Summer Internship Project: HopMotion Studios

Project - 1 Report
By:

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Business Processes and Animation Workflow in the Studio

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Declaration

I declare that this written submission represents the work done by me, summarized in my own words. Wherever other images and texts have been included, they have been adequately referred to their original sources.

I also declare that I have adhered to all principles of academic honesty and integrity and I have not fabricated or falsified any of the data/ facts/ contents in my submission.

I understand that any violation of the above mentioned will be cause for disciplinary action by the Institute and also evoke penal action from the sources that have not been properly cited, or from whom proper permission has not been sought.

Signature:

Name: Gokul C J
Roll No: 156340003
Date:

Completion Certificate

4th June 2016

TO WHOM IT MAY CONCERN

This is to certify that Gokul C J, pursuing Masters in Design in Animation from Industrial Design Centre(IDC), IIT Bombay has completed the internship at HopMotion Animation Private Limited from 2nd May, 2016 to 30th May, 2016.

We found him sincere, hardworking, technically sound and result oriented. He worked well as part of a team during his tenure.

We wish him every success in life.

Anish Patel
Director
HopMotion Animation Private Limited

Abstract

The Summer Internship Project was mainly focussed on the creation of actual animation content for the television and the internet, at the same time learning the processes involved in doing so. My project was performed under HopMotion Studios, Andheri East, Mumbai. The studio specialises in 2D digital animations mainly for television shorts and web series.

The primary aim of this project was to attain working knowledge of the business processes and workflow within an Animation Studio and to contribute to the ongoing work processes.

Over the course of one month in HopMotion Studios, the work flow of the studio has been clearly understood. The hands on experience with the software tools used for storyboarding and animation also made the learning enriching. This report sums up the learnings and takings from the project that spun over a month's period in the studio.

Acknowledgements

First and foremost, I thank IDC and my Professors for providing me with the opportunity to carry out internship at my place of interest.

I thank HopMotion Studios for providing me an enriching experience in the field of business flow and animation processes.

I would like to express my gratitude to Mr. Neel Lukkani, the Chief Operating Officer and founding member of HopMotion Studios, for his guidance and help provided during the internship tenure.

I also thank all the colleagues at HopMotion studios for the help and co-operation provided during the project period, which instilled in me, the knowledge and experience regarding the major work flow of the industry.

Contents

Introduction

About HopMotion Studios

HopMotion Studios is a full service digital 2D animation studio engaged in creating broadcast quality contents for Indian as well as international clients.

Founded by Anish Patel, Carmen and Neel Lukkani, the studio has 5000 sq.ft of studio space in the heart of Mumbai. The studio consists of script writers, pre-production artists, storyboarders, animators and video editors.

The major works of the studio includes the ongoing television series Chhoti Anandi, and the webseries like Modern Activity, Kung Fu Singh, Ninja Patel etc.

The studio also works on international projects like CampWWE as well.

My internship project began with the introduction to the basic work processes in the industry. It was followed by the familiarization of the software tools used within the Studio.

Each working day spanned a total duration of 9 hours, during which I found time to learn and experiment with the software tools, and got to do the works related to the ongoing projects.

The work was divided in such a way that the first half of the project period was utilised in performing the basic understanding of the software, Toon Boom Harmony, and the latter half included the works on certain ongoing projects of the studio, namely creating Props, and finalizing the animated shots.

Regular meetings were done with the team leads which helped in understanding the features of the software, project cycle, animation flow and background art.

Overall working tenure in the studio has equipped me with understanding the animation studio's business processes and animation processes.

Image 1: A still from Chhoti Anandi

1. Business Processes

The first days of the project gave me the basic insight into the business processes undergone in the Animation Studio.

Apart from the animation work flow, the survival of an animation studio depends on how efficiently the employees work and how properly the division of work is done by fully utilizing the talent available in the studio.

The following business processes were followed in handling the workforce in the studio.

1.) Know the team, plan accordingly

The employee strength in every animation studio is divided into specific teams which take care of specific projects. It is necessary to understand the capability of the team members before assigning the work as the speed of completion depends on the efficiency of the team members.

Once the work is assigned, depending on the workforce available, the date of completion of the project is planned. Small studios may have a much lower workforce, which demands the proper work distribution.

2.) Less Man power, More Buffer time

For a small studio, more manpower may not be feasible. Also for a single project, for proper work division, manpower has to be adequate so as to not affect other projects in the pipeline.

Animation projects mainly includes the different stages like Scripting, Storyboarding, Character rigging and Animation. The work force is divided among these major groups, and the time of completion, while undertaking a project, is given an extra buffer time in order to ensure that the work done is perfect and no lag will affect the final delivery.

3.) Proper work based on skill

Within the project team, the skill level of the individuals varies. The efficiency of a studio depends on how the employees are properly assigned the tasks so as to get the most out of them.

No animator is given the extra burden of creating storyboards and no storyboard artist is given the background works. Every task is properly assigned based on levels of expertise.

4.) Freelancers used whenever necessary

Based on the complexity of the project, the workforce varies. But even then it may not be sufficient. When the project demands more amount of work in less amount of time with very detailed and complex animations, the studio might have to approach freelancers to undertake the extra job. It is normally done in most of the animation studios.

The freelancers are hired on contract basis and once the project gets over, they are released.

5.) Proper Planning and timing of shots and scenes.

Every scene in an animation is divided into shots which are divided among the animators involved in the project. The number of shots to be completed per day is planned before starting the animation cycle. The time allotted for the shot completion depends on their complexity. Some complex shots may go as slow as 1 second per day while easy ones may go up to eight seconds of animation per day.

6.) Client Interaction

The interaction with the project clients depends on the nature of the project. For international works, the client interaction will be more regular and systematic, so as to ensure the completion way ahead of time. For self-produced works, the client interaction is limited to finalising each stage of work. The client, however, preferably modify the project only till the Animatics stage. Once the animation stage begins, the periodic interaction is mainly for the confirmation of the shots completed.

2.   Animation Work Flow

The animation work flow of every animation studio is more or less the same, with the following major steps included.

