2D ANIMATION
Production / Post-Production (Practical)

Diploma in
Multimedia and Animation (DMA)

DMA-03
BLOCK-5
2D Animation

Block – V: Production / Post-Production (Practical)
2D Animation

This course has been developed with the support of the Commonwealth of Learning (COL). COL is an intergovernmental organisation created by Commonwealth Heads of Government to promote the development and sharing of open learning and distance education knowledge, resources and technologies.

Odisha State Open University, Sambalpur (OSOU) is the first Open and Distance learning institution in the State of Odisha, where students can pursue their studies through Open and Distance Learning (ODL) methodologies. Degrees, Diplomas, or Certificates awarded by OSOU are treated as equivalent to the degrees, diplomas, or certificates awarded by other national universities in India by the University Grants Commission.

© 2018 by the Commonwealth of Learning and Odisha State Open University. Except where otherwise noted, 2D Animation is made available under Creative Commons Attribution-ShareAlike 4.0 International (CC BY-SA 4.0) License: https://creativecommons.org/licenses/by-sa/4.0/legalcode

For the avoidance of doubt, by applying this license the Commonwealth of Learning does not waive any privileges or immunities from claims that it may be entitled to assert, nor does the Commonwealth of Learning submit itself to the jurisdiction, courts, legal processes or laws of any jurisdiction. The ideas and opinions expressed in this publication are those of the author/s; they are not necessarily those of Commonwealth of Learning and do not commit the organisation

Odisha State Open University
G.M. University Campus
Sambalpur
Odisha
India
Fax: +91-0663-252 17 00
E-mail: info@osou.ac.in
Website: www.osou.ac.in

Commonwealth of Learning
4710 Kingsway, Suite 2500,
Burnaby, V5H 4M2, British Columbia
Canada
Fax: +1 604 775 8210
Email: info@col.org
Website: www.col.org
Acknowledgements

The Odisha State Open University and COL, Canada wishes to thank those Resource Persons below for their contribution to this DMA-03:

**Concept / Advisor**

Dr. Srikant Mohapatra  
Vice-Chancellor  
Odisha State Open University, Sambalpur

**Course Writer**

Bhagabat Kar  
Animation Director, News 7, Bhubaneswar

**Course Editor**

Sanjay Sahu  
Prateek Das  
Centre Head, Om Animations and Graphics Institute, Cuttack  
Olive Ashish Munda  
Teaches 3D Animation, Om Animations and Graphics Institute, Cuttack

**Video Production**

R. Mohana Sundaram  
Creative Director  
Jai Ram Institute of Visual Academy, Khurda, Odisha  
Guest Faculty, National Institute of Fashion Technology (NIFT), Bhubaneswar  
Biranchi Prasad Sahoo  
Freelance Graphic Designer  
Prateek Das, Centre Head, Om Animations and Graphics Institute, Cuttack  
Olive Ashish Munda,  
Teaches 3D Animation, Om Animations and Graphics Institute, Cuttack

**Published by**:

Dr. Jayanta Kar Sharma  
Registrar on behalf of Odisha State Open University, Sambalpur

**Contribution of following staff members of Odisha State Open University is acknowledged:**

- Jyoti Prakash Mohapatra  
- Sambit Mishra  
- Debidatta Behera  
- Prashansa Das  
- Radhakanta Suna  
- Abhinandan Tripathy

OSOU and COL acknowledge the support extended by **Prof. Madhu Parhar**, STRIDE, IGNOU, New Delhi in conducting several workshops in the process of preparation of course material for DMA.
## Contents

### Course Overview

- Welcome to Production / Post Production .............................................................. 5
- Painting & Animation ......................................................................................... 5
- Understanding Background Composition .......................................................... 5
- 2D Animation Technique .................................................................................. 6
- 2D Animation for portfolio Making ................................................................... 6
- Course outcomes ............................................................................................... 7
- Timeframe ........................................................................................................ 7
- Study skills ........................................................................................................ 7
- Need help? ......................................................................................................... 8
- Assignments ...................................................................................................... 8
- Assessments ..................................................................................................... 9
- Video Resources ............................................................................................... 9

### Getting around this course material

- Margin icons .................................................................................................... 10

### Unit-1

- Painting & Animating Practical ........................................................................ 11
  - Introduction ..................................................................................................... 11
  - Outcomes ....................................................................................................... 11
  - Terminology .................................................................................................... 12
  - Ink and Paint .................................................................................................. 13
  - Choose the Right Software .......................................................................... 14
  - Technique for Scanning Inked Drawings ....................................................... 15
  - Scanning Via GIMP ...................................................................................... 15
  - Edit Scanned Image ...................................................................................... 18
  - Scale Image ................................................................................................... 19
  - Preparing the Image ....................................................................................... 21
  - Path Tracing .................................................................................................. 21
  - Using Path ....................................................................................................... 23
  - Tracing the Image ........................................................................................... 26
  - Numbering ...................................................................................................... 27
  - Paint ................................................................................................................ 27
  - Paint Using GIMP ......................................................................................... 28
  - Summary .......................................................................................................... 32
  - Assessments ................................................................................................... 32
  - Resources ........................................................................................................ 32
### Unit 2

**Understanding Background Composition**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>33</td>
</tr>
<tr>
<td>Outcomes</td>
<td>33</td>
</tr>
<tr>
<td>Terminology</td>
<td>33</td>
</tr>
<tr>
<td>Drawing Concept</td>
<td>35</td>
</tr>
<tr>
<td>Understanding Background Composition</td>
<td>35</td>
</tr>
<tr>
<td>Hardware</td>
<td>35</td>
</tr>
<tr>
<td>Software</td>
<td>35</td>
</tr>
<tr>
<td>Creating the Margin</td>
<td>35</td>
</tr>
<tr>
<td>How to plan a background?</td>
<td>39</td>
</tr>
<tr>
<td>How to create and design a background with multiple layers</td>
<td>45</td>
</tr>
<tr>
<td>Unit Summary</td>
<td>49</td>
</tr>
<tr>
<td>Assessment</td>
<td>49</td>
</tr>
<tr>
<td>Resources</td>
<td>49</td>
</tr>
</tbody>
</table>

### Unit 3

**2D Animation Techniques**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>50</td>
</tr>
<tr>
<td>Outcomes</td>
<td>50</td>
</tr>
<tr>
<td>Terminology</td>
<td>50</td>
</tr>
<tr>
<td>Hardware</td>
<td>51</td>
</tr>
<tr>
<td>Software</td>
<td>52</td>
</tr>
<tr>
<td>Pencil 2D animation</td>
<td>52</td>
</tr>
<tr>
<td>Colour</td>
<td>53</td>
</tr>
<tr>
<td>Layers</td>
<td>54</td>
</tr>
<tr>
<td>Camera Layer</td>
<td>56</td>
</tr>
<tr>
<td>Add and delete Layers</td>
<td>56</td>
</tr>
<tr>
<td>Rename Layer</td>
<td>57</td>
</tr>
<tr>
<td>Resize Image</td>
<td>57</td>
</tr>
<tr>
<td>Import in Pencil</td>
<td>58</td>
</tr>
<tr>
<td>Animating</td>
<td>59</td>
</tr>
<tr>
<td>Unit Summary</td>
<td>61</td>
</tr>
<tr>
<td>Assessment</td>
<td>61</td>
</tr>
<tr>
<td>Resources</td>
<td>61</td>
</tr>
</tbody>
</table>

