Learning Mobile Application Development with Corona SDK

Brian G. Burton, Ed.D.

Learning Mobile Application Development with Corona SDK

By Brian G. Burton, Ed.D.

Printed in the Abilene, Texas, United States of America

Published by Burtons Media Group. See http://www.BurtonsMediaGroup.com/books for more information.

Corona® SDK is a registered trademark of Corona Labs® Inc. Corona, the Corona Logo, CoronaLabs.com are trademarks or registered trademarks of Corona Labs, Inc.

Cover images were generated using Corona Simulator and represent views of apps made in this book on the Droid®, Galaxy Tab®, iPad®, and iPhone®.

Trademarked names and images may appear in this book. Rather than use a trademark symbol with every occurrence, we have used the name only in an editorial fashion and to the benefit of the trademark owner, with no intention of infringement of the trademark.

While every precaution has been taken in the preparation of this book, the publisher and author assume no responsibility for errors or omissions, or for damages resulting from the use of the information contained herein.

ISBN (eTextbook): 978-1-937336-07-3| 1-937336-07-7

Version 1.0

Table of Contents

About the Author

Brian Gene Burton, Ed.D. is a teacher, author, and game developer. Besides authoring "Beginning Mobile App Development with Corona" and contributing to several academic books on serious games and learning in virtual worlds, Dr. Burton has created game development degrees at two universities and enjoys researching and playing virtual environments. Dr. Burton presents and publishes internationally on his research and enjoys sharing what he has learned about game and mobile development. When not traveling or teaching, he can be found at his home in the Ozark Mountains of Missouri with his beautiful wife of over 25 years, Rosemary.

Dedication

I dedicate this book to my loving wife whose support and encouragement kept me focused and writing. Thank you for keeping me focused and not running off on rabbit trails!

A special thank you to my students and the Corona community for their support and requests for specific details and editorial comments that helped so much with the development of this book.

All other graphics (unless specified) and cover designed by Brandon Burton (http://www.geeklyentertainment.com).

Copyediting and formatting assistance provided by Brianna Burton (http://www.LiteraryDiaries.com).

Foreword

Walter Luh, CEO of Corona Labs, Inc.

Preface

Welcome

Welcome to Learning Mobile Application Development! This book is the result of years of developing and teaching mobile application development. When I began writing *Beginning Mobile App Development with Corona* in 2011, it was with a specific audience in mind; my current and future students who are experienced programmers. But before I had even finished that textbook, I had begun hearing from another vocal group; those who did not have any programming experience but had fantastic ideas for apps that they wanted to develop. Agreeing with Corona Labs founder Walter Luh that everyone should be able to develop mobile apps, I began working on tutorials and lessons for those in this underserved audience.

I selected the Corona SDK to use as the method for teaching programming and mobile app development for several good reasons: Corona by Corona Labs (http://www.CoronaLabs.com) was developed from the beginning around the concept that anyone can make mobile apps. Using the Lua scripting language, Corona is easy to learn yet powerful enough to allow you to create great, powerful apps and fast, responsive games. Finally, the international community that has formed around Corona is one of the best, developer friendly environments that I have ever experienced in my 25+ years of programming. Corona User Groups and meet-ups are happening all over the world thanks to a devoted network of ambassadors. If there isn't a Corona group in your community, contact Corona Labs and ask about starting one! I hope that you enjoy learning to develop your own mobile apps!

Best wishes and looking forward to seeing your app in the stores,

Brian G. Burton, Ed. D.

Who This Book Is For

While my focus and impetus for writing this book is that it be used as a textbook, I have also written it with the understanding that many (hopefully) are just interested in learning more about the Corona SDK and want to develop for multiple mobile devices at the same time. As I wrote this book, it was with the expectation that this is your first time to program or you are not an experienced programmer. If you are an experienced programmer and would like to learn Corona, I would recommend my first textbook, *Beginning Mobile App Development with Corona.*

How This Book Is Organized

While writing this book, I have kept the traditional 16-week U.S. college semester in mind, assuming one chapter per week. I have included additional chapters to meet specific state requirements. These final chapters should allow faculty to create a course that fits their specific needs or allow advanced high school classes to make use of the textbook for the entire year. While that doesn't work for everyone, it should be enough for most people to get started with mobile development using the Corona SDK. My first draft ended up with more than 28 chapters. After reorganizing content and continuing to develop, we are now down to 19 chapters with an additional chapter on great resources and a couple of appendices for the specific installation and app publishing requirements for Apple or Android . The chapters 17 and 18 are to meet specific state requirements for teaching mobile application development at the high school level. Chapters 17 and 18 were developed so that they can be included at any time after Chapter 7.

Conventions Used In This Book

Throughout the book I will use `Courier New` font to denote code that should be typed in exactly. When you find examples that are in *`Courier New, Italics`*, you will need to enter your own value.

Using Code Examples and Fair Use Laws

This book was written to help you learn to develop applications and games with the Corona SDK. In general, you may use the code in this book in your programs and documentation. You do not need to contact us for permission for reproducing a portion of the code. You don't need to ask permission to write an app that uses large chunks of code.

Now, on the other extreme, if apps appear that exactly reproduce the examples from this book, I will not be a happy camper and will contact the app store that the offending app is a violation of copyright. I don't have issues with using the examples as a starting point, but take the app much further; be original! Answering questions by citing this book or quoting examples does not require permission (but I would appreciate the citation).

