

# Memory Puzzle Game Implementation Using Unity Game Engine

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**Abstract**—Unity Game Engine is one of the most popular game engine used to develop videogames, videogames also have been used as educational tools in the education world. The writer are learning unity and interested in developing an educational game. For getting these two objectives the writer is developing his own educational video games using Unity Game Engine. Based on the final implementation, the writer managed to build workable unity project but failed in getting the game mechanic working because of a bug that also affecting other unity user.

**Keywords**—Video Games; Unity; Cognitive; Education

## I. INTRODUCTION

Video games are one of the world biggest and most spread consumer software. All over the world people are playing video games. From kids to old man, man and women, Caucasian to Asian. Video game also have many Genre from casual to hardcore, from living an imaginary farming live to being a space marine shooting evil alien. Video Game can also be entertaining also can be an educational tool. Video games also have many platform which are pc, smartphone, console, and handheld console.

The Writer are learning one of the popular tools in making video games. The tool name is Unity Game Engine. Game Engine are by the definition are the tools and environment in building video games so the video game developer can focus on creating and composing video game rather than have to learnt computer graphics and game physic implantation by himself. Unity are developed by Unity Technologies, a technology company based in San Francisco, California in the United States of America.<sup>[1]</sup>

The Writer is going to report how he build a memory puzzle game in Unity Game Engine, documenting what he need to learn in building the game. The Documentation will be covering the Unity Game Engine core component, other tools supporting the game making, and the steps taken in creating the game.

## II. BACKGROUND

### A. The Project

The memory puzzle game is a simple food type matching game. Player will be presented a board with 3x3 tile size, each tile hide a food. Player need to click two tiles with the same type of food, if the player select two types of food then the tile will hide the food again, else if the player are correct in clicking two tiles with the same type of food then he got score and the tile will be counted as correct. The correct tile will stay revealed until the game end.

The Writer decided to make this kind of game because it is relatively simple to implement and he has experience playing memory puzzle game.

### B. Memory Puzzle Game Study

The Writer found that many research around the globe are in the process in finding out how video games can contribute in developing and maintaining cognitive skills in young and old people.

Spence (2010, p 11) argues that “At the other end of the educational continuum, new methods of cognitive training based on action video games could help to maintain, or even improve, spatial cognition as we age”<sup>[2]</sup> from this we can infer that video games can be beneficial in education and improving skills.

Using games as educational tool is one of the trend in the modern world. Gamification concept are being implemented in both videogames and traditional educational software. The writer suggests that in order to become more inclusive in education around the world, using video games as mean of education have great merit.

Games help us develop non-cognitive skills that the panelists agreed are as fundamental as cognitive skills in explaining how we learn and if we succeed. According to Gee, skills such as patience and discipline, which one should acquire as a child but often does not, correlate with success better than IQ scores do. And those non-cognitive skills – that is, not what you know but how you behave – are far better suited to a game

context than to a traditional classroom and textbook context. (R. F. MacKay, 2013) [3]

So, making videogames in encouraging cognitive and non-cognitive development are viable in the future.

### III. METHODS

The Writer are splitting the method section in three phases which consist of Asset Searching, Tutorial Learning, and Building the Game.

#### A. Asset Searching

Asset Searching are the activity of searching free royalty that can be used in this self-learning project. The goals is getting the asset for memory object and tiles which hide the object, and also the background of the game menu and the level.

The writer got the asset from <https://opengameart.org> which have declared that all the asset uploaded to the website by its user are free to be used by people who download the asset. The asset that are downloaded are tiles, food sprite and space background.

#### B. Tutorial Learning

The writer search for tutorial in making a simple memory recall in YouTube. The writer found a playlist tutorial which detail the steps in building the game. The write follow the tutorial steps with his own unity editor open. The asset that are used in the video are substituted by the asset in which have been acquired in the asset searching phase.