Basic Animation Work Flow in the Studio
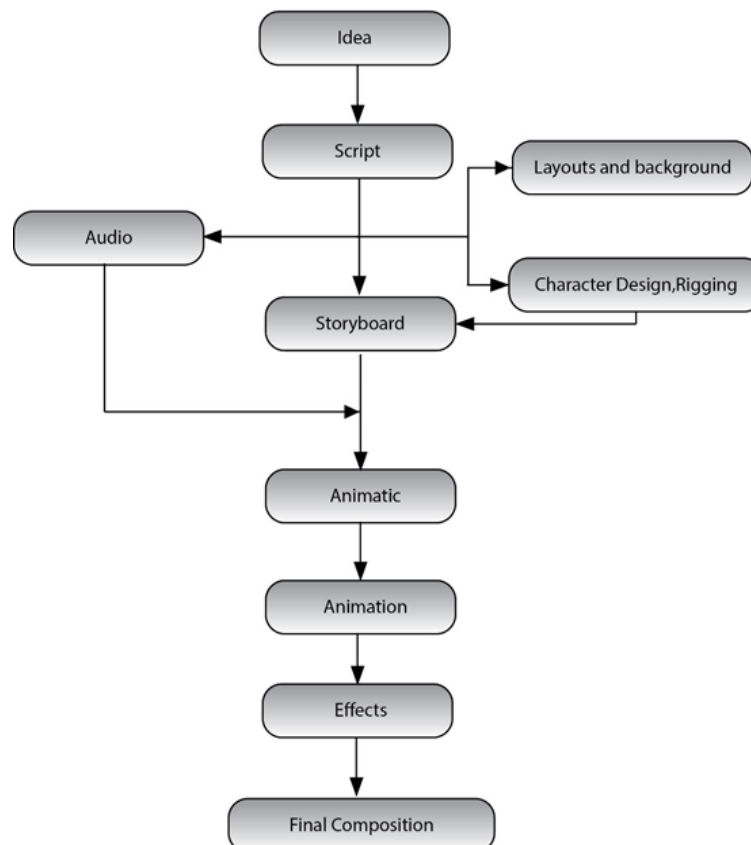
- **Idea**

Every animation project requires the initial idea. For the work that is studio owned and produced as part of web series, the ideation part has the major role. Based on the established and approved idea, the story is created.
For international works that are done in the studio, the ideation and scripting will be packaged and handed over to the team so as to go ahead with the storyboarding and animation steps.

- **Script**

After the story is created, the script stage works are done by the script writers, who ensure that the most apt script for the said story is developed and that is viable for the background artists as well as the storyboard artists.
In the Studio, the scripting for the in-house projects are done by the two-member script writing team.

- **Character Design**

The major step of designing a character sets the mood for the movie hence forth. The success of the short may directly depend on the appearance and personality of the character. Special care should be taken while designing the character such that he/she is loved by the audience.

TV Series like Chhoti Anandi and Web Series like Modern Activity are studio owned works. The character design for these series are purely done within the studio.

- **Storyboard**

The storyboard stage includes setting the shots and the scenes and calculating the camera positions and angles to be used while animating. A special storyboard team takes care of the storyboarding process. Toon Boom Storyboard Pro is used in storyboarding.

While the storyboarding is done, the shots are divided as Close-Ups, Mid shots, and Extreme Angle Shots.
The percentage of each of these in the storyboard determines the time of completion and ease of animation. By norm, the following percentages are followed in the studio:

* Close ups   –   5 – 10%
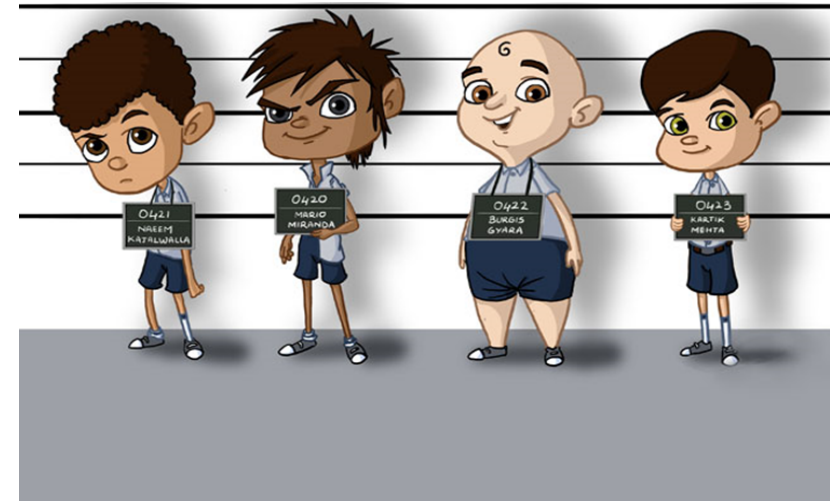* Mid shots   –   60 – 65%
* Extreme Angle shots   –   5%

Image 2: Characters for HopMotion webisode "Modern Activity"

Note: Character model sheets are created during the character design stage, and creation and rigging of those characters follow.

Image 3: Sample Background created using drawing tools.

- **Audio**

Audio is created before the animation in order to ensure the proper timing of the sequences and for maintaining the proper lip syncs.

- **Layouts and Backgrounds**

The team responsible for creating layouts and back grounds may be same or different. Small companies perform both the tasks with the same team whereas certain companies may have different people to perform layouts and backgrounds.

In the studio, layouts are not done separately, but as backgrounds in major projects.
In international project, the styling and colour palette of the background are decided by the clients.

Adobe Photoshop, and Toon Boom Storyboard Pro are used to create and compose backgrounds.
The layering of objects in the background based on distance from the observer is taken care in the background creation stage.

Certain projects utilize 3d rendered backgrounds as well, which is placed onto the composition after post processing and colour corrections.

The steps in creating background images:

a.)   Napkin Sketch:
This is basically a freehand basic sketch used to identify the keep features in a background. The image is not detailed and basically consists of rough lines and basic forms.

b.)   Rough Sketch:
The objects in the image gets clearer and have better form and lines. The composition of the background is done in this stage. It can consist of the entire location of the background without any particular perspective and angles.

c.)   Key Location:
Based on the setting of the scene, the main location is decided.

d.)   Key Background:
Based on the key location, a detailed drawing of that location is created.
E.g.: If the scene is set besides a castle, the detailed drawing of the castle is created preferably with shots from every angle.

e.)   Scene-wise backgrounds:
After setting the scenes, the sections of the key background are split up and used for various scenes.
E.g.: For a shot that happens in the front side of the castle, a different background is created. Similarly, another background is created for the interior and likewise.

- **Animatic**

The animatic stage finalises the timing and camera views of the animation. Any changes from the client should be finished within the animatics stage. Further changes may delay the work flow and completion.

- **Rigging**

The characters developed are properly rigged and joints are connected so as to ensure a smooth motion while animating.

Rigging in Toon Boom Harmony is essentially equivalent to adding bones and joints in a 3D modeling software, but is done by linking or parenting the individual parts to its hierarchical parent

The inbuilt tools of Toon Boom Harmony are utilised in rigging puppet like characters in the software, which is then used for animation.

