

# Hand-Drawn Animation

- History of Hand-Drawn Animation
- Hand-Drawn Techniques
- Introduction to Photoshop

# History of Hand-Drawn Animation

Hand-Drawn Animation, more commonly referred to as **Traditional Animation**, is the act of drawing out all frames by hand. Hand-Drawn Animation was one of the first and most-widely used forms of animation during the peak of animation in the mid 1900's.

Hand-Drawn Animation had little reliance on computers, but could be **easily integrated with computers** as well, thus serving as a very popular animation form during the creative transition to computer platforms.

As platforms change, most hand-drawn practices remain the same. Artists still draw out all frames, but now have additional tools to help monitor and transform frames than in previous generations.



Ratatouille, 2007

# In The Old Days

Artists would draw on thin, **translucent sheets of plastic** known as **cells**. Sheets could be stacked up on each other to create a finished character.

On one cell could be the basic colors of a character, on another could be the shading, and another layer could hold interchangeable parts, i.e face & eye rigs.

Interchangeable parts on separate cells made it easy to swap out moving parts without redrawing remainder of the character.

Lightboard shows **previous frames stacked on each other**. Easy to ink a character by placing a new sheet on top of an old roughed-out sketch.

Can also show **two keyframes** and draw an **in-between frame**. This is known as **onion-skinning**, where you look at different layers of the translucent layers of an onion skin.



<https://www.youtube.com/watch?v=oktGIZQgYWs>

# Nowadays

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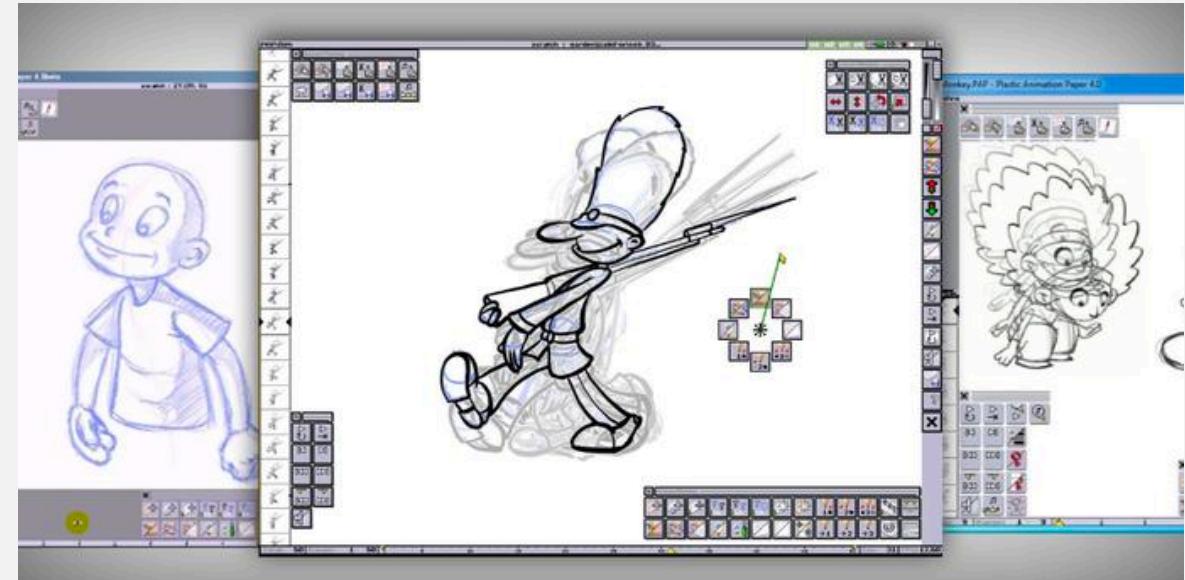
Computer software attempts to preserve the benefits of lightboards and cells while adding in new features.

Cells are replaced with a new notion of **layers**. Different parts of a character can be drawn onto different layers, and layers can be compressed down into each other.

More applicable is the notion of a **frame**, where each frame holds its own set of layers.

