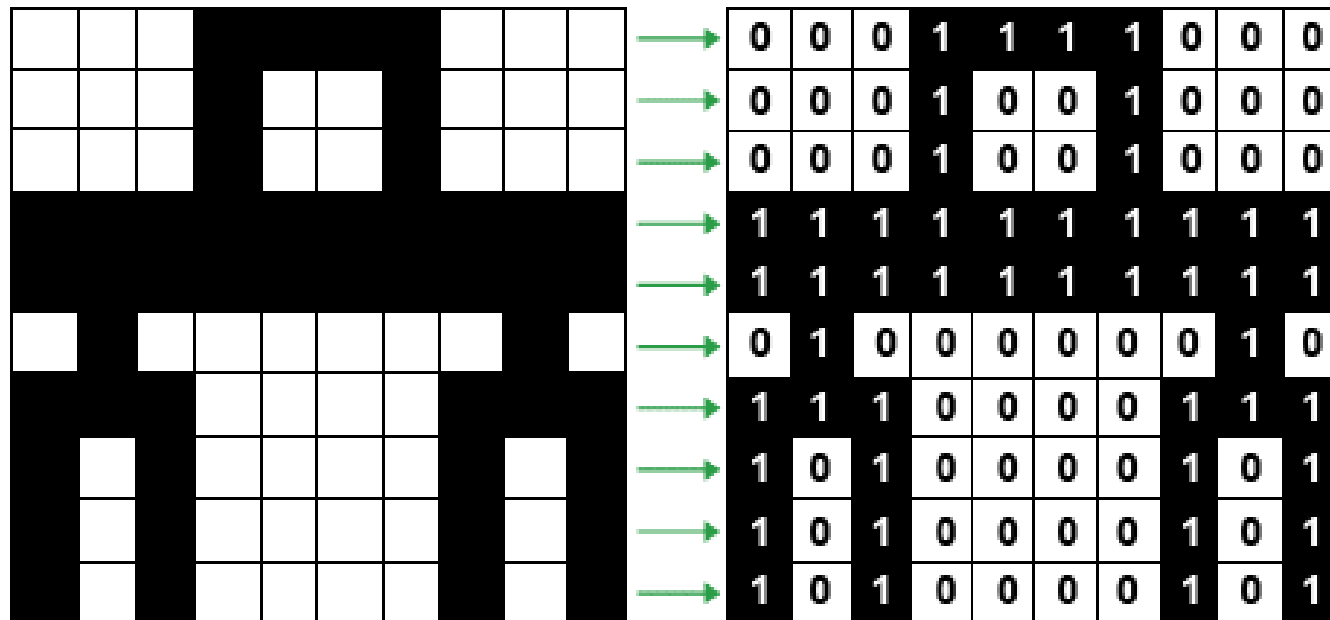


Image with 1-Bit Color

# How Do Computers Represent Color?

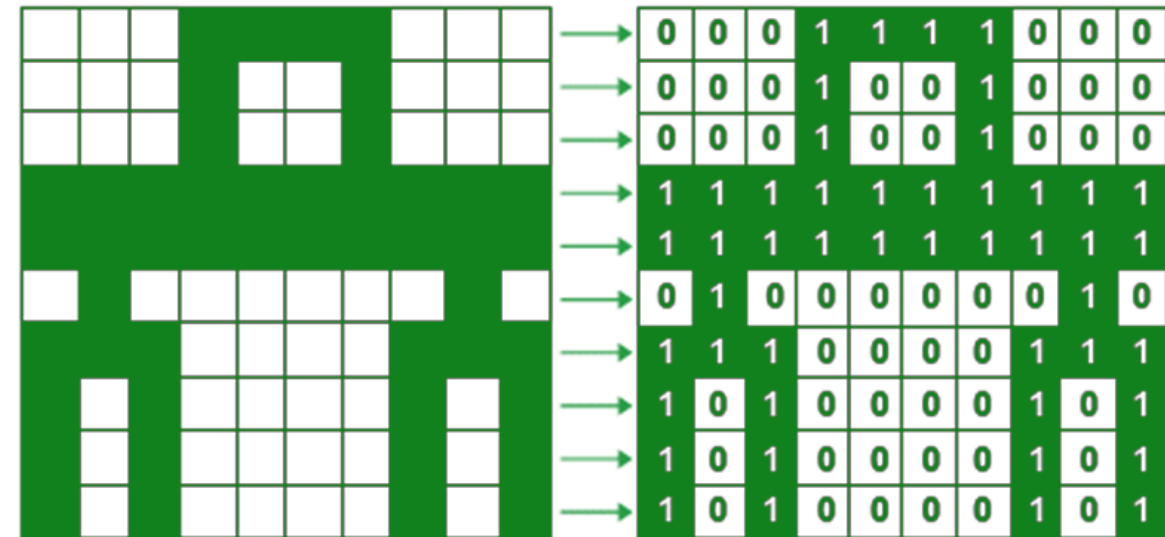
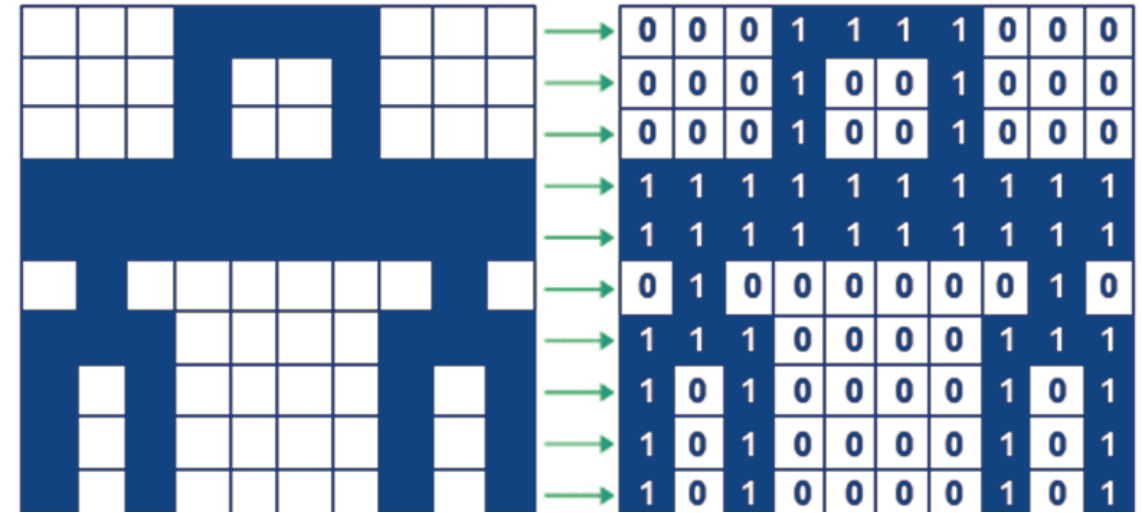
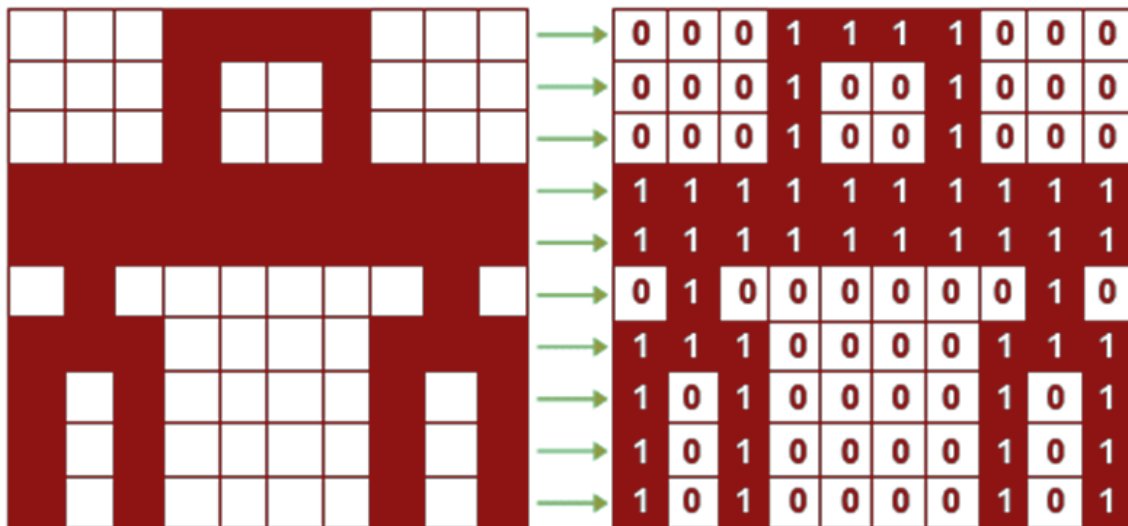