I reserve all rights for selling or distributing the examples in any format provided in this book. If you're not sure if your use falls outside of the fair use laws, please feel free to contact me at: DrBurton@BurtonsMediaGroup.com.

Why didn't I use _____ for _____

There are a lot of great products available that can help the budding programmer/developer get their work done much faster (see chapter 17 for a short list). As this book is aimed at high school and college students, or people just getting started in app development, I tried not to use outside tools. If a tool was required to get the project done, I tried to use only free or low cost tools. If I didn't use one of your favorites, I either 1) didn't know the tool existed; 2) was unable to get an evaluation copy of the software in a timely fashion; or 3) just didn't like that tool (probably the first or second option). If you know of a great tool that can save time and money to developers, please share it with the world in the discussion board on this books site: http://www.BurtonsMediaGroup.com/forum.

Appendices

Appendix A discusses how to download and install Corona SDK. Appendix B covers configuring xCode and setting up provisioning profiles with Apple. In Appendix C, I cover installing Android APK and configuring Keystores for provisioning your Android based apps.

How to Contact Us

Please address any comments or questions to the books website: http://www.BurtonsMediaGroup.com/books or email DrBurton@BurtonsMediaGroup.com. You will find discussion forums for this and other books at http://www.BurtonsMediaGroup.com/forum

Why I Chose to Self-Publish

The decision to self-publish this book was reached after a great deal of consideration. While there were numerous publishers interested (both academic and technical), I decided to publish at least this first edition without the use of traditional publishers. There are many reasons why I made this decision, even though it will most likely lead to fewer sells.

First among my concerns was the price of the final book. I am sick of seeing textbooks at $100+. I feel this pricing is wrong and places an undue burden upon students. While publishers have cut the price slightly with the advent of eBooks and eTextbooks, it hasn't been enough in my opinion. By self-publishing, I am only at the mercy of Apple, Amazon, Google, and Kobo and can ensure that the price is kept reasonable.

.

My second concern was how rapidly software environments change. I personally hate having to purchase a new book for each major revision of software. I have stacks of books that are now completely useless. I decided to publish this as an eTextbook, which allows me to update and provide it to you, the reader, more rapidly. I will provide the minor updates between editions to the eBook to everyone who purchases the eTextbook through my website: http://www.BurtonsMediaGroup.com/books/book-update/

Those being said, if you received a copy of this book, either through a torrent or a friend, please purchase your own copy through my website. This will provide you with the most recent version of the textbook and encourage me to continue to keep it updated. While I am doing this to help my students, I have bills to pay, and my wife is really good at keeping my 'honey-do' list up-to-date. Help me to avoid that list by buying a legitimate copy of this book (I don't have to work on her list if I'm writing or editing).

On the downside of self-publishing, I do NOT have a team of people to proof and double check everything in this book. I am sure that typos were entered by gremlins during the night. I have dyslexia. I did hire a person to proof the final version of the book, but having read many books that were published by major companies and finding errors in their books, I am sure that errors remain in this one. Please let me know if you find a typo on the book's forum site: http://www.burtonsmediagroup.com/forum and I will make sure that it is fixed in the next update.

Chapter 1 Introduction to Mobile App Development

Learning Objectives

In chapter 1 we will learn:

- The different mobile operating systems
- The life-cycle of a mobile app project
- Software needed to make a mobile app
- How to make your first app
- Troubleshooting basics
- About Objects, Methods, and Properties

Introduction to Mobile Application Development

You have been working on your killer mobile app idea for days. It is completely original; no one has done anything like what you have planned before! Just one problem… How do you get your idea on the tablet or smart phone?

Don't worry! You are in the right place! This book was specifically written for you! In the following pages we will walk through all the decisions and processes that you will need to address to develop and sell your app.

To begin, we will examine the various options you have for developing your app.

First, an assumption…

This textbook is designed for the person who has no or very limited previous programming experience. If you are an experienced programmer, I would recommend that you use one of my other books such as "Beginning Mobile App Development with Corona," a textbook that makes the assumption that you understand the fundamentals of programming and are comfortable creating your own loops, decision statements, and functions. If that sounds like a foreign language to you, then you are in the right place!

Mobile Operating Systems

The smart-phone and tablet world are divided by the operating system (OS) that runs on the device. An operating system handles all of the directions from the apps that are running and what the user is tapping on as well as connecting to the internet, handling text messages and phone calls. It is a busy system! As we begin to develop applications for smart phones and tablets, it is important that we keep in mind the devices that our apps will be running on. Below I have listed the four most popular Operating Systems for mobile devices:

Google Android

The Android OS was developed by Google. The first beta was released in 2007 and it has been regularly updated every few months. At the time of this writing Jelly Bean (v.4.1) is the current stable release.

Native development for Android devices is done with Goggle's APK (Android Programming Kit). But many tools (including Corona, which we will be using) also allow you to build android applications.

The Android OS is available on smart phones and tablets. It is the foundation of Amazon's Kindle Fire and Barnes & Noble's Nook tablets and enjoys a devoted following. Android Apps can be sold on Amazon, Barnes & Noble, and Google Play. Watch for Android to begin showing up on gaming consoles such as the Ouya.

