FOREWORD

Everything is connected to everything else.

According to the chaos theory in mathematics and physics, it is possible for a butterfly to flap its wings at one end of the world and create a hurricane at the opposite end. (Hence the more popular term ‘butterfly effect.’) Similarly, the little things that we do may have an impact on society in ways that we can never expect.

Technology is a large factor in linking us to other people. Because of computers and the Internet, we are now connected to virtually everyone in the world. Furthermore, communication has never been quicker and more efficient. With the Information Superhighway, we have access to all sorts of data and gadgets. This would not have been possible a mere twenty years ago. Thus, we need to be aware that we can affect and influence others just by being able to send e-mails, design websites, create presentation reports, compile databases, or make audio/video files.

Our courseware is specifically designed to equip the students with the necessary knowledge and skills so they can navigate the terrain of present technology. Consider this book as a guide to strengthening human productivity and a tool for exploring the twenty-first century.

Jaime D.L. Caro, Ph.D.
Series Editor
ABOUT THE AUTHORS

Alexander C. Maximo, M.A. graduated with a degree in Bachelor of Arts in English Studies: Language, magna cum laude, and also earned his Master’s in the same field in UP Diliman. While in college, he was president and officer of various student organizations and served as a representative of his college’s student council. He worked with TechFactors Inc. as writer and editor before serving as a marketing officer with the company. He also worked as a web development consultant for several companies. He now teaches English for the Professions and College English at UP Diliman. His current research interests involve new media, blogging and the language of information technology.

Joy T. de Jesus, Jr. specializes in ATM-based and ATM-related systems and has served as trainor and content developer of Techfactors Inc., co-authoring the following books: Office Productivity, IT Project Management, Java Programming By Example, Animation in a Flash, and C++ Programming Fundamentals. He studied Computer Science major in Software Technology at De La Salle University and pursued further studies at Mapua Information Technology Center.

Brian P. Loya graduated from UP Diliman with a B.S. in Computer Science. In college, he belonged to several organizations such as UP SIKAT- an acting organization, UP PARSER-the official publication of the Computer Science Department, and UP KUSTURA- an organization for Marikina-based students. He coauthored the book Animation in a Flash, edited the second edition of Java™ Programming by Example, made numerous games for the interactive CDs, and was part of the TechFactors development team.

Regnard Kreisler C. Raquedan is a graduate of the University of the Philippines Diliman. He obtained his Master of Science in Computer Science from the Ateneo De Manila University. An active member of the Philippine Web development community, he founded the Adobe User Group–Philippines and is an advocate of Web Standards & Usability. He is also a past winner of the Philippine Web Awards and has been a fixture at the judging panel for the last five years. He was project manager at the UP Java Research & Development Center and is now a lecturer at the UP Information Technology Training Center.

Gabriel David Alindogan Medina or “Gabs” is a Fine Arts graduate from the University of the Philippines, Diliman, Quezon City. He majored in Advertising. He was employed as the Visualizer at Campaigns and Grey, Inc. where he did some advertising materials for big companies like Proctor and Gamble, Universal Robina Corporation, Smart Communications, Gatorade, Shakey’s, Far East Bank, Del Monte and many more. In 2000, he was taken in as in-house Creative Director of Godiva, Inc. He is now based in Cagayan de Oro working as a web designer and advertising consultant of StickyMedia Solutions, Inc.

ABOUT THE SERIES EDITOR

Jaime D.L. Caro, Ph.D. has more than 20 years of experience in education and research in the areas of Computer Science, Information Technology, and Mathematics. He received the degrees of Bachelor of Science major in Mathematics (cum laude) in 1986, Master of Science in Mathematics in 1994, and Doctor of Philosophy in Mathematics in 1996, all from the University of the Philippines Diliman. He spent a year as a post doctorate research fellow at the University of Oxford from 1997 to 1998. He is presently Assistant Vice President for Development of the University of the Philippines, Program Director of the UP Information Technology Training Center (UP ITTC), and a professor of Computer Science in UP Diliman. He is an honorary member of the Philippine Society of Information Technology Educators (PSITE), President of the Computing Society of the Philippines (CSP), and a member of the Technical Panel on Information Technology Education of the Commission on Higher Education (CHED). Dr. Caro is a recognized expert on Complexity Theory, Combinatorial Network Theory, Online Communities, and e-Learning.
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INTRODUCTION

Flash has now become a very popular software with an assortment of uses in animation, presentation, and in web presentation development. This courseware utilizes Flash and its incorporated technology. It offers a brief history and an orientation to the methods of animation. It then teaches the basics of two-dimensional animation and instructs the student on the uses of the different Flash tools. Lastly, it also introduces the student to the interactive capabilities of Flash and its various applications.

