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Starting A Beginner Game Project With GameMaker Studio 2

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<p>Abstract</p> <p>This thesis was started with three secondary goals: researching GameMaker Studio 2, learning the basics of its drag-and-drop coding mechanics and studying how beginner-friendly the program is for a game designer. The main goal of this thesis was to create a document that delves into the basics of GameMaker Studio 2 and how to create a game level with it.</p> <p>The project was divided into three parts: mechanics, art and research.</p> <p>Competition analysis was used to compare GameMaker Studio 2 to RPG Maker, a program with many similarities in terms of beginner-friendliness. SWOT analysis was used to research this difference further while also looking at GameMaker Studio 2's future in the market.</p> <p>The results of this thesis project showed that while GameMaker Studio 2 is a viable program for game designers and game developers alike, its beginner-friendliness is somewhat exaggerated. This mainly came up with the limitations of the drag-and-drop mechanics. Rudimentary coding skills are still necessary for a complete game project. However, the programs graphical tools gave many positive surprises.</p> <p>In conclusion, GameMaker Studio 2 was determined to be a great program for beginner game designers, who have some experience with coding.</p>		
<p>Keywords</p> <p>gamemaker, game design, pixel art, rpg</p>		

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1 INTRODUCTION

This thesis aims to investigate GameMaker Studio 2 and find out how beginner-friendly the program is.

Specifically, the primary goal is to determine how much a beginner game designer with no knowledge in code can accomplish with the program's drag-and-drop (DnD) functions. While the drag-and-drop functions are lauded as perfect for novices, many online examples focus on point-and-click and projectile-oriented shooters.

The secondary goal of this thesis is to work on the project and learn about the program for future projects. The author has not worked with GameMaker Studio 2 previously.

A role-playing game (RPG) concept will be used as a base for this project for variation and added challenge.

The thesis project will be used as a beginner's first step into making a game. With the aid of this thesis, the project will be started and continued further in the future after graduation.

This thesis will look at the history of GameMaker Studio 2, its competitors and its current use in the game industry. A comparative analysis will be conducted with GameMaker Studio 2's most popular competitor, RPG Maker. SWOT analysis methods will be used to analyse GameMaker Studio 2 further.

GameMaker Studio 2 is generally lauded as a beginner-friendly program for game designers and this thesis will put this to the test. Regardless of the outcome of the actual project, the author aims to have gained knowledge about the program's strengths and weaknesses, user-friendliness and technical skill at the end of this thesis.

1.1 What is GameMaker Studio 2?

GameMaker was created by YoYo Games over 20 years ago, with the specific goal of streamlining the development process with drag-and-drop tools. It was originally released in 1999 and its latest version (GameMaker Studio 2) was released in 2017. (Dealessandri 2020.)

GameMaker Studio 2 is viewed generally as a novice-friendly program. Artists and people who have not written code before can utilize the visual scripting tool, called drag-and-drop, without having to see the code itself. The option to see and work in code is also possible.

GameMaker Studio 2 also has its own coding language, the Game Maker Language (GML), that those more experienced in coding can use. GML is viewed as easy to learn and program in, yet it is still not quite at the same level as more widely known coding languages. Mixing drag-and-drop and GML is also a verified tactic for all users alike. (Dealessandri 2020.)

According to YoYo Games' general manager James Cox, balancing the two sides of a novice-friendly program and a tool for seasoned studio developers has been both a goal and challenge for YoYo Games. "Deciding between adding new features, basic maintenance and upkeep, and adjusting to our customers' feedback can definitely be tough, but it's all a matter of prioritization." (Grubb 2017.) GameMaker Studio 2 and its previous versions have been used to produce many popular and beloved indie titles of varying genres, such as Undertale, Spelunky, Hyper Light Drifter and Hotline Miami. Cox says that GameMaker has helped in producing indie community's most defining moments. (Grubb 2017.)

1.2 Strengths and weaknesses

As mentioned in the previous chapter, the versatility and low bar of entry were the main reasons for using this engine. The program's popularity on the market means knowing even the basics of GameMaker Studio 2 is an excellent skill to have in the market.

The main strengths of GameMaker Studio 2 are its specialization in 2D development, integrations and community. There are many professional-made tutorials online and forums full of guides and tips for beginners. The program is also being worked on and updated continuously. (Criosdevs 2019.)