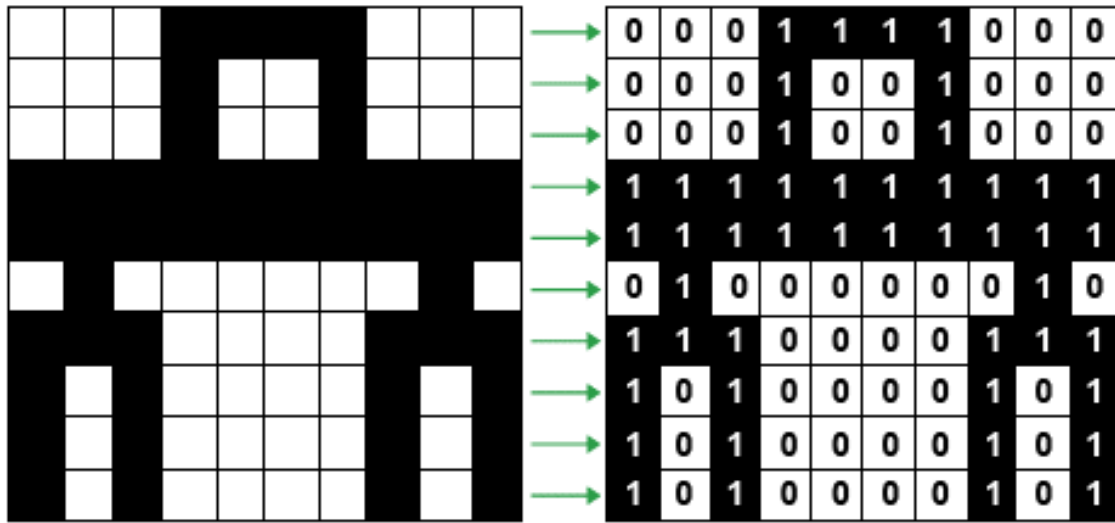


Image with 1-Bit Color

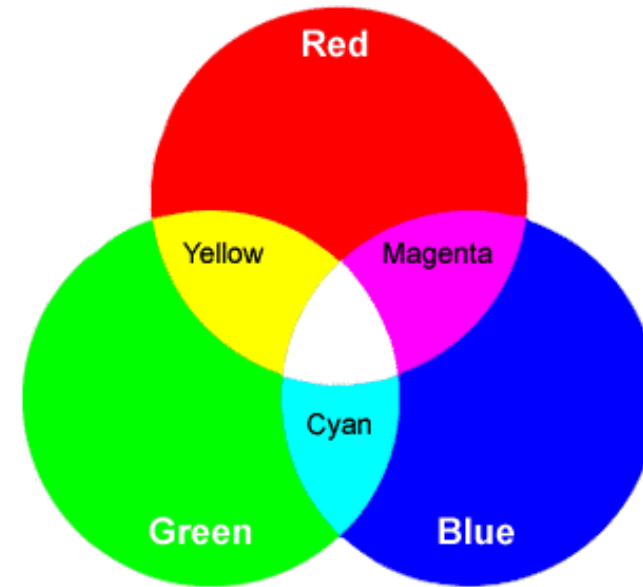
# Bits to Possible Tonal Values

	Bits	Tonal Values Possible
00, 01, 10, 11	2	4
	4	16
	6	64
	8	256
	10	1024
	12	4096
	14	16,384
	16	65,536

