Design Course
Exposure Sheet
Animation Techniques
by
Rohit Kelkar and Prof. Phani Tetali
IDC, IIT Bombay

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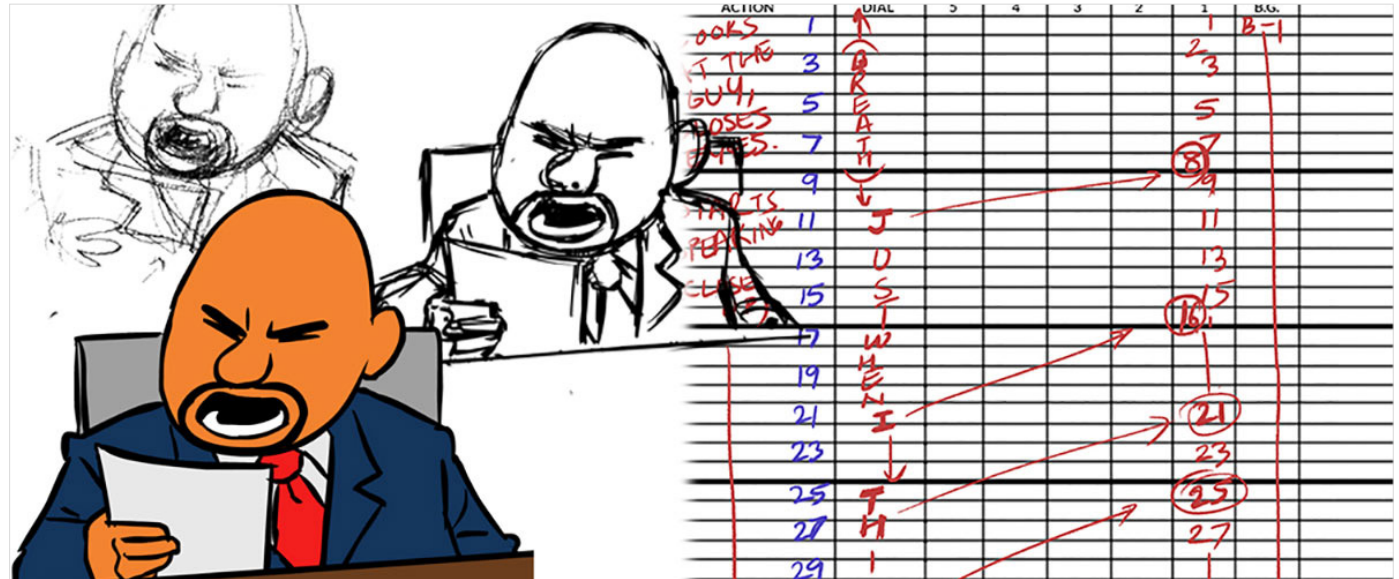
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Introduction

In the production process of any kind of animation (2D or 3D) the story is broken down into chunks called **sequence**. Each scene consists of smaller chunks called **scenes**.

There are multiple people working on a scene/sequence in a production pipeline, so it becomes necessary to have everyone follow a common set of instructions.

Exposure sheet/ X-sheet is a tool used in animation which contains instructions to be followed for a particular scene. It contains notes about the action, timing, camera movement and additional footnotes as required.
In old studio environment, x-sheet also served as an indispensable communication tool between the studio and the cameraman who'd shoot the final cels into film.
Since this helps the animator to create a map of the animation for others to follow, it is also popularly called a **Cheat Sheet** or **Dope Sheet**.

You can act out a scene physically before you start doing the thumbnails, you can scrub through the audio and time out exactly at which frame each vowel sound happens, and you can time out the actions the character makes according to the audio.
But once all of this is laid out on an x-sheet, it becomes much easier to manage all of this and keep all those things in perfect synchronization.

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basic-x-sheet-template

A Basic X-SHEET Template

A basic template of an x-sheet comprises of a table with several rows and columns. Each row represents one frame of animation. A classic x-sheet holds up to **4 seconds** of animation, i.e. **96 rows**.
*(Many classic x-sheets also have markings for **Footage**, i.e. 6 feet of the film reel, and 1 foot= 16 frames.)*

The sheet then has the following columns:

Action
This column holds the timing planned out for the scene, how long the scene should take; and also the action of the character, at what point would the character have a particular pose.
Some animators also annotate the key and breakdown poses within this column to make the action clearer.