Can use **onion-skinning** between layers in helping draw in-betweens.

Adds new features such as **transformations** and **deformations**, ease of **erasing**, **version history**, more stable **brush control**, and more.



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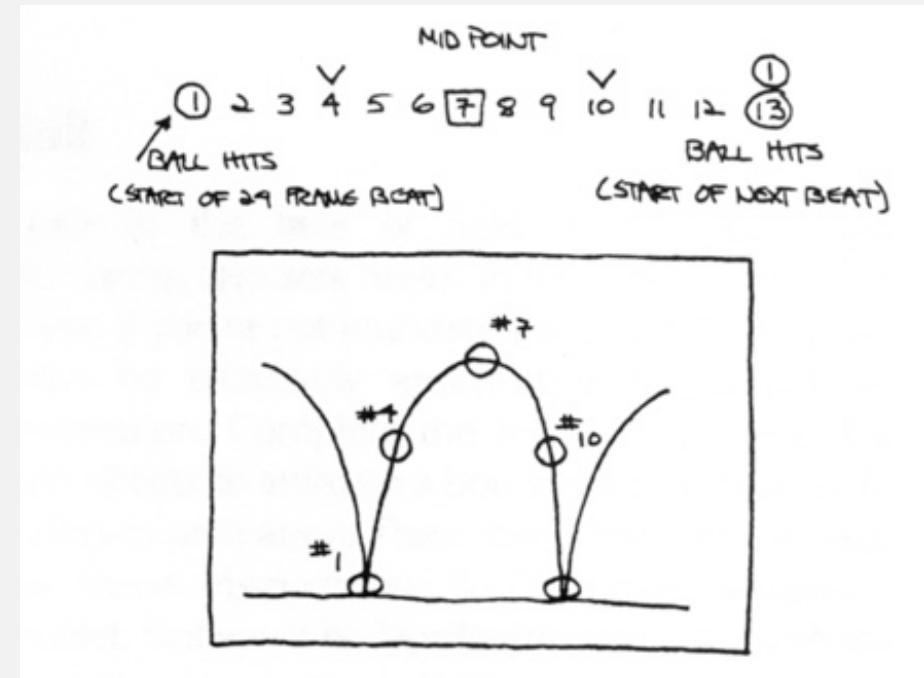
# Pose-to-Pose

One of the 12 Principles. Most Hand-Drawn Animation is drawn out by **keyframes first**. Then, animators revisit the frames and draw in-betweens.

Animation studios will have **senior animators** work on **keyframes**, after which, more **inexperienced animators** will work on **in-betweens**.

Keyframing requires not only a **steady hand**, but precise **posing/proportion** abilities and years of natural and real-life drawings.

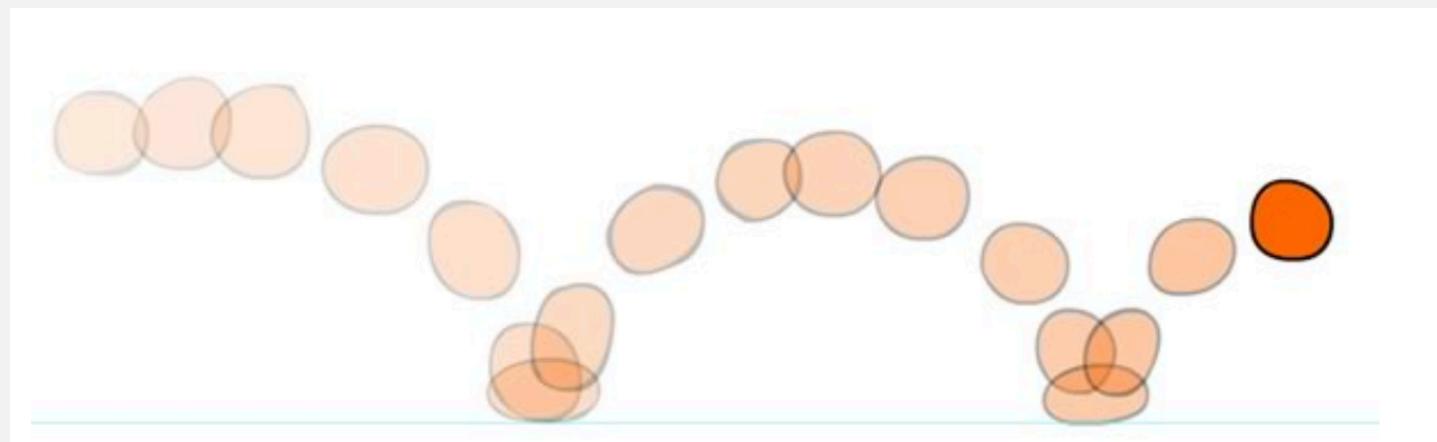
Sometimes keyframes will be shipped overseas to a cheaper animation studio for the in-between frames to be drawn out.



