

Design Course

## Inking and Painting for Animation

Old and new methods of Coloring Animation

by

Prof. Phani Tetali and Geetanjali Barthwal

IDC, IIT Bombay

Source:

<https://www.dsource.in/course/inking-and-painting-animation>



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<https://www.dsource.in/course/inking-and-painting-animation/about>

## About

Animation created on paper is referred as 2D animation. It is the flipping of paper frames that creates an illusion of movement in the still drawings.

If we talk about the past, one of the very first animations of this method is Blackton's animation called as "Humorous Phases of Funny Faces" and Winsor McCay's "Gertie -the Dinosaur". It was in early twenties when traditional animation techniques were developed and more sophisticated cartoons were produced. Walt Disney is called as a pioneer of hand drawn animation method.

Links:

- [www.youtube.com/watch?v=bJuD4ALINU](http://www.youtube.com/watch?v=bJuD4ALINU)

The simplest examples of animated drawings are the flipbooks, which gives illusion of movement.

Here, the animator is creating 2D animation by referring the movement and repeatedly flipping the frames. He is taking help of the light box to make the paper base semi-transparent for animating the drawings.



*2D Animator Working on Light Box*



*Flipping of Papers*

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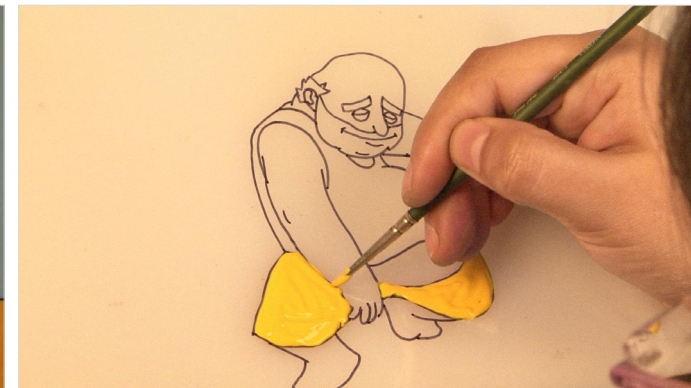
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Traditional Inking and Painting is a process where large no of animation frames are first outlined with ink and then painted on the reverse side of the sheet (celluloid or OHP sheets).



Final painted OHP sheet



Painting of 2D animation on OHP sheets

Digital coloring Technique is done in computers. It doesn't require any other equipment and space other than a computer and a gb's of space in the computer ram. It is one of the fastest and simplest process for production of animation. Digital animation has given a good competition to traditional technique. Digital method is apt for the production process of a huge no of frames for long duration animation film making.

Coloured Digital Animation Frame:



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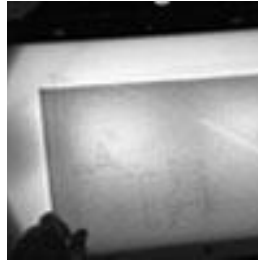
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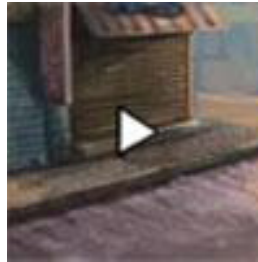
## Traditional Ink and Paint



Introduction



Process



Video - Traditional Process

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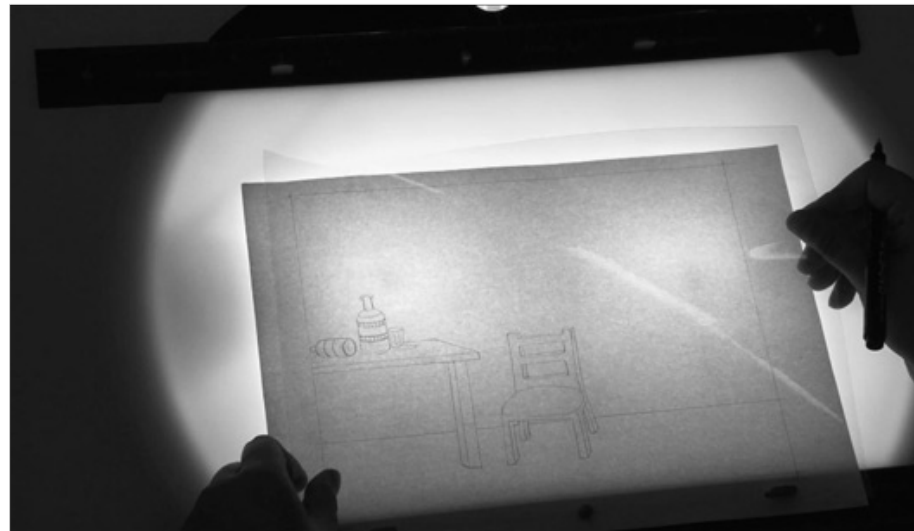
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## Introduction

### How was it done in the past?

Inking and painting of animation is a Production process where the frames are painted. In the past when the animators complete the final drawings they ink and color it with black ink. But with the changing technology animators introduced a big range of color palette rather than using monochromatic scheme of black ink.

In this segment we will experience how does the old masters color 2d animation drawings. This process is special because color is not directly applied on paper. So lets see the process, where we have a character sketch and a background with a rough animation, now will start from clean up of rough drawings.



*Ohp sheet kept over a paper drawing*

This is the process of drawing on paper, animating and colouring on celluloid sheets by hand, which are then photographed under rostrum camera and that to layer by layer. The ohp sheets are painted and then should be dried up in a clean and spacious environment. The production pipeline of the whole work-flow required to be designed in a way that it is able to supply and support the work from one to another level irrespective of the flaws. The Traditional ink and paint is a process used in making animation films. A lot of animators used this process to make animation until Walt Disney came up with his team and animated a full 2 hours feature length film.

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Snow white and the seven dwarfs is the first classical example of Animation film by hand drawn process. This film had motivated and still inspires people throughout the world of the sheer hard work and art involved in it. But unfortunately what was already achievable in the older times is not being considered nowadays. Due to the requirement of manpower and big budget needed in hand drawn animations it is less chosen method by the animators these days. Little Mermaid was the last movie done by Disney studios, to use hand-painted cels and analog camera.