- **Animation**

The main step of animating the characters which makes use of the audio, storyboarding and backgrounds. Toon Boom Harmony is the software used in this process.

- **Effects**

Effects like smoke, dust, rain, water, fire, explosions etc. are added towards the end of the animation so that any changes to the animation will not affect the effects, which would, otherwise, create plenty of unnecessary rework.

- **Final Composition**

The video and the audio are combined together in the compositing software and the animation is completed. Final editing is also performed on the footage.
The render after combining all the necessary footages, audio and credits constitutes the final film or short.

3.   Production Log

Every studio maintains its production log to keep a track of the work processes and percentage of completion. The production log keeps the progress of the work under control.
Production Log consists of the details of the shot, duration of the shot, animator, the number of frames he/she has completed, and comments regarding the same.

Here's how a typical production log in HopMotion studios look like:

Sl.No	Shot #	Duration	Animator	Number of frames	Comments

For every studio running on strict deadlines, the production log does a great job in ensuring no part of work is left undone and no employee remains idle.
It also makes the tabulation easier.

The production log is completed on a daily basis depending upon the work remaining. Every minor addition to the shot goes into the log and nothing remains unlogged.

4: Toon Boom Harmony

All the animation work in the studio are performed using the Toon Boom Software Harmony. The usability and features of this tool makes it the perfect tool to create fast and good quality animations.

Image 4: Basic UI of Toon Boom Harmony- Stage

4.1: Toon Boom Harmony – Drawing:

The first week of the project was dedicated to understanding the basic working of the software and its drawing tools.
The basic tool set includes the Pencil, Brush and freehand drawing tools.

The panel on the left contains the drawing tools, and the bottom tab has the layer details.
Once the drawing tools were familiarised, the next assignment undertaken was to understand the basic anima-tion principles, like anticipation, timing, squash and stretch etc. using the software.

Bouncing balls, character drinking water from a glass, alternating capsules that could rotate, etc. were few of the assignments that were completed.

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The below screenshot shows a basic sphere drawn into the canvas, the layer which is named as Circle_Drawing.
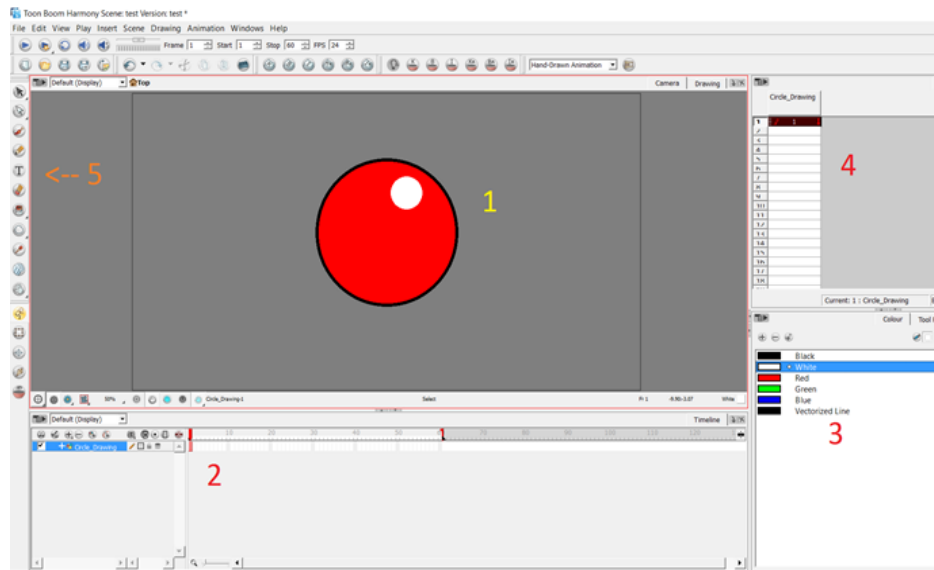
Image 5: Basic user interface and tools within Harmony - Stage

In the image:

1 - canvas on which the drawing is made
2 - timeline and layering of the composition
3 - colour palette used in the drawing. This can be changed at
    will and more palettes can be added. The
    advantage of Toon Boom Harmony over other animation
    softwares is that once the palette colour is changed, it
    affects the entire length of the animation and not just the
    single frame.
4 - time ladder
5 - basic tool bar with the drawing and rigging tools.

Now that the drawing of the ball is completed, in order to give motion to the ball, Pegs are created, which are basically analogous to the pegs in traditional animation that is used to move the canvas in whole.
The Network tab of Toon Boom Harmony denotes all the connections to the drawing.
Once a Peg is added, it is shown in green, and attached to the drawing layer.

Once the drawing layer and the peg layers are created, then the hierarchy can be sorted out and the rigging can be done. For this, there should be multiple layers and pegs present in the timeline.
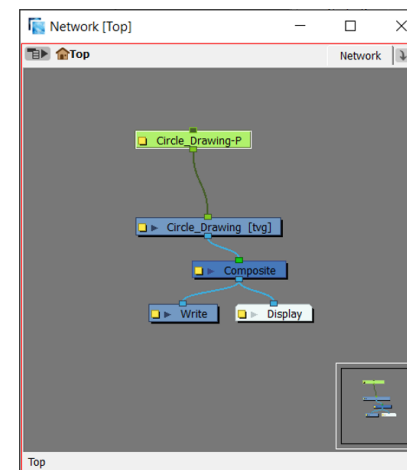

Image 6:

Peg (highlighted in green) is added to a drawing layer, which enables that layer to have properties of translation, transform and rotation without affecting the position of the drawing itself.

4.2: Character Rigging:

Chhoti Anandi and Modern Activity are the major projects undertaken by HopMotion Studios at present.
Chhoti Anandi is an animated series for Colors TV and Modern Activity is a native web series, based on real life characters.

The assignments included rigging existing characters for Modern Activity series.

The protagonist of the series is a kid named Savio, and there are many episodes already with his character appearances. However, this rigging was for a different version of Savio.

All the characters and props are rigged. The details of the rig depend on the fluidity and complexity required of the final animation. Certain international projects demand high quality rigs as their characters are highly detailed and complex. The rigging of such characters takes more time in the animation workflow.
The rigs should be complete so that the animators can proceed with their work hassle free.

