

Vector and Bitmap Graphics

There are two basic types of graphics used in computer applications: bitmap and vector. Vector graphics consist of lines and curves, that are defined by mathematical objects called vectors. Shapes that we draw using computer softwares are vector graphics. Vectors use geometric characteristics such as size, position and shape as well as color to describe graphics. For editing a vector image we need to manipulate the individual vectors. For example, we can change the radius of the circle or its curves. Bitmaps or raster images use colored dots called pixels- arranges in a grid to define an image. Each pixel has a specific location and color, that when seen in relation to other pixels makes an image. To edit a bitmap image we need to edit the color or position of the individual dots.

Vector files are smaller than the raster ones, so they are easier to store and transfer. The images also retain their original definition and perspective when resized, so they can be displayed at various resolutions without compromising the quality. Bitmaps lose their quality on resizing, as individual dots become visible.

2D and 3D Animation

Two D (Dimensional) refers to the two dimensional (measurement or space) graphical representation of a physical space or figure. It technically refers to any material object, form, shape and space having following two dimensions referred as axis, means directions:

1) Height or Vertical dimension called *Y axis*.

2) Width or Horizontal dimension called *X axis*.

It is also called two axis graphical representations. The popular examples of 2D graphics (also imagery) are handmade sketches, paintings, illustrations and photographs. The cave sketches of ancient times are the first 2D graphical representation in the world, these sketches in fact are older than the first language the humans learned to speak. After the advent of various art forms and impetus given by technological revolution, the 2D graphics gained enormous popularity and has been applied in various aspect of life. The 2D graphics gained momentum after the advent of computer graphics and enormous use in media and film industry.

2½ D : Layered image or animation is also called 2½ dimensional imagery. It means besides the usual axis of X and Y, it also has some properties of 3D, that means the

features of depth or distance (Z axis). The 2½D is close in appearance to 3D but is actually made of the properties and techniques of 2D. Besides the basic coordinates of X and Y, following techniques help to achieve the 2½D imagery:

Layers.

Shades.

Size.

Colour.

2D graphics Applications:

- 1) Media and Film industry.
- 2) Architecture.
- 3) Interior Designing.
- 4) Product Designing.
- 5) Publications.
- 6) Graphic Designing. *Etc*

3D Three D (Dimensional) refers to the three dimensional (measurement or aspect) graphical representation of a physical space/world. It technically refers to any material object, form, shape and space having following properties:

- 1) Height or Vertical property called *Y axis* (direction).
- 2) Width or Horizontal property called *X axis* (direction).
- 3) Distance or Depth property called *Z axis* (direction).

It is also called three axis graphical representation. The popular examples of 3D graphics (also imagery) are Computer graphics design (3D) and real world space. However, the definition varies from situation to situation, for example, computer designs 3D imagery using specialized 3D softwares (using mathematical codes called Cartesian coordinate system) and finally produces results in 2D form through monitor displays, prints and video format outputs by the processing called rendering (final processing

stage). The humans perceive and live in multi-dimensional world, however the eyes of humans and other living creature on earth see 3D images due to the eye system (recognizes X and Y axis) and brain system (recognizes Z axis). The 3D is gaining more popularity than 2D due to more realistic results and wide range of applications in every aspect of life. 3D graphics Applications:

- Media and Film industry.
- Engineering.
- Interior Designing.
- Product Designing.
- Publications.
- Medical Science.
- Industrial Designing.
- Pharmaceutical research *etc.*

3D Animation: Animation is the illusion of motion. 3D animation means the illusion of motion of three dimensional graphics generally created by computers. Following stages are applied to create 3D animation production:

- 1) Character and Object Modeling.
- 2) Scene Layout.
- 3) Rigging.
- 4) Character and Object Positioning
- 5) Lighting arrangement and positioning.
- 6) Camera(s) arrangement and positioning.
- 7) Movement (Animation) by using Timeline.
- 8) Finally, Rendering.