Some of the best examples of traditional process of inking and painting:

- a) Snow white and seven dwarfs
- b) Gulliver's travel
- c) Princess Mononoke
- d) Graveyard of the fireflies

Links:

- [www.youtube.com/watch?v=mEFkxRExzHc](http://www.youtube.com/watch?v=mEFkxRExzHc)
- [www.youtube.com/watch?v=E6eyrmYRk1w](http://www.youtube.com/watch?v=E6eyrmYRk1w)

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## Process

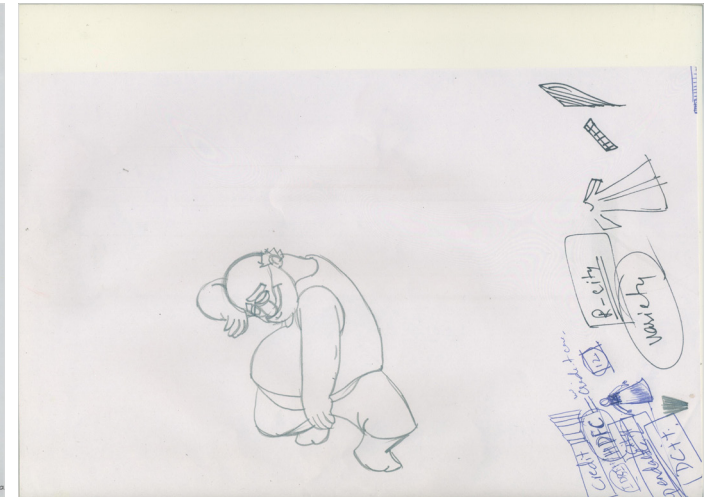
This process of traditional inking and painting includes the following steps:

- Clean up of paper drawings
- Inking on OHP sheets (tracing of paper drawings).
- Painting (coloring OHP sheets).

Clean up:



Clean Animation Fram



Rough Frames

Once the clean-ups and in-between drawings are completed, they are prepared for inking -and-painting. Rough images have sketchy or unwanted lines, sometimes the paper have black smudge dust particles as well. So we have to clean the drawings which is a necessary step in animation production stage. A good clean drawing is easy to trace and ink the details. Clean up is essential for digital or traditional animation.



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## Inking and Painting for Animation

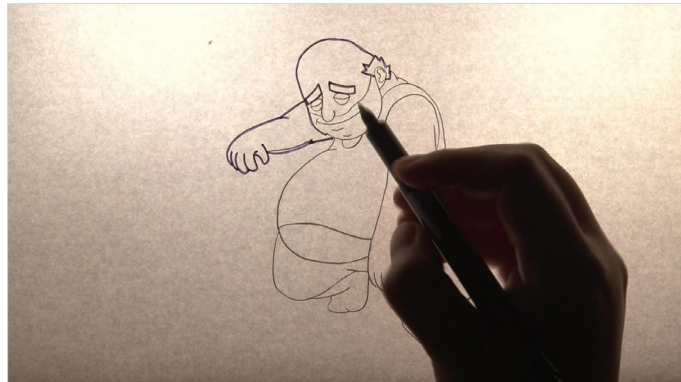
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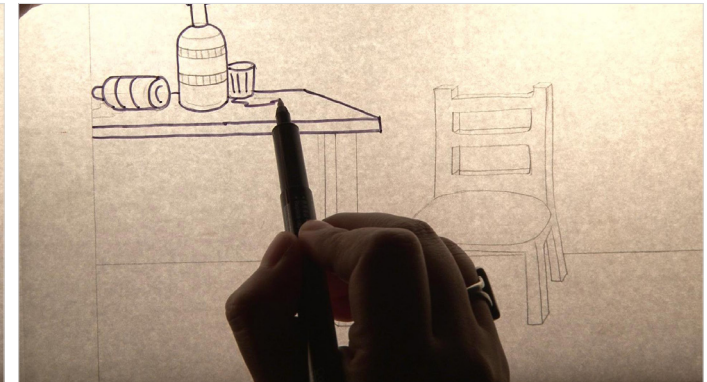
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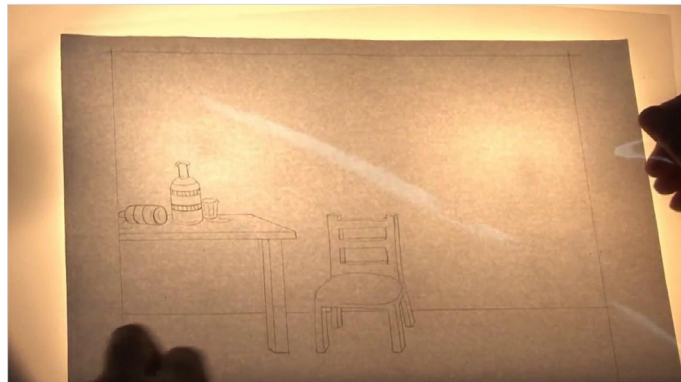
Inking:



Tracing of Characters



Tracing of Background



Tracing using Light Box



OHP Sheets (celluloid sheets)

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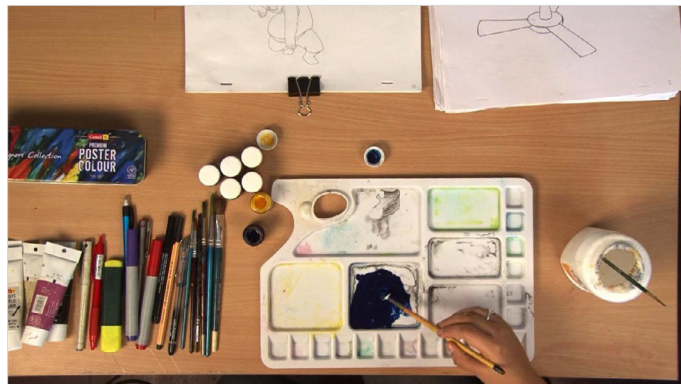
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Inking is tracing of paper drawings on cellulose sheets, which is now called as OHP sheets. Paper drawings are not used to ink and color, because of their opaque nature, on the other hand OHP sheets having transparency shows a number of layers below itself without blotting the ink. Hence, the animation layers are easy to be layered on each other without losing any visibility. Keeping the paper drawings under the OHP sheets mark the drawings using any permanent marker. The outlines of the drawing are replicated from paper to a thin clear sheet of plastic called a cel or a celluloid sheet. Mostly inking was done by hand but for making its less laborious process many animators also photocopy the drawings onto the cel sheets, which is a time saver.