The hierarchy of components created determines the movability of character joints.
Eg: The order of hierarchy of a typical character's hand is as shown below:

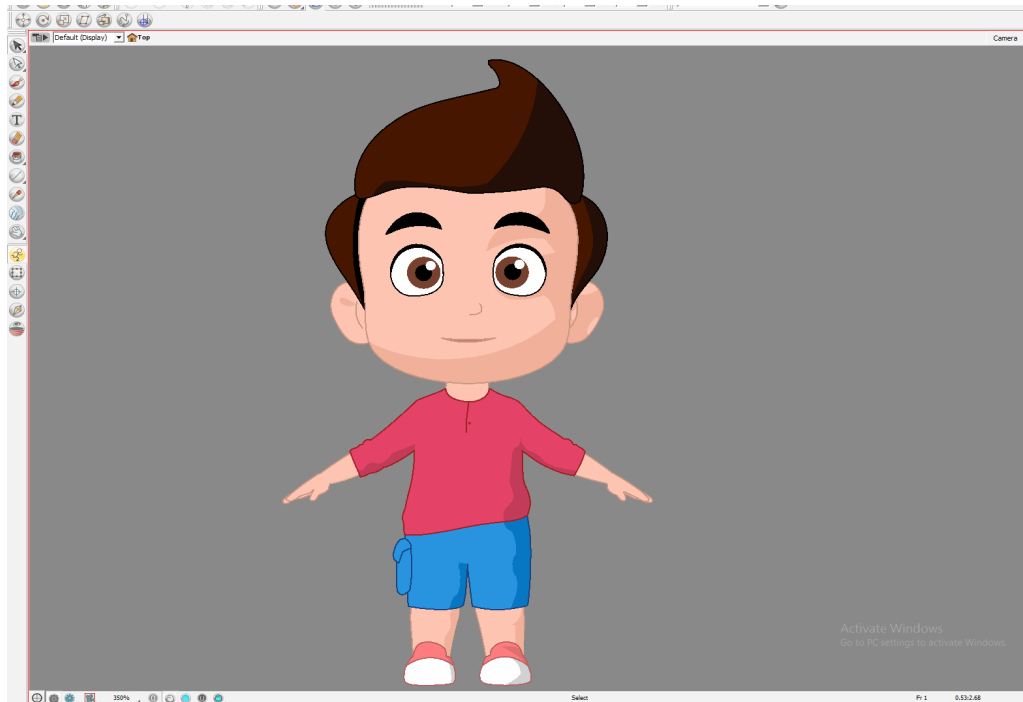Fingers --> Hand-->Lower arm -->Upper arm -->Shoulder

Image 7: Character rigged for Savio for online series.

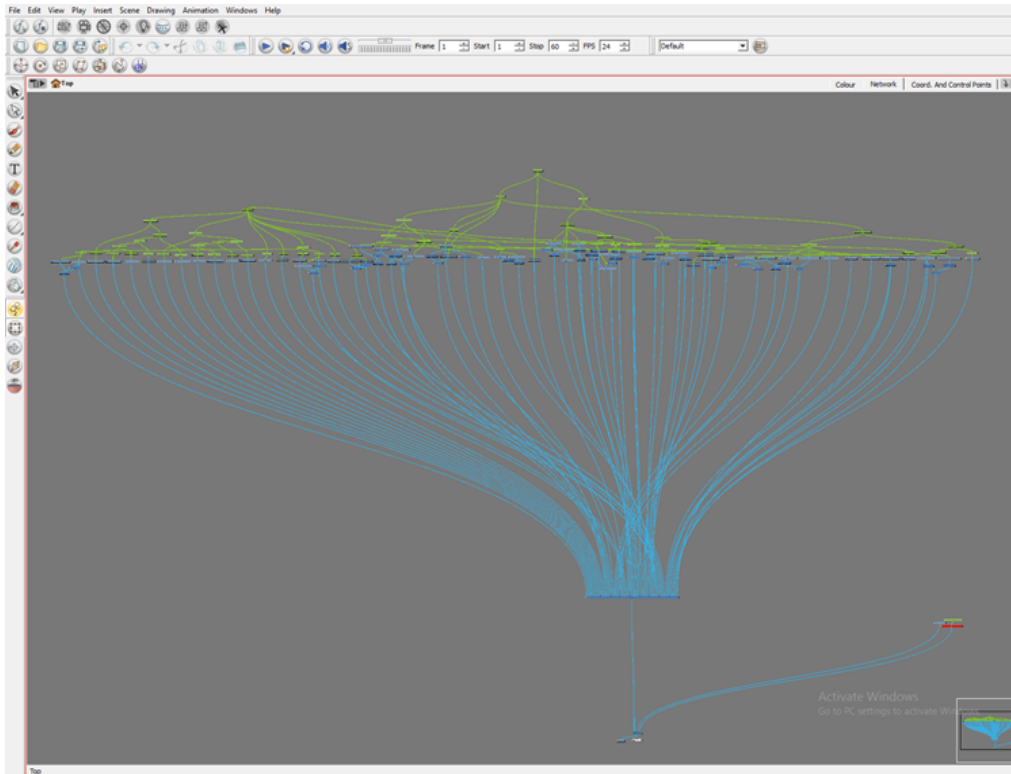Hierarchy as seen in the Network View of Toon Boom Harmony is shown below.

Image 8: Complex Hierarchy of a typical character in Toon Boom Harmony. The blue rectangles shows the drawing layers and filters, whereas the green boxes are the Pegs attached to the drawing layers. Multiple layers can have the same peg and pegs can be nested and it becomes more complex as the movable parts and joints on the character increases.
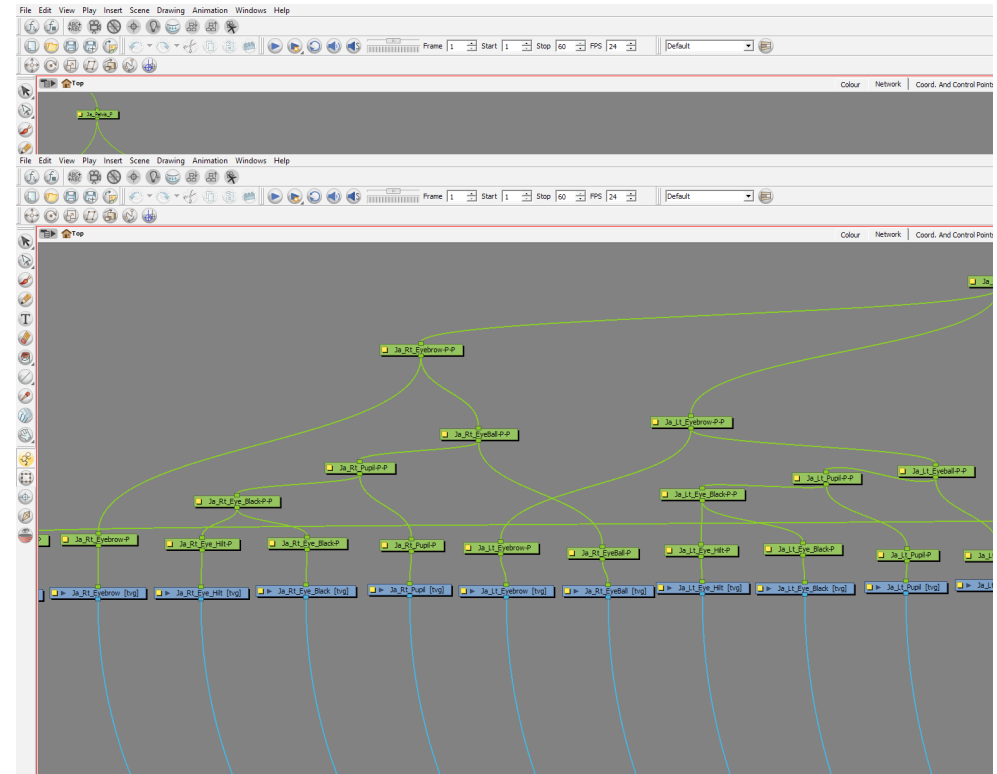

