

## Development of a 2D Action Adventure Game with Rhythm Element Named “Omnicaelum, The Way Out”

Nevio Tamarindo Rumbay<sup>1)</sup>, Jeanny Pragantha<sup>2)</sup>, Darius Andana Haris<sup>3)</sup>

Computer Science Department, Faculty of Information Technology  
Tarumanagara University

<sup>1)</sup>nevio.535180148@stu.untar.ac.id, <sup>2)</sup>jeannyp@fti.untar.ac.id,  
<sup>3)</sup>dariush@fti.untar.ac.id

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### ABSTRACT

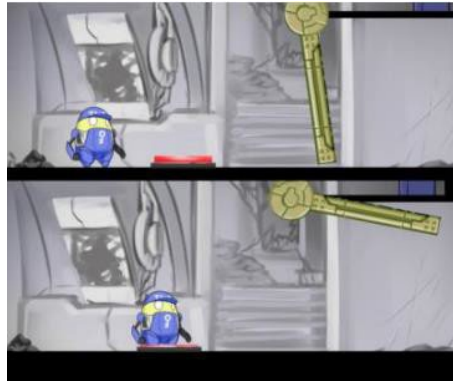
“Omnicaelum, The Way Out” is an action adventure metroidvania game with rhythm element for Windows. The story follows a knight trapped in a lost land of Omnicaelum, looking for the way out by defeating enemies and avoiding traps. The game is made with Unity Game Engine using C# programming language to write the scripts. The game implements a rhythm system where the timing of the enemies’ and traps’ attack follows the beat of the background music. Testing was done using blackbox testing, alpha testing by advisors, and beta testing by surveying 30 respondents. The result showed that the game has an interesting gameplay and the rhythm feature has been well implemented.

### INTRODUCTION

In this day and age, the video game industry is very popular. Cited from Tek.id, according to the data from We Are Social, in the year of 2020, there was a total of 3,77 billion gamers in the whole world. Compared to world internet users, which amounted to 4,66 billion, approximately 81% of them are gamers[1]. This shows the popularity of video game among worldwide internet users. By definition, video game is a game mediated by a computer[2].

Til’ date, the game technology is still continue to be developed with the appearance of various games which are distinguished by genres, i.e. shooters (first-person shooter and third-person shooter), role-playing games (RPG), action-adventure, strategy and many others[3].

“Omnicaelum, The Way Out” is an action-adventure metroidvania game that combines the use of rhythm element to give a different impression when playing an action game. It has a 2D side-scrolling gameplay and as a metroidvania, the player will have to explore the in-game areas and find hostile enemies and traps which will attack the player according to the timing of rhythm of the background music so the player is also challenged to pay attention to the rhythm to avoid the attacks. One example of a side-scrolling game is Beyond which can be seen on **Figure 1**.



**Figure 1** *Game Beyond*

**Source :** Muliadi, Jeanny Pragantha dan Darius Andana Harris, Pembuatan Game Platformer “Beyond” Menggunakan Unity Dengan XBOX 360 Controller, Jurnal Ilmu Komputer dan Sistem Informasi, Vol.4 No.2, 2016

## METHODOLOGY

### • *Game Design*

A design method is required during the development process to act as guidance in order to create a game according to plan, namely as follows[4]:

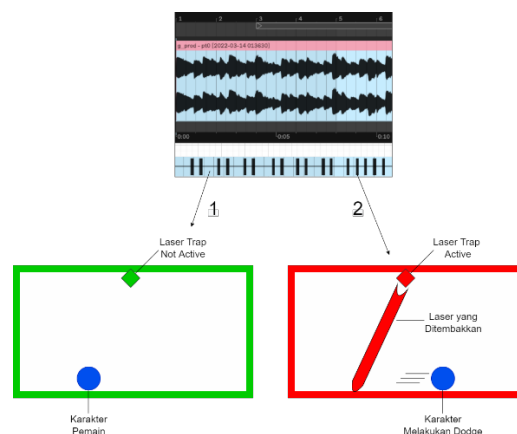
#### 1. High Concept

The high concept of this game is an action-adventure metroidvania with 2D side-scrolling gameplay where the player has to explore various areas to find the way to every boss fight to be able to finish the game.

#### 2. Gameplay

The gameplay of this game is a side-scrolling metroidvania. The player needs to explore to find the way whilst defeating enemies with action combat and avoiding traps. Progress can be made by unlocking new abilities used to pass the previously-blocked paths.

The rhythm element is applied to the timing of the attack of enemies and traps. An example of the attack trigger timing of a trap based on the beat on a beatmap can be seen on **Figure 2**.