Compared to its most popular competitor, RPG Maker and its variations, GameMaker Studio 2 has one advantage: it can be used to make varying genres and types of games. RPG Maker is generally known for being more streamlined and user-friendly, but it can only be used to make role-playing games, as the name might suggest. It also has only a single type of camera, so branching out of the specific style of game is next to impossible. (Lehnen 2017.)

GameMaker Studio 2 is also actively kept up to date and worked on, unlike its former version, GameMaker Studio 1.4. The predecessor program's support ended in 2018, and while it can still be used, no new fixes or updates are available for it (Manthorp, 2018).

While GameMaker Studio 2 has incredible versatility in developing almost all sorts and genres of 2D games, its most obvious flaw becomes immediately obvious: poor 3D functionality and its lack of support. While it is possible to create 3D games with GameMaker Studio 2, it requires skill and good understanding of coding, and the developer must work hard for it. (YoYo Games 2018.)

The limited free license and lack of proper marketing can turn off new users to other programs (Criosdevs 2019).

While the marketing is mostly fixed by the active community, the licence prices are something that must be accepted. The cheapest and most accessible for beginners, the Creator licence, usually is 45 euros for 12 months, with more expensive licences rising to many hundreds in price.

A permanent Windows licence is 91 euros, which can be considered cheap compared to other programs on the market. However, it is still nearly 100 euros for a beginner game creator, when other products can offer free licenses and lower prices.

1.3 Opportunities and threats

The future of GameMaker Studio 2 on the market is a solid one for 2d and independent game markets, its biggest threat currently are its competitors. When compared to RPG Maker, its most known 2d-only competitor, GameMaker Studio 2 can be considered the more favourable option, as stated before.

However, when compared to other 3d-based programs such as Unity and Unreal Engine, GameMaker Studio 2 still has the fatal flaw of limited 3d support.

Programs like Unity are generally known as 3d programs, yet they can be constructed and edited to support 2d with great success. For example, Unity has a separate engine for 2d physics work and many other tools for sprites and scenes (Unity Technologies 2021).

While GameMaker Studio 2 is still more accessible to beginners than Unity, for example, there is still a very real threat to its use in the future. Should GameMaker Studio 2 fail to develop further and better, it may very well be overshadowed by the likes of Unity and other programs with wider application.

However, should GameMaker Studio 2 and its following versions expand further in accessibility and 3d support, it could very well advance to larger markets and challenge the likes of Unity.

2 PLACEHOLDER RPG GAME PROJECT

This project uses an existing game idea as a base created both for this thesis and as a concept of its own. The game concept was inspired by games such as Stardew Valley (2016), The Darkside Detective (2017) and Night In The Woods (2017), with the idea of combining RPG, mystery and puzzle elements for a unique premise.

2.1 Gameplay

The game is a murder mystery where the player character can see and communicate with ghosts. The game kicks off when the main character moves to a small town named Benoit. The town has seen better days and while cosy, it has a certain gloom to it. The player finds out soon enough that the town has a history of unexplainable murders.

The gameplay consists of interacting with the townsfolk and the arguably spooky ghosts, who start mostly unresponsive to the player. Uncovering the ghosts' past by talking to townsfolk and sleuthing around recovers the ghosts' humanity bit by bit, until the player can solve what happened to them.

While this thesis is unlikely to have the time to delve into it, the game is planned to have small mini games and puzzles related to recovering the ghosts' memories.

2.2 Game visuals

The style of the game is nostalgic 90s, drawn with pixel art. The art is mainly made by the creator, with the help of Juuli Partanen, who is using the game concept's visuals for her thesis on immersion. With Partanen's help, the graphics will be attuned and tweaked to fit the time and culture the game is based in. Immersion will be a significant factor in the visuals and gameplay in general.

The graphics in this version of the game project will be deliberately made unfitting to the world the game is set in. This can be seen with the sprites' shapes, their colour schemes and clothes. This is for Partanen to utilize and develop them further in her own thesis project, as mentioned above. This does not affect this thesis project, as the sprites are mostly made to be placeholders for the mechanics.

The game will be heavily focused on lore and environmental storytelling, with the game world filled with subtle elements the player can learn details from. As such, the game will use a mix of tile-sets and custom sprites to build its world. These tile-sets are given more focus than other sprites, for GameMaker Studio 2 offers great tile-set tools that a beginner designer should get to learn.