Dial
The dial holds the breakdown of the pre-recorded dialogue (or the beats of the music in case of no dialogue) to know at which frame to hit a certain phoneme.

Cel Levels
There are generally five of those columns, each representing one layer of cel, meaning to say one x-sheet can hold up to 5 layers of animation, although these many are never usually required.

Background
This column has the background numbers and for how long to hold one and when to switch to another.

Camera
The commands for the camera are put down in this column. If you want the camera to pan, or zoom in or just shake, all of that goes in here.

Scene, Sequence and Sheet numbers
The respective numbers are to be mentioned here.

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PROD.	SEQ.	SCENE								SHEET
ACTION		DIAL	5	4	3	2	1	B.G.	CAMERA INSTRUCTIONS	

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Conventions

The movies and animations that we watch are generally shot 24 frames per second, i.e. **24 fps**.

If we draw **24 drawings** for one second, with each drawing held for 1 frame, the animation is said to be on **Ones**.
If we draw **12 drawings** for one second, with each drawing held for 2 frames, the animation is said to be on **Twos**.

While animating, you need a combination of both. It is best to animate on twos while reserving ones for very fast actions.

So while numbering your drawings on the x-sheet while animating on twos, always use odd numbers, subsequently skipping every next row; and when you want to smooth something out or need a very fast action, just add in the ones with even numbers.

If you want to hold a drawing for a specific number of frames, just indicate it with a straight line, and then get back to the next odd number respective to the frame number.

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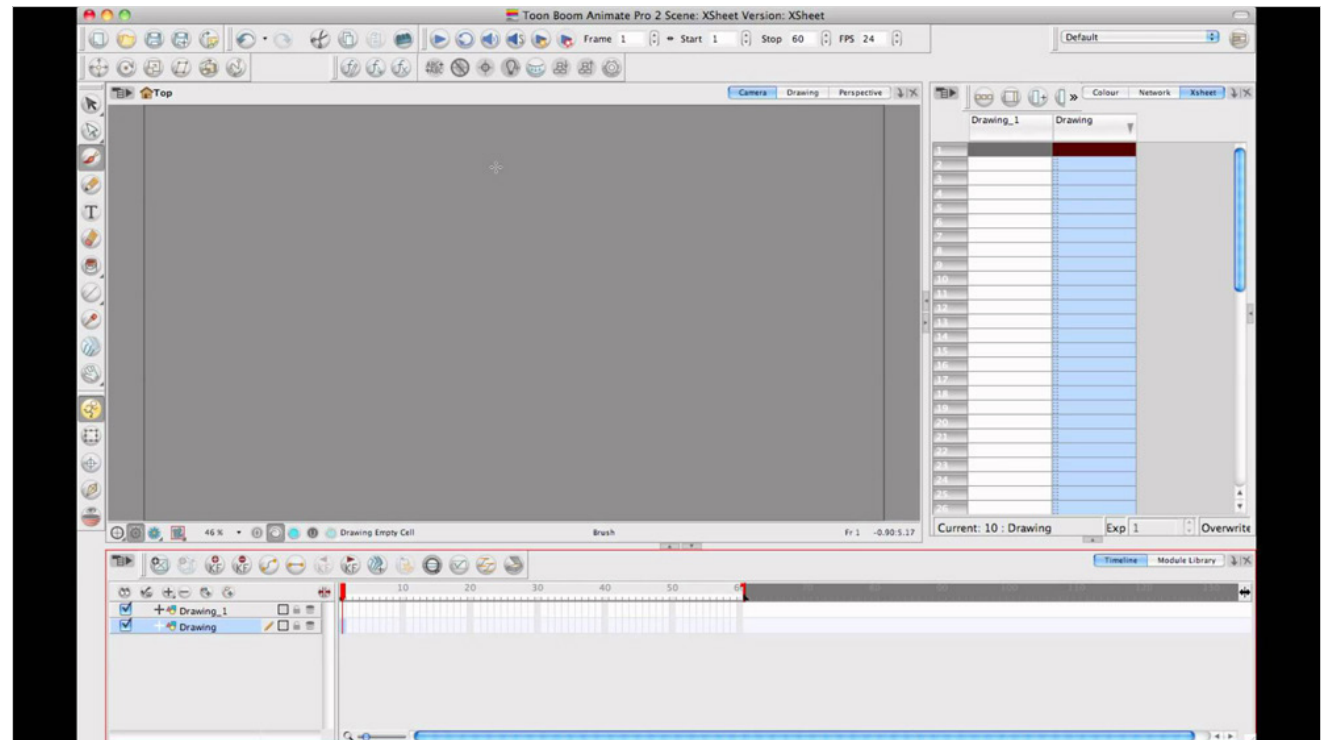Rohit Kelkar and Prof. Phani Tetali
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X-SHEET in Modern Animation Softwares

X-sheets and their usage have also evolved with the way animation is produced.