# How Does Computers Represent Color?



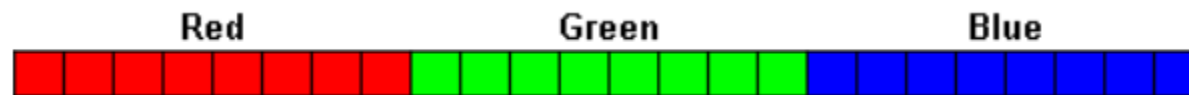
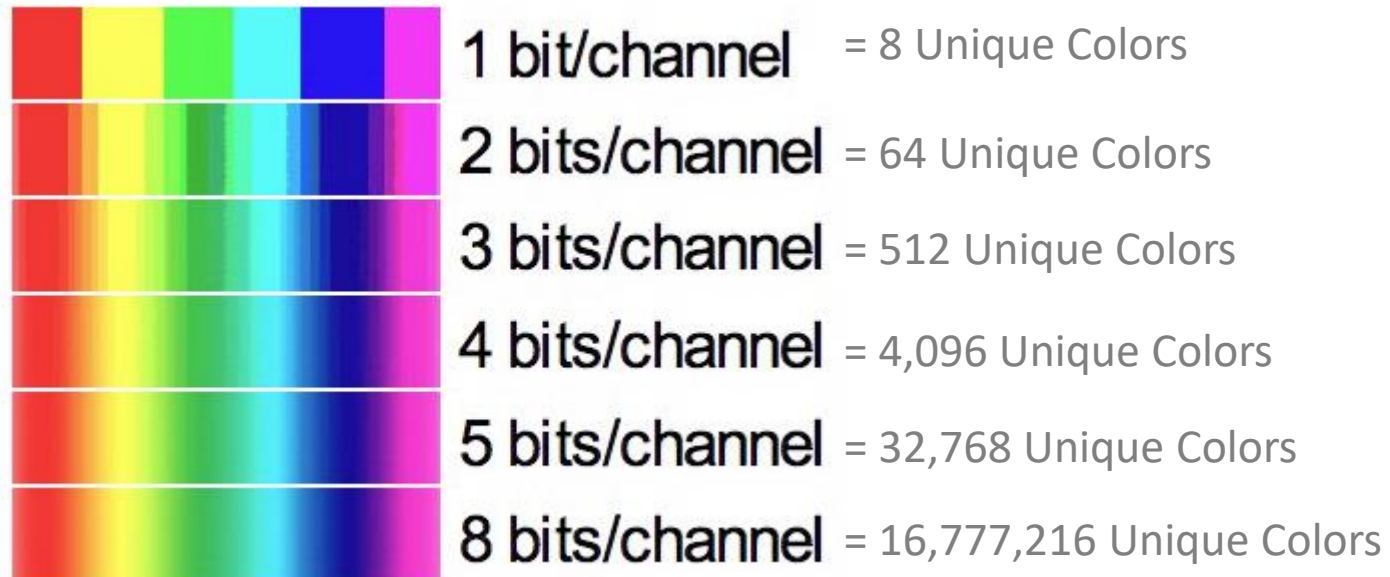
LCD Display Close-up



Additive Color

With a Red 'Channel', a Blue 'Channel', and a Green 'Channel'

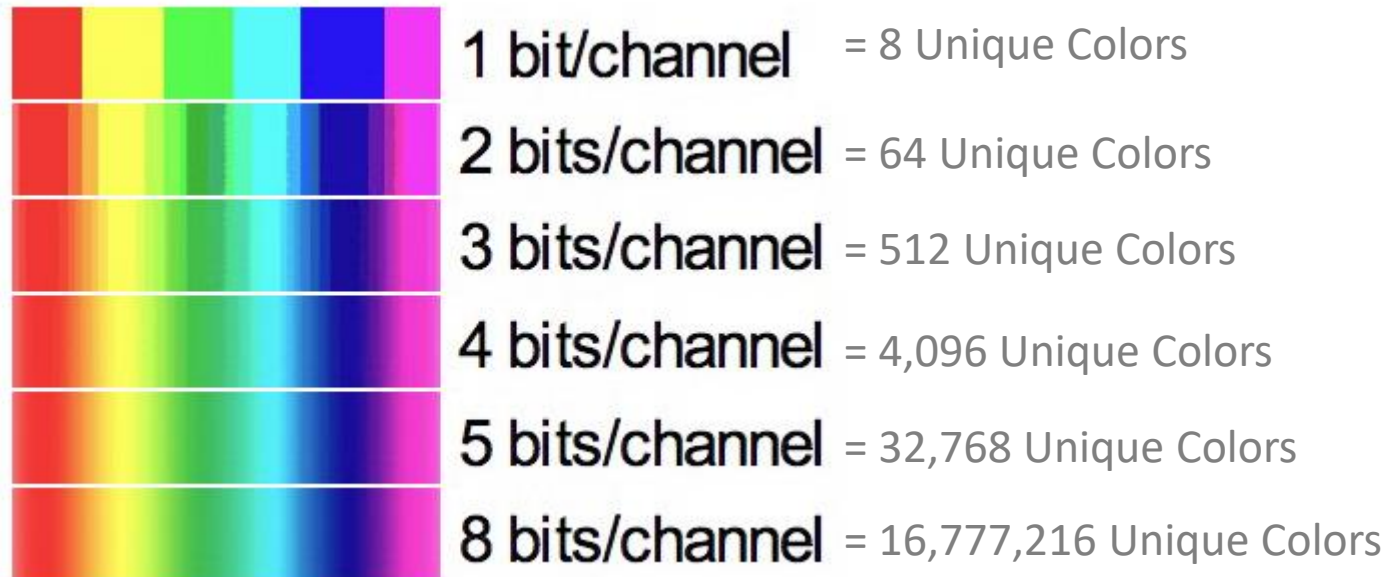
# How Does Photoshop Represent Color?



RGB True Color (24-bit)



# How Does Photoshop Represent Color?

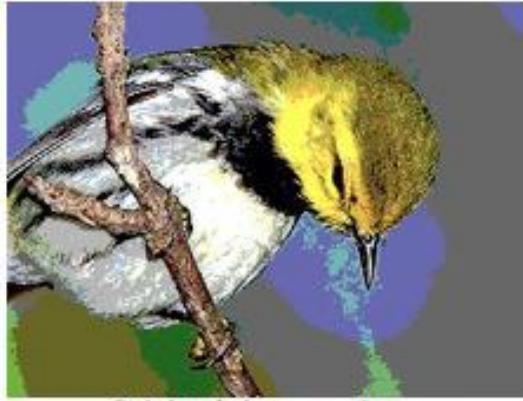


RGBA True Color (32-bit)

# How Does Photoshop Represent Color?



1 bit/channel



2 bits/channel



3 bits/channel



4 bits/channel



5 bits/channel



8 bits/channel

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
Exercise: Rothko

# Creating a new document

Set initial width and height, resolution, and color mode.

Everything here can be changed later on.