Shown in figure 1 are the before and after of author's original, placeholder sprite and Partanen's sprite, edited for immersion. Partanen has most notable added more detail and used a clear colour palette.



Figure 1. Comparison between author and Partanens work. (Pönni, O., Partanen, J. 2021.)

2.3 Goals and predictions for this thesis

The main objective is the designing and creation of a game level. Graphics will be included, if not entirely polished as the main point is learning mechanics and how to create them with GameMaker Studio 2.

The visual side of the project is secondary in general, as it could be a thesis work on its own, but one objective is to learn how making and applying sprites works in GameMaker Studio 2.

This project aims to have a clear understanding of GameMaker Studio 2's possibilities and limitations for beginner-level work. At the end, the author aims to have a good starting point and knowledge for future projects.

3 BEFORE STARTING WITH GAMEMAKER STUDIO 2

When first opening GameMaker Studio 2, The user is immediately greeted with banners advertising tutorials made by YoYo Games. It is highly recommended to watch and read these tutorials, as they give overviews and explanations of the programs different functions.

With quick googling, other tutorials can be easily found online, in written and in video forms. This is where the community support becomes evident and important.

YoYo Games itself has many materials for beginners on its site, which will be explored further on in the following chapter.

3.1 Resources and where to start

As stated before, GameMaker Studio 2 has many resources for beginners and professionals alike, both first-party and third-party made. The first result upon searching Google for GameMaker Studio 2 tutorials is YoYo Games' very own tutorial.

YoYo Games (1999) has created an online GameMaker Studio 2 Manual with detailed descriptions and instructions on all tools and functions the program has, as shown in Figure 3.

It is highly recommended for a beginner to research this manual in depth and get to know the names of the tools and functions before starting a project. The manual has categorizes the tools and functions into helpful categories.

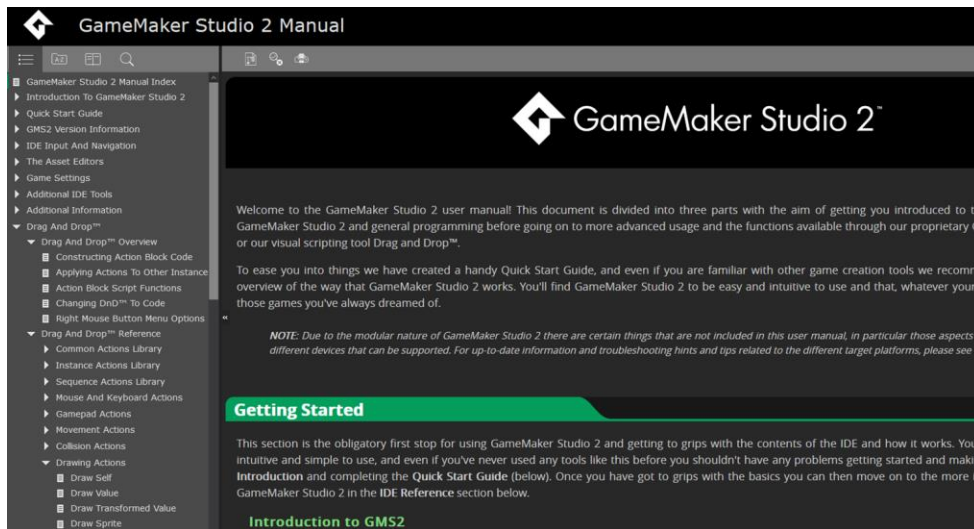


Figure 3. GameMaker Studio 2 Manual. (YoYo Games 2020)

YoYo Games' own site also offers plenty of tutorials and other resources that any beginner should investigate before starting, or while working with the program.

Many of the videos are small projects the user can learn from by working alongside them. The videos break down the projects into specific parts of game design and development.