Apple iOS

Apple's iOS (previously known as iPhone OS) was first released in 2007. Apple iOS can only run on Apple hardware according to the licensing agreement that you sign when you download the software. At the time of writing v.6 of iOS is now available and has been widely adopted by the Apple community.

Apple iOS runs on the iPhone, iPod Touch, and iPad. Apple iOS apps can only be sold through the iTunes store.

Apple iOS native app development is done with xCode. However, like Android, there are many tools available (including Corona, which will be the primary tool that we use in this book) that allow you to build for multiple operating systems/devices at the same time.

Blackberry

At one time, Blackberry smartphones by Research In Motion were the smartphone to own. They controlled a significant market share prior to the advent of the iPhone and Android smartphones. It is difficult to say the impact that Blackberry will have in the future; they are releasing a new SDK called Blackberry 10 and it is supposed to allow Android apps to run on the platform.

At this point in time, only a few multi-platform app development tools do support Blackberry.

Windows 8

Microsoft has dabbled in the smartphone and tablet arena for years (one of the first tablets used Microsoft). However, it has not found much traction. Microsoft hopes to change all of that with Windows 8 and the release of Surface tablet (which Microsoft refers to as a PC). This is a new Surface tablet. Previously Microsoft called their interactive tabletop Surface. Native app development for Windows 8 devices is done in C# using Visual Studio.

Cross-Platform Development

Perhaps I am just lazy, but I don't like to do things twice. When I have created a great app (or even a not-so-great app) for the iPhone or iPad, I don't want to spend weeks completely re-writing all of the programming code just so that it can be deployed to a different set of devices. When I first got started in app development, this is exactly what you had to do. Fortunately, there are now many tools that allow the developer to create apps for more than one operating system.

We will be using the Corona SDK by Corona Labs (http://www.CoronaLabs.com) for the majority of our development. Corona Labs was created in 2008 as a venture-backed company in Palo Alto, California. Before Corona, the Corona Labs team was responsible for creating many of the industry standard tools that I am sure you are familiar with. In the time that I have been developing apps with Corona, I have found Corona Labs to be one of the most friendly and helpful businesses that I have had the pleasure of working with. In addition, online community is unusually friendly and supportive. If you decide to join the Corona community, be sure to continue this great spirit of helpfulness!

At the time of this writing, Corona supports iOS & Android app development, with additional operating system support planned for the near future.

One Last Note Before We Get Started

Corona Labs has recently begun offering the option of becoming a Corona Certified Developer (CCD). As the author of the test and study guide, I want to let you know that if you successfully complete this course, you will have covered everything you need to become a CCD except one; publishing your own app to a store, but we'll cover how to do that so that you can earn your CCD.

Developing Mobile Applications

From concept to store, an app development project goes through eight stages:

1) **Design phase –** This is the entry point that many apps never get past. You have an idea for what you want the app to do. The first thing to determine is if the device you hope to place the app on can even do the tasks that you are requiring of it. If it can, is the project feasible? There are many considerations including development cost, software cost, and time; I think you get the picture. If the project appears to be capable of being completed, then you move on to the next stage. Remember to include in this initial design phase how to make money from your app and include any social networking/marketing ideas. The most successful apps plan for marketing and sales from the beginning. One final consideration in the design phase is legal. Be sure to investigate intellectual property and regional/national laws where you hope to sell your app.
2) **Gather Requirements –** This phase is about detailing exactly what functionality the app will contain and the design of what the various views will look like (also called storyboarding). This is an essential phase. If you, the developer, are not sure what the app will look like when it is completed, how can you communicate what you are developing to others? Be sure to keep these initial designs and develop a webpage around the development process. It will help with your marketing efforts!
3) **Code and Graphic development –** This is where you get started programming and developing the graphics for your project. The best teams are composed of programmers and artists.
4) **User Testing –** Too many people skip the testing phase or do not conduct a thorough enough test of their app. Deploy your app to a few test devices and have people in your target audience use the app. Listen to their feedback (remembering that they might be overly kind) and implement their suggestions.
5) **System Tests**- Before releasing your app into the wild, run a systems test. Is your app connecting to a remote server or the cloud? Facebook? Twitter? Make sure that all of these features and services are capable of supporting the additional demand your app might place on it.
6) **Documentation/Marketing –** Before you can release your work to an app store, you must have a supporting webpage in place with contact emails and screen shots. This is also part of your marketing effort so make sure everything is perfect!
7) **Production** – Create your app for release and place it in the stores in which you would like to sell it.
8) **Maintenance –** If you haven't noticed, the operating systems for devices are constantly changing with more, newer devices becoming available on almost a daily basis. You should expect to refresh and update your app at least every few months at the very least. On the bright side, in most app stores, releasing a new version could get you a higher ranking in the search engine!

The above list is based upon the traditional software development lifecycle. I have made one adjustment. In the traditional lifecycle, Documentation/Marketing is placed after Production. In app development, that would be a mistake. Documentation and marketing are too important and their not being completed will delay you being able to submit your project to the app stores.

Software That You Will Need

It's no surprise that you will need the Corona SDK to get started. For learning, I recommend downloading the trial version. If you are ready to become a full subscriber, just head over to the on the Corona Labs website http://www.CoronaLabs.com/. Click on the download button and register (whether you are purchasing the subscription or downloading the trial). If you are a student or faculty, you can get a discount on your subscription by going to http://www.coronalabs.com/store/corona-for-education/

Setting Up Your Software

The process varies depending on whether you are installing Corona SDK on a Macintosh or a Windows computer system. A full tutorial for installing the software on both machines is provided in Appendix A. In Appendix A we will also discuss what software is required to publish to devices for different operating systems.