Image 9: Hierarchy within Network view.

Toon Boom harmony has built in filters for smoothing out the rigging operation.

Every single part of the body in itself is divided further.
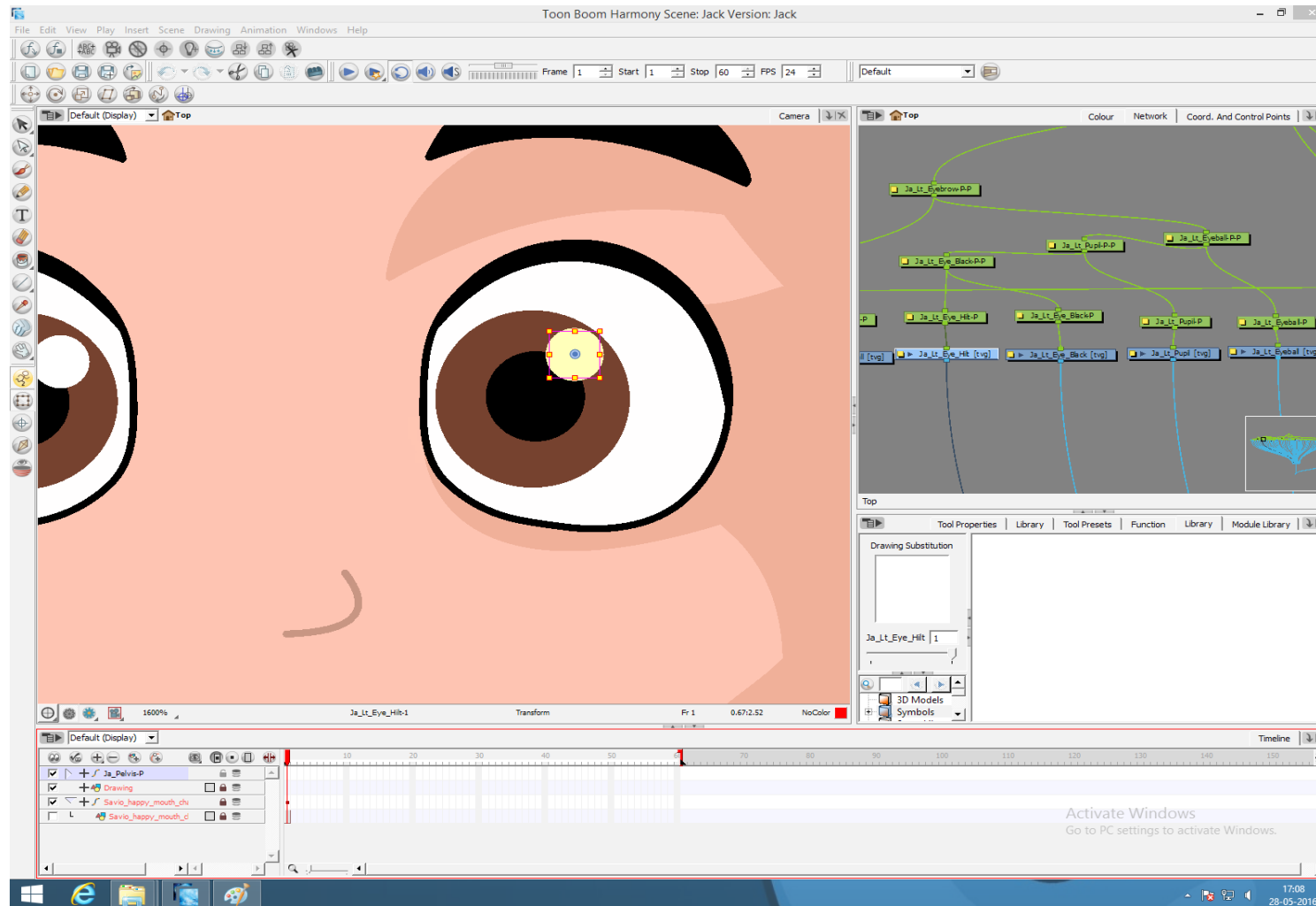
Image 10: The eyes of the character are further layered as eye, pupil, hilt and so on.

4.2.1: Rigging: Layering

Within Toon Boom, the individual body parts are created in different Drawing layers and each layer is attached to a PEG layer which takes care of the motion of the respective layer.
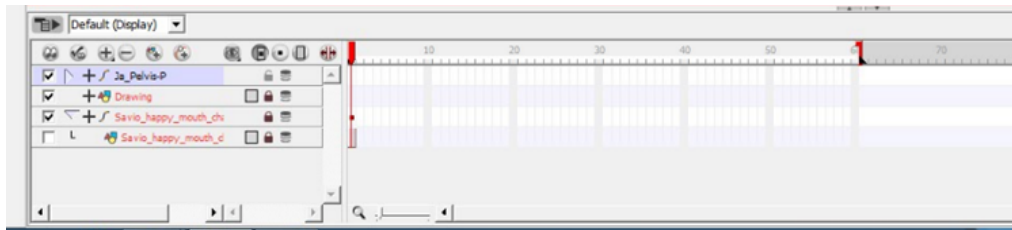

Image 11: The non-collapsed view of the main Pelvis PEG layer within which the individual body parts are ordered hierarchically.