**Figure 2** Example of the attack timing based on the beat on a beatmap

The trap used as example is the Laser Trap which will attack the player with laser each time it is triggered. Number 1 (left) in **Figure 2** shows the trap in idle condition when it is off-beat and number 2 (right) in **Figure 2** shows the trap in triggered/attacking condition as it attacks the player when it is on-beat. Each area inside the game has its respective music and beatmap so the timing of the attack of enemies and traps in one area will be different than those found in other areas. Each of the bosses also has its own music and beatmap.

- **Control Design**  
The control in this game uses keyboard and mouse input.
- **Character Design**  
“Omnicaelum, The Way Out” has three types of character, which are the main character, supporting character and enemy characters.
- **Object Design**  
Objects found in this game consist of traps, lifestones, diary notes, checkpoint and the player’s weapon.
- **Level Design**  
There are five areas in this game, which are Ruins, Wilted Forest, Abandoned Mine, Cavern and Sky Temple.
- **Sound Design**  
Sound is a crucial component in this game as it plays an important role in the timing of attacks. There are two types of sound, Background Music and Sound Effect. The timing of the attack of enemies and traps follows the rhythm of the Background Music.

3. Story

The story of this game is about a Knight who lost in the lost world of Omnicaelum and has to find the way out by defeating enemies.

4. Audience

The target audience of this game is 16-year-old teenagers and above.

5. Hardware

The hardware used to develop the game is a laptop with Windows 10 operating system.

6. Interface Design

The interface modules in this game are Main Menu, Save Slots Menu, Gameplay Module, Character Window, Diary Notes Window, Tutorial Window and Pause Window.

7. Development

“Omnicaelum, The Way Out” is being developed using Unity Game Engine.

8. Testing

In this step the already developed game is tested whether it matches the concept. The test methods used are Blackbox Testing, Alpha Testing and Beta Testing.

- *Game Genre*

Game genre is a categorization of games based on its challenge type, irrespective of its setting or content inside the game world. This grouping allows players to know the gameplay and interaction of a game[4]. The genre of this game is an action-adventure metroidvania where the player has to explore the world inside the game to continue progressing with action combat when battling with enemies. In addition the timing of enemies’ and traps’ attack follows the rhythm of the playing music.

## TESTING AND DISCUSSION

After “Omnicaelum, The Way Out” finished being developed, tests were done to determine whether the result is according to the design and if there is any error when the game is running. A total of three tests were done, namely Blackbox Testing, Alpha Testing and Beta Testing.

- *Blackbox Testing*

Blackbox testing was done to confirm if all modules in the game could run smoothly.

Following are the modules tested :

1. Main Menu Module

Main menu is the first interface being shown when the game is opened. Main menu interface could be seen on

**Figure 3.** On main menu there are a few options that can be chosen, namely:

- a. Play: to open the saved slots interface where the player can choose which saved slot to play. The saved slot interface could be seen on **Figure 4.**
- b. About: to open the about module, showing the name of the developer along with supervisors. About interface could be seen on **Figure 5.**
- c. Quit: to close the game program.

2. Gameplay Module

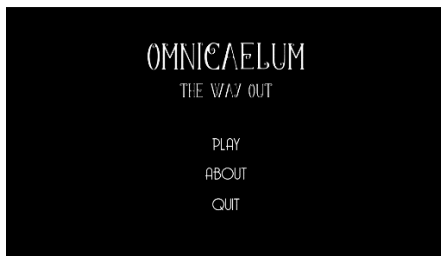
The gameplay module could be seen on **Figure 6.** Interfaces tested in this module are the following:

- a. Pause Menu: accessed by pressing Esc on the keyboard. The game progress will be saved when the player choose Main Menu. Pause Menu interface can be seen on **Figure 7.**
- b. Character Window: opened by pressing H on the keyboard. Character window can be seen on **Figure 8.**
- c. Diary Notes Window: accessed by pressing N on the keyboard. Diary Notes window can be seen on **Figure 9.**
- d. Tutorial Window: opened by pressing T on the keyboard. This window displays the description of the features in game and how to play the game. Tutorial window can be seen on **Figure 10.**
- e. Area Map: opened by pressing M on the keyboard. Area Map shows the location of each area in the game.