Introduction to Flash:

Adobe Flash/Animate CC is an animation software, used for the creation and manipulation of bitmap and vector graphics, adding interactivity for content that can be used online. Flash manipulates graphics to provide animation of text, drawings, and still images. It allows bidirectional streaming of audio and video, and it can capture mouse, keyboard, microphone and camera input. In 2016 it was renamed as Adobe Animate CC. It is an important tool as it allows creation of content, animating that content and adding interactivity to the same content for online consumption. It supports SWF and AIR formats.

Earlier versions of the software supported the object -oriented language, ActionScript 2. Later, ActionScript 3 was added. With the renaming, Adobe incorporated native HTML5 Canvas and WebGL support to prevent a slide from the competitors. Through the new additions, a user can now export animations to any format including SVGs.

Animate CC allows us to create moving or blinking logos, flashing advertisements, 2D cartoon characters, demonstrations, explainer/ how-to videos and buttons.

Interface:

Let's Begin...

Look at the diagram below and then explore the interface of your version of Flash CS3. Identify all the different areas that are labeled below.

MENUBAR

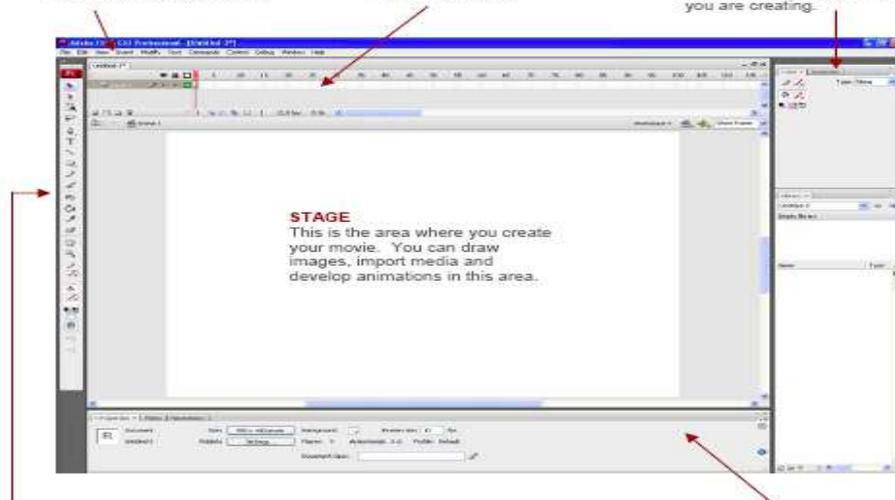
The menu bar contains drop down menus that allow you to choose options that edit, open, close or control your movie.

TIMELINE

The timeline is made up of hundreds of frames. A frame that contains a black circle is called a keyframe.

PANEL SETS

In the section at the right of the screen, we have Panel Sets. Panel sets have items we can change that relate to the movie you are creating.



STAGE

This is the area where you create your movie. You can draw images, import media and develop animations in this area.

TOOLS PANEL

The tools panel contains the tools you can use to select, draw, paint, fill, resize, rotate and manipulate your images. The bottom half of the tools panel contains the modifiers. Modifiers are the options you have for the different tools.

ACTIONS PANEL

(Press F9 to view)
The actions panel can be expanded to allow you to create actionscript. By using actionscript, you can create interactivity in your Flash movie.

