NEBULA A-Z: AN ACTION-PUZZLE GAME WITH ALPHABET AS INPUT MECHANISM

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This report is submitted in partial fulfillment of the requirement for the Bachelor of Information Technology (Game Technology)

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
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ABSTRACT

Nebula A-Z is a 2D action-puzzle game that is developed for Windows PC. Using C# in Unity framework, this game is targeting on audience from 7 to 12 years old. The purpose of this game is to challenge players with their familiarity in using keyboard as the game input and to share knowledge about terms regarding to outer space in alphabetical order. Each alphabet being typed will gain a point and player has five lives to protect in order not to lose the game. Player will win the game if they get to beat the previous high score achieved. This game is inspired from three on-market games named Ztype, The Typing of the Dead and Ninja Cat & Zombie Dinosaurs which all are implementing the typing mechanism as the input channel. The same input channel will be developed in this game with a pool of words focusing only on the theme of Outer Space. The methodology used for the creation of this game is Agile Development Process. The objectives of this game are to investigate the input mechanism of existing typing games such as ZType, Typing of the Dead and Ninja Cat & Zombie Dinosaurs, to develop a game that can introduce the specific terms regarding to Outer Space that are represented through the alphabets of the keyboard and to test the playability of keyboard as the main input device for shooting in this action-puzzle game. The outcome of this project is a complete playable prototype of Nebula A-Z.

ABSTRAK

Nebula A-Z adalah permainan aksi dan *puzzle* 2D yang dibangunkan untuk PC Windows. Dengan menggunakan rangka kerja Unity, permainan ini mengfokuskan pembangunan untuk kanak-kanak berusia 7 ke 12 tahun. Tujuan utama permainan ini ialah untuk mencabar pemain akan kebiasaan mereka menggunakan papan kekunci sebagai input permainan dan juga untuk berkongsi pengetahuan berkenaan perkataan-perkataan yang berkaitan dengan ruang angkasa mengikut susunan abjad. Setiap perkataan yang ditaip akan mendapat satu markah dan pemain mempunyai lima nyawa yang perlu dipertahankan untuk tidak kalah permainan ini. Pemain akan memenangi permainan ini jika dapat mengalahkan jumlah markah tertinggi pada pusingan sebelumnya. Permainan ini adalah inspirasi daripada tiga permainan sedia ada di pasaran berjudul *Ztype, The Typing of the Dead dan Ninja Cat & Zombie Dinosaurs* di mana ketiga-tiga permainan ini menggunkan kaedah menaip sebagai saluran input. Saluran input yang sama akan digunakan dalam pembangunan permainan ini dengan penggunaan perkataan yang berfokus pada tema angkasa lepas. Metodologi yang digunakan dalam pembinaan permainan ini ialah Proses Pembangunan Agile. Objektif projek ini termasuklah untuk mengkaji mekanism input yang terdapat dalam permainan sedia ada seperti *ZType, Typing of the Dead* dan *Ninja Cat & Zombie Dinosaurs*, untuk membangunkan satu permainan yang boleh memperkenalkan perkataan-perkataan berkaitan angkasa lepas yang akan diwakili oleh huruf abjad pada papan kekunci dan untuk menilai tahap kebolehan bermain dengan menggunakan papan kekunci sebagai alat input dalam permainan ini. Hasilnya ialah permainan Nebula A-Z yang berfungsi secara menyeluruh.

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CHAPTER I

INTRODUCTION

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1.1 Project Background

Nebula A-Z is an action-puzzle game created to challenge players with their familiarity in using keyboard as the game input and to share knowledge about terms regarding to outer space in alphabetical order. It is written in C# programming language using Unity as the game renderer. The target audience of this game are players within the age of 7 to 12 years old. With outer space as the main theme, this game introduce a collection of words that can add to players' vocabulary in learning the terms in the galaxy.

The aim of this game is to shoot every single alphabet that drops down before it reaches the bottom of the scene in order to gain score if it is played under the 'PLAY' mode. Nebula A-Z consists of two main modes which are named 'PLAY' and 'LEARN' respectively. Under the 'LEARN' mode, the alphabets that will be typed out by player using the keyboard will display a word paired with a small picture focusing around the theme of Outer Space. Example of words such as Galaxy, Constellation, Solstice, and Eclipse will represent the alphabet shoots by the players (Eg. A stands for Asteroid). Meanwhile, under the 'PLAY' mode, every alphabet being shot will bring a point to the player and the more alphabets being shot, the higher the player would gain the total score. This game progresses endlessly with the alphabets continuously spawning faster and faster until players have missed the shoot 5 times and only then the game would be over in said mode. The winning condition of this game is when player would get to beat the high score from previous session. The losing condition of this game is when player has lost all the minimum 5 levels on the live meter.

