THE EXPERT'S VOICE®

Digital Image Compositing Fundamentals

Wallace Jackson

Apress®

Digital Image Compositing Fundamentals

Wallace Jackson

Apress®

Digital Image Compositing Fundamentals

ISBN-13 (pbk): 978-1-4842-1639-2

ISBN-13 (electronic): 978-1-4842-4060-1

Managing Director: Welmoed Spahr
Lead Editor: Steve Anglin
Technical Reviewer: Chád Darby
Editorial Board: Steve Anglin, Louise Corrigan, Jonathan Gennick, Robert Hutchinson, Michelle Lowman, James Markham, Susan McDermott, Matthew Moodie, Jeffrey Pepper, Douglas Pundick, Ben Renow-Clarke, Gwenan Spearing, Steve Weiss
Coordinating Editor: Mark Powers
Copy Editor: Jana Weinstein
Compositor: SPi Global
Indexer: SPi Global
Artist: SPi Global

Distributed to the book trade worldwide by Springer Science+Business Media New York, 233 Spring Street, 6th Floor, New York, NY 10013. Phone 1-800-SPRINGER, fax (201) 348-4505, e-mail orders-ny@springer-sbm.com, or visit www.springeronline.com. Apress Media, LLC is a California LLC and the sole member (owner) is Springer Science + Business Media Finance Inc (SSBM Finance Inc). SSBM Finance Inc is a **Delaware** corporation.

For information on translations, please e-mail rights@apress.com, or visit www.apress.com.

Apress and friends of ED books may be purchased in bulk for academic, corporate, or promotional use. eBook versions and licenses are also available for most titles. For more information, reference our Special Bulk Sales–eBook Licensing web page at www.apress.com/bulk-sales.

Any source code or other supplementary material referenced by the author in this text is available to readers at www.apress.com. For detailed information about how to locate your book's source code, go to www.apress.com/source-code/. Readers can also access source code at SpringerLink in the Supplementary Material section for each chapter.

Digital Image Compositing Fundamentals is dedicated to everyone in the open source community who is working so diligently to make professional new media application development software and content development tools freely available to rich application developers so that they can utilize them to achieve our creative dreams and financial goals. Last but not least, I dedicate this book to my father, Parker Jackson, my family, my life-long friends, and my production ranch neighbors for their constant help, assistance, and those relaxing, late-night BBQs!

Contents at a Glance

Contents

About the Author

Wallace Jackson has been writing for several leading multimedia publications about work in the new media content development industry, after contributing a piece about advanced computer processing architectures for the centerfold (a removable "miniissue" insert) of an original issue of *AV Video Multimedia Producer* magazine that was distributed at the SIGGRAPH trade show. Wallace has written for a large number of popular publications about his work in interactive-3D and new-media-advertising campaign design, including: *3DArtist* magazine, *Desktop Publisher Journal*, *CrossMedia* magazine, *Kiosk* magazine, *AV Video Multimedia Producer* magazine, *Digital Signage* magazine, and many other publications.

Wallace has authored a dozen Apress book titles, including four titles in its popular Pro Android series, Java and JavaFX game development titles, digital image compositing titles, and new media content production titles.

In the current book on digital image compositing, he focuses on the GIMP and Photoshop CS6 digital image compositing software packages, and uses them to demonstrate digital image editing and compositing fundamentals to beginners who wish to become digital imaging professionals.

Wallace is currently the CEO of MindTaffy Design, an agency specializing in new media content production and digital campaign design and development, located in Northern Santa Barbara County, halfway between its clientele in Silicon Valley to the north and Hollywood, the "OC," West LA, and San Diego to the south.

MindTaffy Design has created open source, technology-based (HTML5, JavaScript, Java, JavaFX, and Android 5.3) digital new media i3D content deliverables for more than a quarter century (since 1991).

The company's clients consist of a significant number of international branded manufacturers, including Sony, Tyco, Samsung, IBM, Dell, Epson, Nokia, TEAC, Sun Microsystems, Micron, SGI, KDS USA, EIZO, CTX International, KFC, Nanao USA, Techmedia, EZC, and Mitsubishi.

Wallace received his undergraduate BA degree in business economics from the University of California at Los Angeles (UCLA) and his graduate degree in MIS business information systems design and implementation from University of Southern California in Los Angeles (USC). Wallace also received a postgraduate degree in marketing strategy from USC and completed the USC Graduate Entrepreneurship Program. He earned the two USC degrees while at USC's nighttime Marshall School of Business MBA Program, which allowed him to work full time as a COBOL programmer while completing his degrees.

About the Technical Reviewer

Chád ("Shod") Darby is an author, instructor, and speaker in the Java development world. As a recognized authority on Java applications and architectures, he has presented technical sessions at software development conferences worldwide (in the United States, UK, India, Russia, and Australia). In his fifteen years as a professional software architect, he's had the opportunity to work for Blue Cross/Blue Shield, Merck, Boeing, Red Hat, and a handful of start-up companies.