### Painting/ Coloring:



Coloring Preparation

Color palette of a character is already finalized in during preproduction. Now the colorists have a final chart of color palettes in use. The celluloid sheets have transparent quality so the colors must be spread evenly on sheet surface. With a thin brush size apply the paint thoroughly over the drawn area. Keep your OHP frame clean. Give a good time to dry the painted sheets. Each sheet involved in a frame is laid on top of the other, with the background at the bottom of the stack. The transparent quality of the sheet allows the painted object to be animated, as one layer is visible underneath the other revealing the last layer of static background. Once all the layers are clicked they are exported as final animation.

These colored sheets should be kept away from dust particles and scratches.

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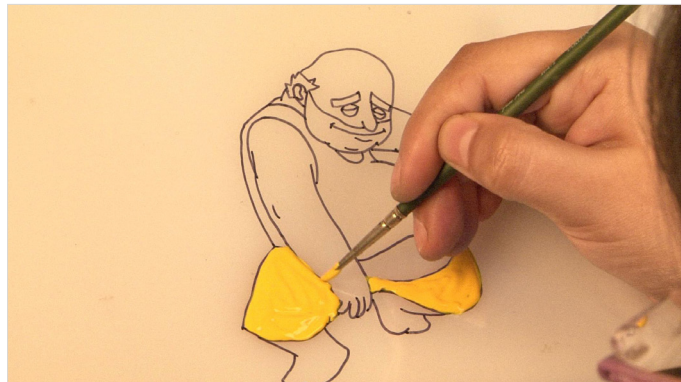
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Preparing Color using Poster Colors Mixing Favicol



Traced Animation



Coloring Animation on the Reverse Side



Applying Color thoroughly over the Flat Surface

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## Video - Traditional Process

Traditional Process:



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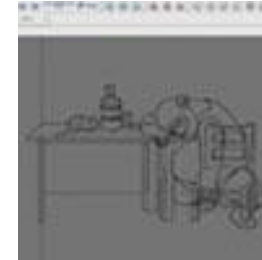
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## Digital Ink and Paint



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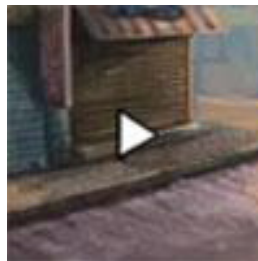
Animation Software



Preparation for Ink and Paint Digitally



Image Processing



Video - Animation frames

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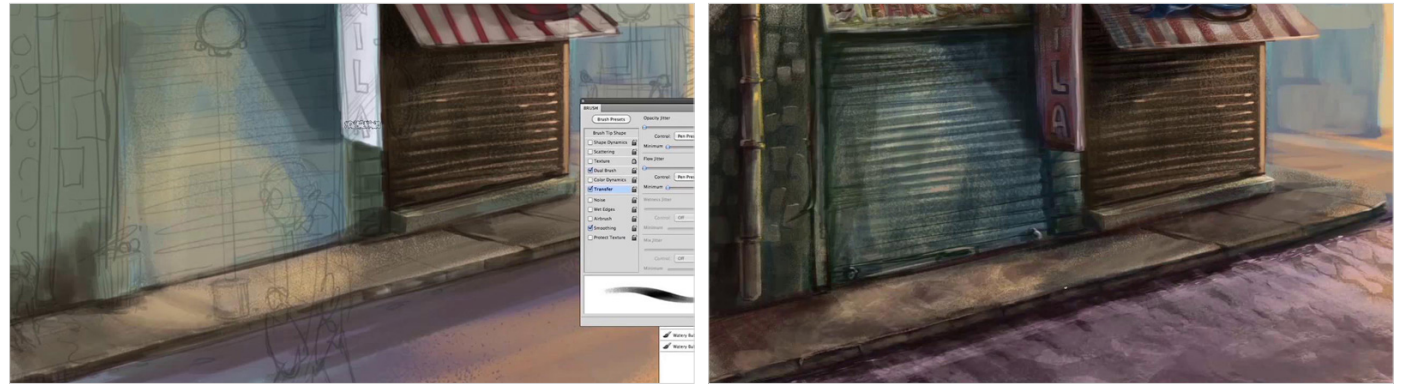
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Digital ink and paint is the modern version of traditional ink and paint process. The technological advancements that boomed the animation industry and give flourishing business to a big group of people. It is actually an augmented reality of the physical world. It converts the lines on paper into vector form. If the work is created on software scanning doesn't exist as well it, the work can be imported or exported from one software to another for refinement. The digital library of brushes, effects and techniques is limitless. Only thing requires to get your imagination go wild and experimentative to explore the world of digital possibilities and go beyond what we see or imagine in the physical world. It gives a plethora of possibilities like the drawing mediums acrylic, watercolor pastels, or oil colors etc. It has a wonderful tendency for customization with respect to artist needs. It gives you the best of you, forgives your mistakes by undo command, destroys it by delete, create new work, saves your work and can duplicate it in seconds etc. It can apply thousands of effects blur, noise, glow, shady, cloudy, etc, change the color composition to hue, saturation, or in tint.

The main idea behind using the digital animation is to make it easy, fast, and economical. The results are always astonishing as it gives a lot of options and commands like "undo" delete " or "new". Animations can be done on one table chair space without any temperature or storing hassles. Only thing requires to get your imagination go wild and experimentative to explore the world of digital possibilities and go beyond what we see or imagine in the physical world. Digital coloring requires software's and little amount of storage space. It has resolution independence and eliminates quality constraints.