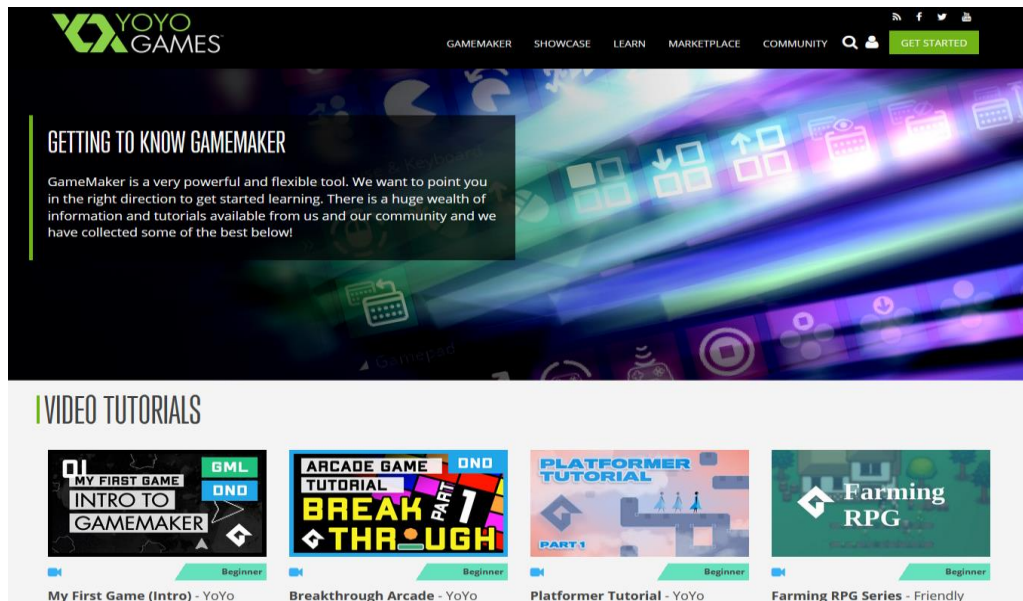


Figure 4. YoYo Games Learn page. (YoYo Games 2020)

Some examples of the many videos featured on YoYo Games' Learn page can be seen in figure 4. Below the video tutorials one can find written tutorials and other resources linked on the page, such as GML scripts, development blogs and other guides.

3.2 Basics of GameMaker Studio 2

When choosing to start a new project, the prompt for choosing either GML or drag-and-drop appears. This is not a choice set in stone, the user can either use both or switch between the two at any time.

One of the main aspects of GameMaker Studio 2 interface is the resource tree, found on the right of the programs screen. Any resources open for editing will show up on the workspace, in the middle. On the left are layers, Room instances and Room properties. (YoYo Games, 2016.)

The most essential items on the resource tree (at the beginning stages) are the Objects, Rooms and Sprites folders. These folders work together to form most of the visual and interactive objects in the game.

Sprites work as the graphics in GameMaker Studio 2 that can be edited and animated. Objects work as objects to code functions and events into. Events are the code that tells objects what to do and how to function. If an object has no sprite, it is invisible. Rooms are the game levels that objects can be placed in. Without at least one room, there is no game to run.

3.3 Implementing graphics

Creating a Sprite begins with right clicking the sprites folder and selecting to create a sprite. This action opens the sprite window, where the user can tweak the dimensions, textures and collisions of the said sprite.

Clicking the icon below the “Size:” text opens Resize Properties-window, which has options to scale either the image or canvas. This window is shown in figure 5.