Chád is a contributing author to several Java books, including *Professional Java E-Commerce* (Wrox Press), *Beginning Java Networking* (Wrox Press), and *XML and Web Services Unleashed* (Sams Publishing). Chád has Java certifications from Sun Microsystems and IBM. He holds a BS in computer science from Carnegie Mellon University.

You can visit Chád's blog at `www.luv2code.com` to view his free video tutorials on Java. You can also follow him on Twitter at `@darbyluvs2code`.

Acknowledgments

I would like to acknowledge all my fantastic editors and their support staff at Apress, who worked those long hours and toiled so very hard on this book to make it the ultimate digital image compositing fundamentals book title currently on the market.

I thank:

Steve Anglin for his work as the Acquisitions Editor for the book and for recruiting me to write development titles at Apress covering widely popular open source content development platforms (Android, Java, JavaFX, HTML5, CSS3, JS, GIMP, etc.).

Matthew Moodie for his work as the Development Editor on the book and for his experience and guidance during the process of making the book one of the leading image compositing titles.

Mark Powers for his work as the Coordinating Editor for the book and for his constant diligence in making sure that I either hit my chapter delivery deadlines or far surpassed them.

Jana Weinstein for her work as the Copy Editor on this book, for her careful attention to minute details, and for conforming the text to current Apress book writing standards.

Chád Darby for his work as the Technical Reviewer on the book and for making sure that I didn't make technical mistakes.

Anna Ishchenko for her work as a Book Cover Designer for the book and for creating the graphic design for the book.

Finally, I'd like to acknowledge Oracle for acquiring Sun Microsystems and continuing to enhance Java and JavaFX, which allows their Java and JavaFX to remain the premiere open source programming languages, and allows digital image compositing pipelines to be written in Java code, taking this industry to the next level.

Introduction

Digital Image Compositing Fundamentals is intended for digital photographers; multimedia producers; 2D-application developers; 2D or 3D web site developers; user interface or user experience designers; social media users of image-centric web sites and/or apps, including Instagram, Pinterest, Facebook, LinkedIn, XING, YouTube, and similar; and just about anyone interested in generating high-quality digital imagery or special effects delivered in popular PNG, JPEG, GIF and animGIF file formats.

The book covers digital image editing and compositing; in the early chapters, that equates to fundamentals: proper terms, topics, concepts, and definitions. The subsequent chapters each build on the knowledge of the previous chapter. So, by the time we get to the later chapters in the book, our readers should be creating some fairly advanced digital image compositing pipelines, by using alpha channels, masks, and blending modes, special effects, adjustment layers, and the like.

There is even coverage at the end of this book on data footprint optimization as well as on creating digital image compositing pipelines that use open source platforms such as Java, JavaFX, HTML5, CSS3, JavaScript, Python, and Android.

Chapter 1 focuses on one of the foundations of digital imaging, the pixel, and Chapter 2 looks at the size of digital imaging, or resolution. Chapter 3 covers aspect ratio and the shape of digital imaging, and Chapter 4 takes on digital imaging color theory.

As we get into Chapter 5, we take on the digitization of digital images using color depth, and Chapter 6 goes on to cover digital image transparency and the alpha channel. Chapter 7 looks at isolating areas in digital images using masking tools, and Chapter 8 addresses organizing the digital image composite by using layers.

Chapter 9 starts to get into more advanced concepts, like blending modes, and Chapter 10 discusses the modal operational nature of digital image compositing software packages, such as GIMP and Photoshop CS6. Chapter 11 covers the installation and usage of plug-ins, and Chapter 12 discusses the finer points of the digital image compositing pipeline using both Photoshop CS6 and GIMP 2.8.14.

In Chapter 13, we look at data footprint optimization and, finally, in Chapter 14 we review how computer programming languages factor into image compositing, both inside of GIMP and Photoshop and with popular open source platforms such as Python, Java, JavaFX, Android, JavaScript, CSS3, and HTML5.

If you're interested in digital photography or in digital imaging and want to learn the fundamentals, and how everything works in the digital domain from pixel to compositing pipeline, this is the digital image editing and special effects book for you. I even show how to do everything with free digital imaging software, GIMP 2.8.14, so your only expense will be this book.

Chock full of tips, tricks, tools, topics, terminology, techniques, and work processes, *Digital Image Compositing Fundamentals* can help you to transition from a digital imaging amateur to a knowledgable professional where your digital image compositing pipeline is concerned.

CHAPTER 1

The Foundation of Digital Imaging: The Pixel

Welcome to *Digital Image Compositing Fundamentals*. This book will take you through the foundation of digital imaging as well as multilayered image compositing. It starts with the lowest-level concepts—in this chapter that's the **pixel**—and builds upon each of those concepts in subsequent chapters until we have a comprehensive understanding of image compositing concepts, pipelines, work flows, and terminology.

I will show you what the concepts, techniques, and terms look like as we progress through this book by reproducing them, using two of the most widely used digital image compositing software packages, Adobe Photoshop CS6 and the open source GIMP software package; the latter is free for commercial use.