**Advantages:**

- No longer is the animator is restricted to the black line and flat color infill, like that of traditional method.
- Now painting animation and creation needs a computer and decent about of storage space for bigger or smaller project. Everything becomes compact like a 7GB or 8GB file.
- Animation can be rendered into several film formats like NTSC/Pal, HDTV, DVD, 35mm or 70mm, or IMAX.
- Digital painting is all about freedom of style and process.
- It has resolution independence and eliminates quality constraints.
- The commercial aspects are also very high. It can be shared or mailed to clients where ever in the world.
- Background artwork, drawn and painted as normal, can be changed, color corrected or even enhanced by a correction of the saturation or hue.
- Unlike in traditional method, in the digital process there is no need to draw shadows for any character. It's bet-

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ter to achieve this effect later during the final composition. Neither should any areas be filled in with black. This can be done during ink and paint stage.

- Any unwanted gaps may be automatically closed to allow for fast painting.
- A color model controls the coloring of the drawings. By preparing multiple palettes, the painted drawings can be automatically reclosed without having to be repainted. If required, changing the palettes the color of the character can be fine-tuned at any stage.
- Real time color preview.
- Complex perspective shots can be achieved by computers and will be impossible to work with rostrum cameras.
- The final stage of any animation is to put the artwork under the camera for shooting. Of course these computer systems do not use a real camera but they do use a simulated version. The computer interface screen in the module is a little more complex than the other modules depending to a greater or lesser extent on the software.

### The Advent of the Technology:

Digital animation boomed the animation industry after 1992. CAPS (computer animation production system) a team of people founded the process using software which was capable of a high level of image quality. Little Mermaid (1989) was the first animation film in which this technique was used but minimally. Subsequent films were made completely by using CAPS. Caps were actually a process where 2D drawings were scanned and then digitized with the help of particular software. Majorly the team for Caps was the people from Pixar studios and from Disney studios. CAPS was shut down and dismantled after the merger with Pixar but Disney still produce movies which use the same process.

How to Hook-Up Your Home Theater, The Princess and the Frog and The Ballad of Nessie were produced using Toon Boom Harmony computer software, which offered an updated digital animation system.

3D animation challenged the 2D Traditional (hand-drawn) animation as well as digital animation. But in some of the countries, 2D animation by hand is still followed may not be the traditional inking process. Like Japan's Anime.



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## Animation Software

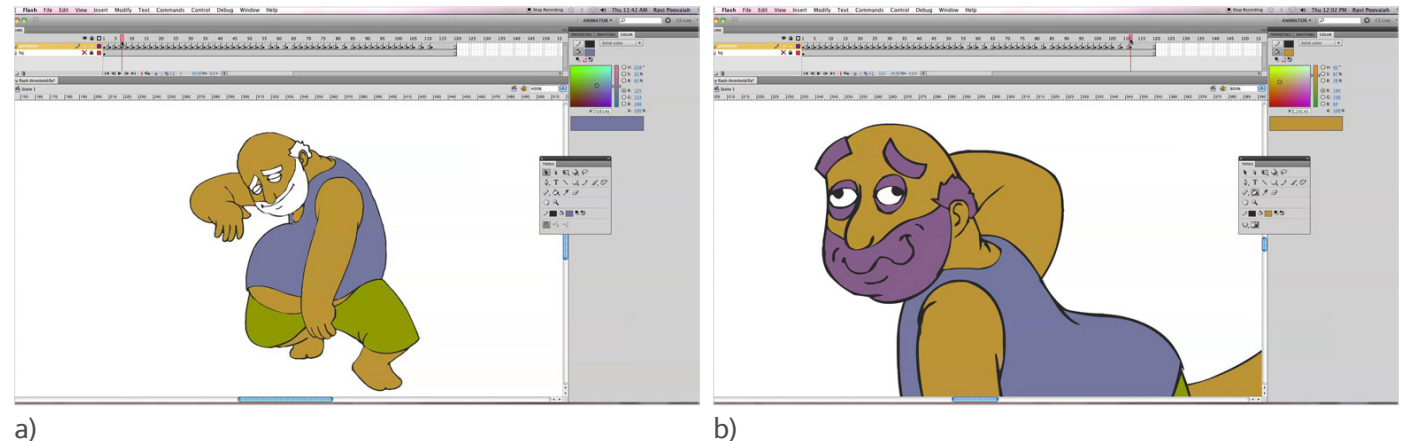
The Animation industry uses softwares like Toonboom, animate pro, Adobe Flash. The softwares are simple to learn and use. If the Software provides better or easy workspace and incorporate most of the artistic techniques in the interface, it is of high demand in the industry. Toon boom animate is best example for films, for Internet animation Adobe flash is used.

Some of the initial films in which 2d animation is further modified or ink and paint production stage are:

The Rescuers Down Under, Beauty and the Beast, Aladdin, The Lion King etc.

Big production houses like Disney or Pixar, MGM animation studios etc also have their own animation software's as well.

Animation using Flash:



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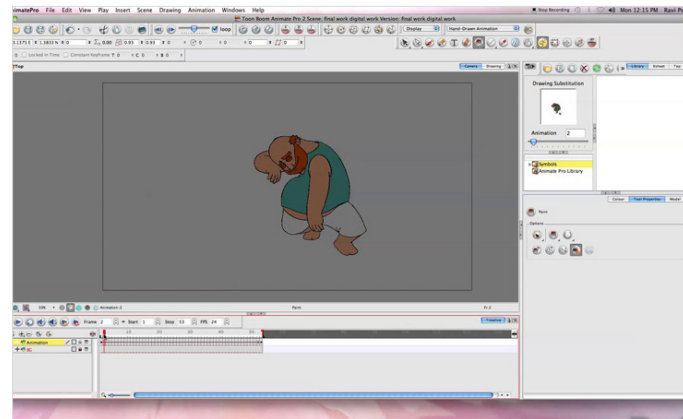
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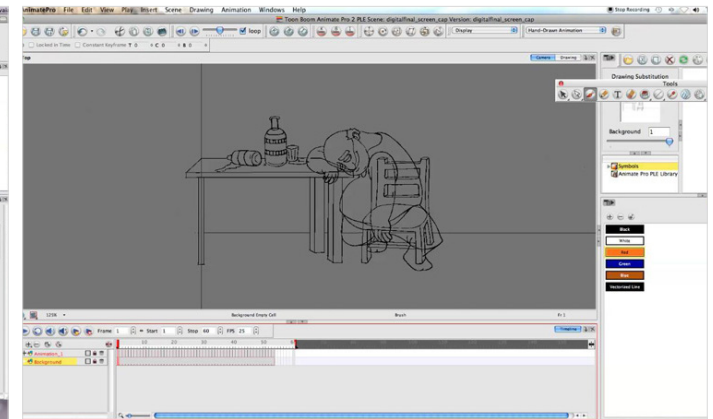
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### Animation using Toon Boom:



a)



b)

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## Preparation for Ink and Paint Digitally

**Scanning:**

Once the animation is completed upto final clean-up stage, the scanning could begin.