Ja_Pelvis-P denotes the PEG layer for the Pelvis.
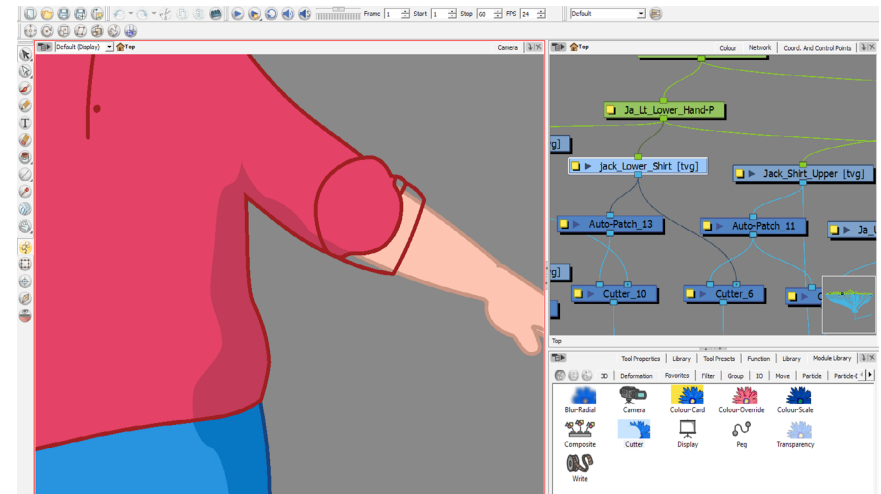Upon collapsing that layer, we get the body peg, under which the body Drawing layer exists and so on.

Image 12: DIfferent layers of the hand, namely Upper and lower hand.

4.3: Harmony - Rigging Helpers:

While adding layers and creating hierarchy, there occurs stages when one drawing overlaps the other and affects its visibility.

For example, when the upper leg and lower leg are hierarchically combined, there occur a state when the part of the upper leg is visible above the lower leg as shown below.

Under such circumstances, an inbuilt filter called as AUTOPATCH is added in order to avoid that abnormality automatically.

The process is analogous to manually adding a patch layer over the image with the same colour.

In this case, another filter called CUTTER is added so that the layer which is above cuts the patch and applies it to the layer below.
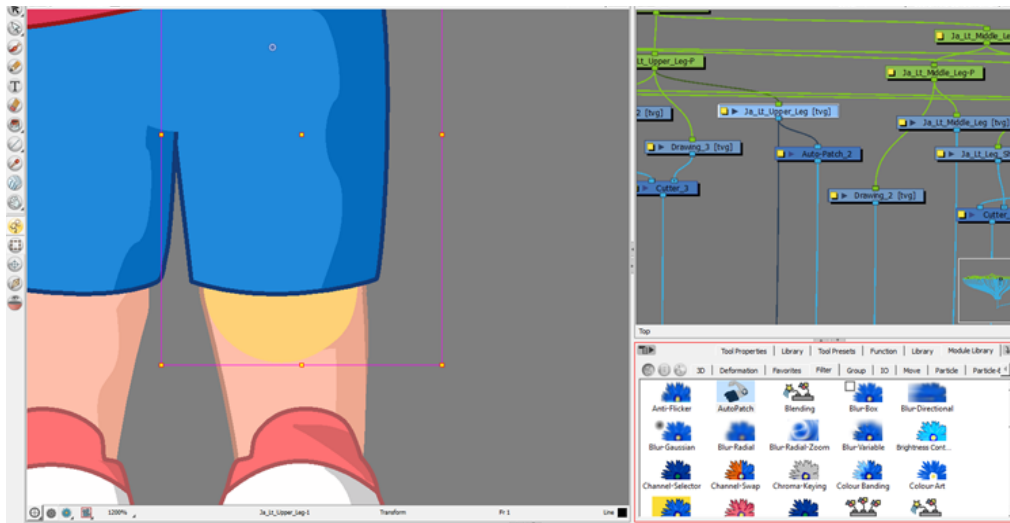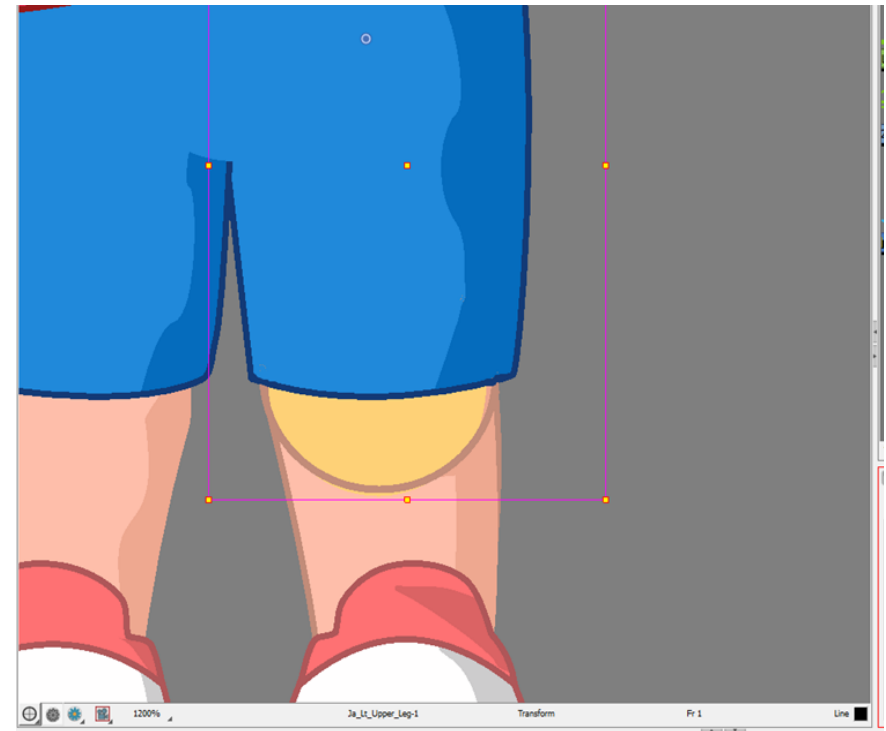

Image 14: Part of upper leg visible above lower leg, without AutoPatch.

Note: The thing to be noted while adding AutoPatch is that the line drawing and colour layers have to be separated before doing it, which means, the outline of the leg should be made in the LINE ART layer and the colouring should be done in the COLOUR ART layer.

Image 13: The portion of the leg with AutoPatch filter added.