Setting up Your Hardware

Corona isn't too demanding on your development computer. As long as you are running at least OSX 10.7 (Lion) or later on the Mac side, or Windows XP with a 1 GHZ processor on the PC side, you will be fine.

If you are planning to develop and deploy to iPhone, iPod Touch, and/or iPad, then you must have a Mac of some type to publish your apps. This is an Apple requirement. To keep in everyone's good graces, Corona will only publish for an iOS device if you are using a Mac computer to deploy the app. You will also be able to develop and deploy your Android based app from a Mac.

If you only have a windows system, you will be able to develop and deploy for Android based devices. You will also be able to develop for iOS devices. You just cannot deploy your finished app to an iOS device (or the iTunes store). I use both a Mac laptop and a PC, regularly switching back and forth during the app development process.

Development Hardware Matrix:

Development Hardware	Android OS		Apple iOS	
	Develop	Deploy	Develop	Deploy
Macintosh	X	X	X	X
Windows PC	X	X	X	

Test Devices

If you are going to develop and sell apps for mobile devices, you should have a mobile device to test your creation. I have been on projects where I was required to develop for hardware that I didn't have. It was like herding cats. Using just the app simulator will get you 75% of the way home, but it won't allow you to spot all potential problems. On one of the aforementioned projects, the app worked fine on the simulator, but crashed on the mobile device and was rejected by Apple. The experience was more than just a little frustrating and taught me a valuable lesson: If you are developing for a platform, have test devices!

Android

Corona only builds for Android OS 2.2 and newer. Any devices that you plan to develop for must use the ARM V7 processor. There are plenty of devices that meet this requirement, so you shouldn't have any problem finding one to perform your tests.

iOS

For deploying to an iOS device, you will need a developers license and either an iPhone, iPod Touch, or iPad. Obviously, having an older phone or iPad is a good idea for testing FPS (Frames Per Second) for graphically intensive apps. It is recommended that you use the newest iOS on your devices. To be able to deploy to an iOS device, you will need a Mac computer system and a Standard, Enterprise, or University developers account from Apple.

Book Examples and Graphics

If you don't want to create your own graphics or you would like to double check what you have programmed against what I have coded, I have created a repository of code samples, graphics and other tools that you might want to use with the projects that are listed in this book. They are all available at http://www.burtonsmediagroup.com/books/learning-mobile-application-development/.

Editors

The editor that you decide to use is a personal decision. Corona isn't impacted by the editor selection, so you need to use an editor that you are comfortable with. I recommend one that allows the integration of Lua to make your editing easier.

Some of the most popular editors in use with Corona include (but are not limited to) BBEdit, Eclipse, Notepad++, TextMate, TextWrangler, and Xcode. Of course you can ignore all of these editors and use notepad or textedit if you so desire.

BBEdit (Mac) by Bare Bones software, $99.99.
BBEdit does a nice job for a multitude of editing needs. BBEdit has built in configurations (including Lua), which easily allows you to set the editor to the language you are developing in. http://www.barebones.com

Corona Project Manager (Mac/Win) by J.A. Whye, free or $49.
Corona Project Mangaer has a built in editor and is the primary tool I use for editing and project management. Coupled with its ability to greatly simplify tracking your Corona project, the cost of CPM is well worth it. See Chapter 17 for a coupon code to save on CPM. http://www.coronaprojectmanager.com

Eclipse (Mac/Win) Open source, $0.
Eclipse is the editor I use when working on my PC. Eclipse has a large community of support. Though Eclipse was originally designed as a Java IDE (Integrated Development Environment), it is now the bases for many editors on the market. A Lua/Corona plugin is available. http://eclipse.org

Notepad++ (Win) Open source, $0
A popular open source language editor for the PC environment. http://notepad-plus-plus.org/

TextMate (Mac) by Micromates, €39 (about $57).
Textmate is very popular in the Corona community with a Corona plugin available on the Corona Labs website. http://macromates.com

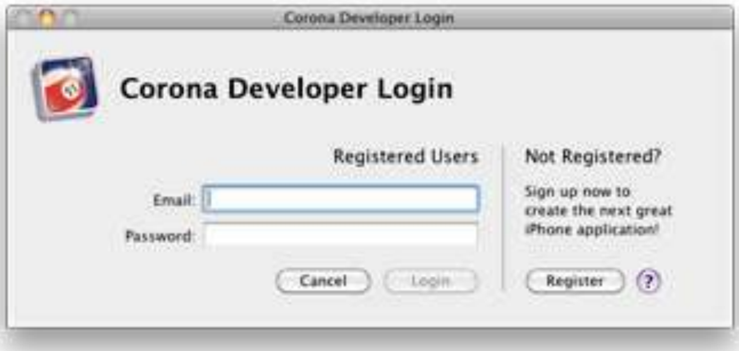
TextWrangler (Mac) by Bare Bones Software, $0.
TextWrangler has the advantage of being a free editor for your Mac. Though it doesn't have all the bells and whistles as BBEdit, it will get the job done for those on a budget and offers integrated Lua support. http://www.barebones.com

Xcode (Mac) by Apple, $0*.