Modern day animation softwares *(like ToonBoom, Adobe Flash, Autodesk Maya)* have a tool called **Timeline**, which in many ways is similar to the x-sheet, but more interactive. You can move your key frames around and adjust your timing easily, and you can also have your recorded audio for animation on another layer and move frame by frame on it.

Although a handful of them still have the classic x-sheet built into them along with the timeline *(like ToonBoom and Autodesk Maya)*, as it provides a clearer and simpler overview.
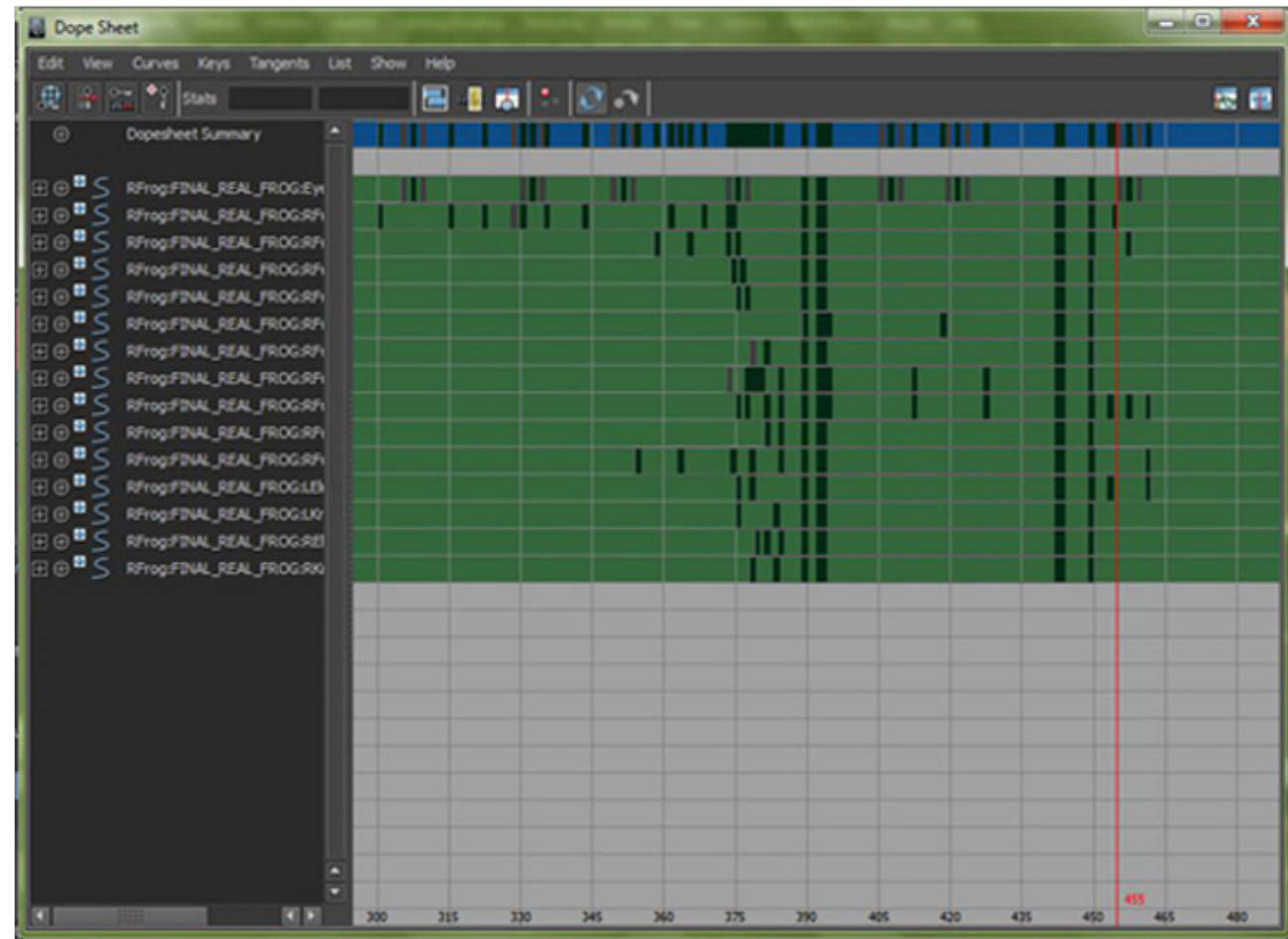
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Nonetheless, be it 2D animation or 3D animation, it is always better to have your animation planned out on paper first, with all the key poses and the timing and spacing worked out. Hence, having a physical x-sheet always comes in handy.