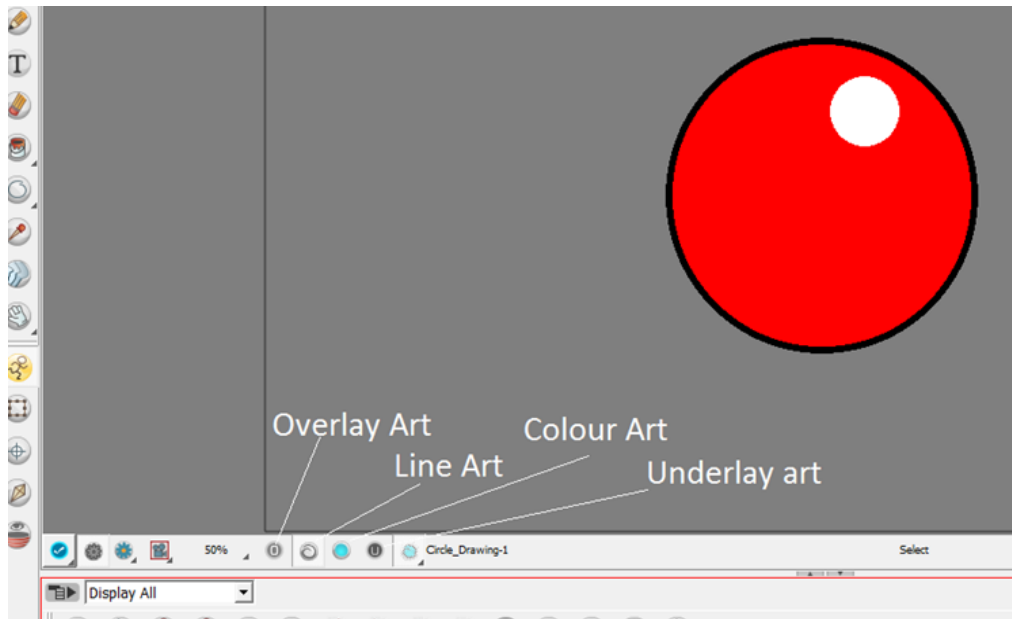Different sub layers within a single layer:

Image 15: Different drawing layers in Toon Boom Stage

Every drawing layer in Toon Boom Stage is divided into four sub-layers, namely-

• **Overlay**
    Can be used for:
        • Highlights and tones
        • Annotations and corrections
        • Sketching

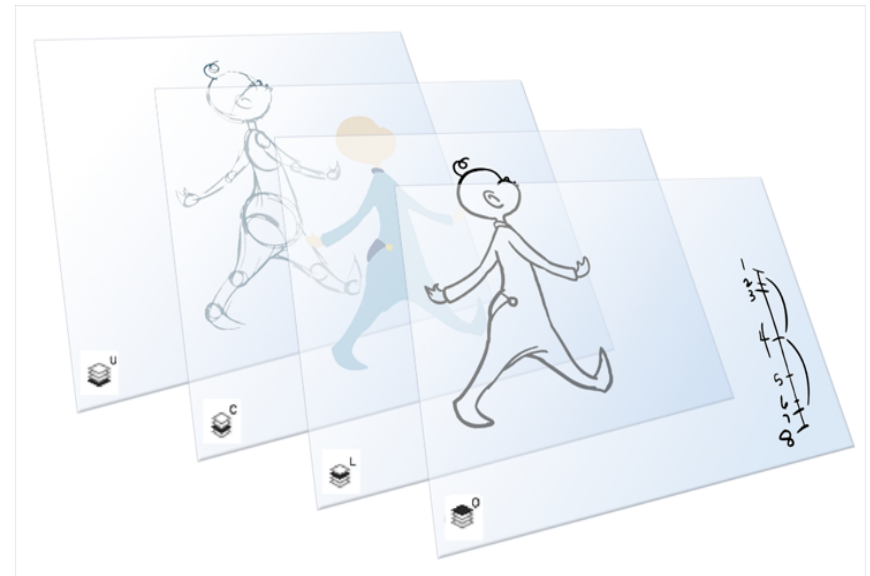• **Line Art Layer** - The layer to perform the line drawings

Image 15: Different sub layers - image courtesy toonboom.com

• **Colour Art Layer** - This layer should contain the colour information of the drawing.

• **Underlay**
Mainly used to sketch rough animations

Overlay and Underlay art layers are within the same layer, and can be used to add shadows and other accessories to the same layer. Clicking on each of these button displays the respective layers.

4.4: Adding Shadows:

Shadows are added to each drawing layer towards the end of the character creation phase.

Cutter Filter can be used for adding shadows. It can also be added by manually drawing the shadows on the OVERLAY layer of the character.

In the image here, Cutter is used to add shadows.
A drawing layer is made above the Head layer with a basic shadow layer, and the shape is cut depending on the boundaries of the head by using the Cutter filter.

While using Overlay layer, the shadow is directly drawn onto the layer so that it is automatically attached to the layer without the addition of any Peg or cutter.
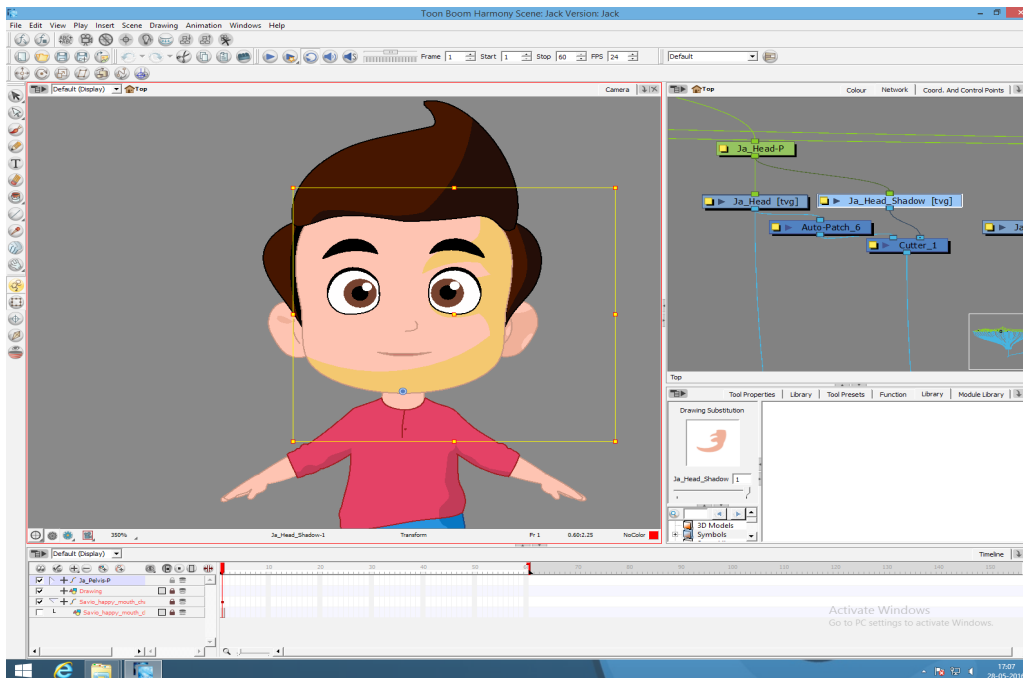

Image 16: Shadow added to the face layer.