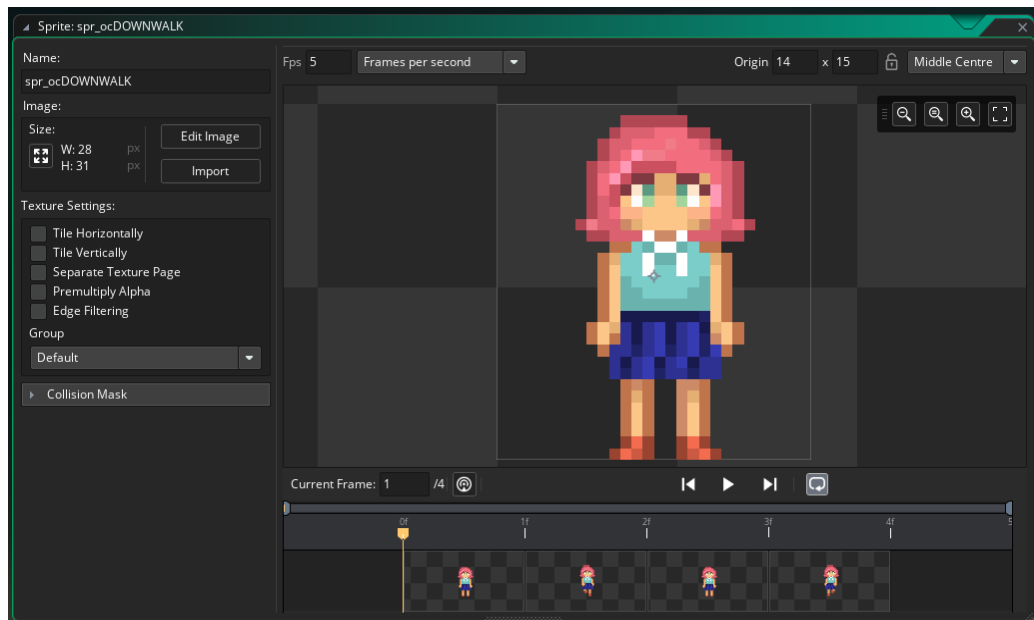


Figure 5: GameMaker Studio 2 Sprite spr_oc_DOWNWALK (YoYo Games 2020)

Clicking the Edit Image opens the editor that can be used to create graphics with. This editor has things many artists are familiar with: layers, tools, colours, frame wheel and the actual canvas.

While simplified, the image editor is surprisingly versatile and easy to use. It can be used to create animations, as seen in the figure below, where a rudimentary running animation has been created with four frames.

The icon on the top left is “Toggle onion skinning” - seen in figure 6 - a helpful resource when animating movement. It lets the user see the previous frame of animation while working on the next one, easing the process of creating a smooth-fitting animation.

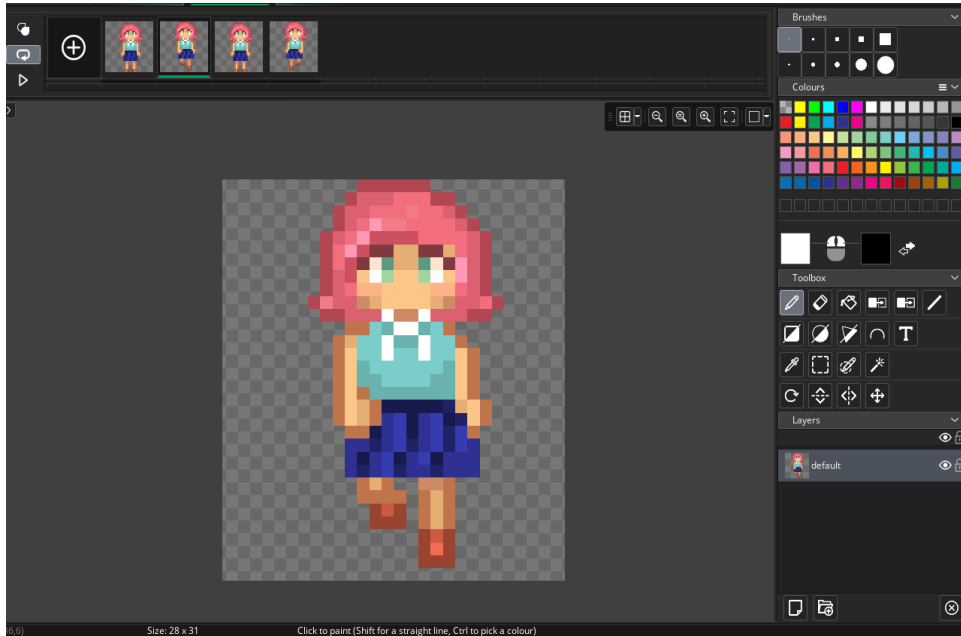


Figure 6: GameMaker Studio 2 Image Editor (YoYo Games 2020)

After a sprite has been created, it must be assigned to an object to be used in-game. Figure 7 illustrates both how the sprite has been assigned to the object, and the first glimpse into how coding works in drag-and-drop.