#### C. Building the game

The writer is building his own implementation which used the asset he acquired earlier and using the steps he learnt at the tutorial learning phase. In developing his own implementation, the writer find one big obstacle in getting bug that freeze the game upon playing.

The bug also affect another user who watch the tutorial and building their own implementation. The writer has not found the solution to this problem but have found the source of the bug. In the solution in order to generate random objects assigned behind each tile in the start of the level there must be a initialization, the initialization used a GameObject array to store the location of the instance of tile that are going to be initialized. Unity editor of the writer freeze every time the array are populated, if the array is empty the game are not freezing albeit don't function as a game.

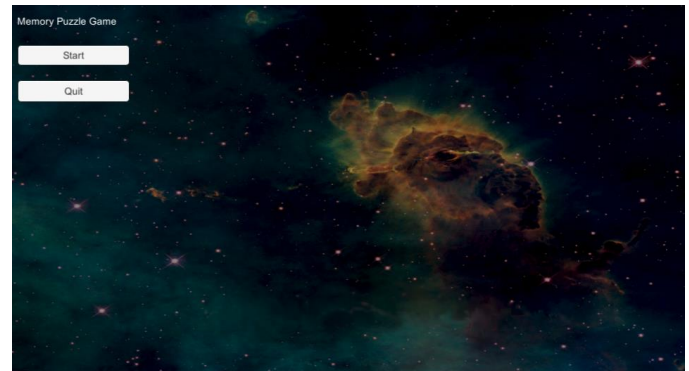
### IV. RESULTS AND DISCUSSION

#### A. Result

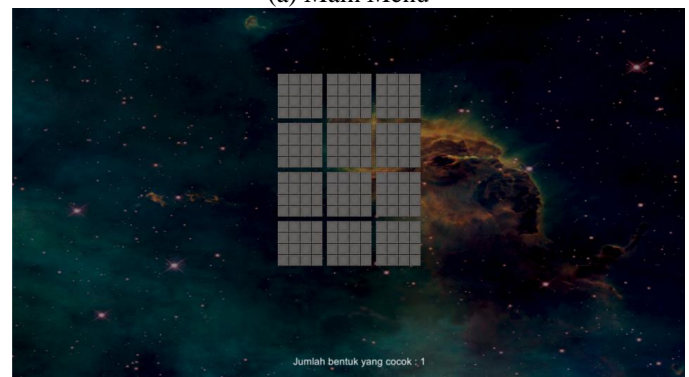
The write managed to build a unity project which has 2 unity scenes consist of Menu and Level. The time that are taken to learn and building the implementation are 5 hours. The main

menu are functional in starting the level scene and quitting the game.

The Level scene have tiles that can be clicked to reveal the object behind it, although the main functionality are not functioning yet because of the bug.



(a) Main Menu



(b) Level

#### B. Discussion

The writer has learned some of the functionality of the Unity Editor and the quirk of the Unity Engine. The writer also learnt in anticipating changes in Scripting API behavior, because old unity tutorial cannot be applied to newer unity version.

The game can be implemented with another way of building the mechanic, be it the semantic design or the technical implementation. In solving the bug the writer suggest that in debugging the initialization function and searching for the cause

### V. CONCLUSION

Unity game engine is one the tools that are used in building video game to multiple platform. The flexibility and the learning resource which are abundant in the internet contribute to the popularity of the unity game engine. Unity can be used in developing an educational video game that can be used in helping to develop cognitive and non-cognitive skills in people of all ages, be it children, adult or old people.

#### REFERENCES

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- [3] University, S. (2013, March 01). Using games as an educational tool provides opportunities for deeper learning, panelists at Stanford event say. Retrieved May 05, 2017, from <http://news.stanford.edu/2013/03/01/games-education-tool-030113/>

#### STATEMENT

With this I declare that this paper that I write is my own writing, not an adaptation or translation of others' papers and is not based on an act of plagiarism.

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