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Roberto Dillon

HTML5 GAME DEVELOPMENT *from the Ground Up with* CONSTRUCT 2

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To my Students

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Foreword

Scirra started out life several years ago as a loosely organized band of volunteer students working in our spare time around full-time courses. We were fairly casual and a little chaotic in getting the first (and rather flawed) iteration of our software, Construct Classic, off the ground. Sometimes there were periods of neglect when exams and other concerns came up, but we always returned to it. We really loved it solving the technical problems, working with the community, and slowly gaining recognition. Years later, through a complete ground-up rewrite and release of the successor, Construct 2, I find myself sitting in our office in the outskirts of London and making a living from it all! Passion and persistence can get you a long way, even from the most humble of beginnings.

I won't go into Construct 2 itself, since this book by Prof. Dillon will teach you a great deal about that. However, I will add a word about technology in general. I think technology is amazing. You can buy consumer graphics processors that have thousands of cores, using billions of individual transistors. Most of the computers in the world are connected together and can communicate in real time via the Internet. Phones are now computers with apps that you carry everywhere with you, and tablets are a whole new type of device. There are, of course, even more exciting technologies, and there are surely more innovations to come that we cannot even anticipate. When it comes though, as ever, software will be the glue that connects all of it together.

Traditionally software development has been a complicated endeavor requiring expertise to combine exciting technologies in interesting ways. One of our aims with Construct 2 is to help people get involved in this fascinating, fast-paced world. It's designed to considerably lower the barrier of entry, while remaining a productive and useful tool. We hope that even without much experience you can come up with something exciting that combines graphics processors, Internet communication, phones, tablets,

and more—all made possible by a whole stack of technology, right down to the individual transistors.

If you are using Construct 2 and ever experience the delight of seeing something working the way you wanted it, or feel curious to find out how something works and are compelled to learn more, or just awe at how much is working together to make it all possible, then we have succeeded If you are young, or have never really been involved in technology, and Construct 2 is your first inspiration on a longer path of involvement in technology (just as other technologies fascinated us when we were young), then it truly is a privilege to have provided that for you. Just remember that with your persistance and Construct 2, you can create great games!

Ashley Gullen
Director, Scirra Ltd.
London, September 2013

Preface

The exponential growth in sales of smart phones and tablets, together with more widespread and faster Internet connections worldwide, has made playing video games more popular than ever before. Internet-enabled personal computers and mobile device sales worldwide are fast approaching 1 billion units, and research data show that a significant portion of time spent online is dedicated to playing games. It's no wonder then that game development is attracting more and more attention, as a hobby as well as a possible career, where even small teams, relying exclusively on online platforms, can find success.

In an industry that was dominated until recently by big blockbusters sold at retail and developed by teams of 100+ professionals with budgets topping $100 million or even more, this may look like a dramatic and totally unexpected revolution. In reality, it can also be seen as a resurgence of the original spirit that characterized the early days of the gaming industry: in the 1980s, in fact, the relative simplicity of 8-bit computers allowed for the emergence of the so-called "bedroom coders," young students and teenagers who, through their passion and commitment, managed to find success in a market that started as a niche but soon expanded in ways that were truly unimaginable.

As the market became more demanding and complex, though, so did the underlying technology. Consequently, more resources, more time, and bigger teams were needed to develop successful titles. Today, instead, we are witnessing a new generation of technology that sidestepped raw power and complexity for convenience and ease of use. The new tools that are now available are so advanced and yet so intuitive that they enable anyone to develop commercially viable products. We can actually say that the time for the "bedroom coders" is back!

This book is written for this new generation of hobbyists and aspiring game developers who realized that exciting things can actually be done

with the right tools and knowledge. Indeed, there's a plethora of new and very good manuals available already covering all possible game engines and middleware, but, still, the book you are currently holding aims at being a little different, and I'm very glad it found a place on your shelf.

Not only will it teach you how to use a modern tool, in this case Construct 2, an HTML5-based game engine that will enable you to develop and release polished two-dimensional games on a multitude of different platforms, but it will also cover a foundational knowledge of game analysis and design based on my personal research on the subject. This more theoretical part will be covered in the exact same way I have been successfully teaching it in specialized classes across different institutions, including DigiPen Institute of Technology and James Cook University.

It is my hope that the first part of this book will help you in understanding what really matters in games and contribute to making you a better game designer from the ground up, able to play any game critically and to express your ideas in a clear and concise format. The practical chapters that follow from Chapter 5 onward are structured through step-by-step tutorials. There, we will build an arcade-style game, a platformer integrating some physics elements, and then a more complex puzzle game, remaking my own game *Turky on the Run*, published on Apple App Store and on BlackBerry World.

Lastly, the book will discuss different ways to deploy and monetize games across several platforms, including Facebook, iOS, Android, web-based marketplaces, and more. A couple of appendices are also included to provide some additional resources you may want to investigate as you progress in your journey as an independent ("indie") game developer.

Get ready to work hard and play harder!

Roberto Dillon
Singapore
September 6, 2013

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I'm grateful to all editorial staff at CRC Press for believing in this project, in particular to Mr. Rick Adams and Ms. Jennifer Ahringer, and to Ms. Carmen Tropeano for her invaluable feedback on the different tutorials. Special thanks also to my family for providing constant support and encouragement. Last but not least, I'm also very grateful to the guys at Scirra for making Construct 2 such a fantastic tool!

About the Author

Roberto Dillon was born in Genoa, Italy, and holds a Master's and a Ph.D. degree in Electrical and Computer Engineering from the University of Genoa.

Over the years he has worked in prestigious academic institutions across Europe and Asia, including the Kungliga Tekniska Högskolan (Royal Institute of Technology, KTH) in Stockholm, Nanyang Technical University (NTU) in Singapore, and the DigiPen Institute of Technology in Singapore.

While at DigiPen, he served as an Assistant Professor and Game Design Department Chair, teaching a variety of subjects like Game Mechanics and Game History, with his students gaining top honors at competitions like the Independent Games Festival (IGF) both in San Francisco and Shanghai.

He is now an Associate Professor at the Singapore campus of James Cook University, where he teaches game design and project management subjects to both undergraduate and graduate students.

As a game developer, Roberto has led high-profile research projects on innovative game mechanics and has designed indie games that were showcased by the international press and at events like Sense of Wonder Night in Tokyo, Electronic Language International Festival (FILE) Games in Rio de Janeiro, and the Indie Showcase at Casual Connect Asia.

Besides *HTML5 Game Development from the Ground Up with Construct 2*, Roberto wrote two other books: *On the Way to Fun* and *The Golden Age of Video Games*, published by A K Peters and CRC Press.

About the Book

This book covers game design and development in a manner suitable for beginners, hobbyists, and aspiring indie developers. No specific programming knowledge is required, although familiarity with very basic concepts (e.g., what is a variable, an array, or a function) is assumed.

The practical chapters are based on Construct 2, an HTML5-based game engine that runs under Windows. Note that Construct 2 is an ever-evolving engine with new versions being released very often. To make the book as "future proof" as possible, the tutorials have been carefully designed around stable and proven features that shouldn't change significantly in upcoming versions of the software. But remember that these were developed and tested up to the latest stable and beta releases available at the moment of writing, and specific implementations may have to be tweaked and modified in the future. The underlying game design concepts discussed here, though, will not be affected by any change in software and should help you in building a solid foundation in game design and development regardless of the actual tools used later in production.

Sample Construct 2 project files for the games designed in this book can be found on the author's website, http://programandplay.com.