*Cleanup Stage*

There are 5 important points to keep in mind while scanning:

**1. Registration:**

All the drawing must be scanned having the same registration. This helps in staging the character with relation to background, foreground and the character.



Holes at the Bottom of the Paper for Registration

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### 2. Scanning Registration:

Resolution must be 72 ppi or above for video format.

### 3. Scanner Settings:

Check for a proper value of contrast and brightness before scanning. This helps while vectorization of the bitmap images.

### 4. Naming convention:

Plan your naming convention shot by shot for the frames, so that it's understood by name itself.

### 5. File Extensions:

Tiff and png file extension takes less space and are editable in software's without losing any quality.

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## Image Processing

### Changing from Bitmap images to Vector Images:

All the scanned drawings are imported in software like , Toon boom or animo and this application changes the bitmap images into vector images, for to get ready to be painted with color. This may be named as inking process, which encloses the boundaries of the drawings for the color to be applied. With this process the gaps or unwanted lines can be fixed easily. Brightness and contrast may be changed in order to blacken the lines and whiten the paper area of the drawing.

Image Types:

- Vector Images
  - Bitmap Images
- 
- **Vector Images:**



*Vector Drawings on Computer*

Vector drawings are created in computer, which defines a certain path or stroke style. Outlines of the character or paths are drawn using a choice of pens or pencils from the toolbar of software. The outlines are skeleton of a drawing employing knots at intervals, which define a path, and so these shapes can be manipulated manually by changing the direction of the path. Vectorization allows true multi planning in multiple layers with object rescaling – all without pixelisation. Vector images have file extensions like jpeg, jiff tiff or png.

Compared to bitmapped technology, vector based systems preserve line quality, remaining true to the animators' original work at any scale without pixelisation.

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Source:

<https://www.dsource.in/course/inking-and-painting-animation/digital-ink-and-paint/image-processing>

### • Bitmap Images:



*Vector Drawings on Computer*

Any drawing or photo, scanned is called a raster image or bit map image. It is actually a bunch of square pixels that carry different color information when combines forms an image. A bitmap image is dependent on the quantity of the pixels or quality of brightness and contrast during scanning. It losses its quality if manipulated at times and in different software.

They are stored with file extensions like jpg, Tiff, png or jiff.

Raster images are not good for print out work because they may be lacking the pixels per inches (ppi) count so for a good out put they need to be at higher ppi. i.e 300ppi.

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## Video - Animation frames

How to Ink and Paint the Animation frames:

Flash Ink and Paint:



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Digital Ink and Paint part-1:



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## Inking and Painting for Animation

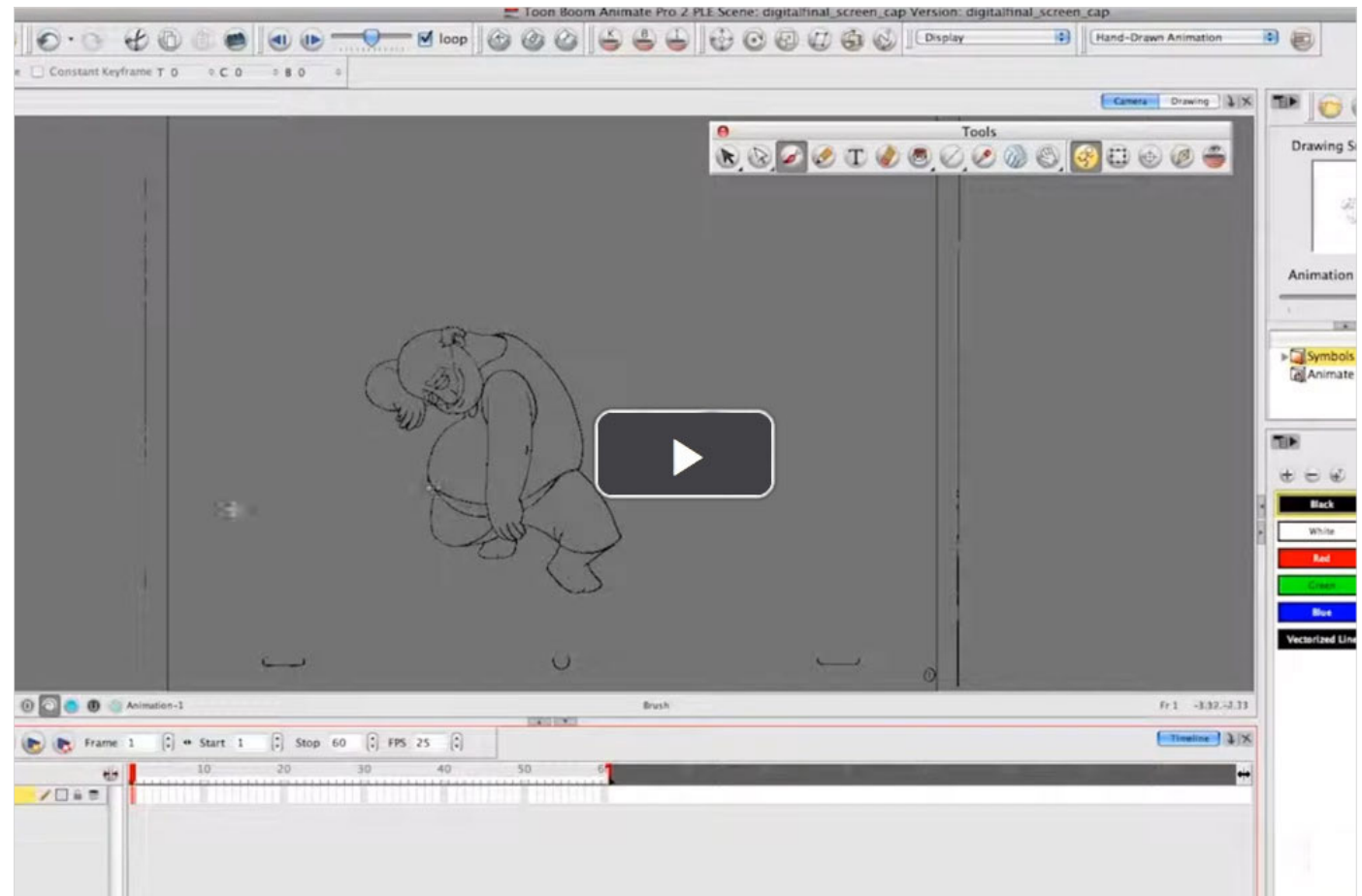
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Source:

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### Digital Ink and Paint part-2:



The inked and painted sequences of images are then animated under virtual animation cameras, to create pans, zooms, and rotation on the including overlays as well as animated transparency and blur effects. Once all the layers including overlays and background are animated under the virtual camera, they are composited and exported as video. Since the invention of these types of computer systems animation had never been produced so fast.

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## Exercise

Make small animations, take the character and background of your choice, then color it using any color medium (oil, pencil, water color).

Some examples you can try:

- 1) A bouncing ball
- 2) Bird flying in the sky
- 3) Plane flying
- 4) Sun with bright sun light

Make sure you are coloring both background and character by handwork and no computer involved until its coloring and editing on a software.

You can share your work with us to get feedback and other references.

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Source:

<https://www.dsource.in/course/inking-and-painting-animation/traditional-and-digital-process>

## Traditional and Digital Process

### Traditional Ink and Paint Process:

Each cel involved in a frame of a sequence is laid on top of each other, with the background at the bottom of the stack. As the cel of one character can be seen underneath the cel of another, the transparent quality of the cel allows for each character or object in a frame to be animated on different cels, and the opaque background will be seen beneath all of the cels. In order to flatten any irregularities, a piece of glass is lowered onto the artwork and then by rostrum camera (a special animation camera), the composite image is photographed.

The camera is then used to create pans, zooms, and rotation on the including overlays as well as animated transparency and blur effects. Once all the layers including overlays and background are animated, they are composited and output directly to video.

### Videos - Traditional Process:

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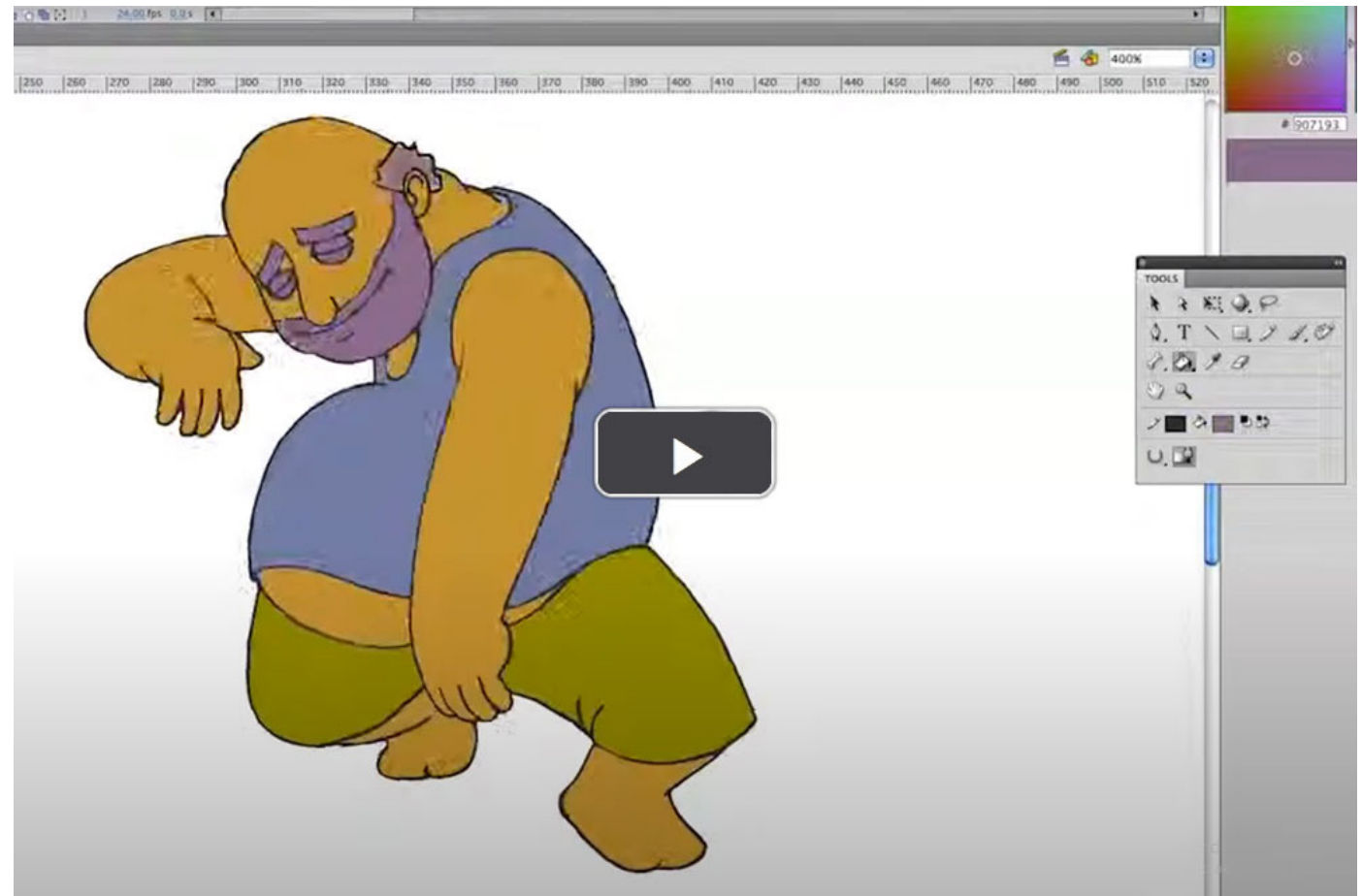
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Source:

<https://www.dsource.in/course/inking-and-painting-animation/traditional-and-digital-process>

Flash Ink and Paint:



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### Digital Ink and Paint Process:

The inked and painted sequences of images are then animated under virtual animation cameras, to create pans, zooms, and rotation on the including overlays as well as animated transparency and blur effects. Once all the layers including overlays and background are animated under the virtual camera, they are composited and then output directly to video or onto storage media for transfer onto films. All camera actions motions (complex pan, deep zoom tilt) etc. Since the invention of these types of computer systems animation has never had so much freedom of style.

### Videos - Digital Process:

#### Digital Ink and Paint Part-1:



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## Inking and Painting for Animation

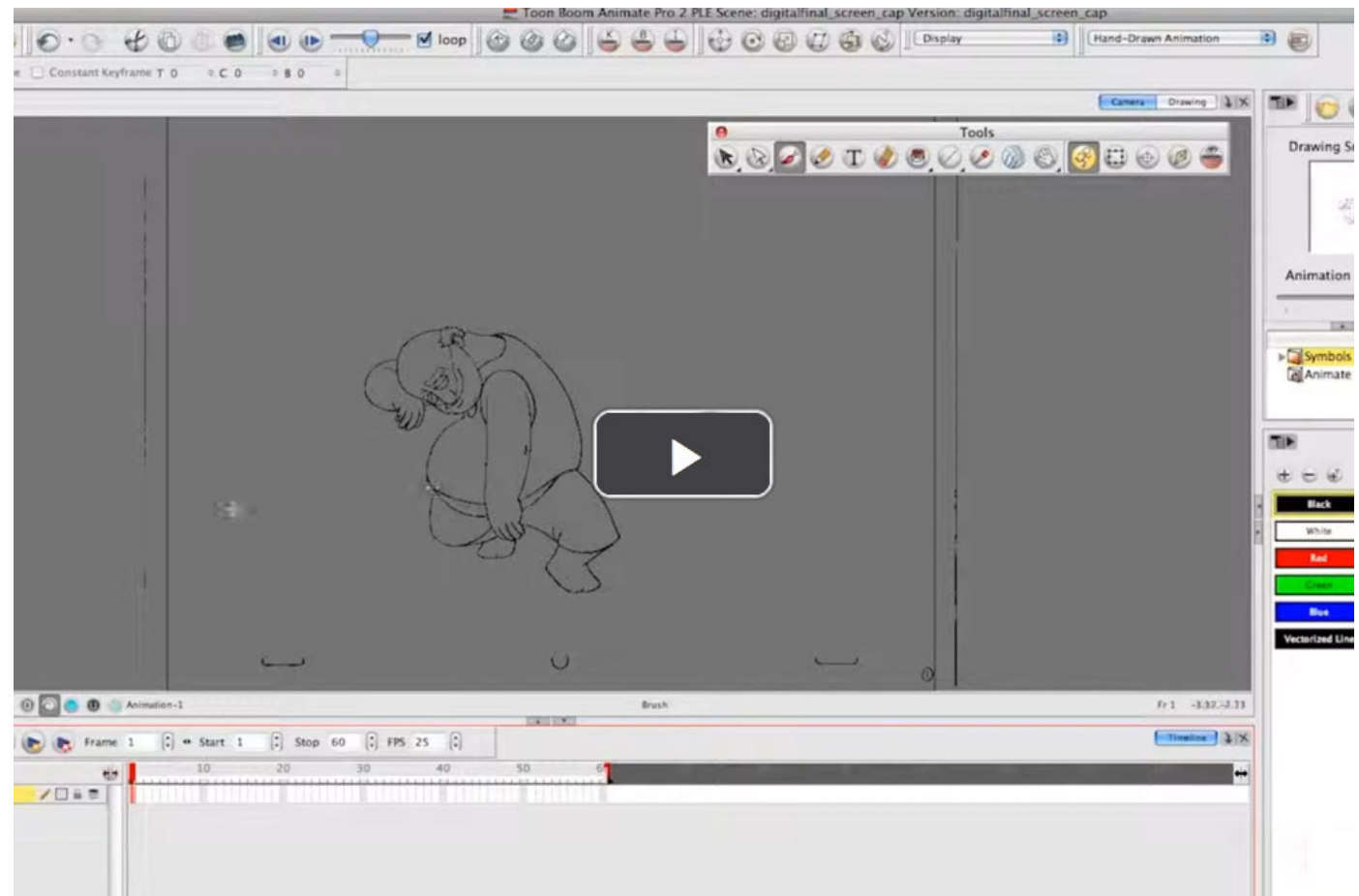
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### Digital Ink and Paint Part-2:



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## Links and References



Traditional Ink and Paint  
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Digital Ink and Paint  
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## Traditional Ink and Paint Links

**You Tube Links of Films Made by this Technique:**

- [www.youtube.com/watch?v=mEFkxRExzHc](http://www.youtube.com/watch?v=mEFkxRExzHc)
- [www.youtube.com/watch?v=bJuD4AlINU](http://www.youtube.com/watch?v=bJuD4AlINU)

**Book:**

Historical Dictionary of Animation and Cartoons  
- By Nichola Dobson

**Online Reading Links:**

- [www.justdisney.com/animation/animation.html](http://www.justdisney.com/animation/animation.html)
- [animatedtv.about.com/od/thesimpsonsfaq/a/celanimation.htm](http://animatedtv.about.com/od/thesimpsonsfaq/a/celanimation.htm)
- [www.awn.com/animationworld/concept-creation-digital-ink-paint](http://www.awn.com/animationworld/concept-creation-digital-ink-paint)
- [www.celshader.com/classic/ink/ink.html](http://www.celshader.com/classic/ink/ink.html)
- [www.en.wikipedia.org/wiki/Traditional\\_animation](http://www.en.wikipedia.org/wiki/Traditional_animation)