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1.2 Problem Statement

Children from age 7 to 12 already have the typing skill since their early exposure to IT devices nowadays. Yet are they familiar with the position of alphabets on the computer keyboard and do they have a vast alphabetical vocabularies especially in any certain topic? Thus, this game is created to test players' ability in typing out the alphabets as the main input mechanism since it could train them familiarising themselves with the alphabet order upon the keyboard through the 'PLAY' mode and broaden their vocabulary especially the terms regarding to outer space in the 'LEARN' mode. Some people love the adventure of the galaxy, but few have the knowledge about the outer space, let alone all the general terms used to describe the universe. Therefore, it brings to the creation of this action-puzzle game named Nebula A-Z.

1.3 Objective

This project is based on the following objectives:

a) To investigate the input mechanism of existing typing games such as ZType, Typing of the Dead and Ninja Cat & Zombie Dinosaurs.

b) To develop a game that can introduce the specific terms regarding to Outer Space that are represented through the alphabets of the keyboard.

c) To test the playability of keyboard as the main input device for shooting in this action-puzzle game.

1.4 Goals and Genre

The main goal of this game is educational since it is created to assist players broaden their vocabulary about the terms of Outer Space. With better understanding about the galaxy, players are expected to have greater interest in learning about Science since it is one of the prominent subjects introduced even at the earliest level of education. The selected genre of the game is action-puzzle game.

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1.5 Game Features

The target players for this game are students in primary school who are at the early stage of learning and understanding the Science subject.

The general game rules:

1. Player has to choose ‘PLAY’ to practice their familiarity of using keyboard as the game input under the game mode while choose ‘LEARN’ to discover new vocabularies regarding to Outer Space.

2. Under ‘PLAY’, player needs to shoot the dropping alphabets by typing them out upon the keyboard.

3. Player has to shoot the alphabets before they reach the bottom of the screen to gain a point.

4. Player needs to shoot as many as they can as the spawning alphabets drop faster and faster.

5. Player has to be aware not to miss more than 5 levels of the live meter to not lose the game.

6. Player needs to beat the previous high score to completely win the game.

7. Under ‘LEARN’, player simply needs to type out the falling alphabets to learn new words about Outer Space represented by each single alphabet. (Ex: type A, a picture and word of ‘ASTEROID’ will appear.)

8. Learn as many words as the player would want as it is endless.

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1.6 Conclusion

The main output of this project is the implementation of alphabets A to Z from keyboard as the input in this game is successful while also getting to represent those alphabets with terms of the Outer Space to broaden the knowledge of players in that field through the learning mode. In overall, this chapter covered on the background of this project, the problem statement that has brought to the creation of this game, the objectives set to be achieved by the end of the development, the goals and genre of the game, some game features and the general rules on navigating the gameplay. Next in Chapter II, the literature review upon this project will be discussed alongside with the methodology chosen to organize the implementation of Nebula A-Z.

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CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

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2.1 Introduction

This chapter will discuss on comparison of features in the existing games through three major categories that firstly is Shooting games, secondly is Typing games and thirdly is Shooting and Typing games. Besides, the discussion will also include the advantages and disadvantages of implementing keyboard typing as the input mechanism in the games especially in context of shooting games. The games selected for comparison vary according to the categories and will be stated in the tables below. The methodology used for the game implementation is Agile Development Process.

2.2 Genre

The genre selected in this game is the hybrid of action and puzzle game. Action game in general requires the hand-eye coordination which in this case, the hands are used to type out the falling alphabets while simultaneously using the eye focus to detect the next falling alphabet and read the word appears to represent each alphabet. The puzzle genre according to Earnest Adams (2013), puzzle solving is the primary activity, though puzzles may occur within a storyline or lead up to some larger goals. Together, it built up this game both to have a goal in winning the game and challenge the players' coordination strength in typing on the keyboard.