# Onion Skinning

Onion-Skinning is a tool that lets you see **previous** and **future frames** at a lower opacity. This helps when you have two keyframes and want to add an in-between frame.

Onion-Skinning can also help you visualize the **spatial trajectory** and **motion** of your objects. It is a good debugging tool to make sure trajectories are arc like and maintain proportions.

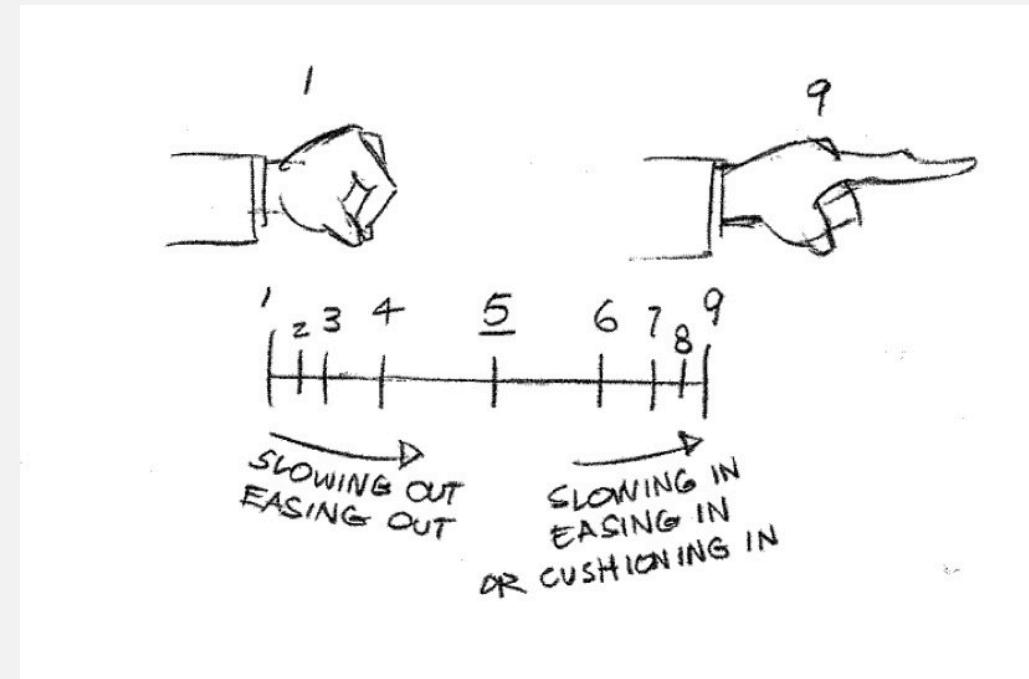


# Easing

Easing is a strategy where objects **accelerate** into and out of their motion. It is derived from physics where objects with **inertia** have to feel a force in order to ease their way into a new momentum.

Easing can be visualized in a **1D chart with tick marks**, where the ticks represent **equal time separation** between frames, but **varying spatial separation**. The closer the tick marks, the smaller the spatial separation, and the slower the motion.