### Unit 4

**2D Animation for portfolio**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>62</td>
</tr>
<tr>
<td>Outcomes</td>
<td>62</td>
</tr>
<tr>
<td>Terminology</td>
<td>63</td>
</tr>
<tr>
<td>2D Animation Portfolio Making</td>
<td>63</td>
</tr>
<tr>
<td>Portfolio Making Rules</td>
<td>63</td>
</tr>
<tr>
<td>How to make Animated Short Film</td>
<td>65</td>
</tr>
<tr>
<td>Step 1: Select script</td>
<td>66</td>
</tr>
<tr>
<td>Step 2: Create the Character</td>
<td>66</td>
</tr>
</tbody>
</table>
Step 3: Creating Storyboard ................................................................. 67
Step 4: Creating Animatics ................................................................. 68
Step 5: Creating Background Layout .................................................. 69
Step 6: Creating Exposure Sheets ....................................................... 70
Step 7: Creating Rough Animation .................................................... 70
Step 8: Clean-up ................................................................................. 71
Step 9: Making In-between ................................................................. 72
Step 10: Backgroundsync and Paint ..................................................... 73
Step 11: Characters Ink and Paint ....................................................... 74
Step 12: Compositing ......................................................................... 75
Ideas for exercises ............................................................................. 76
Unit summary ..................................................................................... 77
Assignment ........................................................................................ 77
Resources .......................................................................................... 77
Course Overview

Welcome to Production / Post Production

In this block, you are going to study about the basic techniques of 2D animation practical. Before setting your hands into the practical, you have to learn about the theoretical aspects of 2D animation. There are some common ingredients of a successful 2D design. Painting, animating, making background, lighting, character animating, portfolio making are discussed in this block.

Painting & Animation

Paint is an introductory exploration of computer graphics as a technology and a creative medium. Through the use of the industry-standard software, Adobe Photoshop, students learn the fundamentals of working with raster editing software for digital graphics creation and image manipulation.

Understanding Background Composition

Design for animation pertains to many areas of 2D, from the location design, to the props and to the look of the characters. It involves understanding the principles and elements of design and how it applies to the often stylized and caricatured look of 2D animation.
2D Animation Technique

Traditional character animation through the introduction of a 2D digital software package. Students will understand the basics of how to draw, animate, import sound, composite and export in this digital software.

2D Animation for portfolio Making

Portfolios are also one of the most important tools for initially getting a job or contract. This module provides the knowledge and tools required to prepare a high-quality academic and professional portfolio.

This video will provide a brief overview of this course.

<table>
<thead>
<tr>
<th>Topic</th>
<th>YouTube link</th>
<th>QR Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video 1 – project preparation for Broadcasting</td>
<td><a href="https://youtu.be/J0YVuo5VsYA">https://youtu.be/J0YVuo5VsYA</a></td>
<td><img src="Qr_code" alt="QR Code" /></td>
</tr>
<tr>
<td>Video 2 – 2DGlobe animation</td>
<td><a href="https://youtu.be/V03iKGXQjnE">https://youtu.be/V03iKGXQjnE</a></td>
<td><img src="Qr_code" alt="QR Code" /></td>
</tr>
<tr>
<td>Video 2 – Show reel preparation</td>
<td><a href="https://youtu.be/BlFMd2scrz0">https://youtu.be/BlFMd2scrz0</a></td>
<td><img src="Qr_code" alt="QR Code" /></td>
</tr>
</tbody>
</table>
Course outcomes

Upon completion of preproduction you will be able to:

- Understand the stages of 2D animation
- List the techniques of scanning inked drawings
- Understand the basics of background composition in animation
- Plan the background
- Apply the 2D animation techniques
- List the various techniques of 2D animation
- Understand portfolio
- Know the steps and rules to make a portfolio

Timeframe

This course will be completed within “4” classes.
This course is of “1” credit.
8 hours of study time is required for this unit.

Study skills

This is a combination of theory and practical.
Hence, you should have access to a personal computer or personal laptop for better understanding of this unit.

Each and every option is explained step by step in the course material.

Apart from this course material, the learner needs to adopt the tendency of learning from multiple sources i.e.;

- Internet tutorials
- Video tutorials on YouTube
Collaboration with people working in the industry etc.

Only classroom study will not make you a professional. You have to be active to grab the opportunity of learning wherever you get a chance.

Need help?

In case you need any help, you can browse the internet sites such as youtube.com for video tutorials about the subject.

Assignments

There will be some assignments at the end of each unit.

These assignments are mostly practical based and should be submitted in CDs or DVDs. Theoretical assignments are to be submitted written on A4-size sheets.

All assignments will be submitted to respective study centres of the Odisha State Open University or as directed by the co-ordinator.

All assignments should be unit wise on separate CD/DVDs clearly mentioning course title and unit on the top. Theoretical assignment will be neatly filed or spiral bind with cover mentioning necessary information of course, student detain on top.
Assessments

There will be “1” assessment for each unit.

All practical assessments will be submitted to the OSOU.

Assessment will take place once at the end of each unit.

Learner will be allowed to complete the assessment within stipulated time frame given by the university.

Video Resources

This study material comes with additional online resources in the form of videos. As videos puts in human element to e-learning at the same time demonstrating the concepts visually also improves the overall learning experience.

You can download any QR code reader from Google Play to view the videos embedded in the course or type the URL on a web browser.
Getting around this course material

Margin icons

While working through this course material, you will notice the frequent use of margin icons. These icons serve to “signpost” a particular piece of text, a new task or change in activity; they have been included to help you find your way around this course material.

A complete icon set is shown below. We suggest that you familiarize yourself with the icons and their meaning before starting your study.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Activity</th>
<th>Assessment</th>
<th>Assignment</th>
<th>Case study</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="activity_icon.png" alt="Activity Icon" /></td>
<td>Activity</td>
<td>Assessment</td>
<td>Assignment</td>
<td>Case study</td>
</tr>
<tr>
<td><img src="assessment_icon.png" alt="Assessment Icon" /></td>
<td>Assessment</td>
<td>Assessment</td>
<td>Assessment</td>
<td>Case study</td>
</tr>
<tr>
<td><img src="assignment_icon.png" alt="Assignment Icon" /></td>
<td>Assignment</td>
<td>Assignment</td>
<td>Assignment</td>
<td>Case study</td>
</tr>
<tr>
<td><img src="casestudy_icon.png" alt="Case study Icon" /></td>
<td>Case study</td>
<td>Case study</td>
<td>Case study</td>
<td>Case study</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Icon</th>
<th>Discussion</th>
<th>Group activity</th>
<th>Help</th>
<th>Note it!</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="discussion_icon.png" alt="Discussion Icon" /></td>
<td>Discussion</td>
<td>Group activity</td>
<td>Help</td>
<td>Note it!</td>
</tr>
<tr>
<td><img src="groupactivity_icon.png" alt="Group activity Icon" /></td>
<td>Discussion</td>
<td>Group activity</td>
<td>Help</td>
<td>Note it!</td>
</tr>
<tr>
<td><img src="help_icon.png" alt="Help Icon" /></td>
<td>Help</td>
<td>Help</td>
<td>Note it!</td>
<td>Note it!</td>
</tr>
<tr>
<td><img src="noteit_icon.png" alt="Note it! Icon" /></td>
<td>Help</td>
<td>Help</td>
<td>Note it!</td>
<td>Note it!</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Icon</th>
<th>Outcomes</th>
<th>Reading</th>
<th>Reflection</th>
<th>Study skills</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="outcomes_icon.png" alt="Outcomes Icon" /></td>
<td>Outcomes</td>
<td>Reading</td>
<td>Reflection</td>
<td>Study skills</td>
</tr>
<tr>
<td><img src="reading_icon.png" alt="Reading Icon" /></td>
<td>Reading</td>
<td>Reading</td>
<td>Reflection</td>
<td>Study skills</td>
</tr>
<tr>
<td><img src="reflection_icon.png" alt="Reflection Icon" /></td>
<td>Reflection</td>
<td>Reflection</td>
<td>Reflection</td>
<td>Study skills</td>
</tr>
<tr>
<td><img src="study_skills_icon.png" alt="Study skills Icon" /></td>
<td>Study skills</td>
<td>Study skills</td>
<td>Study skills</td>
<td>Study skills</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Icon</th>
<th>Summary</th>
<th>Terminology</th>
<th>Time</th>
<th>Tip</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="summary_icon.png" alt="Summary Icon" /></td>
<td>Summary</td>
<td>Terminology</td>
<td>Time</td>
<td>Tip</td>
</tr>
<tr>
<td><img src="terminology_icon.png" alt="Terminology Icon" /></td>
<td>Summary</td>
<td>Terminology</td>
<td>Time</td>
<td>Tip</td>
</tr>
<tr>
<td><img src="time_icon.png" alt="Time Icon" /></td>
<td>Summary</td>
<td>Terminology</td>
<td>Time</td>
<td>Tip</td>
</tr>
<tr>
<td><img src="tip_icon.png" alt="Tip Icon" /></td>
<td>Summary</td>
<td>Terminology</td>
<td>Time</td>
<td>Tip</td>
</tr>
</tbody>
</table>
Unit-1