**Song: High**

Album - Echoes And Frames  
- by Alexander Franke

- [www.jamendo.com/en/track/858538/high](http://www.jamendo.com/en/track/858538/high)

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## Digital Ink and Paint Links

Online Links:

- [www.ebay.com/gds/Difference-between-cel-sericel-original-production-/10000000000016731/g.html](http://www.ebay.com/gds/Difference-between-cel-sericel-original-production-/10000000000016731/g.html)
- [jimhillmedia.com/editor\\_in\\_chief1/b/jim\\_hill/archive/2011/09/20/disney-style-inking-amp-painting-lives-on-thanks-to-courvoisier-s-studio-replicas.aspx](http://jimhillmedia.com/editor_in_chief1/b/jim_hill/archive/2011/09/20/disney-style-inking-amp-painting-lives-on-thanks-to-courvoisier-s-studio-replicas.aspx)
- [www.awn.com/animationworld/concept-creation-digital-ink-paint](http://www.awn.com/animationworld/concept-creation-digital-ink-paint)
- [www.tested.com/art/movies/442545-2d-animation-digital-era-interview-japanese-director-makoto-shinkai/](http://www.tested.com/art/movies/442545-2d-animation-digital-era-interview-japanese-director-makoto-shinkai/)
- [www.ehow.com/about\\_6361327\\_painting-animation-software.html](http://www.ehow.com/about_6361327_painting-animation-software.html)
- [www.ehow.com/video\\_4948788\\_paint-digitized-line-art-drawing.html](http://www.ehow.com/video_4948788_paint-digitized-line-art-drawing.html)
- [www.youtube.com/watch?v=4e816NdNSP4](http://www.youtube.com/watch?v=4e816NdNSP4)
- [www.ehow.com/video\\_4948781\\_computer-equipment-digitizing-drawings.html?cp=1&wa\\_vlsrc=continuous&pid=1&wa\\_vrid=fea85239-9803-453c-ae1-2affa9f0db6e](http://www.ehow.com/video_4948781_computer-equipment-digitizing-drawings.html?cp=1&wa_vlsrc=continuous&pid=1&wa_vrid=fea85239-9803-453c-ae1-2affa9f0db6e)
- [en.wikipedia.org/wiki/Computer\\_Animation\\_Production\\_System](http://en.wikipedia.org/wiki/Computer_Animation_Production_System)

You Tube Links:

- [www.youtube.com/watch?v=nGJYyel0H3M](http://www.youtube.com/watch?v=nGJYyel0H3M)
- [www.youtube.com/watch?v=uQBy6jqbmlU](http://www.youtube.com/watch?v=uQBy6jqbmlU)

Music:

Song: Easy Lemon

- by Kevin MacLeod

• <http://incompetech.com/music/royalty-free/?keywords=lemon>

Song: Shadows in the Moonlight

- by Josh woodward

• [http://freemusicarchive.org/music/Josh\\_Woodward/The\\_Simple\\_Life\\_Part\\_2\\_1667/JoshWoodward-TSL-NoVox-206-ShadowsInTheMoonlight\\_1695](http://freemusicarchive.org/music/Josh_Woodward/The_Simple_Life_Part_2_1667/JoshWoodward-TSL-NoVox-206-ShadowsInTheMoonlight_1695)

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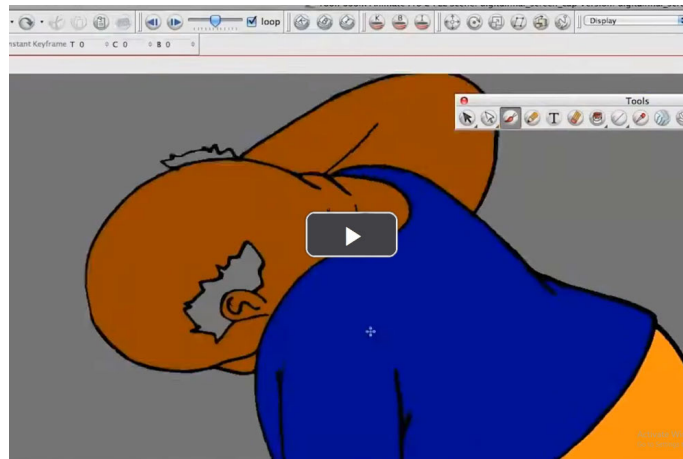
## Video



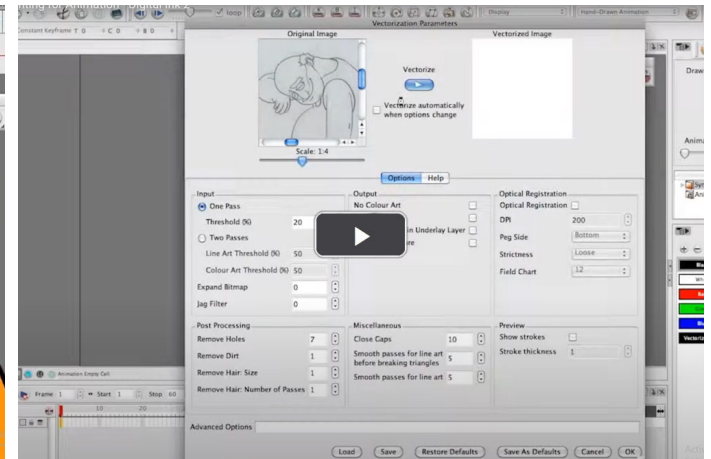
Traditional Ink and Paint - Part 1



Flash Ink and Paint



Digital Ink and Paint - Part 1



Digital Ink and Paint - Part 2

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## Contact Details

This documentation for the course was done by Geetanjali Barthwal, IDC, IIT Bombay.

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Phone: 091-22-2159 6805/ 091-22-2576 7802

Email: [dsource.in\[at\]gmail.com](mailto:dsource.in[at]gmail.com)

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