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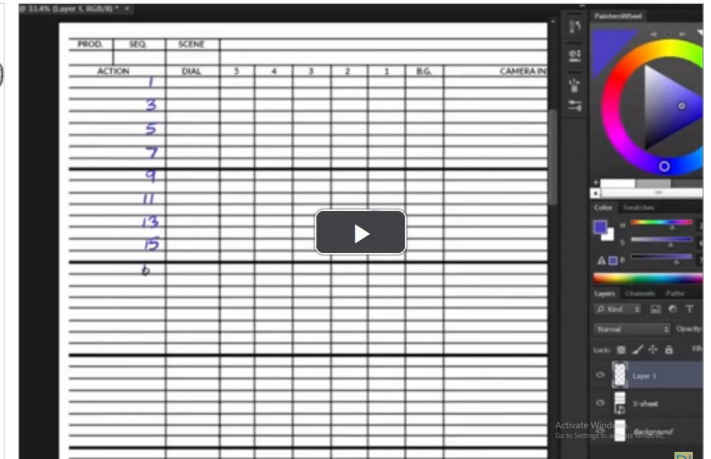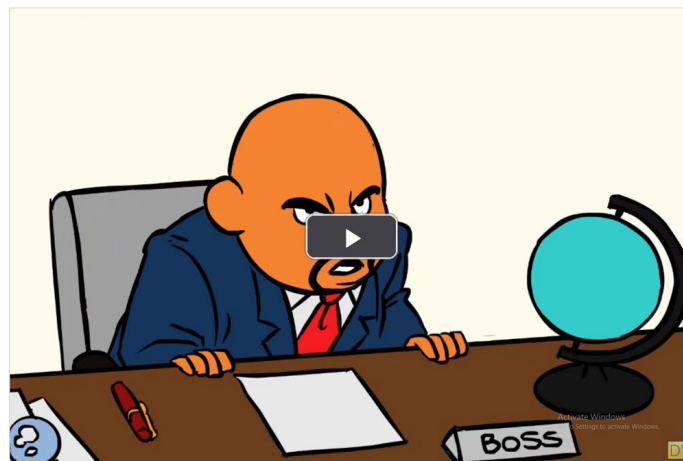Rohit Kelkar and Prof. Phani Tetali
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Video

Exposure Sheet

Exposure Sheet - Filling X-sheet

Exposure Sheet - Animation

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Design Tools

Animation Design:

Animation is a method of photographing successive drawings, models or even puppets to create an illusion of movement in a sequence. Animation Tool is developed by IDC, IIT Bombay. It is an interactive web space where students can learn about the basics of animation. There are four main types of animation that are commonly used: 2D Traditional Animation, 2D Computer Animation, Stop Motion Animation, and 3D Computer Animation. There's also something called Experimental animation, where you can mix different types of animation together. The Animation Tool teaches things like Straight Ahead, Pose to Pose, Stretch and Squash, and Slow in Slow out, which are all important for making animations look good.

For more information visit: https://dsource.in/tool/animation_tool/

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contact-details**

Contact Details

This documentation was done by Rohit Kelkar at IDC, IIT Bombay.

You can get in touch with Rohit Kelkar at rkelkar492[at]gmail.com

You can write to the following address regarding suggestions and clarifications:

Helpdesk Details:
Co-ordinator
Project e-kalpa
Industrial Design Centre
IIT Bombay
Powai
Mumbai 4000 076
India

Phone: 091-22-2159 6805/ 091-22-2576 7802
Email: dsource.in[at]gmail.com