Painting & Animating Practical

Introduction

Before beginning 2D animation, you require pictures or artistic creations. Your drawn edges should be converted into an advanced digital format. Keeping the end goal in mind, you need to check the drawn frames. So before you check them, you will need to set them up for the scanner. Consider the line quality that is on the paper. If it's too light, the scanner won't lift it up, and you will need to settle those lines in the PC or totally redraw them later.

In this practical unit, you will learn the basics of animation techniques, implementation of traditional 2D techniques in digital animation, understanding the techniques of scanning the drawings. You will be introduced to ink paint of drawings, the techniques of tracking and tracing the paths, various paint techniques involved in animation production and painting them in 2D painting tools. Thus, you can apply the principles to create the animated character.

Outcomes

Upon completion of this unit you will be able to:

- Understand the stages of 2D animation
- List the techniques of scanning inked drawings
- Use GIMP to scan and edit images
- Work with ink and paint in GIMP program
### Terminology

<table>
<thead>
<tr>
<th><strong>Terminology</strong></th>
<th><strong>Description</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Background:</strong></td>
<td>It is the area where the action takes place. There are usually very few backgrounds in a film compared to Cels.</td>
</tr>
<tr>
<td><strong>Cel &amp; Cel setup:</strong></td>
<td>A picture is drawn on a unique place of plastic. This plastic is called as Cel. At least one Cel overlays on a base which is known as Cel setup.</td>
</tr>
<tr>
<td><strong>Depth of Field:</strong></td>
<td>Depth of field deals with the range of depths over which objects in a frame are in focus. It forces the eye to focus on the next focal place. Depth of field is very important in computer animation.</td>
</tr>
<tr>
<td><strong>Maquette:</strong></td>
<td>It is a statue based on the model sheet.</td>
</tr>
<tr>
<td><strong>Model Sheet:</strong></td>
<td>It is the drawing of a single character in a variety of attitudes and expressions, created as a reference guide for animators.</td>
</tr>
<tr>
<td><strong>Motion Blur:</strong></td>
<td>Motion blur helps in bringing the frames together &amp; eliminating the jittery images that can come from animation.</td>
</tr>
<tr>
<td><strong>Rough Animation</strong></td>
<td>They are the original first sketches of a character in action. In computer animation, it’s done with wire frames.</td>
</tr>
<tr>
<td><strong>Rough Sketch:</strong></td>
<td>It is the animator’s drawings used in the process of creating the finished image to be transferred to Cel.</td>
</tr>
<tr>
<td><strong>Xerography:</strong></td>
<td>It was tested in sleeping beauty and then used for the first time as a feature in 101 Dalmatians.</td>
</tr>
<tr>
<td><strong>Computer Assisted</strong></td>
<td>Animation performed by hand, with the computer, creating the in between steps.</td>
</tr>
</tbody>
</table>

**Cel & Cel setup:**
- A picture is drawn on a unique place of plastic.
- This plastic is called as Cel. At least one Cel overlays on a base which is known as Cel setup.

**Depth of Field:**
- Depth of field deals with the range of depths over which objects in a frame are in focus. It forces the eye to focus on the next focal place.
- Depth of field is very important in computer animation.

**Model Sheet:**
- It is the drawing of a single character in a variety of attitudes and expressions, created as a reference guide for animators.

**Motion Blur:**
- Motion blur helps in bringing the frames together & eliminating the jittery images that can come from animation.

**Rough Animation Drawings:**
- They are the original first sketches of a character in action. In computer animation, it’s done with wire frames.

**Rough Sketch:**
- It is the animator’s drawings used in the process of creating the finished image to be transferred to Cel.

**Xerography:**
- It was tested in sleeping beauty and then used for the first time as a feature in 101 Dalmatians.

**Computer Assisted Animation:**
- Animation performed by hand, with the computer, creating the in between steps.
Background Layout:

Accurate drawing that depicts everything in a scene that has to appear in the background, prior to the animation or background art being created.

Ink and Paint

A long time back, our only alternative for painting animation drawings was to trace the image with ink on top of Cels. At that point, the colours were painted onto the Cel. The Cels were then stacked on racks to consume scarce space. As clear as the Cels seem to be, they must be stacked to six or seven levels because of a somewhat loss of light and shading with each layer.

Then the ongoing procedure called "Digital Ink and Paint" came. It is the similar process as traditional ink and paint until, after the animation drawings are finished. Instead of being transferred to Cels, the drawings are scanned on to computer or drawn directly on the digital program (for example, a Pen tablet), where they are coloured using a software program. With all the ink-and-paint programs now advanced features, we can paint a whole area in a click or use an advanced paintbrush to colour a character. We can change the line colour, improve the drawings, scale and adjust the animation layer, build a customized palette and also can export the output in various formats. In addition, all programs have the dope sheet for tracking record of our animation.

With computers, exchange of artwork between different departments, states and even nations has become easier.

As the cost of both inking and painting, new Cels for animation programs and the reuse of older Cels for new programs goes up, the cost for doing the same thing digitally goes down. The digital ink and paint process became the standard for animations. The computerized ink and paint animation drawings are created and organized in computer through bitmap or vector graphics. This is advanced digital procedure of traditional methods like morphing, onion skinning and roto-scoping.

There are some differences between the latest ink and paint programs. The main difference is in the interfaces of each
software, their user-friendliness, project management, camera and compositing functions and capabilities to keep the images as bitmap pictures or to vector formats. Vector Images have lower file sizes and can be scaled to any size without quality loss.

The various procedures inside ink and paint programming are broken into different module. In digital painting, camera or compositing modules may not be required, so some selected modules should be procured to keep the cost down. These modules we use on different computers.

To begin the ink and paint process, various parameters should be set for every scene. Each ink and paint program enables you to modify different parameters, some with limited options and others with a large number of options.

Digital ink-and-paint programs are the computerized adoption of complete 2D animation using:

- Scan
- Tracing
- Ink and Paint

Choose the Right Software

Picking the right software is a lot like picking the right car, but it depends upon your feel and preferences, you may prefer one below the rest. The following is a quick list of the best professional 2D animation software. You can use it to animate and produce your video. Take a look at these to determine the best fit for your skill level and budget.