4.5: **Animation:**

The animation in Toon Boom Harmony is generally done using the Pegs, which are attached to the various drawing layers. The key frames are set to the pegs at various time intervals to give motion to the drawing layers.

The Animate button is set in order to give auto key frames depending on the movement of the peg. The Transform tool when applied on the Peg gives a yellow bounding box over the drawing, which shows that it is ready to be animated.
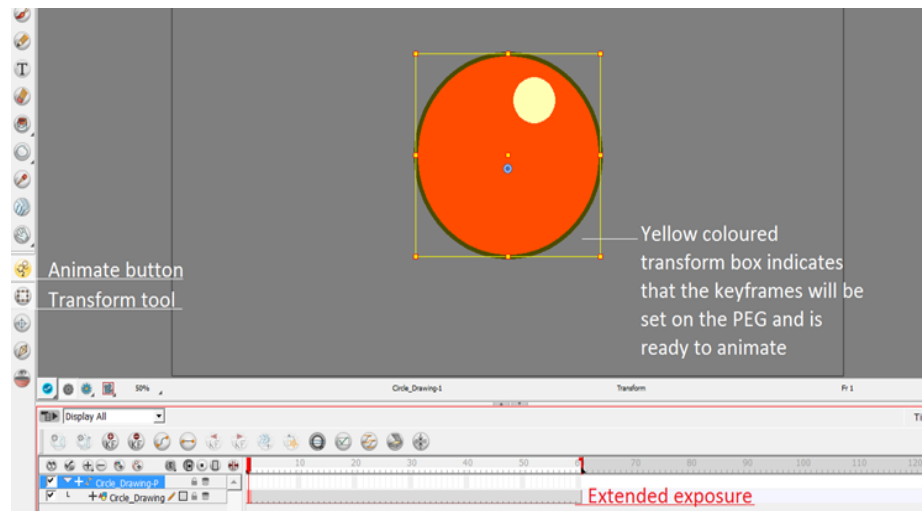

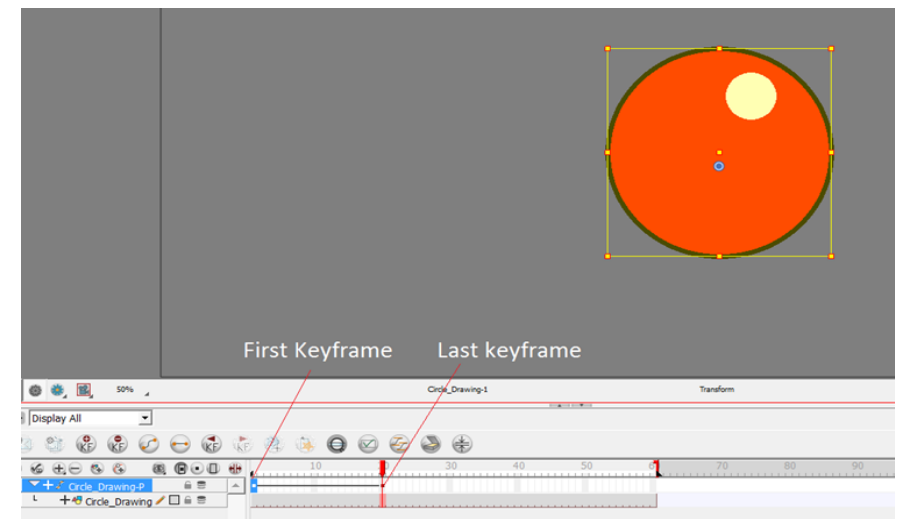Image 17: Basic animation buttons on Toon Boom Harmony.

Image 18: Movement given to the ball by changing the peg position within key frames.

5. Props

Towards the final week of the project, I was given the opportunity to work on certain props for an international project. Props are anything other than characters that are present in an animation.

For the said project, props included various objects varying from clothes to cars.

The props are created in the following manner:

- The storyboard image of the Prop is added to a layer as reference.
- A new drawing layer is added above it.
- The Prop is traced over with the exact line widths on the Line art layer.
- The colouring is given in the Colour Art layer.
- The parts of the prop are divided in such a way that the parts which is closer to the viewer is done in the Overlay layer and the parts behind is done in the Underlay layer.
- If the Prop has multiple movable parts, each of those parts are drawn onto different drawing layers and combined under a single peg or multiple pegs as necessary.
- In the end, the prop is used in the animation by removing the reference layer

6. Shots

Shots were the final tasks that I did as part of the internship. The shots that I worked on were for Modern Activity web series.

The task included addition of Shadows, cleaning up the shots, and ensuring that the animation was proper and fluid.

In this stage, several shots require multiple corrections and rectifications to ensure completely perfect animation. I also worked on animating several parts of the shots.

The final numbered shots are uploaded onto the server, where it is combined with the rest of the shots of the scene and is merged to create the final scene.

7. Animations Performed:

The following works were done as part of the software training to understand animation principles and human - object interactions.

a) Bouncing ball animations

b) Moving and Rotating links

c) Pendulum - Single and Double

c) Man picking up a glass of water

d) Man trying to lift a heavy stone

e) Human walk cycles

Conclusion

Characters and Props for ongoing web series Modern Activity have been constructed as part of the project. Rigging has been performed and small animated shots were rendered out.

The project enabled me to get hands on experience on the software Toon Boom Harmony, experiment and learn the various methods of character rigging and animation using the tool.

The internship tenure equipped me with the understanding of the animation studio's business processes, work divisions, time allocations for the projects and client interaction.

The various stages of the character development, background creation, storyboard setting and animation were touched upon during the course of four weeks.

References

ToonBoom Layers : http://docs.toonboom.com/help
Logo - www.hopmotion.com
Chhoti Anandi image: http://www.afaqs.com/
Modern Actiity image: www.animationxpress.com