LEARNING GOALS

By the end of this courseware, the student is expected to:

1. Learn the basic principles behind animation.
2. Gain a functional knowledge of Flash.
3. Create simple 2-D animation.
Indeed, it was an exceedingly pleasant sight, those bright little souls at their task! Moreover, it was really wonderful to observe how knowingly and skillfully they managed the matter. Violet assumed the chief direction, and told Peony what to do, while, with her own delicate fingers, she shaped out all the nicer parts of the snow-figure. It seemed, in fact, not so much to be made by the children, as to grow up under their hands, while they were playing and prattling about it. Their mother was quite surprised at this; and the longer she looked, the more and more surprised she grew.

—from *The Snow Image: A Childish Miracle*, by Nathaniel Hawthorne
In *The Snow Image*, Violet and Peony shaped a little girl’s figure out of snow using their creative young minds, hoping to create a “snow-sister” they can play with. Well, they did a really good job at it and, unbelievably, the little girl came to life! She ran around in the garden like the siblings who made her. Other children can make snow images, too, but not like Violet and Peony whose creation was animated. Animation, as you would see and later learn to do, is an art. It is a method of representing real-world things through other objects—figures out of snow, landscapes in paintings, etc.—and as a series of images.

**Animation Defined**

What did you see in the short clip? Probably, you would say “a cartoon.” Don’t you spend weekend mornings in front of the TV watching cartoons from The Cartoon Network or some animated classic? Amidst all the action flashing before your eyes, did it ever cross your mind how these pictures move? You know that there are no Powerpuff Girls and Johnny Bravo in real life because of their exaggerated features and extraordinary powers. Yet they seem to move and speak in believable ways. Well, in truth they are merely images; movement and speech are possible because of a process called animation.

**LESSON OBJECTIVES**

At the end of this lesson, the student will be able to:

1. Trace a brief history of animation.
2. Know the different methods of animation.

**LESSON OUTLINE**

1. Animation Defined
2. Traditional Animation Process
3. Animation Techniques

**NOTE**

In the interactive exercise browser, you can play the Flash intro file and see what happens. In this book, you will find out how to do pretty much the same thing. So better get on with learning animation!
Animation is the process of stringing together a sequence of images to create an illusion of movement. To understand how this is done requires a little understanding of video production. Real-life movements can be recorded using a video camera, correct? When we watch the movements, what we actually see is a series of images that capture the progression of an action. These images are called frames. New professional video cameras record movements at a speed of 120 frames per second (fps) or more. Take for example this particular sequence:

![Animation sequence](image)

Animation works similarly. Objects in a scene are made to move by creating small changes in the pictures so that when they are viewed, the sequential effect is produced. Something as simple as a drawing of a ball that appears to be bouncing is considered as an animation.

![Animation sequence](image)

**NOTE**

Creating animation does not necessarily need high-tech approaches. In this lesson, you will be going over the different techniques that have been used in creating animation. Even if you will be using a particular technique throughout this course, having a good understanding of the general principles of animation and how technology has changed over the years will develop in you a greater appreciation of the art of animation.

From Small Beginnings to Big Outcomes

Animation, in its broadest sense, has already existed for a very long time. Archeological findings reveal that paintings on cave walls are actually attempts to capture the movements of people and animals.

According to film scholars, the first animated cartoon (as illustrated images) was created in France in 1877 by Charles-Émile Reynaud using his invention called the praxinoscope which can create loops of 12 pictures (or a repeated sequence of 12 frames). In 1892, his work of a 500-frame loop was exhibited in the Grevin Museum in Paris, France using a device that resembles the modern film projector.
From then on, animation became popular as numerous people jumped into the animation bandwagon. The first animated cartoon on standard picture film was made by Émile Cohl (born Émile Courtet) called Fantasmagorie. In this effort, he is dubbed as the “Father of Animated Cartoon.”

As technology developed, so did animation—from silent features like Walt Disney’s Mickey Mouse to full-length movies like Walt Disney’s Snow White and the Seven Dwarves (1937), to long-running shows like Looney Tunes from Warner Bros. Public exposure was made through animated cartoon TV series like the ones developed by Hanna-Barbera Productions whose popularity lasted for decades.