- Professional grade software: Adobe Flash, Toon Boom

Let’s select the Open Source free software GIMP as it is user friendly for beginners. Now we start the techniques of Paint and Animate (Scanning, Tracing, Ink and Paint).
Technique for Scanning Inked Drawings

After all the hand drawings are finished, then it is scanned through the computer scanner. The large scanner with auto feeder is too expensive for a small production. These categories of scanners together with the right software can read the drawing sheet holes. So even if the drawing sheet was not properly aligned, the software automatically positions all the drawing sheets at the right location.

Before we scan a drawing sheet, we need the following tools:

- Good scanner
- Scanning software

Scanning Via GIMP

Considering your scanner has been set up and it's associated with your PC/network, the actual steps you use to scan a picture (or anything else) will rely upon your scanner. Ordinarily, it will be one of the following:

Begin "The GIMP" to start the scan

- Select "File" menu, select "Acquire" and afterward "TWAIN". In the event that you don't see these choices, you may need to choose "File > Scanner > Import". Here "TWAIN" is the scanner.
Select the scanner, you are using from the rundown. If you don't see your scanner here, it might be that the scanner driver is not installed.

GIMP has accessed the scanner software via TWAIN standard. The scanner software makes it quite simple from here on. You can click "preview" to check that your photograph is positioned effectively or not. You can also change the scan quality. Note that in case you're just going to utilize the picture on the HD Video, 300 dpi is fine. Having said this, by increasing the resolution, the more
detail you capture (and the bigger the image becomes). Higher resolution will often result in a much larger file size, so check the file size once you’ve scanned it.

Screen shot

- After clicking the "Scan Now" button, the scanner starts making noises and after a few seconds, the image pops up on my screen. Note that this image has been transferred to my graphics software (The GIMP).
So, now that the photo has been scanned, you can save it just as you would any other file (i.e. via the "File > Save As..." menu). Once you've saved it you don't need to do anything more. Having said this, you can make changes to the image as you wish. For example, you might want to resize it, use a filter such as "sharpen", "despeckle" etc.

Presently the photograph has been scanned, you can save it similarly as you would some other file (i.e. By means of the "File > Save As..." menu). Once you've saved it you don't have to do much else. Having said this, you can roll out improvements to the picture as you wish. For instance, you might need to resize it, utilize a channel, for example, "sharpen" and so forth. When it's done, stop your scanning application.

If you are utilizing your photographs on the web, you'll have to ensure you save it in the right format.

**Edit Scanned Image**

If the scanning application hasn't opened up picture automatically, you have to open the scanned image manually. If you zoom in, you'll see it looks extremely crude and pixelated. It'll disappear in the subsequent steps. However, before we do that, we should
remove the white paper background and any mistakes. Rotate image if necessary, select the Eraser Tool (press SHIFT + E on your keyboard) and remove any lines or those things you don't need. You don't have to go into the small details at this time, so just give it a quick correction; once over and you may save the image.

Now, since we scanned in Line Art/Bitmap, we need to switch the mode to Grayscale, to do that just select Mode->Grayscale in the Image menu. A dialog box will come up, but just leave the setting at 1 and click OK.

Next, open your Layers palette; press Ctrl+L on your keyboard if it's not already visible. You'll see the layer's name has a little padlock next to it, so click twice on the layer's name and click OK, without disturbing the other settings.

Choose ByColour in the Select menu. Set the Fuzziness to 0, click once in the white "paper" part of the image and press OK.

You'll see that all the white parts of your image have been selected. Now hit Backspace or Delete on your keyboard, it'll be removed and replaced by a checker grid, indicating that it's now transparent.

It is recommended to create a new white layer behind your drawing so you can see it better.

Scale Image
Screen shot

In the Image menu, choose Scale image, set the Resolution to half of what it is currently and press OK.

Screen shot

Here's the rundown for the GIMP user.

- Scan your artwork in Line Art at twice your planned determination
- Remove any evident mix-ups
- In Grayscale Mode, open your layer
- Use Select-> By Colour to choose the white foundation, at that point to evacuate it
- Go to Image Size and set the resolution to half of what it was before
- Complete
Note: If you often scan a lot of drawings in high resolutions it is recommended that you save them in the bitmap mode for later use and do the following steps when you need to. In the long run, it becomes a huge difference in file size. Even though you might be able to get the same results by scanning in grayscale, adjusting the levels and removing any irregularities, this method will save you a lot of time.

Preparing the Image

- File>Open>Select image to manipulate
- If necessary, Image>Transform>Rotate by necessary degrees
- Using Rectangle Select Tool, select area of image* to be traced
- Copy area to clipboard (Ctrl + C)
- File>New>Choose US Letter
- Paste an image (Ctrl + V) to New Untitled Image
- Layer>Scale layer

Path Tracing

Launch GIMP and open an image that contains an object you'd like to trace.
Press "Ctrl-B" to view the Toolbox window if it's not visible, and click the window's "Paths" tool to select it. The Paths tool looks like a blue pen with a yellow tip that sits to the right of a white bar. That bar contains three boxes stacked vertically. A white curve extends from the top of that bar to the brush's tip. GIMP displays the tool's name when you move your mouse cursor over the correct icon.

Click a point along the edge of the object you wish to trace. For instance, in the event that you need to trace a building, click a point along the building's edge. When you do that, GIMP puts a little dot by then. Move your cursor a short distance along the
edge and click a new point. GIMP puts a dot at that location and draws a short line segment between that dot and the past one.

Keep moving your cursor short distances along the object’s edge and clicking points to draw short line segment. Eventually, you will draw a path around whole object. When you reach the starting point (the location where you made the first dot), double click the dot to finish the path. This path will comprise all the small line segments you made by putting dots along the path.

**Using Path**

Click "Windows," select "Dockable Dialogs" and click "Paths" to open the Paths dialog window. This window has an icon that represents the path you traced. By default, its name is "Unnamed." If you had multiple paths, you would see them in this window.
Review the buttons at the bottom of the window. Click the "Path to Selection" button if you'd like to convert the path into a selection.

Find the window's "Paint along the Path" button. This button enables you to generate a line around your object automatically using the path you traced.

Click the “Paint along the Path” button, and type a value in the "Line Width" text box. That value determines the line's width in pixels. To draw a line around the object, click "Stroke". The line's color matches the project's current foreground color. The line's shading matches the venture's present foreground shading.
After you make a selection from a path or draw a line around an object, you can delete the path by choosing it in the Paths dialogue window and clicking "Delete." You would then be able to upgrade the selection any way you like better.

When you trace a path around an object, you can click and drag any dot along that path to modify the line segment at that location. You'll most likely need to do this since it's hard to trace around an object perfectly. For example, in the event that you see that one line segment has a space between it and the object's edge, you can click and drag the two circles at either end of the segment and move them to bring the segment closer to the object's edge. Your goal when tracing is to make your outline fit flush against an object's edge.

If you want to trace a small object, do that more precisely by clicking the drop-down box at the bottom of the image window and selecting a zoom percentage. Select "400%," for instance, and GIMP makes the image four times larger.
Tracing the Image

- Create New Layer
  Layer fill type Transparency (default). Naming the Layer "trace" is helpful. Be sure the new layer "trace" is highlighted
- Select Pencil Tool
- Choose brush size based on thickness of lines you prefer
- Begin "tracing" the important lines of the image

**TIPS:** Be sure to save your work occasionally.

Use Zoom Tool for more accuracy
Numbering

- Once an entire image is traced to preference, Remove visibility from pasted layer.
- This is done by deselecting the "eye."

**NOTE:** Only the tracing should remain. This should resemble a line drawing.

- Select the Text Tool.

Set font & size. Try Smaller, may be necessary depending on the detail of the trace.

- Click on an area of the trace to be numbered. Enter # for each area.