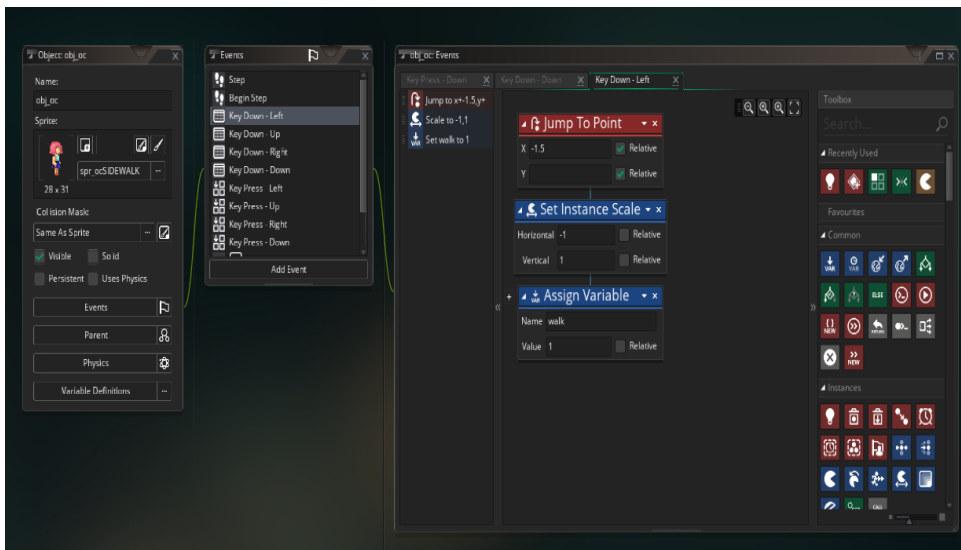


Figure 7: GameMaker Studio 2 Object and Events Editors. (YoYo Games 2020)

3.4 Implementing mechanics

The previous chapter and figure 7 illustrated some steps of creating code for movement with drag-and-drop. This can be seen further in figure 8, where if variables and key down commands are used to determine which direction the character moves and when.

These were easy to understand and implement. A video tutorial series by YouTube user Sparckman was of great help and followed closely for this process.

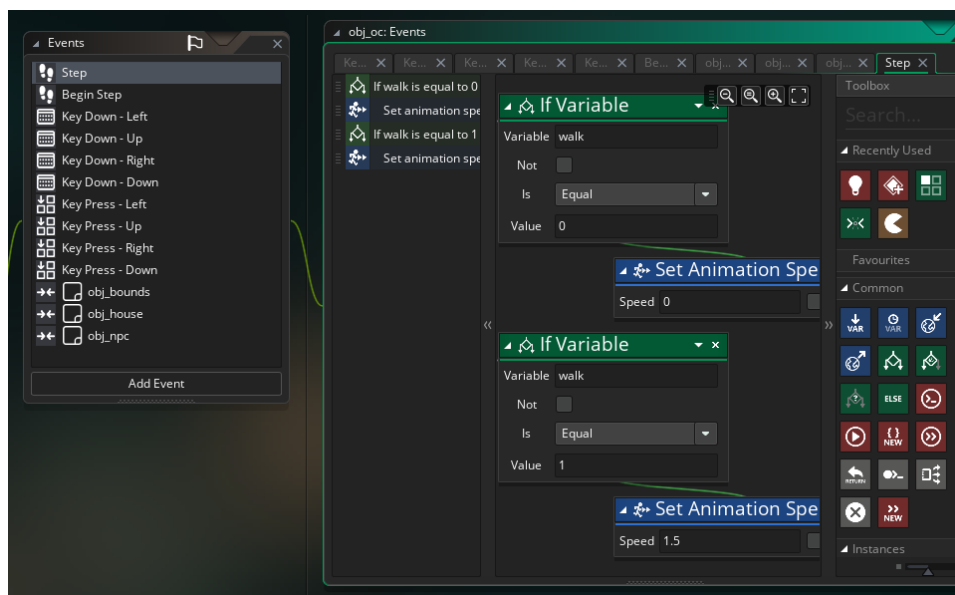


Figure 8. Movement Events And Drag-and-drop Code. (YoYo Games 2020)

Rudimentary collisions were also added that can be seen at the bottom of figure 8. These collisions prevented the player character from moving through objects such as houses and other character sprites.

As stated before, combining drag-and-drop and GML is a viable tactic for beginners and experienced users alike. I tried this method in this project, after it became apparent I could not achieve all the goals I had set for it using only drag-and-drop.

The dialogue boxes were attempted with GML entirely, as finding tutorials or methods for creating them was more complicated than predicted. Due to this, I chose GML tutorials and open-source code for their ease of access, if not ease of use.