Xcode is an integral part of the iOS SDK. If you are used to developing using Objective-C, Xcode is a natural choice. While Xcode is included with iOS SDK, it is only free if you are already a standard developer with Apple. If you register for a free account, the iOS SDK (which includes Xcode) is $4.99.

Our First Project: Hello World

The first time you launch the Corona Terminal or Simulator it will ask you to login with your registration information that you used on the Corona Labs website. Complete this one time authentication and you will be ready to go.



Corona Developer Login

Sign up now to create the next great iPhone application!

Corona Developer Registration

You should always launch the Corona Debugger on a Macintosh instead of the Simulator for performing application builds and testing. On a Windows system, launching the Corona Simulator also launches the Corona Simulator Output window (commonly referred to as the terminal window). The Corona Terminal gives you important feedback when you are building your apps and allows for easier troubleshooting. The Corona Terminal will automatically launch the Corona Simulator.

Project 1.0: Hello World

I personally always hated programming books and classes that spent the first chapter or week just getting all the details taken care of. I purchased the book or took the class because I wanted to program, not to go over some syllabus or a review of all the different ages of computer development. So let’s skip all of that and make an app that will help you learn your way around Corona: a “Hello World” project.

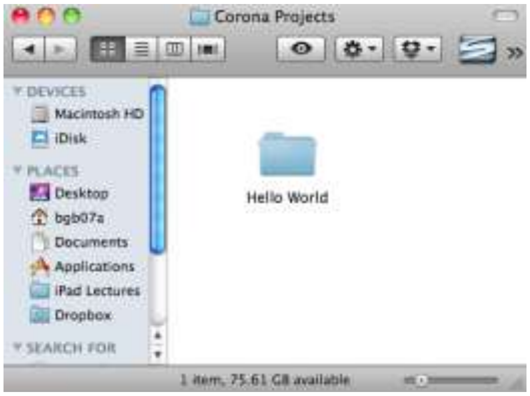
Stop with the rolling of eyes! Before I lose you, let me guarantee that you will get a very valuable resource out of this Hello World project, something that you will use the rest of the time you develop in Corona.

Was that enough to get your attention? Then let's get started!

Project Setup

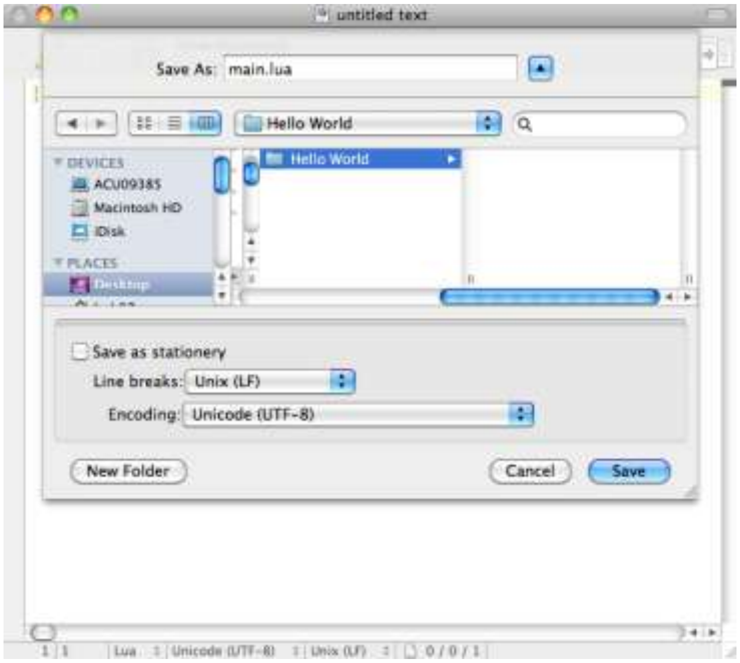
If you follow this process each time you start a new project, it will make your life a lot easier:

First, create a project folder called "Hello World". This can be on your desktop or wherever you like to organize your work. I keep all of my project folders together in a folder called "Corona Projects".



Create the Hello World folder for your project

Open your editor of choice (I'm using BBEdit in these initial screen shots). Create a blank file and save it as "main.lua" to your Hello World folder that you just created. The main.lua file is the first file that the Corona simulator will look for when it is run. If there is no main.lua file present, nothing will happen.



Save As: main.lua

□ Save as stationery

Line breaks: Unix (LF)

Encoding: Unicode (UTF-8)