**TIP:** 1-5 colour regions works best. If using a colour photo, try Posterizing it before tracing as follows.

- Colours>Posterize. Try 3-10 levels.

Paint

**Scan the pencil Drawing**

First step is the scanner acquisition with Xsane of drawing (HB pencil on A4 paper). Scan it with Gray level at 300dpi. To get an excellent outcome, first clean the Background white.
Paint Using GIMP

This project uses GIMP to make Paint by Number of a particular picture, be it low resolution GIF of some object or high resolution photograph.

Paint and Ink

Start to change to convert the pencil artwork in a light blue range of colours; use the tool colorize (Color>Colorize).

Screenshot

The colorize tool in action
With the Pen tool of Gimp-painter, start to ink the drawing, on a different layer. The screenshot above demonstrates the setting with Pen tool.

Toward the end, include a white layer under the line-art to complete the inking. When it's complete, save the work, and save in another file a duplicate of the last Line-art layer; it will be required later.

**Multi-Fill**

This is an important section of this instructional exercise. Include another layer under the line art, and start with a thinner pen in darker to draw the limit of each different color zone I want. I flatten the layer when it's finish.
Setting up the zone for the Cell-shading

Launch the script 'Multi-Fill' with the same setting as in the screenshot above and let the script detect each closed zone, and fill with arbitrary shading.
The flatting-tools script in action

When it’s done, delete the layer above with Line-art + red limits; and load (Load as new layer) old copy of final Line-art (the one without red lines).

Screenshot

The result of the flatting tools

As you see on the animation above; the benefit of this script is in the clean result of the colorization: each zone frontier is right in the middle of the thickness of your black lines.
Summary

This unit focuses on three central areas of 2D animation production – ‘Scanning’, ‘Tracing’ and ‘Ink & Paint’. You have learned the selection of proper software for scanning and painting. Besides, we also discussed the techniques of scanning inked drawings, editing of scanned images, tracing of image paths, painting your imagination using through GIMP.

Assessments

1. How you can resize the image in GIMP?
2. How do you select an exact colour to match?
3. Explain How to organize layers?
4. What is a lasso tool?
5. Explain the difference between Layer and group
6. Create a path in GIMP
7. Create a duplicate layer
8. Describe how to rename a layer
9. Explain pen tool’s job
10. For a perfect straight line in any direction, which tool we used?
11. Explain digital ink and paint

Resources

- Traditional animation book
- GIMP: 6.2. Paths
- http://www.quackit.com
- GIMP: 6.2. Paths
- Maximum PC: 10 Sweet GIMP Photo Editing Tricks
- GIMP: Main Windows - The Toolbox
- http://gimp-registry.fargonauten.de
- http://www.questionablecontent.net
- http://creativecommons.org
Unit 2

Understanding Background Composition

Introduction

In this unit you will know the practicalities of 2D animation background composition; explore the rationale behind various functions of layout and background composition principles with clear visual examples. This unit is designed chapter-by-chapter, to sequentially build fundamental on components of background composition with easy to follow step-by-step examples and diagrams. Beginners in the field will hopefully find the information contained here, a good starting point.

Outcomes

Upon completion of this unit you will be able to:

- Understand the basics of background composition in animation
- Plan the background
- Create a margin in GIMP
- Know how to create backgrounds in Pencil 2D
- Create and design a background with multiple layers

Terminology

Animation Layout: Exact drawing which designs the volume and situation of activity in a scene. There are normally two different kinds of layout in 2D animation such as BG Layout and the Animation Layout.

Atmospheric: Experimental color sketches describing the
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sketches</td>
<td>moods and setting for a scene</td>
</tr>
<tr>
<td>Background Layout</td>
<td>Accurate drawing describing everything in a scene that is to appear in the background, prior to the animation or background art being created.</td>
</tr>
<tr>
<td>Rough Outline</td>
<td>It is the artist's drawings used as a part of the way towards making the complete picture which is to be exchanged to cel.</td>
</tr>
<tr>
<td>Clean up</td>
<td>The act of standardizing the appearance of a drawing or image.</td>
</tr>
<tr>
<td>Exposure sheet</td>
<td>A printed diagram format which shows each frame, exact layers, actions and dialogue columns for different timing and breakdown. Also it is known as a Dope Sheet.</td>
</tr>
<tr>
<td>Flipbook</td>
<td>A simple process of movement made by drawing small figures at the edge of a book and watching them move as the pages are flipped.</td>
</tr>
<tr>
<td>Foreground</td>
<td>Finished artwork depicting all that does not move in an animation scene. Usually seen in front of the animated action in the form of an overlay level. Opposite of Backgrounds.</td>
</tr>
<tr>
<td>Hand Tracking</td>
<td>The process where the animation is traced, by brush or pen, onto the Cel by an Inker.</td>
</tr>
<tr>
<td>Image Map</td>
<td>A term used in game animation to indicate the background image.</td>
</tr>
<tr>
<td>Master Background</td>
<td>The animated equivalent of a live-action master shot. Establishes the setting, lighting and scale of a sequence but may not be an actual production background.</td>
</tr>
</tbody>
</table>
Drawing Concept

Understanding Background Composition

Now, we are going to learn the basic background composition rules, software and techniques used for animation.

Hardware

One of the primary things needed to create a background is a Pen tablet. With Pen tablet we can draw straight into the computer using a pen. Use of Pen Tablet makes animation easier as we don't need to draw it in the traditional way. In the traditional way, we have to draw into a paper and then scan it into the computer or take pictures. But that's quite a long process and we can't preview what we've drawn, whereas in the software and computer we can draw something and straight away look through the footage and check if it works or not. So a Pen Tablet is very beneficial in creating a background.

Software

The next thing required is software such as: Flash, Blender, Illustrator, Adobe Photoshop, Gimp, Toon Boom etc. Let's use “pencil” and “Gimp”, which are open source and have all the features of normal animation software. In ‘pencil’ you will able to make films for free. If you find yourself liking 2D animation you can go ahead and buy some better software. But to start with, some free software is perfectly fine.

Creating the Margin

Screenshot
First start the GIMP or any supported software, open a new project and select the image ratio of the canvas.

Then select the frame size as per requirement, and then click OK.
Start the creation of first margin, which is known as the outer margin. Now we got the new transparent layer and rename this layer as margin.

Then select the square selection and create the outer margin, and convert the square selection to path. After the path is selected, deselect the path and select the paint tool and choose the margin size. After resizing, go to create the margin through path tool, then repeat the above process for the inner margin.
Save the file and export the margin as the bitmap format. Now it is completed in Gimp, but it is not supported in pencil 2D.

So now open MSPaint program and open the margin sheet or import in paint.
After importing, save the file in bitmap format again.

In this process pencil 2D supports this bitmap margin.

**How to plan a background?**

Now we know about the background, it tips where to position the characters in the background and how to move the camera and edit different points and how to manage other details.
On the above figure, we have a simple sequence, a character that is coming towards camera from a background. Here it's an opening shot. Let’s start setting the scene. First, we create a new vector layer and then draw on the drawing area. Select the fat brush tool and plan the backgrounds eye leading area.

Let’s use the brush tool to mark. It's a lead-in shot, zoom in the frame. After we get the character's position area, now the mouse is kept on the character and that is where we're going to have our hero. This was planned in pre-production process. Now slide up to the background where character is not animated and it is going out of the dark.
Now, we may think about our lighting condition and put the framer on the background. It is then planned according to what's going to happen in the scene. The character is coming forward in the scene, therefore here we need to think about all that background space characters that are going to be in dark as the character reveals on close observation. Now we have to plan the shots exactly like that, which must be adding the mood.