PRESET DETAILS

Untitled 




Width

1000 Pixels


Height

1500

Orientation

Artboards




Resolution

72 Pixels/Inch

Color Mode

RGB Color 16 bit

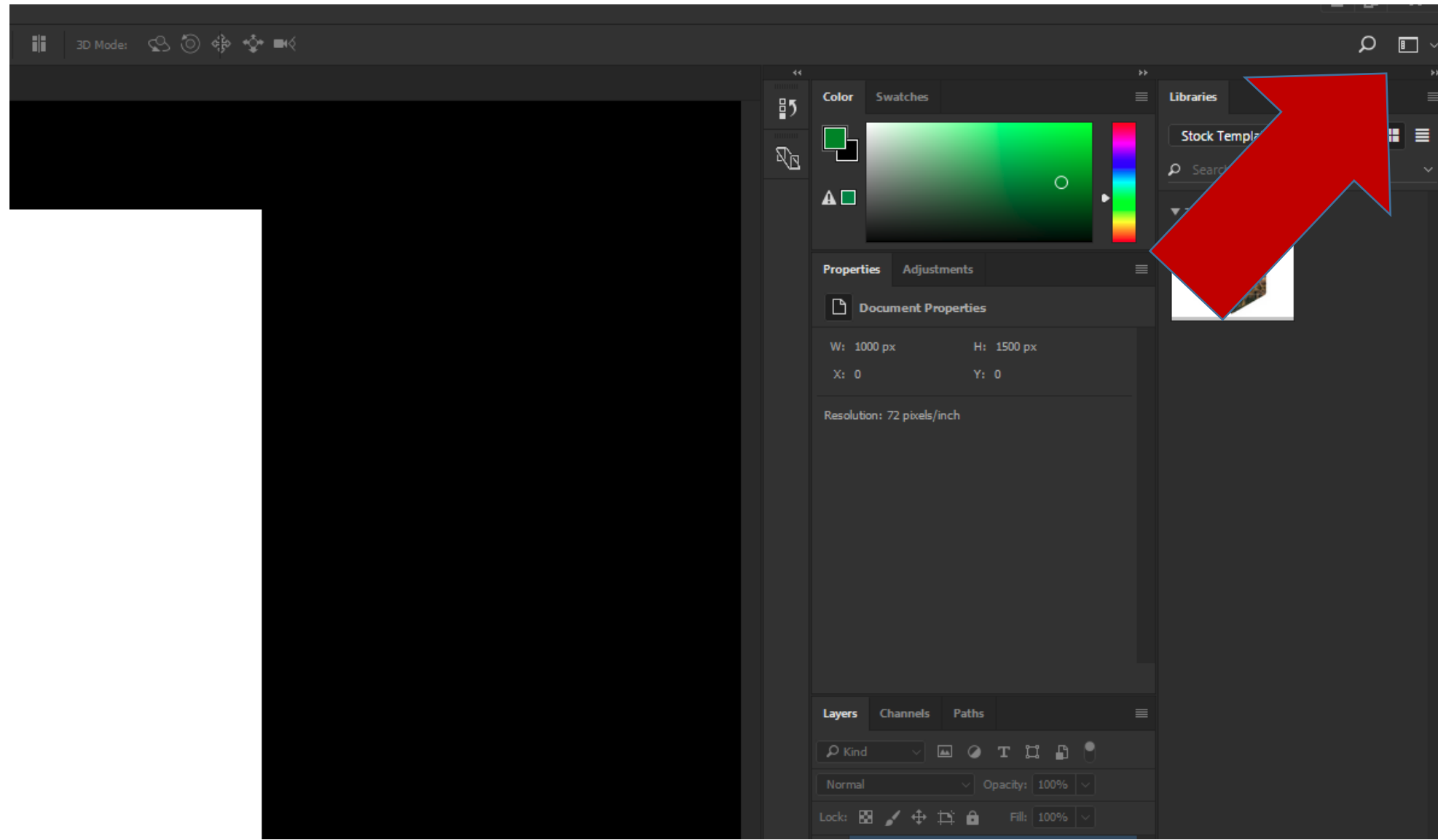