A strategy in this example would be to draw a frame in the middle of frames 1 and 9 (call it 5), then a frame between 1 and 5 (call it 4), then 1 and 4 (call it 3), and then 1 and 3 (call it 2). This is referred to as **subdivision** and is an easy strategy to guarantee appropriate easing.



Illusion of Life, 1999

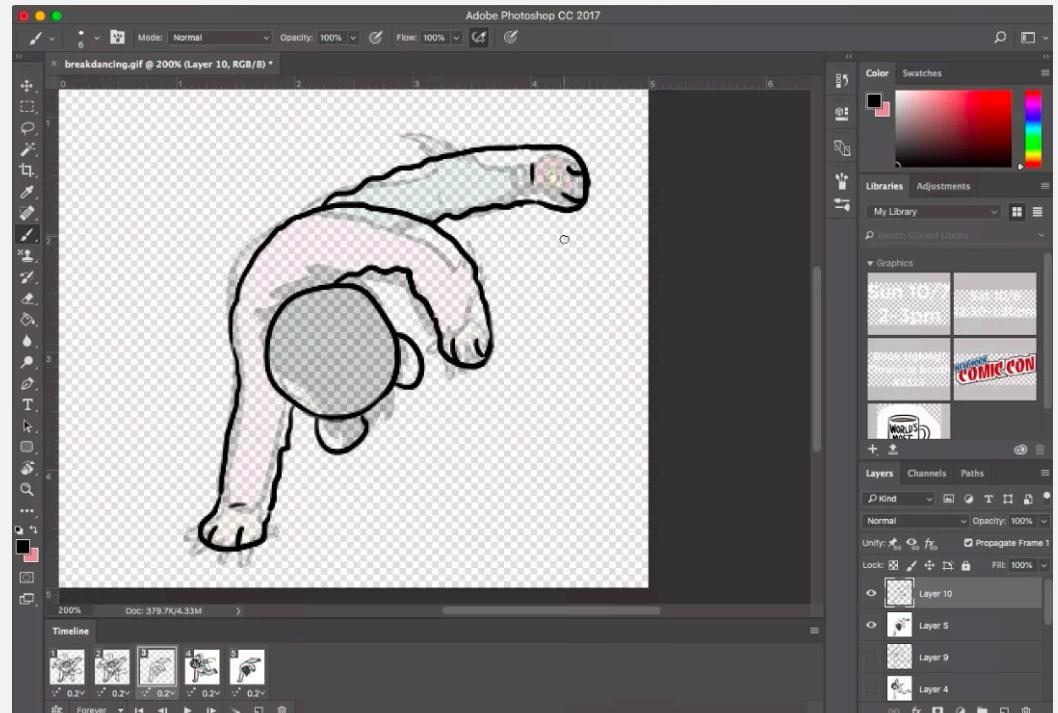
# Layers

Layers are used to separate different components of your animation and edit or transform them independently.

General strategy is to have layers for:

- Sketch
- Ink
- Color
- Shading
- Lighting

Sketch layer is only for reference and will be deleted in the end. Remaining layers can be merged back down into one.



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# Photoshop

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Photoshop is a flagship photo and digital media editor software made by Adobe. It was first released in 1990

Photoshop has a lot of functionality in the photo-editing domain, but can also be used as an animation software with its built-in **timeline** support.

Photoshop is not fully-fledged, meaning it **cannot export animations** on its own. Rather, it can export a **series of layers** that can be reimported back into a composition-based software with a structured timeline (Adobe After Effects or Premiere Pro), where frames can be timed and rendered out to production.