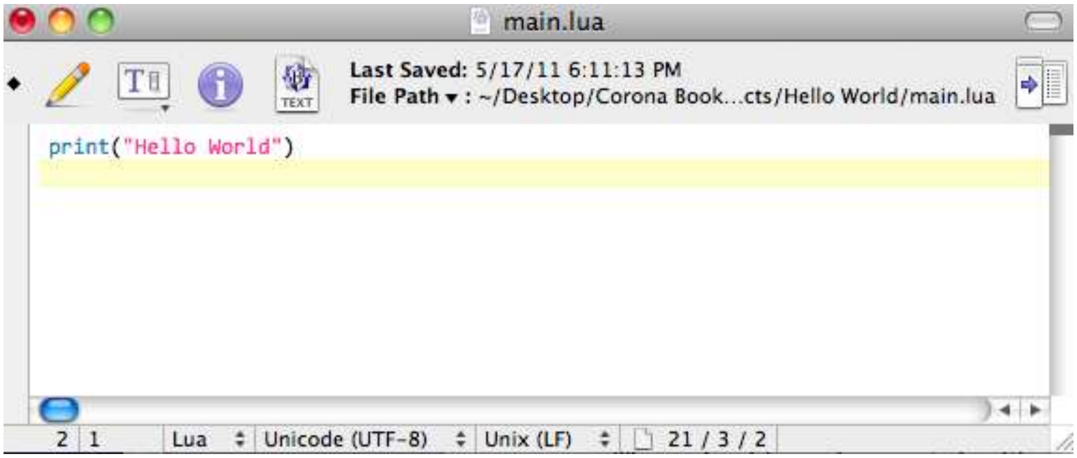
Save the main.lua file to your Hello World folder

There should now be a main.lua file in your Hello World folder.

Back in your editor type:

```
print("Hello World")
```

and save your file as main.lua.



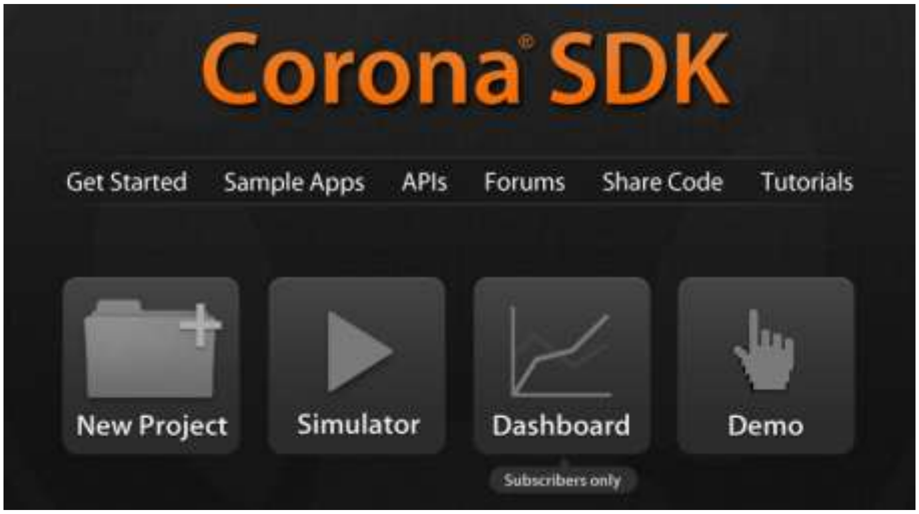
Last Saved: 5/17/11 6:11:13 PM
File Path ▾ : ~/Desktop/Corona Book...cts/Hello World/main.lua

```
print("Hello World")
```

Hello World project in the editor

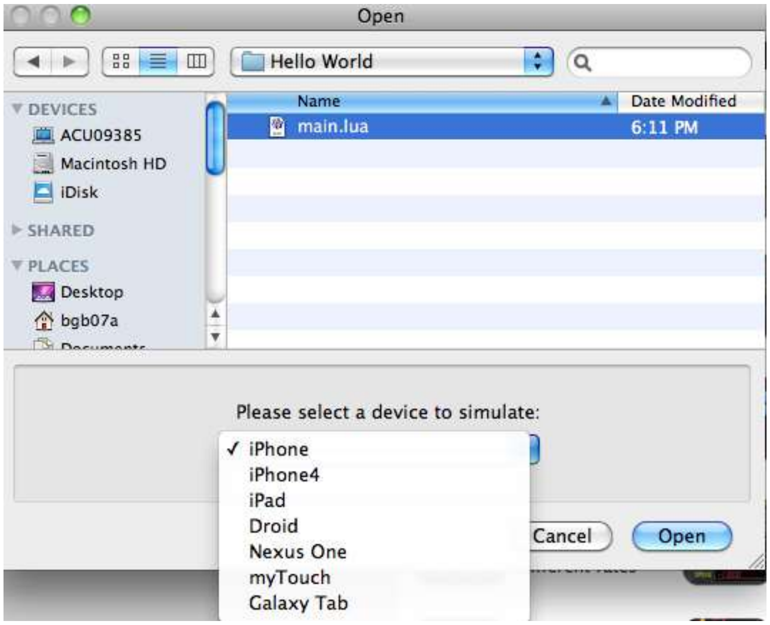
Next, you will need to launch Corona. If you are on a Microsoft Windows system, launch the Corona Simulator. On a Macintosh, launch Corona Terminal.

An Important Macintosh Note: Throughout the book I recommend using the Corona Terminal to launch Corona instead of the simulator if you are using an Apple computer. The Corona Terminal can be found through your Finder under Applications > CoronaSDK > Corona Terminal. On Windows, the terminal windows will open automatically when you launch the simulator.



Corona at startup on a Macintosh – don't use the new project button yet!

On launch, you will see the Terminal window and the Welcome to Corona dialog box. Select "Open a Project" from the Welcome to Corona dialog and navigate to the Hello World folder that was created earlier. Your initial window might be different based upon the version of Corona that you are using.