Background Contents

White 

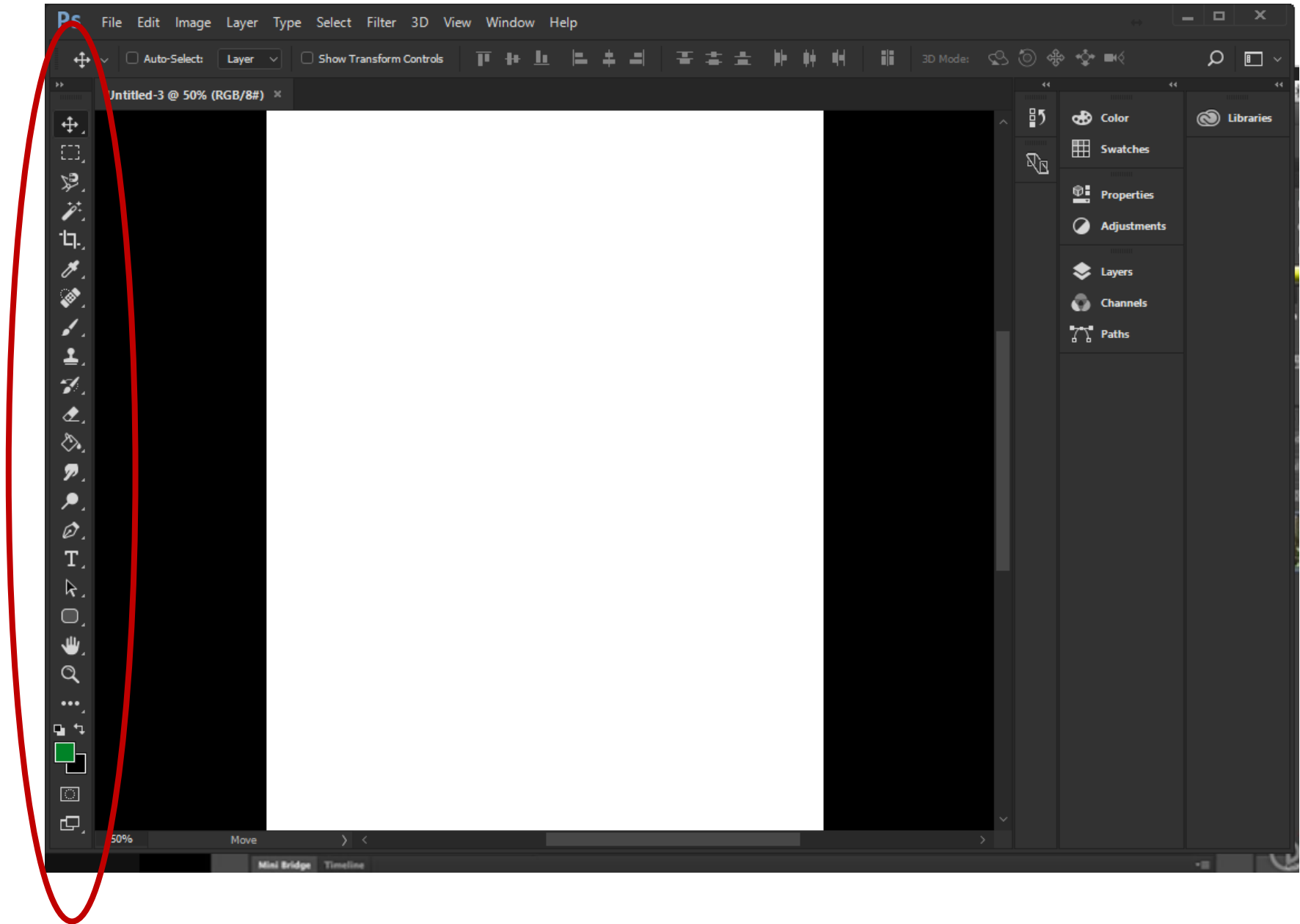
> Advanced Options

Create Close

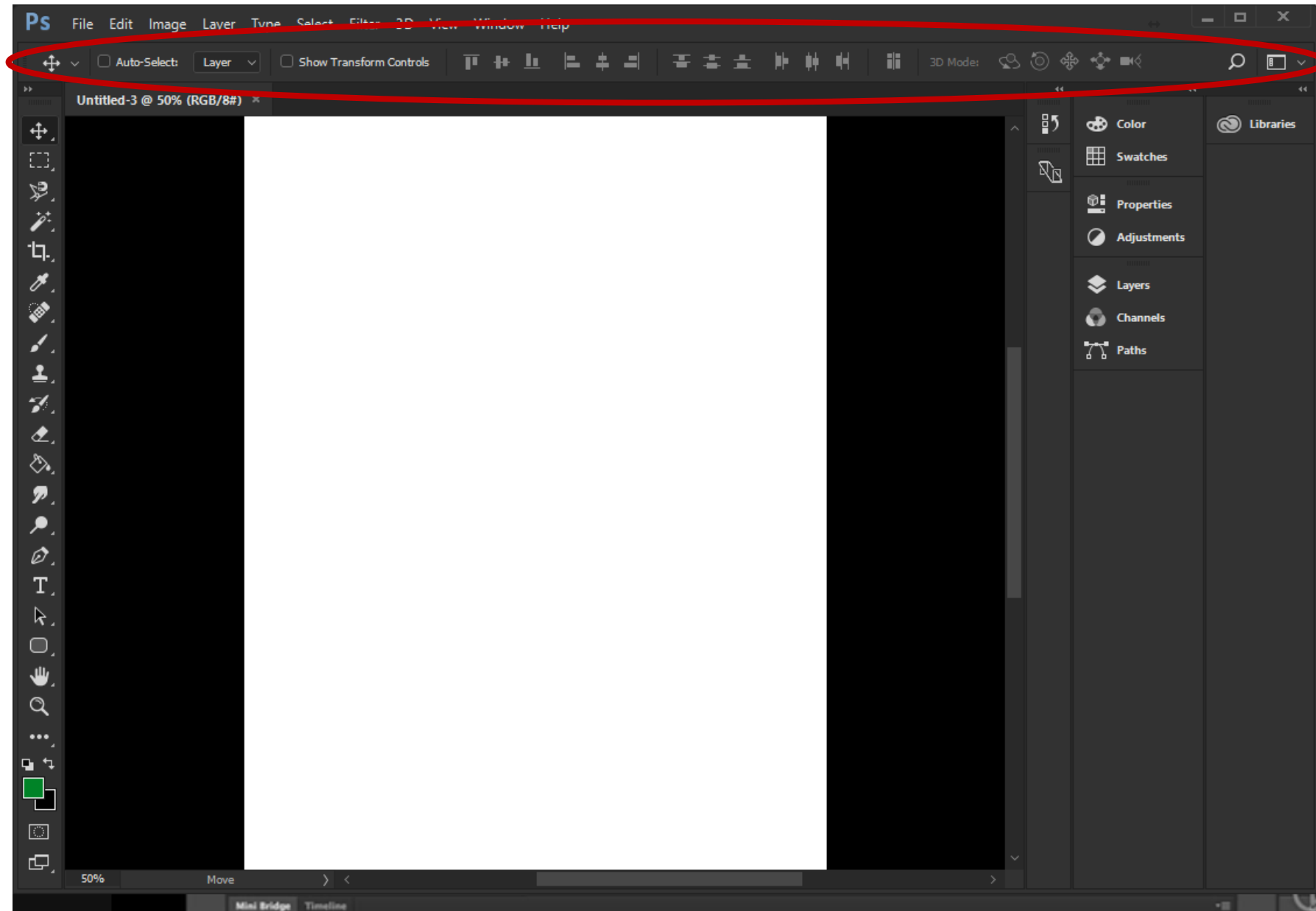
# Resetting your Workspace – Reset Essentials