Animation has also grown geographically with different countries coming up with diverse styles. Japanese animation, or anime, has now gained worldwide popularity that even Hollywood became interested in adapting their styles. This is seen in Walt Disney’s acquisition of the cult-classic Princess Mononoke and in the release of The Animatrix, the anime-styled short film series based on the blockbuster movie The Matrix.

Today, computer animation enables more and more cartoons to be released, as in the latest string of three-dimensional (3-D) movie releases and the more accessible two-dimensional (2-D) animated features on daytime TV.

Traditional Animation Process

During the first 80 years of the century, animation followed a more or less common process. Some animators still follow this general guideline, perhaps with variety given their preferred technique. Here are the basic steps of the traditional animation process:

1. **Storyboard** – A storyboard serves as a script for the animated feature. It is made up of pictures and text that indicate how a scene looks like and which dialogues accompany each shot. This is usually done in coordination with the director.

2. **Voice Recording** – The sounds and speech are recorded for use in the feature. This step is sometimes done after animation with the voice actors using the feature itself as a guide to synchronize their speech with the animation.

3. **Story Reel** – Also called **animatic**, it is a videotaped version of a storyboard. When the preliminary voice recording is done, the storyboard is matched with the recorded voices. (Timing is very essential to animation; it helps the animation team plot out the feature better.) The most important decisions and revisions are made here since the next stages are tedious processes. Careful planning helps prevent costly errors.

4. **Design** – From the animatic, artists start creating the necessary models of the characters. In the traditional 2-D animation, each character needs to be drawn in various poses. At times, 3-D figurines are made in order to serve as guides on how the characters would look like, particularly when they are depicted in action.

5. **Layout** – This phase is synonymous to **blocking** in live action video. This is where the placements of the characters and other objects are conceptualized with the different backgrounds in mind.

6. **Animation** – The creation of sequences is done here. Traditionally, this employs creating drawings that simulate the movement of characters and objects. Since this book is basically about this phase, it will be expounded on in the next lessons.

7. **Background** – In traditional filmmaking, this process can be equated to **set design**. However, as opposed to set design, which is a critical task before shooting the footage, creating the backgrounds can be done during or after the animation phase since the designs are now based on the layout. In this process, the environment where the characters and other objects move is created. In older animated cartoons, backgrounds are often static and repetitive.

8. **Filming** – The images created in the animation and background are traditionally painted on clear thin plastic sheets (called **cels**) made of acetate. The layers of cels with the images inked and painted on them are arranged under a camera and are photographed using a rostrum camera to create composite images. These shots are all arranged in sequence, thus creating the animated feature. Nowadays, images are created and sequenced using a computer, thus eliminating the use of cels, films, and cameras.
Cels were previously made of celluloid, a wood by-product, hence the name. However, cels today are made out of acetate.

9. **Post-Production** – Depending on the method of distribution, the audio or voice recordings could be mastered or engineered with the film to create the full audiovisual feature.

**Animation Techniques**

Animation techniques are methods and practices that are used in the animation phase of a project. There are so many techniques used over the years; this section will discuss a few popular ones.

**Traditional Animation**

Traditional animation involves the use of ink and paint on cels which are shot using a rostrum camera. Here are some techniques that were used to create animation:

- **Cel Animation** – This involves manually inking and painting each frame of movement. Early animations used minimal movement. For example, a scene involving a talking character would have a static body and face for the character. Only the mouth would be animated and then imposed over the cel containing the rest of the character’s parts. Due to the fixed scope of animation it is also termed as limited animation.
• **Loops** – In efforts to economize the process even more, sequences that repeat over and over are used in some stretches of scenes. These are called “loops.” For example, to depict a man walking, frames are looped over a moving background to create the illusion of movement. These are noticeable in old cartoons where the backgrounds obviously repeat and the major character executes an even and repetitive stride.

• **Transferring to Cels** – It had become an issue on how to easily transfer artists’ works from paper to cels. Hand inking or manually doing this took a lot of time. Two groundbreaking techniques were developed in answer to this. The first is xerography, which uses photocopying technology to do the transfer of inks. This allowed for more control on the sizes of the characters to be transferred. A more refined method of this was APT, or Animated Photo Transfer, which gave more control and definition in the transfer of lines. Walt Disney’s animation studio helped much in developing these techniques.

• **Rotoscoping** – This is a technique that requires live action footage to be traced over in order to produce a very realistic basis for the animation. Rotoscopic animations are known to have very fluid and lifelike movement.