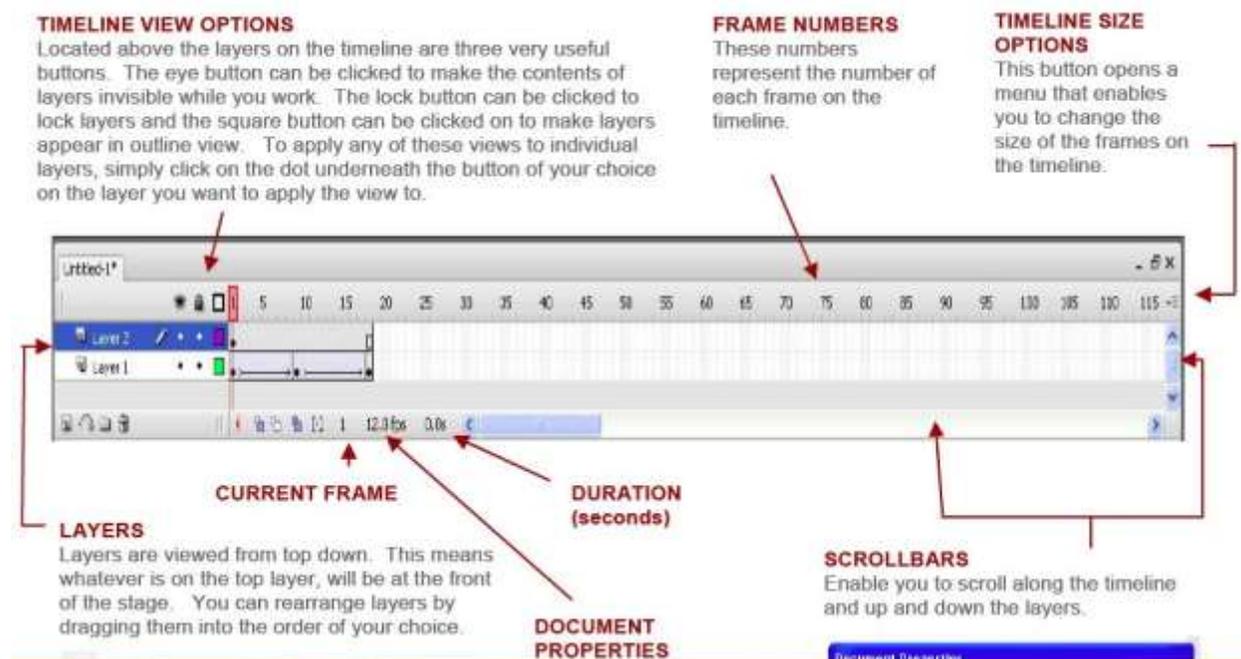
PROPERTIES PANEL

The properties panel contains the options you have for the tool or object you are working with.

Like any other animation software, Animate CC program includes **Stage**, where we place the content for the animation, its size and shape determine the final dimensions of the finished animation (**default size of the stage is set to 550 x 400 px**). We create with the available tools in the software or import graphics onto the Stage.

Timeline: Animate CC includes a Timeline that holds the frames for the animation. Frames here are the individual drawings/ graphics to be animated. These simply hold content, which is not the case with Keyframes, which is discussed later.

Features of the timeline



If you look at the timeline above, before the current frame number (shaded squares), there is **Onion Skin tool** (tools are discussed in next section and normally are on the left on tools panel), it allows a user to see the content of adjacent frames. For example if we are changing the position of an object in an animation project, we can see that change in position through respective frames by turning this tool on.

Onion skinning is a 2D computer graphics term for a technique used in creating animated cartoons and editing movies to see several frames at once. This way, the animator or editor can make decisions on how to create or change an image based on the previous image in the sequence. In traditional cartoon animation, the individual frames of a movie were initially drawn on thin onionskin paper over a light source. The animators (mostly inbetweeners) would put the

previous and next drawings exactly beneath the working drawing, so that they could draw the 'in between' to give a smooth motion. In computer softwares, this effect is achieved by making frames translucent and projecting them on top of each other.

Layers are used in digital image editing to separate different elements of an image, same in Adobe Animate CC, it allows separation of different elements in an animation. A layer can be compared to a transparency on which imaging effects or images are applied and placed over or under an image. Today they are an integral feature of all image editors including Animate CC. Layers allow us to position objects in front of each other, allowing us to create depth in a drawing.