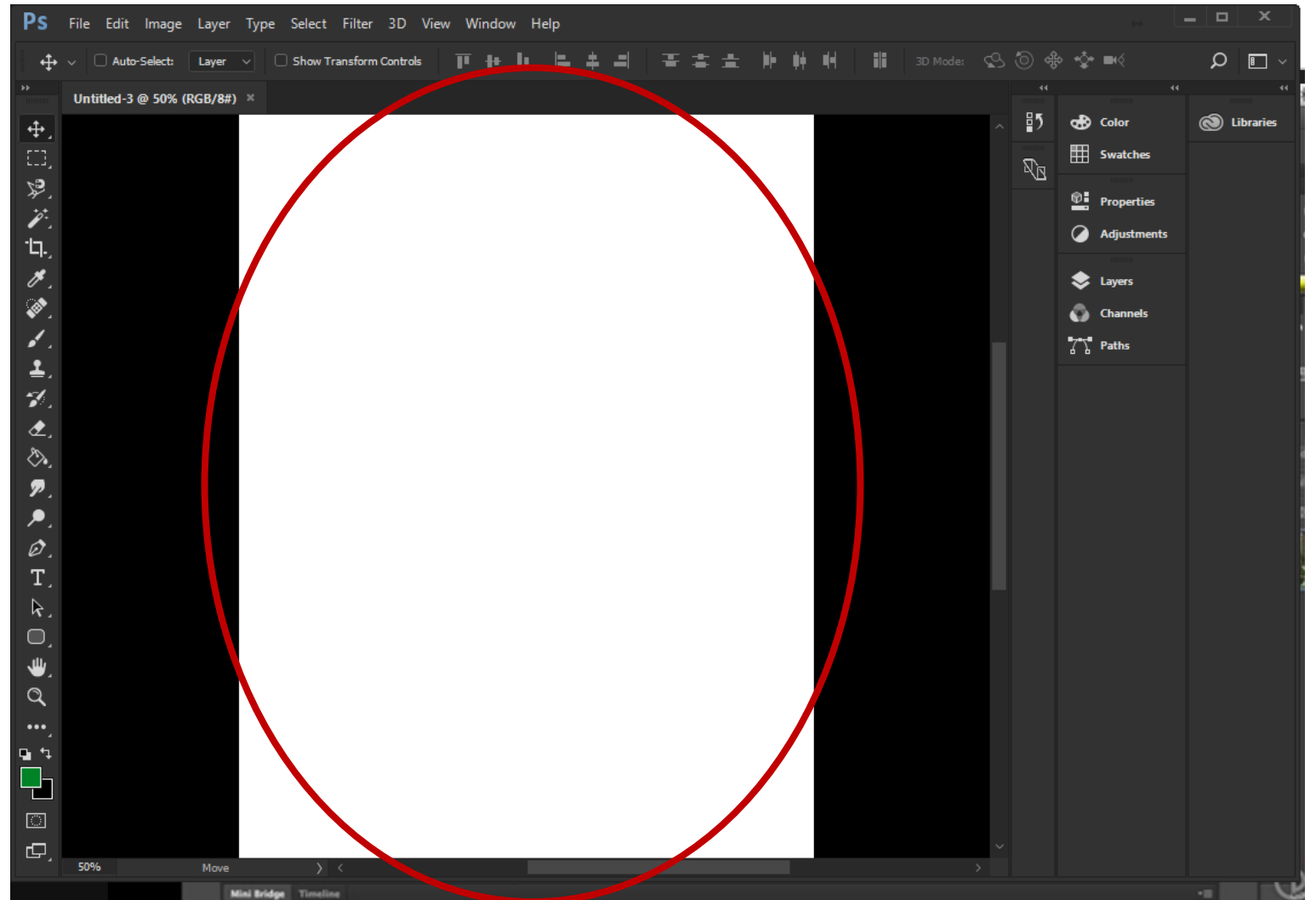
# Tools Panel



# Options Bar



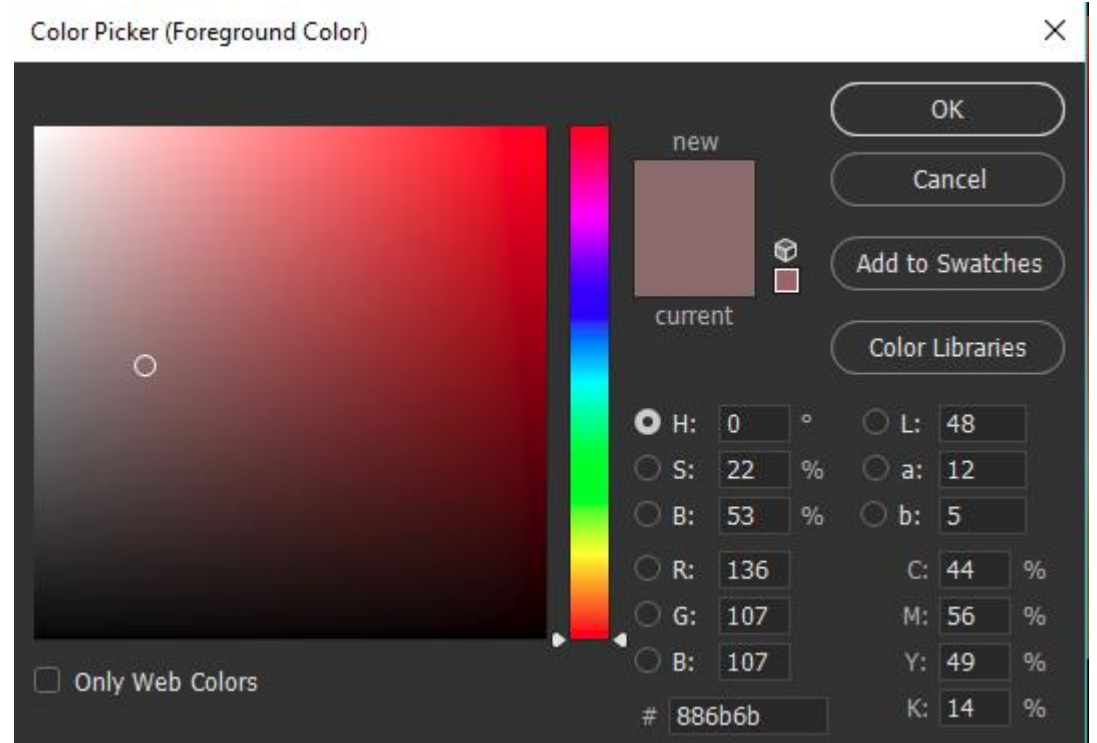
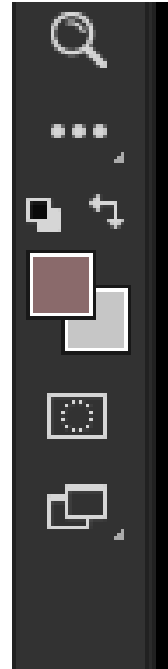
# Image Canvas