• **Live Action** – This combines live footage and animation. The animation is integrated with a live action clip. Its effect is that animated objects or characters appear to exist in real life. A very successful feature that employs this technique is Walt Disney’s *Who Framed Roger Rabbit* (1988).

**Computer Animation**

2-D computer animation practically employs the same principles of traditional animation. However, instead of using countless numbers of cels and manually inking and painting to produce composite images, computers are used to produce them digitally. There are many 2-D animation programs available in the market for both production- and consumer-level users. Day-to-day computing also features 2-D animation in the form of animated graphic interchange files (GIFs). There are many programs, both commercial and free, that enable users to create these animated GIFs. But in this book, you will be learning more about one of the Web’s most popular formats, the Shockwave Flash format (.swf). Adobe Flash (formerly Macromedia Flash) enables users to create vector-based animation and carefully sequence them, with options like adding sound and interactivity. Due to commercially available software like Flash, many budding animators are able to publish their works online.

3-D computer animation creates outputs with depth as opposed to flat outputs in 2-D. Computer software like Autodesk 3ds Max and Autodesk Maya are commercially available. A freeware program, Blender, is also available to produce 3-D graphics. These programs involve the creation of 3-D models and environments; most involve physics to produce effects. Some production companies even created their own 3-D rendering engines in order to produce their desired results. For example, Weta Digital created its own program, Massive (Multiple Agent Simulation System in Virtual Environment), to create en masse sequences in 3-D like those found in the battle scenes of *The Lord of the Rings*. 
A. Identify the terms described in each of the following items. Write your answers on the blanks provided.

1. the process of stringing together a sequence of images to create the illusion of movement
2. a series of images that capture the progression of an action
3. the number of still pictures per unit of time of video
4. the invention of Charles-Émile Raynaud which was used in creating the first animated cartoon
5. a clear thin plastic sheet used in traditional animation; represents an animation frame

B. Enumerate the concepts being asked in each item.

1. List down the nine (9) basic steps of the traditional animation process discussed in this lesson.

2. Give at least five (5) techniques that were used to create traditional animation.

3. What are the two common types of computer animation?
C. Before learning more about computer animation and Flash, you may take a shot at one of the basic steps of the traditional animation process—storyboarding. First, come up with your own original cartoon character. Draw a rough sketch of your character and give him/her/it a name.

Now come up with a short story/scene with your character in the lead role. You may give your story a real-world or an imaginary setting (time and place). You may also add additional characters but you should keep your story short so that the storyboard can fit in fewer frames, like comic strips.

Name:

SKILLS WARM-UP

Flipbook Animation

On either corner of an old notebook, draw pictures that appear in a sequence. You may try copying the bouncing ball example in this lesson. Do this on a number of pages. Now try flipping through the corner of the notebook where your drawings are. What do you see? This is a simple way to create animation but a very good exercise nonetheless.

SKILLS WORKOUT

Research the following animated movies or series and identify the method of animation used in each feature. The possible answers for each item are: Traditional Animation, 2-D Computer Animation, 3-D Computer Animation, and Animated/Live Action.

1. Steamboat Willy
2. Madagascar
3. Zoids (TV Series)
4. Howl’s Moving Castle
5. The Little Mermaid
6. Space Jam
7. ¡Mucha Lucha! (TV Series)
8. Finding Nemo
9. Wacky Racers (TV Series)
10. Transformers (TV Series)
Animation is the process of stringing together a sequence of static images that creates an illusion of movement. Through the years, various techniques and approaches have been made to produce visual features. In the advent of technology, the process of animation has dramatically changed from manually laboring over the images to using computers to produce effects. Today, technology has made available, to ordinary users, tools to make their own animation.

**WORD BANK**

**Animation** – the process of stringing together a sequence of images to create an illusion of movement

**Cel** – clear thin plastic sheet made of acetate; represents an animation frame

**Frame Rate** – the number of still pictures per unit of time of video

**GROUP WORK**

Aside from creating animated cartoons, animation can also be used in other applications. For this activity, create a group composed of five (5) students to do some group research work on other applications of animation.

List down specific examples and discuss among yourselves the benefits of using animation in these applications.

Summarize the results of your research and discussion below and present them in class for additional insight.

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<th>Specific Examples</th>
<th>Benefits</th>
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*Examples: Adding transition and other effects on slide presentations (PowerPoint); Web advertisements; animated navigational elements, Windows animations (file copy/move/delete/search, etc…)*
THIS IS A SAMPLE COPY

To purchase the full version of this book, go to www.techfactorsinc.com/store