Screenshot

**Note:** In order to give a sense of revealing to the character into the scene where character blends with the environment, dynamic camera techniques like first camera angle is set according to character's point of view. Now the camera zooms out and the character walks into the scene.

Screenshot

When we have a look at the background we can see that it's a long drawing.
Now focus of the camera moves on the background as we predetermined. The green line is the beginning point and red line is the end point. You can see that we have created a background which is looking as if it is at a distance far away from the scene. But you don’t really notice the bridge or anything else in the background because if we look at the background, although the whole background can be seen. But the focus is on the door, so when we see him walk in, we can see the scene in character’s point of view.
So here is a small directional style of shot where the shots have been divided. It is displaying different angles of shot like profile, close-up, mid close etc.

Here in the scene, as we can see the character and the statue is taken in close shot. Then the character turns his head to change the direction of view point of the shot. By such techniques, directors give the audience a feel of suspense inorder to understand the scenario before introducing the statue, through
his actions, look and the geography of the background. When we turn off the geography and review the background,

We could sense its absence in the background. The statue is facing towards the audience and the character is placed towards the left in the scene. Having the character in the shot, a little bit of editing is used to keep the background left of the character and the character to our left. If our face is towards the character from the background point of view his left would be to our right.
In the above figure by creating a small movement of the statue, it portrays as if it is threatening or frightening kind of disturbed feeling to the background atmosphere.

How to create and design a background with multiple layers

Now open the pencil program to start the background design. This is the pencil’s margin template. First of all, copy (Ctrl+C) the margin and paste (Ctrl+V). Now, add some key frames on animation layers. Goto layers and add another layer and rename it as Background Layer because now we are creating the background.
Now we have got the drawing area, we are now ready to draw and can paint the background. Let’s start a simple background having grass. In the beginning, the work area is zoomed for ease to work. Then go to the tools, select the sketch tool and draw a simple ground grass field layer.

Then select the BG colour layer and select the coloring tool. Go to the alpha layer and check all the settings of brush and colour tools. Select the required colour for background and start colouring. If our colour exceeds a little bit from the margins inner outline, it’s ok but don’t cross the outer margin. Note: When we paint, we don’t erase the margin outline. If we are erasing it, we will lose the frame alignment.

When we colour the background, we can use all the tools as per coloring requirement like coloring tool, zoom, sketch, fill and pick colour. Then erase the margins over colours and clean it through the erase tool.
Now, we can do some detailing on the background through the smuggled, erase and colouring tool. In colouring period, select the proper brush size from the tools layer for detailing the background.

Now we add some light colours on the ground for detailing the grass background layer.
Then add some sky blue colours of the sky.

Select the white colour from colour layer and add some cloud on the sky layer through the colouring tool. Use the alpha tool, smoothly erase some sky colour, and draw the layer which would look like the cloud on the sky.

Now it is the final background output and you can save and export it.
Unit Summary

In this unit, you have learned about 2D animation background composition tricks. We discussed about understanding and skills about different type of background composition by exploring relevant techniques and processes as well as creating a practical background composition. We also learned about the Pencil 2D and Gimp animation software and the production process to create an animation background.

Assessment

1. Explain the process of creating margin
2. Describe creation of background
3. Elaborate the process to design a background with multiple layers
4. Explain what is layout design
1. List the types of colour use in inking and colouring

Resources

Books for Reference

- The Animator's Survival Kit: Richard Williams
- Timing for Animation: Harold Whitaker and John Halas
- The Animator’s Guide to 2d Computer Animation: Hedley Griffin
- Character Animation-2d Skills for Better 3d: Steve Roberts
- How to Make Animated Films: Tony White
- Flash Cartoon Animation: Learn From the Pros
- The Art of Flash Animation: Creative Cartooning: Mark Stephen Smith

Web resources:

- http://pencil-animation.org
- http://www.awn.com
Unit 3

2D Animation Techniques

Introduction

2D animation figures are made and/or edited on the computer using 2D bitmap graphics or created and edited using 2D vector graphics. This includes automated computerized versions of traditional animation techniques such as interpolated morphing, onion skinning and interpolated rotoscoping.

2D animation has several applications, including computer animation, Flash animation and PowerPoint animation.

In this practical unit, you are going to learn how to create 2D animations. It will teach you how to get started, what equipment you're going to need and software required.

This unit will make you understand the pencil 2D animation tools and how to apply them to create a basic 2D animation.

Outcomes

Upon completion of this unit you will be able to:

- Apply the 2D Animation Techniques
- List various Techniques of 2D Animation
- Name the software’s used for 2D Animation
- Apply pencil animation tool

Terminology

**Bitmap image:** Computer graphic consisting of “pixels” on a grid. Each “pixel” contains color information for the image.

**Vector image:** An alternate option for bitmap image is vector image. It depends on mathematical equations defining the lines, shapes and points that structure the image.
## 2D Animation

| **Key:** | A placeholder on the Pencil timeline contains information about what the layer should show or produce at the frame where it is located. A key characterizes vital purposes of movement in animation. |
| **Onion skin views:** | A view alternative inorder to show the past as well as subsequent key frame as semi-transparent. |
| **Model Sheet:** | It is the drawing of a single character, in different poses created as reference for animators. |
| **Character Models:** | First a model sheet of any character is made by the animator. The model sheet contains the character in a variety of facial expression & poses, which will serve as the model for each time they are drawn. |
| **X-Sheet:** | It is also called an Introduction Sheet or a Dope Sheet. It is a worksheet that gives particular guidelines on how the animation should be captured. It is used to planning the timing and activity and incorporates details on field, camera and action. |
| **Rough Sketch:** | It is the animator’s drawings used in the process of creating the finished image to be transferred to Cel. |
| **Layout:** | The black & white rendering done by a layout person that determines the basic composition of the scene. |
| **Traditional animation:** | The black & white rendering done by a layout person that determines the basic composition of the scene. |
| **Computer Animation** | The animation is created digitally using computer techniques. |

## Hardware

One of the primary things is to create a 2D animation is a Pen tablet. With Pen tablet we can draw straight into the computer.
using a pen. Use of Pen Tablet makes animation easier as we don’t need to draw it in the traditional way of animation. In the traditional way, drawing was initially drawn in paper and then it was scanned into the computer or pictures are taken. But that took quite a long time and was a lengthy process. Also it didn’t have provision to check the preview of what has been drawn. Whereas in the software used in computer, we can draw something and straight away look through it to check if the footage works or not. So a pen tablet is very beneficial in creating a background.

Software

The next thing required is software such as: Flash, Blender, Illustrator, Adobe Photoshop, Gimp, Toon Boom etc. Let’s use “pencil” and “Gimp”, which are open source and all the features of normal animation software. In ‘pencil’ you will be able to make films for free. If you like 2D animation you can start with free software and latter work on higher professional software.

Pencil 2D animation

Pencil is free and open-source 2D animation software available for various operating systems. One can use it free by just downloading it from internet.

Let us discuss some basics of pencil through some figures:
You can see above figure on red circle area, it shows the tools of pencil.

1. Sketch
2. Colouring
3. Draw
4. Polyline
5. Erase
6. Clear
7. Fill
8. Pick Colour
9. Marque Selection
10. Move Object
11. Zoom
12. Modify Curve

Colour

In the above figure, you can see there are basic colours, main colours and different variations like Blue, Gray dark and skin colours. These will go a long way as far as animation colours are concerned. Let’s say you have an image or something you want to get that colour. Pick whichever colour you want and put it in colour pallet, so that you can use it on your pencil and save it anywhere.

When you save colors, it chooses any one of your color and keeps the label on it. Here you can add customized colors by using the drop in the ‘pick colour tool’ which is called a Dropper. After you
select pick colour tool, you can see the selection tool through it where selection can be done from up or down. While using the "move tool" sometimes it stops at few selections where the colors are not visible. It is one type of color adjuster.

