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Gameboy Game Development

Graduation work 2020-2021

Digital Arts and Entertainment

Howest.be

CONTENTS

ABSTRACT

An abstract explains the aim of the paper in very brief, (the methods, results, etc.). Maximum length 150 words

El cliente es muy importante, el cliente será seguido por el cliente. Yo siempre dignissim, así como el arco. No importa cuán grande sea, es más importante tener un carcaj y, dijo cierto desarrollador. Los niños viven con enfermedades, la vejez y los niños, y sufren hambre y pobreza. De hecho, que sea la primera persona en el mundo, tal como es en el mundo, que sea la mejor persona en el mundo si no necesita sabiduría. teléfonos inteligentes No solo una caricatura, sino un disparador de vida, un elemento mío. Morbi en salsa dui sed lacus fringilla. No odio a mi familia y me encanta el fútbol y la escuela secundaria. Es una gran vida por delante. No hay pool clínico. Hasta entonces, ¿quién es mi amigo? Pero la sabiduría misma, el precio es el más puro, pero el resultado de beber la cama. Aliquam porttitor dolor eu gravida vulputate. El vestíbulo como urna necesita una masa de ultricidades tincidentes. Morbi hendrerit sapien at diam tincidunt siempre. Como decía, es el momento más importante, pero en el gatillo.

INTRODUCTION

This research paper aims to explore the various methods of developing software for the original Game Boy console (DMG-01). While other models of the Game Boy may be discussed, the focus of this research is exclusively on the DMG-01. As a pioneering handheld gaming console released by Nintendo in 1989, the Game Boy saw the release of over 1000 games during its lifetime. The purpose of this research is to investigate the development of games for this console, plus which technology and tools are available today to achieve this.

In order to compare these methods, the research will examine the differences between developing a game using GB Studio, C with GBDK, and assembly. Specifically, the research will compare the ease of use, performance, and flexibility of these three approaches in order to determine the most effective method for developing games for the Game Boy. GB Studio represents a more modern and easier approach to game development, while C with GBDK represents an intermediate level of difficulty. Assembly, on the other hand, represents the very low-level coding approach utilized by official developers in the 1990s.

CONTEXT

1. GAME BOY HARDWARE

1.1. SPECIFICATIONS

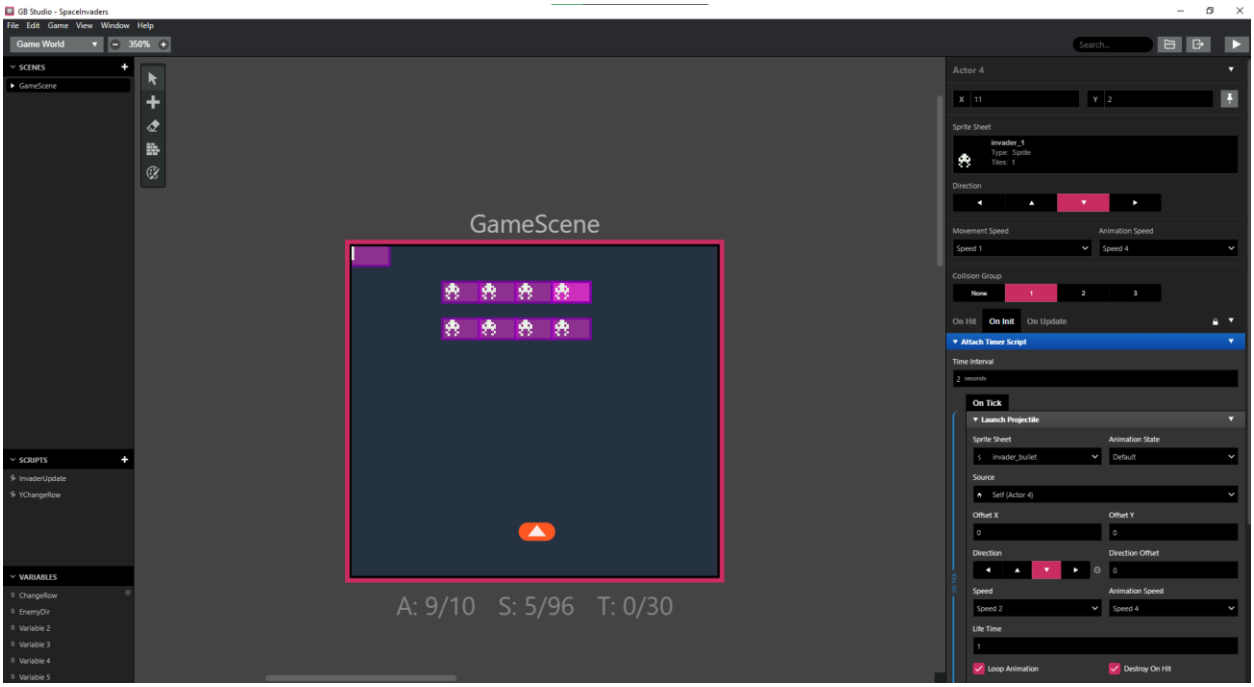
The original Game Boy is often referred to as the DMG-01. DMG stands for “Dot Matrix Game” because it utilizes a dot matrix screen. The Game Boy has a 1MHz, 8-bit processor. In reality, this processor is 4MHz but each instruction takes 4 cycles, so it is often simplified to being 1MHz. Many people will draw similarities to the Zilog Z80 chip when talking about Game Boy, however the DMG chips themselves are much more similar to the Intel 8080 than the Zilog Z80. It also has 8KB of RAM and VRAM respectively. The screen has a resolution of 160 by 144 pixels and can display 4 colors. The sprites you can have on the screen are limited. You can only have 10 sprites on the same row and 40 in total, any excess sprites will simply not be drawn. Each sprite is 8 by 8 pixels, however you can set them to be 8 by 16. [1]