2.3 Existing Games

The implementation of this game is combining both shooting the alphabets as player input and typing upon the keyboard to get the action of shooting done. Thus, there are three existing games that used this combination of shooting and typing to create a complete game. The comparison of these games are shown below:

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Table 2.1: Comparison of shooting and typing games

Game Title	ZType	The Typing of the Dead	Ninja Cat and Zombie Dinosaurs
Platform	Online web game	Playstation, windows, dreamcast, arcade	Online web game
Game Play	-Player needs to shoot the enemies coming from above. -Player needs to type a word attached to every enemy to gain score. -Player has to complete typing every single word to proceed to the next wave.	-Player has to kill zombies by typing out words or phrases to shoot them. -Player has to save citizen in the apocalypse town to collect clues for further mission. -Player has to complete all missions to further the level. -Player will completely win the game if all the zombies in the town died and all the citizens are saved.	-Player as the ninja cat has to type each alphabet that appeared with the enemies such as dragons to kill them. -Player needs to go as far as they can along the journey to reach the main boss, a zombie dinosaur. -Player gains extra live for their health bar by typing longer words on flying stars. -Player will win if they get to defeat the zombie dinosaur and the smaller enemies to save the entire

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			city, Paris.
Graphic	2D graphic	3D graphic	2D graphic
Interaction	Keyboard typing	Keyboard typing	Keyboard typing

2.3.1 Comparison of Existing Games

The next comparisons are focusing upon the existing Typing games and Shooting games separately in order to achieve the first objective of this game that is to study the features and mechanism used by these games in implementing typing as player input. There is also a comparison upon the advantages and disadvantages of making the player input through keyboard typing.

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Table 2.2: Comparison of shooting games

Game Title	**Gradius**	**Ikaruga**	**Thunder Blade**
Platform	Windows, arcade, dreamcast	Xbox 360, gamecube, arcade, windows, dreamcast	arcade, amiga, dos, msx, sega master system, turbografx-16, sharp x68000, zx

			spectrum, nintendo 3ds, amstrad cpc, atari st, commodore 64
Game Play	-Player battles waves of enemies through varies environments. -Player has to combat against a giant craft placed on one to several blue colored spheres that formed a passage from the exterior of the giant craft to one of the space cores. -Player shoots into the passage while avoiding attack patterns from the body of the giant craft. -Player gains greater capabilities by collecting and using power-up items.	-Player as the Ikaruga fighter, avoids obstacles by changing polarity of their ship between black and white. -Player absorbs white bullets fired by enemies and stores them as power for special attack. -Player has to avoid being hit by black bullets if the ship is white or it will be destroyed. -Player has to destroy the enemy with same polarity as the player to gain energy for the ship and attack with twice the damage towards the enemy.	-Player controls a helicopter to shoot the enemies. -Player uses guns and missiles to destroy enemy tanks, helicopters and other military weapons to save his country. -Player has to reach to the boss level to entirely win the game. -Player will lose if they hit any of the enemies' combat weapons.

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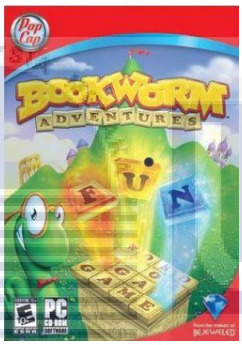
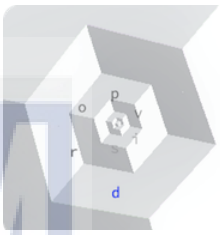
Graphic	2D graphic	3D graphic	2D and 3D graphic
Interaction	Arcade controller: joystick and push-buttons	Gamepad, keyboard controller	Joystick, gamepad

Table 2.3: Comparison of typing games

Game Title	**Bookworm Adventures**	**Icarus Proudbottom Teaches Typing**	**Drop**
			
Platform	Windows	Online web game	Online web game
Game Play	-Player leads Lex the Bookworm through a number of stages to battle ancient creatures along the way to save a princess named Cassandra. -Player types out and creates words from the grid of	-Player works with Icarus Proudbottom in his Holy Wow Studio as a typist. -Player has to type every sentences or short paragraph to gain points. -Player has to avoid making errors while typing not more than	-Player has to type each alphabet that is dropped down the hexagon hole. -Player needs to go as far as he can into the hole to gain more points. -Player needs to reach certain point goal to unlock

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