

Programming with Mobile Applications: Android™, iOS, and Windows® Phone 7 Thomas J. Duffy

Executive Editor: Marie Lee

Acquisitions Editor: Brandi Shailer

Senior Product Manager: Alyssa Pratt

Development Editor: Lisa M. Lord

Associate Product Manager: Stephanie Lorenz

Content Project Manager: Heather Hopkins

Art Director: Faith Brosnan

Marketing Manager: Shanna Shelton

Compositor: Integra

Copyeditor: Karen Annett

Proofreader: Suzanne Huizenga

Indexer: Sharon Hilgenberg

Cover Designer: Hannah Wellman

Cover image credit: Color Symphony/

Shutterstock.com

© 2013 Course Technology, Cengage Learning

ALL RIGHTS RESERVED. No part of this work covered by the copyright herein may be reproduced, transmitted, stored or used in any form or by any means graphic, electronic, or mechanical, including but not limited to photocopying, recording, scanning, digitizing, taping, Web distribution, information networks, or information storage and retrieval systems, except as permitted under Section 107 or 108 of the 1976 United States Copyright Act, without the prior written permission of the publisher.

For product information and technology assistance, contact us at Cengage Learning Customer & Sales Support, www.cengage.com/support

For permission to use material from this text or product, submit all requests online at cengage.com/permissions

Further permissions questions can be emailed to permissionrequest@cengage.com

Library of Congress Control Number: 2011944540

ISBN-13: 978-1-133-62813-2

Course Technology

20 Channel Center Street Boston, MA 02210

Cengage Learning is a leading provider of customized learning solutions with office locations around the globe, including Singapore, the United Kingdom,

Australia, Mexico, Brazil, and Japan. Locate your local office at:

international.cengage.com/region

Cengage Learning products are represented in Canada by

Nelson Education, Ltd.

For your lifelong learning solutions, visit course.cengage.com

Visit our corporate website at cengage.com.

Some of the product names and company names used in this book have been used for identification purposes only and may be trademarks or registered trademarks of their respective manufacturers and sellers.

IOS SDK, Xcode, and Interface Builder are trademarks of Apple, Inc., registered in the U.S. and other countries

Android is a trademark of Google Inc.

App Inventor: ©2011 Google Inc.

MOTODEV Studio: ©2011 Motorola Mobility, Inc.

Adobe product screenshots reprinted with permission from Adobe Systems

Incorporated.

Visual Studio is a trademark of Microsoft Corporation.

Any fictional data related to persons or companies or URLs used throughout this book is intended for instructional purposes only. At the time this book was printed, any such data was fictional and not belonging to any real persons or companies.

Course Technology, a part of Cengage Learning, reserves the right to revise this publication and make changes from time to time in its content without notice.

The programs in this book are for instructional purposes only.

They have been tested with care but are not guaranteed for any particular intent beyond educational purposes. The author and the publisher do not offer any warranties or representations, nor do they accept any liabilities with respect to the programs.

Printed in Singapore by Seng Lee Press Print Number: 03 Print Year: 2014

Brief Contents

Ħ

Preface	ix
The Computer of the Future Is in Your Hand	1
Developing for Small Devices	17
Best Practices for Small Device Programming .	39
Google Android: App Inventor	72
Google Android: Motorola MOTODEV Studio . 1	02
Apple iOS	66
	22
Web Applications 2 2 2	55
Cross-Platform Development with PhoneGap . 29	90
Installation and Setup	15
Glossary	32
Index	38
	Apple iOS

Contents

- 5	a.r	
- 81	A.	

	Preface	
CHAPTER 1	The Computer of the Future Is in Your Hand	
	What You Need to Know	3 1 5 5 3 1 2 5
CHAPTER 2	Developing for Small Devices	,
	Platform Architecture The Android Platform The iOS Platform The Windows Phone 7 Platform The App Life Cycle The Android App Life Cycle The iOS App Life Cycle The iOS App Life Cycle The Windows Phone 7 App Life Cycle Comparing Life Cycles Chapter Summary Key Terms Review Questions Up for Discussion Research Projects 18 20 21 22 23 24 25 26 27 27 27 28 29 20 20 20 20 20 20 20 20 20 20 20 20 20	901227245553

CHAPTER 3	Best Practices for Small Device Programming . 39
	Object-Oriented Programming 40 Encapsulation 43 Inheritance 46 Polymorphism 50 Design Patterns 52 Model-View-Controller 52 Delegates 57 Optimization 58 Strings, Buffers, and Operations 59 Loops and Conditional Statements 60 Memory Management 63 Chapter Summary 64 Key Terms 66 Review Questions 67 Up for Discussion 70 Programming Exercises 70
CHAPTER 4	Google Android: App Inventor72Review of the Android Architecture73Your First App: Hello App Inventor73Designing a User Interface74Working with Blocks80Running in the Emulator84Detective Work87Advanced Android Apps: Where's My Phone?88Packaging and Deploying Applications95Detective Work96Chapter Summary97Key Terms98Review Questions99Up for Discussion100Programming Exercises100
CHAPTER 5	Google Android: Motorola MOTODEV Studio . 102 Eclipse and MOTODEV Studio

CONTENTS

	Advanced Android Apps: DotSmasher	
	Packaging and Deploying Apps in MOTODEV Studio	
	Advanced Android Apps: Where's My Phone?	
	Detective Work	
	Chapter Summary 160	
	, , , , , , , , , , , , , , , , , , , ,	
	Review Questions 162	
	Up for Discussion 164	
	Programming Exercises 164	
CHAPTER 6	Apple iOS	
	An Objective-C Primer	
	Back to the Beginning	
	Moving Forward: Hello iPhone! 178	
	Detective Work	
	Troubleshooting	
	Advanced iOS Apps: ButtonChaser	
	Detective Work	
	Working with the iOS Development Tools	
	Packaging and Deploying iOS Apps	
	So Where Is Where's My Phone?	
	9 N N N	
	The second secon	
	Key Terms	
	Review Questions	
	Up for Discussion 221	
	Programming Exercises	
CHAPTER 7	Microsoft Windows Phone 7	
	A Quick Look at C#	1
	Your First Windows Phone 7 App: Hello Windows!	į
	Running in the Emulator	
	Detective Work	
	Working with Visual Studio 2010	
	A 04	
	Detective Work	
	Packaging and Deploying Windows Phone 7 Apps 242	
	Again, Where Is Where's My Phone?	
	Using the Location Service	
	Chapter Summary 249	
	Key Terms and warms at the property of the second s)

	Review Questions 251 Up for Discussion 253 Programming Exercises 253
CHAPTER 8	Web Applications
	Developing for Mobile Browsers 256 Choosing an Editor 257 Detective Work 260 A Quick Look at Web Technologies 261 HTML 261 CSS 264 JavaScript 268 Your First Web App: Hello Web! 273 Testing Web Apps in Emulators 277 Android 278 iOS 278 Windows Phone 7 279 Detective Work 280 Advanced Web App: DotSmasher 280 Detective Work 285 Chapter Summary 286 Key Terms 286 Review Questions 287 Up for Discussion 289 Programming Exercises 289
CHAPTER 9	Cross-Platform Development with PhoneGap . 290
	Introducing PhoneGap

vii

CONTENTS

APPENDIX

Installation and Setup 315 Android 316 App Inventor 316 MOTODEV Studio 318 Apple iOS 323 Windows Phone 7 326 PhoneGap 329 Using PhoneGap with Xcode 3 329 Using PhoneGap with MOTODEV Studio 330 Getting Help 330 Glossary 332 Index 338