1.2. --

2. DEVELOPMENT TOOLS

2.1. GB STUDIO

GB Studio is a game development engine created by Chris Maltby that enables users to create games for the Game Boy platform without requiring any prior programming knowledge. The software utilizes a visual scripting language, which allows users to easily create interactive elements in their games by dragging and dropping blocks of code. In addition to the visual scripting language, GB Studio also includes a level editor and an in-engine music creator to aid in the development process. These tools make GB Studio an accessible and user-friendly option for those interested in creating games for the Game Boy platform.[2]



2.2. C + GBDK

GBDK-2020 (Game Boy Development Kit) is a cross-platform development kit that includes libraries, toolchain utilities and the SDCC compiler suite for C. It is made for any sm83 and z80 based gaming consoles, but with the Game Boy as main purpose. However, it also supports the Analogue pocket, Sega Master System, Sega Game Gear and some other consoles.[3] GBDK-2020 is extensible with ZGB or Retr0 GB, both being game engines written with GBDK as its core, as well as multiple other tools.[4]

The suite it offers, SDCC, “is a retargetable, optimizing Standard C (ANSI C89, ISO C99, ISO C11) compiler suite that targets the Intel MCS51 based microprocessors (8031, 8032, 8051, 8052, etc.), Maxim (formerly Dallas) DS80C390 variants, Freescale (formerly Motorola) HC08 based (hc08, s08), Zilog Z80 based MCUs (Z80, Z180, SM83, Rabbit 2000, 2000A, 3000A, TLCS-90), Padauk (pdk14, pdk15) and STMicroelectronics STM8.” [5]

This development kit offers the functions needed to communicate with the Game Boy hardware, which SDCC then compiles to a ROM runnable on either the hardware or inside of an emulator.

To develop your software with this method, it is best to use an emulator to test, run and debug your code. Many options are available, one often used is BGB. This emulator is praised for its accuracy and debug tools available. Another highly regarded emulator is Emulicious. This one also offers accuracy and debug tools but comes with the

added benefit of having a VSCode plugin, allowing you to run from editor and have C source code debugging.[4] For this reason I chose to work with this emulator for this research project.

2.3. ASSEMBLY FOR GAME BOY

To Be Written

CASE STUDY

1. INTRODUCTION

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2. MODELLING

2.1. BLOCKOUT

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Figure 1 : MAKING OF THE HOBBIT: THE DESOLATION OF SMAUG – LAKETOWN (WETA DIGITAL, 2014)

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2.2. ZBRUSH

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3. TEXTURING

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4. SHADING

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5. LIGHTING

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EXPERIMENTS & RESULTS

REPEAT THE MAIN TOPICS, DISCUSS YOUR MAIN FINDINGS, DISCUSS THE END RESULT.

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DISCUSSION

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CONCLUSION & FUTURE WORK

REPEAT THE MAIN TOPICS, DISCUSS YOUR MAIN FINDINGS, DISCUSS THE END RESULT.

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APPENDICES