Photoshop, 1990

# Why Photoshop?

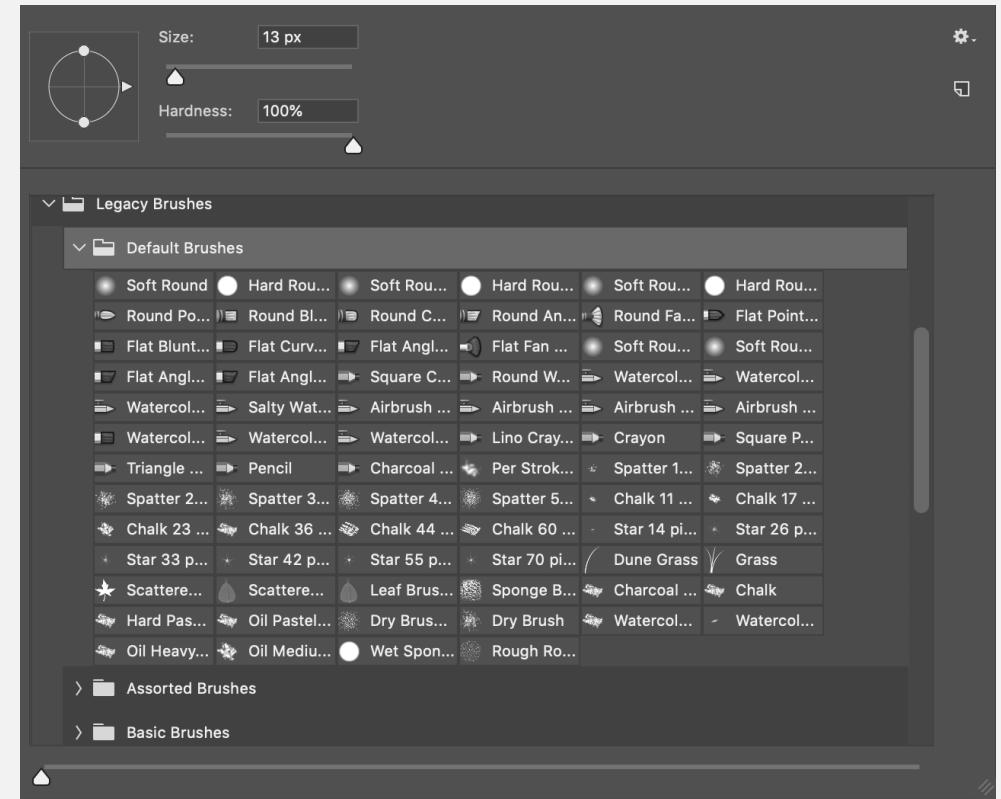
Flash Professional is commonly advertised as Adobe's primary animation software, but lacks the drawing capabilities integrated into Photoshop's **brush**, **color**, and **selection** tools.

Strokes are more **customizable** and **accurate** in Photoshop.

Vast brush library with easy-to-import **external brushes** that makes the workspace faster.

Larger support for brush **sensitivity**, **tilt**, and **range**.

Easier to save and interact with color **swatches**.



Photoshop, 2018

# Photoshop Interface

## Tools Panel

Stores all main functionalities, including brush, primitive, erase, gradient, text, transform, zoom, swatch tools and more.

## Timeline, Playback

Limited timing/playback. Each frame contains info on what frames are visible.