However, since I had no knowledge of code, implementing the GML failed due to unknown reasons. This was disappointing for two reasons. Firstly, dialogue boxes are an essential part of all RPG games and not having the time to learn and implement them was a loss for both myself and for this thesis. Second, since I had no knowledge of GML, the problem could not be identified and worked on.

Had there been more time for the thesis, a dialogue system could have been attempted further. I found a readymade dialogue system from YoYo Games' marketplace at the end of the writing process, which seems promising enough.

3.5 What problems arose

As mentioned before, implementing dialogue proved to be more challenging than expected. The drag-and-drop events failed at this and tutorials online mostly focused on code-based dialogue mechanics. Would there ever be a follow-up for this project, however, I am certain a solution could be found from online materials.

There were some glitches when the player character was moved on the edges of the map. These were likely due to distortions in camera and viewport dimensions. I did not notice this issue until the very end of this project, and as such it remains unfixed, though it should not theoretically pose too large a problem.

Collisions also raised some issues. Buildings had to be sorted in two or more layers depending on the collisions and which parts the player character was to move in front of or behind.

The biggest problem turned out to be the deadline, in the end. Due to the lack of time and changes in my personal life that ate up time for this thesis, many features that I had planned had to be cut.

4 RESULTS OF THE PROJECT

The results of this project were mixed, but not overall disappointing. There were problems that could be overcome and problems that could not.

I learned a lot about GameMaker Studio 2, and although I could not get into the program as deep as I would have preferred, I am happy with the gained knowledge. I now have an adequate base understanding of what the program can and cannot do. I also gained a clear vision on what needs to be worked on in the future.

There are many things that could have been done differently and more efficiently, but as a learning experience this project was invaluable.

4.1 How beginner-friendly is it?

GameMaker Studio 2 is a program with broad possibilities and potential for all kinds of 2D games, yet it still requires a basic understanding of code to really get into as a designer or developer. While the drag-and-drop tool is easy to visualize code in, more advanced work requires advanced knowledge.

For game designers, the program has great graphical tools and implementations. Creating and animating sprite artwork has been streamlined and made easy to understand. The program has a great tile set tool as well for implementing background art.

It is very easy to create level and character art mockups with the program. The program can therefore be used to create prototypes or game concepts.

The basics of game developing and designing are beginner-friendly and easy to pick up. The program has segmented all its tools into neat categories, everything has a logical place, and the programs appearance can be customized to suit the programmers needs well.

Creating simple game projects as demonstrated on many tutorials really is as easy as it looks. However, anything more complicated – such as this thesis project – requires more advanced skills and studying.

4.2 Advice for novice developers and designers

I would recommend budding game designers and developers to learn the basics of coding before starting a project with GameMaker Studio 2. A deeper understanding is not necessarily required, but helpful.

In case of a tight schedule, a simple and streamlined project plan is something I would recommend. That way features can be worked on in detail without as many distractions. Unforeseen problems will appear despite the size of the project, but a manageable project will likely have more manageable problems.

GameMaker Studio 2's online tutorials and materials are of great help and beyond plentiful. Any beginner should study and search them in detail beforehand. I would recommend starting with YoYo Games' own tutorial materials, as they provide a great starting point.

All in all, GameMaker Studio 2 is a great program for learning through tiny projects, little by little. I would not recommend making the same mistake as I did by starting with a complicated project.

5 CONCLUSION

The conclusion of this project is a successful failure.

I set out to learn about GameMaker Studio 2 and how it works, start a game project with it that I would continue in the future, and have a clear idea for the future at the end of the project. I succeeded in all these goals.

I looked into GameMaker Studio 2's history, current place in the market and possible future. Many tutorials and online materials were studied and consumed for this project. I worked on my project and documented on what happened, both successes and failures.

However, many things could have been done differently, and the project could have been worked on much further with better planning and preparation. I could have managed my time and expectations better and gotten more results in general.

This thesis could have been expanded further with more material, yet I had to work with what I had, and the project suffered for that. I made the classic game developing mistake: I bit off more than I could chew.

I would still recommend GameMaker Studio 2 to many starting game designers. However, I would also recommend looking at one's own project and researching what program suits it. Forcing a project to use an engine or program unsuited to its specification only leads to unnecessary issues and workarounds.

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