3. Gameplay Module Interaction

Interactions tested inside the gameplay modules are the following:

- a. Ability Switching: the player can choose what special ability to use by pressing 1, 2 or 3 on the keyboard.
- b. Trap Timing: every trap in game will attack according to the timing of the rhythm of the music. The testing of the timing of its attack can be seen on **Figure 11.**
- c. Timing of Normal Enemies: normal enemies in game will attack according to the timing of the rhythm of the music. The testing of the timing of its attack can be seen on **Figure 12.**
- d. Boss Battles: every boss in game can be fought in its respective boss room. The testing of the boss fight can be seen on **Figure 13.**
- e. Dialogue Interaction: shown when the player interact with the supporting character Old Man and before the battle with Baron. The dialogue panel could be seen on **Figure 14.**
- f. End Scene: played after the player defeats the final boss Baron.



**Figure 3** Main Menu Interface



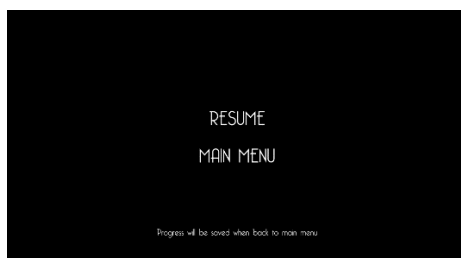
**Figure 4** Save Slots Interface



**Figure 5** About Module



**Figure 6** Gameplay Module



**Figure 7** Pause Menu



**Figure 8** Character Window



**Figure 9** Diary Notes Window



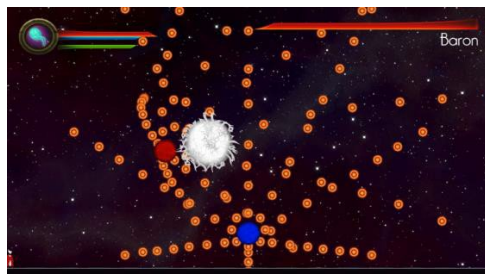
**Figure 10** Tutorial Window



**Figure 11** Attacking Trap



**Figure 12** Attacking Enemy



**Figure 13** Boss Fight



**Figure 14** Dialogue Panel

- *Alpha Testing*

Alpha testing was done internally by those who act as representative of a player of the game. In this case, the test was done by the supervisors who understood the concept of the game. After the test was done, there are some changes in the game according to the comments of supervisors, namely:

- 3 Changing the font in-game to another one with better readability.
- 4 Removing the crossfade effect on scene transition.
- 5 Implementing a secret method to access cheats so the cheat menu would not be so obvious.
- 6 Using a better graphic sprite for the object Cleaner Switch.

- *Beta Testing*

After Alpha Testing was done, the next test method is Beta Testing. The test was done by distributing the game publicly. The game was distributed online using Google Drive along with a questionnaire containing questions about the player's feedback about the game. The questionnaire has been answered by a total of 30 respondents.

- *Test Results*

The answers of the questionnaire of Beta Testing were then collected and analyzed. The results are as

follows:

1. Metroidvania games are not common to be played as only 20% of the total respondents answered to have played a metroidvania game.
2. A total of 26 respondents (87,7%) answered to have played games of the genre rhythm, showing that rhythm games are common to be played.
3. The game is being played in 15 minutes or more.
4. The average answer about the responsiveness of the character control is 4,57 out of 5, showing that the character control is responsive.
5. The majority of respondents (93,3%) answered that the timing of the attack of enemies and traps matches the rhythm of the music, meaning that the rhythm system has been well implemented.
6. The average answer about the difficulty of predicting / avoiding the attack of enemies and traps is 3,5 out of 5, meaning that predicting the attack of enemies and traps is not too difficult.
7. The average answer of the respondents shows that Normal Attack is the most used ability.
8. The average answer of the respondents shows that Protective Shield is the least used ability.
9. Respondents answered that the gameplay of the game is interesting with the score 4,34 out of 5.
10. The average answer about the helpfulness of tutorial in helping the player understand how to play the game is 3,5 out of 5, showing that the in-game tutorial is quite helpful.
11. From the average answer from the respondents about the difficulty of each boss in the game, the boss Cleaner was easy, Corrupted Root was medium, Garson was medium, Despaired Serpent was medium, Lunatic Knight was medium and Baron was difficult. This shows that the overall difficulty of the bosses is not too easy but also not too difficult.

### CONCLUSION

After the test were done on the game “Omnicaelum, The Way Out” by a total of 30 respondents, the followings are concluded:

- 2 As an action-adventure game, “Omnicaelum, The Way Out” already has responsive controls suitable for the action in-game.
- 3 The main feature of this game, that is the timing of the attack of enemies and traps following the rhythm of the playing music has been well implemented.

- 4 The gameplay of “Omnicaelum, The Way Out” is interesting to be played.
- 5 The difficulty of the boss enemies in game is not too difficult but also not too easy.

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