# Selecting a Color

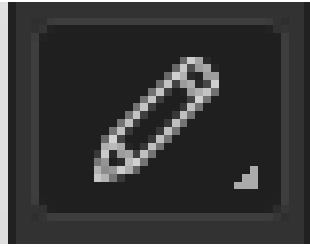
Color Picker to  
select new colors



Eyedropper to select  
color already on canvas



# Pencil tool



Size – Number of pixels to affect

Shortcut: '[' to increase, ']' to decrease

Opacity- Transparency of the color being applied

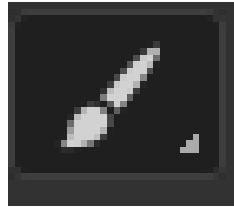
Brushes- The 'footprint' of the pencil'

Shift+Click- Draw straight lines

X: To quickly switch between foreground and background colors

Option+Click: To quickly select a color already on the canvas

# Using the brush tool



Size- Same as Pencil

Opacity – Same as Pencil

Flow – Rate at which pixel change occurs, additive up to set Opacity

Hardness- Sets the outline of the brush stroke

Brushes – Same as Pencil, but more

# Zooming and Navigating



Mousewheel: Scroll up and down

Command + Mousewheel: Scroll left and right

Spacebar + Click: Pan around image

Command+0: Return to 100% zoom

Command+ '-': Zoom Out

Command+ '+': Zoom In