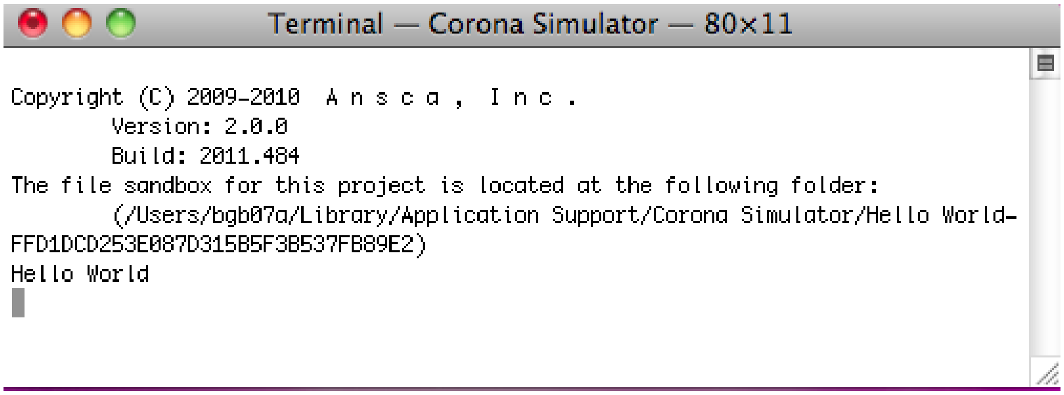
Open Hello World & select device to simulate

When you are opening a project, you will be able to select which device you would like to simulate in the Corona Simulator. For now select either iPhone or Droid and click on the Open button. Selecting other devices could give you different results than what are in the screen shots that have been included.

As soon as you open the project, the simulator will run the project.

Did you notice? That's right, nothing happened…in the simulator. Look in the Terminal window.

On the last line of the text in the Terminal you should see your Hello World displayed.



```
Copyright (C) 2009-2010  A n s c a ,  I n c .
        Version: 2.0.0
        Build: 2011.484
The file sandbox for this project is located at the following folder:
        (/Users/bgb07a/Library/Application Support/Corona Simulator/Hello World-
FFD1DCD253E087D315B5F3B537FB89E2)
Hello World
```

Hello World in the Corona Terminal window

Congratulations! You just made your first Corona app! Now before you become disappointed, you just learned a very important tool for troubleshooting your applications. When something doesn't seem to be working correctly or displaying the way you want, you can send yourself messages through the Corona Terminal window. Believe me when I tell you that this one command will save you hours of troubleshooting headaches!

I am sure you also noticed that Corona generates a great deal of additional information before giving you the results of your print command. The first few lines provide information about the version of Corona and the location of the simulation files.

Note: If you didn't see anything, there are two areas that people commonly make a mistake: 1) they didn't save their main.lua file (I still make this mistake) or 2) when saving the main.lua file, it wasn't saved as a text file type.

Debugging

One of the key methods for debugging is liberal use of the print() command. With the print() command, you can pass a variety of text or variable values to the NSLog (a file that tracks events for Apple devices) or terminal window (depending on your version of Corona SDK). To be a successful app developer, you will quickly come to depend on using print throughout your program.

Project 1.1: Hello World (v2.0)

Well, that was frustrating! I wanted to make something appear on the screen! Let us make a second attempt at getting something on the simulator screen. Back in your editor (you can use the same main.lua file)
Type:

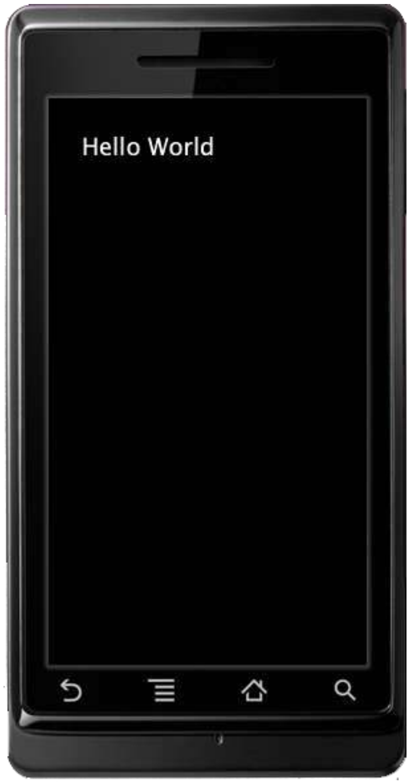
```
local textObj = display.newText("Hello World", 50, 50, native.systemFont, 24)
textObj:setTextColor(255, 255, 255)
```

Lua, the language behind Corona, is case sensitive. So newText is a different word than newtext. Try newtext and look at the error that appears in the Terminal window.

Note: Be sure to use " " and not “” in your apps. “” will cause an error!

I'm sure you have a lot of questions on what you typed in, but try launching your app first, and then we will look at what happens.

Save the file, and then launch your simulator. You should now see Hello World displayed in the simulator.



Hello World

Hello World on the Droid simulator

What did you just do? Here's the run down:

First we created a local variable called textObj. A **variable** is just a place holder for other things in our program. Often times we aren't sure what the value or information will be when we are writing our apps, so it is necessary to use a variable to hold our information. Remember back in math (or if you are from the U.K., maths) when you would use x or y to solve an equation? Well, a variable is the same thing, except we are going to name our variables much better than x or y. Good variable naming will make our lives much easier when we get to more complex apps that might have 10 to 20 (or more) variables. It might mean more typing, but you will really appreciate it when you go to revise or update the program at a later date. We do not have to use the variable name textobj, we could use fred for the variable name but after a couple of days we might forget what fred represents.