Keyframing/Keyframes: Animate CC allows us to add two types of frames, regular frames (hold content) and **keyframes, these are used to specify a change in the animation** Contrary to creating frame by frame animation, we use keyframes to control attributes of an animation. For example, if we are to change the position of an object from the left to right in two seconds, we need to draw minimum 24 (1sec=12frames) frames to show the change in position, while if we insert keyframes and add **motion tween** we just need to have two keyframes, starting frame and the end frame. One of the two key frames present in this animation will contain the object at the left side of the frame, while the other key frame will show the object at the right side. The program calculates the proper position for the object in each frame between the two keyframes, the process is called **tweening**, because it creates the in-between frames for a creator. We can also have **path tween or shape tween**. In the first one we can make an object to follow a path that we want it to follow, it can include curves, loops or angles. To insert path animation, we use a special layer in animation called a **motion guide layer**, we draw the path on this layer for the animation. While in shape tween we simply vary the shape of the object between first and last frames and add tween.



In addition to that the software has different **drawing tools**, on the left side of the interface.

Those are:

Arrow: (Selection Tool) This is used for whenever you are not using any of the other tools. It selects individual objects or frames or a marquee for selecting multiple objects. It operates the tool bar and menu systems. Etc.

Brush: The Brush tool is not unlike the pencil, but it allows you to create thicker objects for freehand drawing.

Dropper: Use the eyedropper tool to copy fill and stroke attributes from one shape or line and immediately apply them to another shape or line.

Eraser: Self-explanatory.

Lasso: This is used for selecting single or multiple objects in hard to reach places by allowing you to draw a line, which then becomes the selection.

Line: This tool does what the title suggests. It draws lines. Useful for drawing polygons and other weird shapes the Oval and Rectangle tools can't deal with.

Pen Tool: Allows you to draw very precise lines vector lines and curves for filling.

Magnifier: You will be able to zoom in on your stage and objects with this tool. Holding down the "Alt" key will change the pointer to a "minus" sign. This will enable you to zoom out.

Paint Bucket: This will fill objects with a color of your choosing.

Ink Bottle: This tool creates lines around objects. For example, after selecting the tool and clicking on a circle object it will create a circular line around it. This can then be turned into a separate object.

Pencil: This tool draws freehand lines. Some bright sparks at Macromedia have granted you the ability to straighten and smooth the ravages of your unsteady hand. Have a play with this by choosing **Modify > Curves > ...**

Rectangle: Another useful tool and you guessed it! It draws squares. When you draw one it will create a border too if you have to. Clicking on the border once and it will only highlight one side. A double click will highlight

all four sides. **Oval:** A very useful tool, which allows the designer to create circles and ovals of any size. Remember: When you draw an oval, Flash creates a border around it if you have a border color selected. So if you don't want it there either turn the border color off or click on the border of the object, this will highlight the border, and delete it. (These borders can be useful in your design)

Text: This tool allows the designer to create text or text fields. **Fill Transform tool;** Adjusts the direction and angle of a gradient or bitmap fill

Free Transform tool: Allows you to rotate, scale or skew a selected object.

Hand Tool: Allows you to quickly move around the stage.

The Library can be found in the bottom right of the workspace and is used to locate all of the imported graphics, imagery, sound and video clips. You can drag and drop these assets to the stage from the library. There are different panels in the interface which can be customized, including the properties panel on the bottom and color panel on the left side on top of library panel.

A **symbol** is a reusable image, animation, graphic, movie clip, sound file, font or button that resides in the library. A bitmap (any imported graphic file) is not as controllable as a symbol. For example, opacity of a bitmap cannot be keyframed for dissolves but a symbol can be. A graphic can be placed in a symbol by entering symbol edit mode and importing the symbol into the symbol stage. Enter symbol edit mode by clicking the + button in the library.

A **button** responds to mouse clicks and other events. Graphics are defined for various button states. Actions are assigned to the button instance.

Features of new Adobe Animate CC

1. Export for SVG animation.
2. 4K+ Video support.
3. Colored Onion skinning.
4. Rotable Canvas
5. Integration with shared libraries.

Note: I have used Adobe Flash Manual for the graphics in the study material and used Multimedia Basics by Weixel etal, in addition to different online resources. I don't claim authorship for the same.