Layers

When working in pencil, it's possible to create several different layer types. If you look at the timeline, you notice that the layers have different symbols and colored bars at the side to indicate layered type. For example, vector layers have a violet bar and colorful symbol on the left hand side. You can change the color of these layers by going to the program menu bar and select Edit > Preferences then from the Preferences panel, choose the Colored tab and select the colour you want to change. Also add or remove layers on timeline – Layers, click + / - (+add / - remove). There are 4 types of Layers in the Time Line:

1. Bitmap Layer
2. Vector Layer
3. Sound Layer
4. Camera layer

Bitmap Layer
Bitmap Layer is used for raster graphics. On the Bitmap Layer, we can work with different type of format like BMP, DIB, GIF, JPEG etc. It is important to note that, if bitmap image is condensed, the image look like blur and pixels.

**Vector Layer**
Vector layer is always used for vector graphics, because when we want to increase or decrease the vector files size it work without any quality changes.

**Sound Layer:**

Adding Sound layer, first go to menu bar> Edit> Import sound file from your stock of sound files. When sound is added, a black triangle will appear on sound layer indicating where the sound will play during start. You can move this triangle as any other keys on the time line.
Camera Layer

Camera layer puts limits on the height and width of video. Double click on the camera layer then choose the size. You could do 540 x 400 or whatever size you want. Set the height and width of your camera and go to file, then export the movie of that dimensions. Camera scan move the whole movie in one key frame if that makes any sense. For instance, if a new key frame is added in camera layer, you can use the drag tool to drag it a little bit and add another key frame. Drag it a little bit more, then add another key frame and again drag it a little bit more and then you will have a moving thing.

Add and delete Layers

If you need extra layers in timeline we can add or delete from the timeline. For adding a new layer, click + (plus) button next to
“Keys”, it will show four types of new layers from them select any one new layer which you require, then add it in your time line.

If you want to remove/delete any existing layer, select the particular layer from the timeline and click – (minus) buttons next to “Keys”. Then a warning dialogue box shows on screen. If you are sure to delete the selected layer, press OK. Then the layer is removed from the timeline.

**Rename Layer**

If you want to rename the layer, doubleclick on the name of the layer in the timeline. A window will pop up, allowing you to edit the layer’s name. Click OK when you have changed it to the name you want and the new name will appear in the timeline.

**Resize Image**
Through the Select Tool we can resize or move the image. Using the select tool, draw a rectangle in the region of the image. Use the arrow tool or move object tool for moving or resizing the image. To move an image select the image and click the mouse button on the image and drag, as per requirement. If you want to resize the photo, click on the select area corner point, press the mouse middle button and drag the select area.

**Import in Pencil**

![Screenshot]

You can import a raster image at a particular frame in a bitmap layer by using the Import image command in the File Menu under Import. Alternatively, you can drag and drop bitmap images from an external window onto the canvas. A key is created for each imported image. This is particularly useful when you have a lot of images. By default, the center of each image is set to the center of the view. If you want to import your images at a particular location, use the select tool and drag a rectangle on the canvas. The images will be imported in the rectangle. If the images are larger than the rectangle, they will be rescaled.
**Animating**

Key Frame is displayed as a rectangle at the time line. Grey colour specifies that the key frame is empty. Coloured frame indicate that here is an image in frame. Black colour indicates that frame is selected – you can move selected frame: click on a frame and drag it to the needed place. To shift more than one frame, hold down the Shift key.

**Onion Skin**

The traditional way of planning images for each key frame is to use the previous (or next) key image to guide the drawing of the current key image (essentially flipping through images when done by the paper method) by displaying the previous (or next) key image.
images in a semi-transparent state. This is called Onion Skinning. You can use the Onion skin buttons to activate or deactivate the previous and next onion skins.

**Export**

After the animation is made, the final output or film needs to be exported. For this go to the File Menu then select the export. As per the requirement, you can choose the formats such as X-Sheet, Image Sequence, QuickTime movie and Flash movie (swf). While exporting the final file, please remember to check the file size and the ratio. Adequate camera Layer must be created for exporting the final file.
Unit Summary

In this unit, you have learned about the process and technique of 2D animation. We also discussed about various tools and features of Pencil 2D animation software.

Assessment

1. Write down the tools appeared in tools bar of Pencil 2D
2. In Pencil 2D, there are four types of Layers in the Time Line
3. Vector layer is always used for vector graphics
4. Explain the basic techniques used in 2D animations
5. Explain Animation process
6. List the selection tools of animation
7. What is free transform tool
8. Explain what time line is
9. List the different types of image format

Resources

- [http://pencil-animation.org](http://pencil-animation.org)
- [http://google.com](http://google.com)
- [https://wikipedia.co](https://wikipedia.co)
Unit 4

2D Animation for portfolio

Introduction

A portfolio is a short video or film footage showcasing professionals or presenters previous work. For jobs in the fields like film, television, animation and games development. You will probably be asked to submit a portfolio as part of your application. Irrespective of whatever qualifications and academic degrees you have, the portfolio which is also known as Demo Reel, is an important factor in deciding whether a multimedia professional will get hired or not. It is a direct showcase for their work. Portfolios are of usually 2 to 3 minutes in length and showcase the artist's skill, talent, experience and past work.

In this practical unit, we will discuss about animation portfolio, hardware and software required for making a portfolio. We will also discuss techniques of 2D animation portfolio, various techniques involved in 2D animation and how to apply 2D animation tools to create a basic 2D animation portfolio for you.

Outcomes

Upon completion of this unit you will be able to:

- Understand Portfolio
- Know the steps and rules to make a portfolio
- Create an animated short movie
- Describe the rules for making Portfolio
Terminology

2D animation: The formation of moving images in a two-dimensional condition. Images can be manual “cel” animations or computer-aided drawings created with animation programs.

Bitmap Image: Computer graphic consisting of “pixels” on a grid. Each “pixel” contains colour information for the image.

Vector Image: An alternative to the bitmap image, vector images depend on mathematical equations defining the lines, forms and points that built an image.

Xsheet: Also known as exposure sheet or a dope sheet. It is a worksheet that gives particular instructions for how the animation should be captured. It is used to plan the timing and action and includes the details on the field, camera and action.

2D Animation Portfolio Making

Portfolio Making Rules

For animation and visual effects artists, it's the portfolio that helps in grabbing everyone's attention. It’s a vital marketing tool for the professional. One must prepare the portfolio or demo reel with utmost care, highlighting his/her skill, expertise and creative ability. Please remember your show-reel is the showcase of your work. Here are six important principles to keep in mind, while preparing your portfolio.

1. Length

Nobody has time to watch a 30-minute portfolio. It is recommended that the portfolio should be within 2 minute. Preferably, it can be shorter. In most cases, people get a good idea of what to expect within 30 seconds. Don’t save the best until
last. You need to grab people’s attention instantly and keep it to watch it all.

2. **Content**

Only best works should be added to the portfolio. A 30-60 seconds portfolio with wonderful animation is better than a 3-minute portfolio with poor animations. If you are not satisfied with something, do not put it. Always use the original shots you have done, never recreate the same. If you don’t have a good reason to, don’t repeat content.

3. **Order**

Since the portfolio should showcase the best of you, strongest and engaging work should appear first. It takes people a few seconds to decide if they want to keep watching your reel. There is no need of waiting and building the suspense.

4. **Audio/Fx**

It is a very important part of Portfolio as many emotion and engagement comes through the music and editing choices made. Include the original audio for dialogue pieces. A simple music is the best BGM. The music should not be distracting and should act as a connector between the shots.