We set textObj equal to the **object** (which we will discuss in just a minute) that we create by calling display.newText. display.newText is a command that Corona understands. When Corona sees display.newText, it knows that we are going to type something to the screen by telling it what we want to type, where we want it placed (the numbers 50, 50, which are the top and left corner of the text), what font we want to use, and how big the text will be.

The display.newText parameters are:

```
display.newText(text, left corner, top corner, font, text size)
```

or

```
display.newText("Hello World", 50, 50, native.systemFont, 24)
```

In the second command line,

```
textobj:setTextColor(255, 255, 255)
```

we set the color of the textobj that was just changed using the R, G, B color system (each color (red, green, blue) having a value between 0 – 255) to white (which is 255, 255,255; to get black, we would set it at 0, 0,0; red is 255, 0, 0; green is 0, 255, 0; blue is 0, 0, 255):

```
textobj:setTextColor(R, G, B)
```

By default, the text object is white, so we didn’t really accomplish anything by setting the textobj to white. I want to get you in the practice of setting the text color when you create a text object. Later we will look at how to fade the text object out (or in).

Now you have made your first REAL Corona app!

Warning: If you copy code from a website (or even from this book), sometimes the quotation marks will change from straight quotation marks to smart quotes. This WILL cause an error in Corona. Make sure your quotes are always " " and not “ ”.

Introducing Objects

You may have noticed the use of the term **object** sprinkled throughout the book thus far. When I use the term 'object' it is to represent anything that is used in our project. Text, buttons, or sounds; they are all objects. Just as in the real, physical world, I can move or interact with an object (a lamp, table, or car). An object in your software is anything that you or the people using your app can interact including viewing, tapping, dragging, listen to, or just a pretty picture that is on the display.

Real world objects all have **properties** that help to describe the object's location, color, or anything that can be changed about the object. If I have a car, I might describe the car's location by its longitude and latitude.

In programming (including Corona), we are able to interact with each object's properties to make changes; such as when the textObj was created, we set the left, top, font, and size properties as well as the string that would be displayed.

Most objects can have their property changed just by setting it to a new value:

```
textObj.x = 100
```

would move the Hello World that was displayed on the screen to pixel location 100 (or to the right 50 pixels of the original location). Properties always have a period between the object name and the name of the property.

A few valid properties for display.newText include:

object.size – set the font size of the text
object.text – set or change the text
object.x – set or change the x location of the object (based upon the center of the text)
object.y – set or change the y location of the object (based upon the center of the text)

Objects can also have **methods.** A method is something that changes the current state of an object. Think of a lamp. A lamp can be turned on or off. If we were going to have a method for a lamp, we might call it setLight so that we could have it on or off.

To use a method, we put a colon between the object's name and the method we are going to use. In the case of our text, the primary method that we are concerned about right now is setTextColor. To change the color of the text we would use the command

```
object:setTextColor(R, G, B)
```

Okay, that is enough for now! If it seems confusing, do not worry about it, it is confusing when you are first getting started! Give yourself a little bit of time to get used to the idea. Remember: 75% of any new skill is learning the vocabulary. If you get used to the idea that an object can be anything in our app and a variable is just the name that we are going to use to refer to that object, you are most of the way there already!

Summary

This has been a busy chapter! Corona should now be installed on your system, you have been introduced to editors, hardware considerations, and publishing information. We even managed to develop two apps (okay, maybe not saleable apps, but they are apps)! The first app introduced the critically important print command; the second app actual displayed text to the Corona simulator, our original goal. Finally, the concept of a variable and an object in programming was briefly introduced. If the idea of an object and variable doesn't seem natural yet, don't worry, it will make more sense as we learn more material.

Programming Vocabulary:

Method
Object
Property
Variable

Questions:

1. What is a method? Specify its importance and give an example.
2. What is an object? Specify its importance and give an example.
3. What is a property? Specify its importance and give an example.
4. How are objects and properties related to one another?
5. What is a variable? Specify its importance and give an example.
6. What is the programming language that Corona uses?
7. True or false: I can publish for an iOS device using a PC.
8. True or false: Corona allows me to publish to multiple mobile operating systems.
9. List and summarize the eight steps of app development.

Assignments

1. Try various typos to see the resulting error messages in the terminal window.
    a. Make a typo in newText. What is the result?
    b. Make a typo in native.systemFont. What is the result?
    c. Try settextColor. What is the result?
2. Change the text object to red in the Hello World (v2) project.
3. Reposition the text to the bottom of the simulator without letters going off the bottom by changing the x and y values of display.newText in the Hello World (v2) project.
4. Place 5 different messages in different places on the screen, each in a different font, size, and color.

Chapter 2 Introduction to Programming

Learning Objectives

In chapter 2, we will learn

- about Variables
- the difference between a local and global variable
- how to place a comment in your program
- how to determine the screen size of a device
- how to create a routine that can be called
- what a listener is and how to use one
- about the API and how to use it

Chapter 3 Animation and Orientation

Chapter 4 Working with Data

Chapter 5 Working with Graphics

Chapter 6 User Interface Considerations

Chapter 7 Working with Media