## Layers Panel

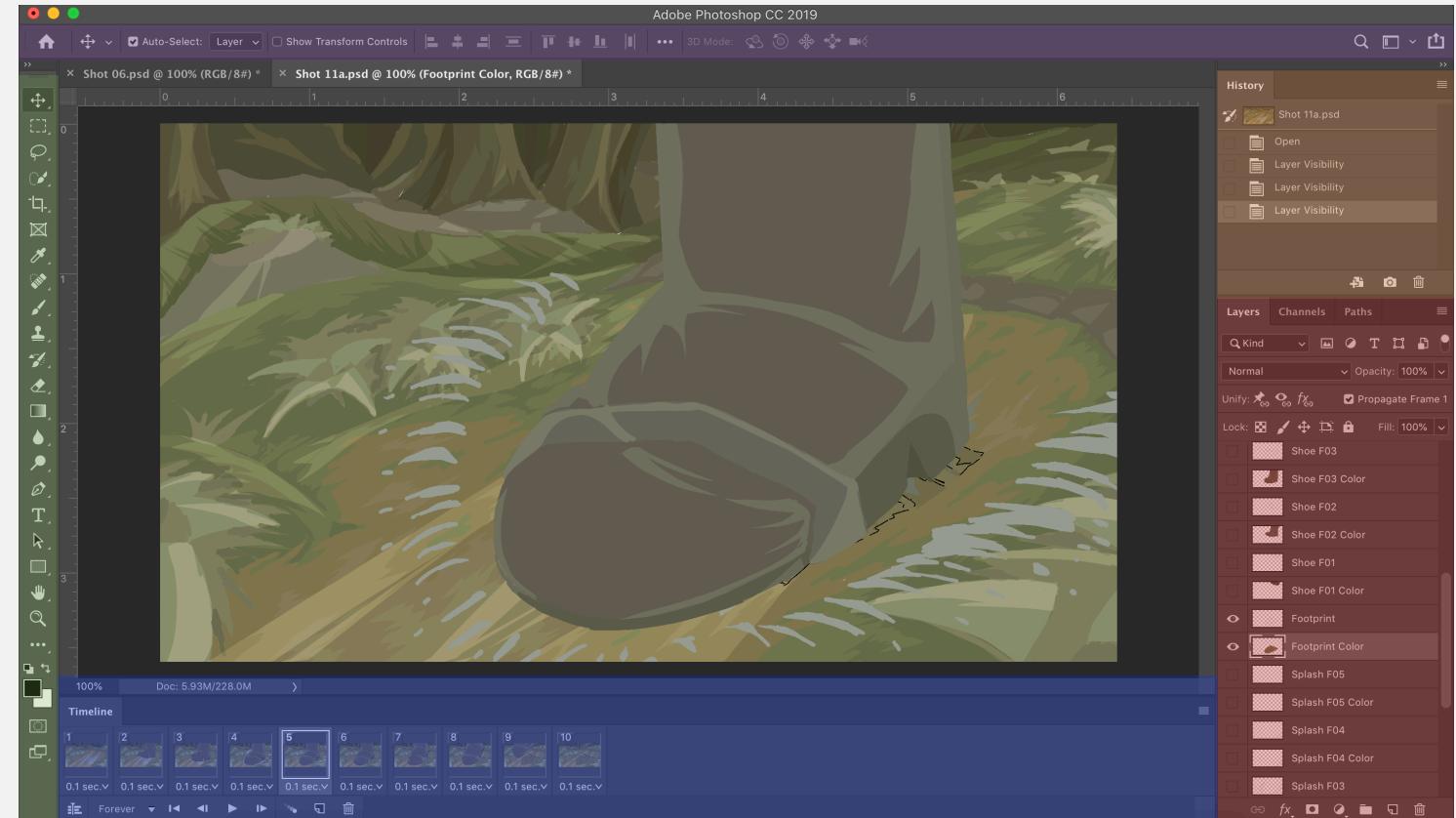
Drawn layers. Each frame can show multiple layers at once.

## History Control

Saves last N events.

## Selected Element Properties

Element-specific properties depending on what element is currently active.



# Drawing Hardware

In order to effectively create hand-drawn animations, you will need a device with a compatible touch screen and pen support.

Common options include a touch-screen laptop, an iPad with pencil or other stylus, or a graphics tablet.

Touch screen location precision is measured in **lines per inch (lpi)**, or how many different lines can be differentiated per millimeter of space on the device.

Touch screen pressure sensitivity is measured in **layers**, or how many different pressure layers it can distinguish.

**Apple** and **Wacom** hold some of the best devices in these domains, but also some of the priciest.

Other brands such as **Huion** offer cheaper tablets.

For this course, you can use your mouse.



Entry-Level Wacom Intuos S for \$80.

# Homework

- ❑ Use Photoshop's drawing feature to draw the outlines of two main keyframes of any object.
- ❑ Use subdivision to create in-between frames that incorporates easing techniques.
- ❑ Stage the frames out using the timeline panel.
- ❑ Upload the photoshop file to the course Drive.

# Questions?

# Live Demo