Option+Mousewheel: Zoom in and out

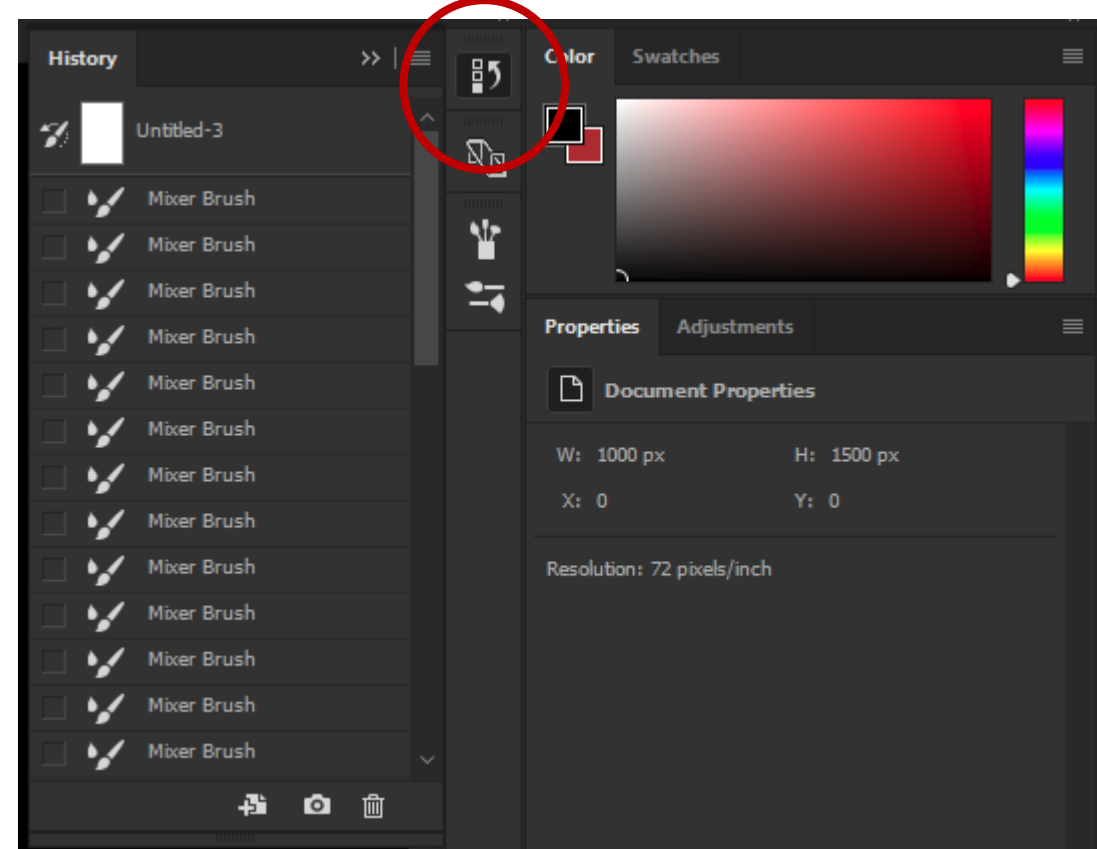
# Using History

Command+Z: Toggle Last Edit

Command+Option+Z: Step Backward

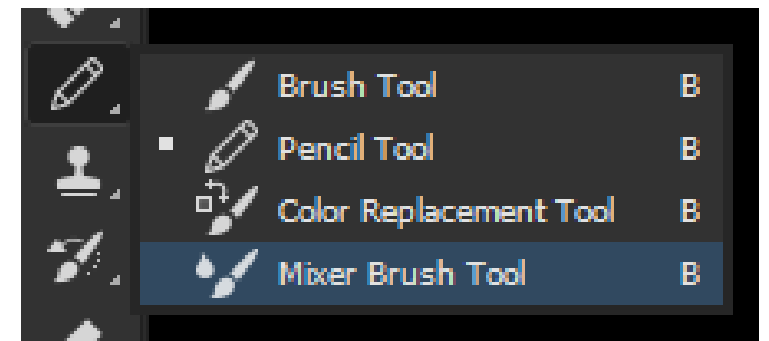
Command+Shift+z: Step Forward

History Panel: Jump to any previous state



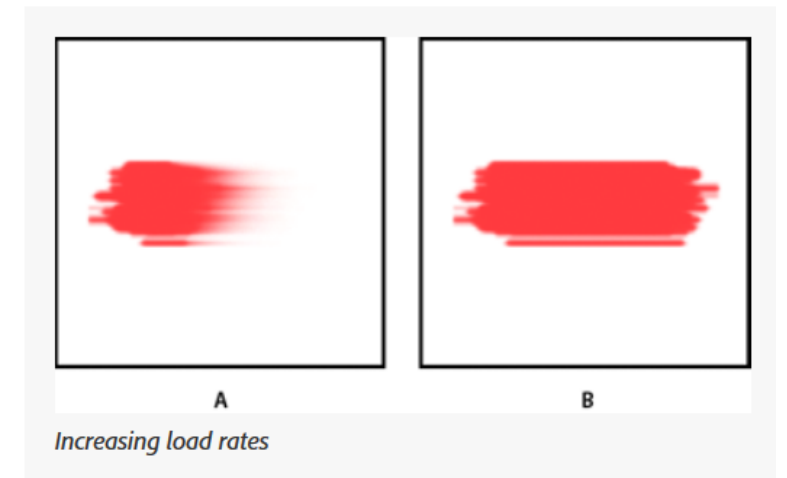
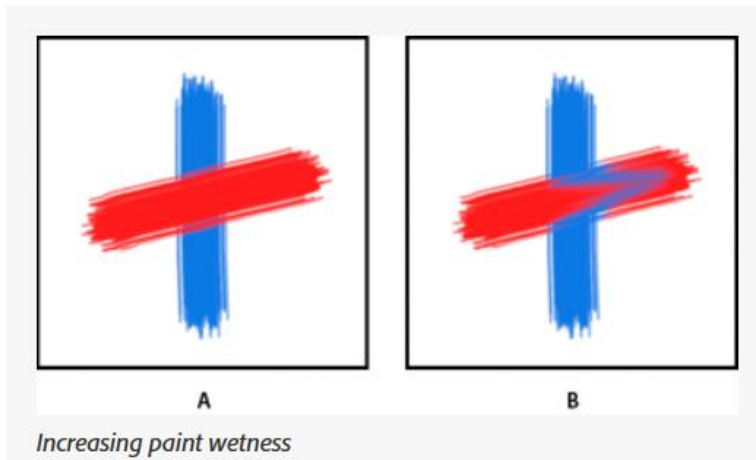
Note: After a file is closed, history is gone forever

# Using the Mixer Brush Tool



Useful for smearing colors around, like oil paints.

Loading and Cleaning Brushes

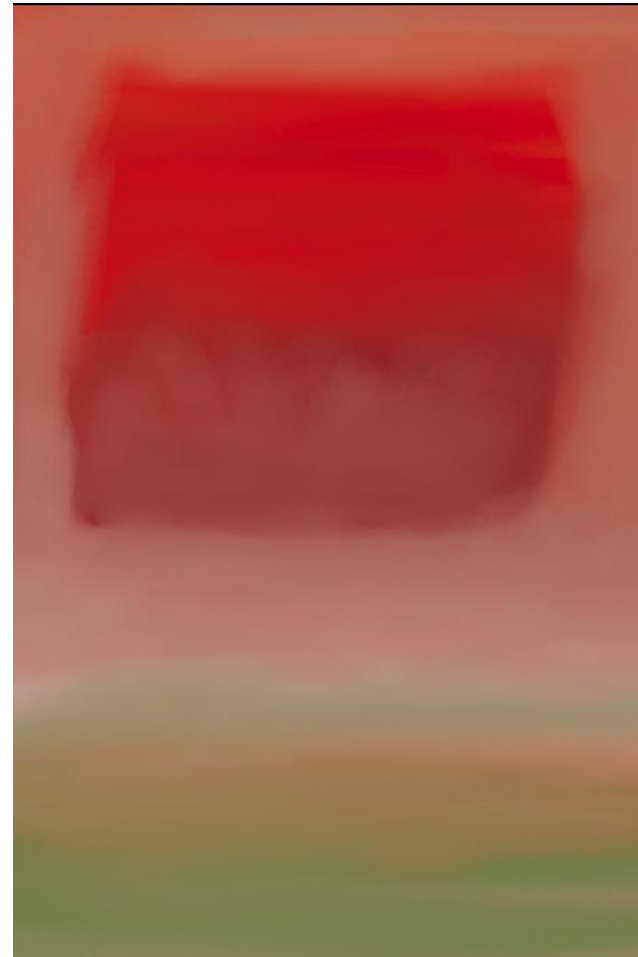
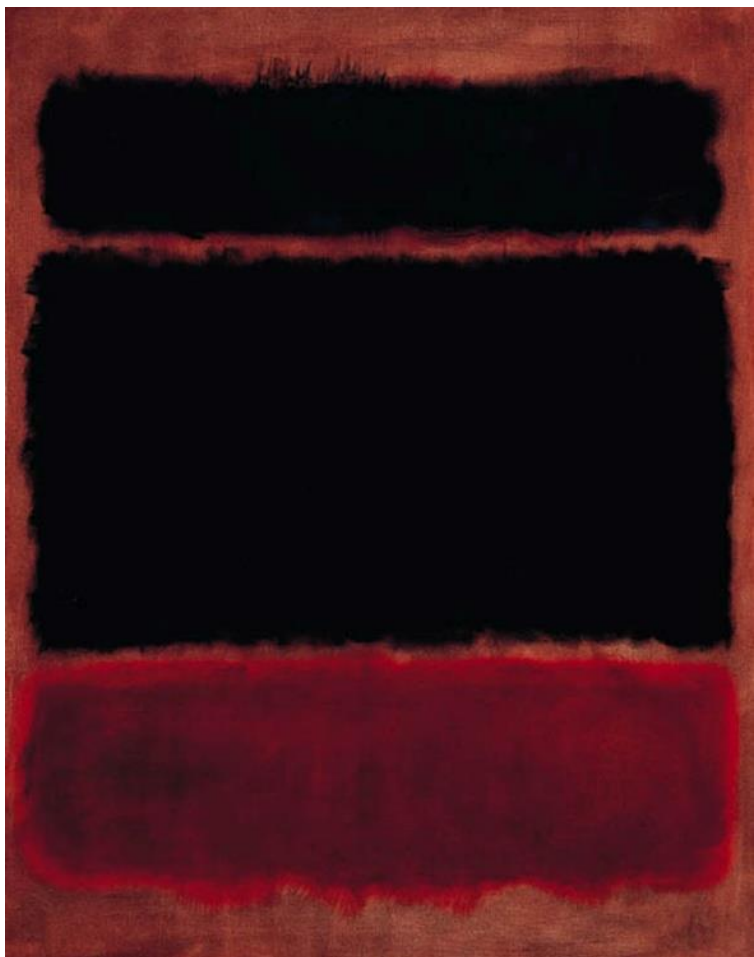


Mix- Ratio of canvas paint to reservoir paint

# Adobe Photoshop Shortcuts tool and Resources

<https://helpx.adobe.com/photoshop/using/default-keyboard-shortcuts.html>

# Mark Rothko, Abstract Expressionist (1903-1970)





# Exercise 1-

Using only the tools we've introduced so far (pencil, pen, color picker, mixer brush), create your own version of a Rothko painting.

See PDF on website