Assuming you might not want to pay for the brand name digital imaging software, the first part of this chapter will cover how to download and install your very own open source GIMP software package. If you do want to use paid software, I suggest using Photoshop at $10 per month. The rest of the chapter discusses the foundational element of digital image compositing: the pixel.

How the pixels are composited is what this book is all about, and each chapter will build on the knowledge from the chapters that preceded them until you have a clear picture (no pun intended) regarding precisely how digital image compositing pipelines work.

Downloading and Installing GIMP

In order to follow along with this book, all readers are going to need to have a digital imaging software package of one kind or another, whether that is Adobe Photoshop or Corel Painter or PaintShop Pro. If you do not own any of these, you can use GIMP 2.8, which is free for commercial use.

To download GIMP 2.8.14, which is the current stable version of GIMP (the next version, GIMP 2.9, the predecessor to the much anticipated GIMP 3.0, is due out some time during 2016), go to www.gimp.org and click the orange **Download** button, seen in Figure 1-1, or alternately click the **Downloads** link on the right side of the screen.

Figure 1-1. *Go to the gimp.org site; click the* ***Download*** *button*

Then, download the GIMP-2.8.14.exe installer for your OS to start the installation. The installer will determine whether you need a 32-bit or a 64-bit version, so all you have to do is select the language that you want to use for the installation of the software and click the **OK** button, as shown in Figure 1-2.

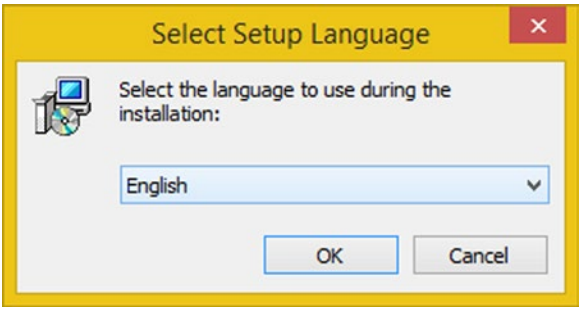

Figure 1-2. *Select a language you want to use for the install*

Once you click the **OK** button, you'll get a **GIMP Setup** dialog, as shown in Figure 1-3, where you can click the **Install** button to start the installation process.

Figure 1-3. *Click the* ***Install*** *Button to start the install*

If you want to customize the installation, you can click the **Customize** button and select exactly what components you want installed on your system.

I recommend that you use the (full) Install button, which will give you the default GIMP software installation with the plug-ins, filters, and file support that is now part of the stable GIMP version, which is the fully completed (finished) package architecture. GIMP is an digital imaging-software package that rivals paid image editing software packages.

As you can see in Figure 1-4, GIMP will install itself.

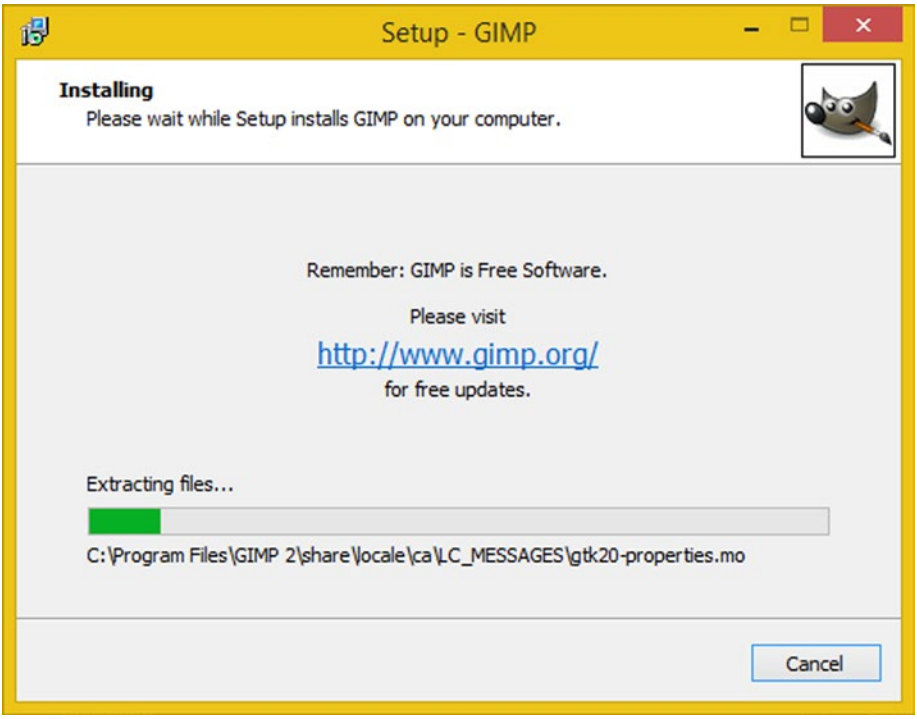

Figure 1-4. *GIMP tells you which file it's installing*

Once the install process has completed, click the **Finish** button, shown in Figure 1-5, and then create a shortcut icon for the quick launch taskbar on your OS so that you can launch GIMP if you need it by using just a single mouse click.