5. **Presentation**

Every piece should be given the time it deserves. You should not edit the music or get too creative. In an animation reel you want to present each shot separately (sometimes with a title card before each shot) to let the viewer understand what they are watching without confusing them.

6. **Numbering**

Write the proper information for each shot in the portfolio.
Incomplete works should not be added in the portfolio. Include a head and tail slate with your name, phone number and email address on the reel. It should be like a complete package of your work and personal information. Never include examples of work that is not relevant to the client or animation.

A portfolio needs to tell a story. Showcase your personal strength and passion through the portfolio. Be clear on your style and what you do best. Also be honest about your work. When a piece of work doesn't match your experience or expertise, it might create doubts on your abilities.

The person who reviews the portfolios has to view number of reels, one after another, so it is important to build an impact at the first impression. Think about the work with which you are confident, then include the same in the portfolio. Review again and again before finalising.

**How to make Animated Short Film**

Making animated movie from scratch involves many stages. The process of production for a typical animated short film can be divided into three stages: Pre-production, Production and Post-Production.

In this section, we will discuss about step by step methods of animation short film making. Now we need the animation software to start. Let's select GIMP for imaging, Openshot for editing the video and pencil 2D for animation.
Step 1: Select Script

One of the most important stages of any film production is Script. One can choose the best story or can write the story; for example an animation of simple bird as given here. Then it is important to make an outline of what you want to show. In animated films, visual scripting of the action and performance is important.

If you write a script, it’s better to make a perfect plan. But, if the story is not complete, then start the rough drawing and in the production process give the best direction to the film.

Step 2: Create the Character

First develop the characters sketch in a perspective view. This rule implies that the characters aren’t directly facing the viewer; they’re angled 3/4ths to the left or right, like the example below.

This view suggests that our characters aren't clearly standing up to the viewers; they're figured 3/4ths to the other side or perfect.
Step 3: Creating Storyboard

Title- Storyboard
Attribution- Angela rees
Source-
Link- https://mooc.employid.eu/storyboarding-tutorial/

The Storyboard is a manual hardcopy version of the animation film and plan for the actions and dialogues for animation. It contains
the shot locations, camera angle, sounds and all details of cinematic requirements. A storyboard does not need to be super realistic with good drawings. But all the key poses should be drawn. It will make the work easier.

After completing and properly naming all the sheets, it should be scanned to have them in digital formats. After the scanning you can move them for editing.

**Step 4: Creating Animatics**

Simply put, animatic is an animated storyboard or rough cuts of animation. Making animatics is fun. In this process, all scanned image files are imported into the editing program. At this stage, we match the sound and scanned frames as per requirements and decide the length of animation. It acts as a reference for animators; here, we can see how our movie will look like and the story is built-up.
Step 5: Creating Background Layout

A background layout is the pencil hand drawing for a scene. It is not the final background, just for reference of the scene. Here we start drawing in the right place and size as per our BG field guide.

Since we know what our backgrounds look like as of now, we will draw as it is required to be in the shot. For instance, we don't have to draw a whole mountain when we might be utilizing section of trees.

If we are re-utilizing the BG later in a different field size, we need to draw a large size background so that we can use it for both without losing any pixels.
Step 6: Creating Exposure Sheets

Exposure sheet is a very important thing in animation. A simple exposure sheet contains a table with some lines and column segments like Action, Dial, Cel Levels, Background, Camera, Scene, Sequence and Sheet Number. Each line signifies one frame of animation. A normal exposure sheet holds upto 4 seconds of activity (i.e. 4 seconds x 24 frames = 96 rows). A well-prepared exposure sheet will help in maintaining the perfect timing.

Step 7: Creating Rough Animation

The initial step in traditional animation is the rough animation, which is its skeleton. We should always start the animation from the main action. For instance, to animate a walk cycle, we should begin with the body movement and the legs. Head, hand and clothes can be added later during the secondary animation. All the key poses on the storyboard should be made.

For a perfect animation, always complete the main action before adding every other detail. If we start animating all the details right away, we may lose a lot of time. If you have to make corrections, it will be difficult.
2D Animation

Animation -- Bird -- Rough Animation

Screenshot

Step 8: Clean-up

Animation -- Bird -- Cleanup

Animation -- Bird -- Cleanup
Once we finish the animation and are satisfied with the work, we can start the cleaning up of the images/drawings. We have to choose what kind of line we would use.

There are various types of line art we can select. Normal lines are all of the same thickness while rough lines are not closed and make your animations look like they are dancing. Cartoony lines are thick around the border with thin lines on the inside. Cleaning up the rough animation is a repetitive work, but when we do it properly it will make the inbetweening and colouring easier.

**Step 9: Making In-between**

For smooth animation, in-betweens are important. Keys lead the animation but the in-betweens smooth out the movements. This process is called inbetweening. A huge amount of in-betweens are not always required. When we animate an action shot, we can make with a few keys and two or three in-betweens. For fine animation, more in-betweens give us a smoother result.

So now let's check the example below.
Animation -- Bird -- In Between

Screenshot

First we have put frame number 10 and frame 25 on a light box. Then label it with frame 25 to add in betweens this. Always it should be started from frame breakdown. Here 25 number frames are at the centre in between 10 number frames and 40 number frames. Now start drawing right in between the two lines of those drawings and that is how we create the breakdown. When it's complete, we can go to frame number 25 and 40 and create the in-between number 28. After we are done with that one, we take frame number 28 and 40 to create the last one in the scene number 32.

Step 10: Backgrounds Sync and Paint

Screenshot

Background painting should be included behind our characters using inking. We can ink it the traditional way with the crayons or paint or we can scan the drawing and paint it through the paint
program like GIMP. Our backgrounds are a mix of crayons, water paints and GIMP.

It's important to mark all layers and keep them isolated because the animation will be placed in the middle of the layers to create depth.

**Step 11: Characters Ink and Paint**

![Animation -- Bird -- Colour, Ink & Paint](image1)

![Animation -- Bird -- Colour, Ink & Paint](image2)
When all our animation has been cleaned up, it is ready for colouring. When we begin this ink and paint, all our movement has been tidied up and prepared for paint.

We can use specialised software to ink all the characters.

Here, the hard work of clean-up that we did before truly pays off. With great line work and closed lines, colouring will be an easy walk.

**Step 12: Compositing**

When all the artworks and characters are painted, we can use any compositing software to composite it. Composting is the process of combining all the elements into a scene.

Now we set up the entire film together and make it flow into one.
Ideas for exercises

Here are some suggestions for animation exercises.

- Two leg character walk and run cycle
- Tiger walk and run cycle
- Man juggle
- Throwing balls
- Man hits a door with a briefcase
- Baby chews food
- Sword tussle
- Kung Fu styles
- Man cycling
- Man with diving board
- Character’s happy and sad expression
- Loudly smiling a man
- Dialogue
- Underwater swimming
- Walk and run transitions
- Birds feathering
Unit summary

In this unit, you learned what portfolio is and how to prepare a 2D animation portfolio. We also discussed about the various steps in making animated short films. You need to prepare a good and impressive portfolio of you skill and work to draw the attention of your prospective employers or clients to start you professional career in multimedia.

Assignment

1. What thing should you keep in mind while creating a portfolio
2. Explain the clean-up model sheet
3. How to create a portfolio
4. List the various steps in creating a 2D animations portfolio
5. What are animatics
6. Explain uses of portfolio
7. What is an exposure sheet
8. What is the requirement of portfolio
9. List the different types of rows and columns as in the exposure sheet
10. Evaluate the 2D animation portfolio

Resources

- https://google.com
- http://wikipedia.com