

# **Village of Algorithm**

**BY**

**Anzamal Haque Akash**

ID: 183-15-2297

**AND**

**Murad Kabir Md. Rakib**

ID: 183- 15-2301

This Report Presented in Partial Fulfillment of the Requirements for the Degree of  
Bachelor of Science in Computer Science and Engineering

Supervised By

**Dr. Sheak Rashed Haider Noori**

Professor & Associate Head

Department of CSE

Daffodil International University

Co-Supervised By

**Mohammad Jahangir Alam**

Senior Lecturer

Department of CSE

Daffodil International University



**DAFFODIL INTERNATIONAL UNIVERSITY**

**DHAKA, BANGLADESH**

**SEPTEMBER 2022**

## APPROVAL

This Project titled “**Village of Algorithm**”, submitted by Anzamal Haque Akash, ID No: 183-15-2297, Murad Kabir Md. Rakib, ID No: 183-15-2301 to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Bachelor of Science in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 12<sup>th</sup> September 2022.

### BOARD OF EXAMINERS



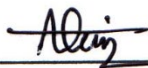
**Dr. S M Aminul Haque**  
**Associate Professor & Associate Head**  
Department of Computer Science and Engineering  
Faculty of Science & Information Technology  
Daffodil International University

**Chairman**



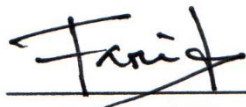
**Md. Abdus Sattar**  
**Assistant Professor**  
Department of Computer Science and Engineering  
Faculty of Science & Information Technology  
Daffodil International University

**Internal Examiner**



**Al Amin Biswas**  
**Senior Lecturer**  
Department of Computer Science and Engineering  
Faculty of Science & Information Technology  
Daffodil International University

**Internal Examiner**



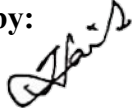
**Dr. Dewan Md. Farid**  
**Senior Lecturer**  
Department of Computer Science and Engineering  
United International University

**External Examiner**

## DECLARATION

We hereby declare that, this project has been done by us under the supervision of **Dr. Sheak Rashed Haider Noori, Professor & Associate Head, Department of CSE, Daffodil International University**. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

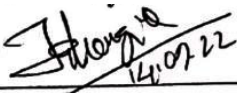
Supervised by:



---

**Dr. Sheak Rashed Haider Noori**  
Professor & Associate Head  
Department of CSE  
Daffodil International University

Co-Supervised by:



---

**Mohammad Jahangir Alam**  
Senior Lecturer  
Department of CSE  
Daffodil International University

Submitted by:



---

**Anzamal Haque Akash**  
ID: 183-15-2297  
Department of CSE  
Daffodil International University



---

**Murad Kabir Md. Rakib**  
ID: 183-15-2301  
Department of CSE  
Daffodil International University

## ACKNOWLEDGEMENT

First, we express our heartiest thanks and gratefulness to almighty God for His divine blessing makes us possible to complete the final year project/internship successfully.

We really grateful and wish our profound our indebtedness to **Dr. Sheak Rashed Haider Noori, Professor & Associate Head**, Department of CSE Daffodil International University, Dhaka. Deep Knowledge & keen interest of our supervisor in the field of “Web Application, Mobile Application (Traditional), Data Mining, Machine Learning (ML), Internet of Things (IoT), Android Application, Artificial Intelligence (AI), Embedded System, Deep learning, etc.” to carry out this project. His endless patience, scholarly guidance, continual encouragement, constant and energetic supervision, constructive criticism, valuable advice, reading many inferior drafts and correcting them at all stage have made it possible to complete this project.

We would like to express our heartiest gratitude to **Dr. Sheak Rashed Haider Noori, Mohammad Jahangir Alam, and Dr. Touhid Bhuiyan Head**, and Head, Department of CSE, for his kind help to finish our project and also to other faculty member and the staff of CSE department of Daffodil International University.

We would like to thank our entire course mate in Daffodil International University, who took part in this discuss while completing the course work.

Finally, we must acknowledge with due respect the constant support and patients of our parents.

## ABSTRACT

In this gaming world, there are lots of games, but most of them are for entertainment purposes. So, we developed a game where people can learn computer programming by completing the game levels. It's a 3D Desktop Game where players can find several types of coding problems and MCQ questions that they have to solve with coding and selecting toggle, so we can call it an online game judge. The name of our game is “**Village of Algorithm**”. This name was selected by its gaming area where players can complete game levels from different programming tasks and MCQ questions step by step. "**Village of Algorithm**" is a game that is a structured form of play, usually undertaken for learning with entertainment, learning programming, and practicing programming and problem-solving. This game's key components are growing thinking ability, problem-solving goals, algorithm rules, understanding challenges, and real-time interaction. So, the game is designed to be used for educational purposes and we can also use this in our computer programming classes and labs, where teachers will be able to teach their students programming and problem solving by using this game and also take lab performance and class tests with this game. Benefits of this type of test, students show more interest in this type of lab or class test. Using this type of concept, we can make education more attractive and enjoyable. We know that programming is too depressive when students are just about to start learning it. This is why wise students don't want to go through this complicated and hassle process of learning. Our main goal with this project makes programming and problem solving more enjoyable and fun based on this and more students are entering this field spontaneously.

**Keywords** Gamification, Computer Programming, Algorithms, Compiler, Competitive programming.

# TABLE OF CONTENTS

<b>CONTENTS</b>	<b>PAGE</b>
Approval	i
Declaration	ii
Acknowledgements	iii
Abstract	iv
<b>CHAPTER 1: INTRODUCTION</b>	<b>1-4</b>
1.1 Introduction	1
1.2 Motivation	1-2
1.3 Rationale of the study	2
1.4 Project Questions	3
1.5 Objectives	3
1.6 Expected Output	3-4
1.7 Project finance	4
1.8 Layout of this report	4
<b>CHAPTER 2: BACKGROUND STUDY OF THIS PROJECT</b>	<b>5-8</b>
2.1 Introduction	5
2.2 Background Study	5-6
2.3 Related Work	7-8
2.4 Challenges	8
<b>CHAPTER 3: REQUIREMENT SPECIFICATION</b>	<b>9-11</b>
3.1 Introduction	9
3.2 Project Instrumentation	9
3.3 Requirements analysis	9-10
3.4 Game Mechanism	10-11
3.5 Requirement of design	11
3.6 Maintaining the project	11

<b>CHAPTER 4: DESIGN SPECIFICATION</b>	<b>12-21</b>
4.1 Agile methodology for Game	12-13
4.2 Use case diagram	14-15
4.3 Data Flow Diagram	15-16
4.4 Frontend	17-20
4.5 Special features	20
4.6 Coding Hints	21
4.7 API (Geeks for Geeks Compiler)	21
<b>CHAPTER 5: IMPLEMENTATION AND TESTING</b>	<b>22-24</b>
5.1 Project Implementation	22
5.2 Project Testing	22-24
5.3 Result	24
<b>CHAPTER 6: GAMIFICATION IMPACT ON THE WORLD</b>	<b>25-26</b>
6.1 Impact on Society	25
6.2 Impact on Environmentally	25
6.3 Impact on Educationally	25
6.4 Impact on Competitive thinking	25-26
6.5 Summary	26
<b>CHAPTER 7: DISCUSSION &amp; FUTURE SCOPE</b>	<b>27-29</b>
7.1 Discussion	27
7.2 Conclusion	27
7.3 Summary of the Study	27-28
7.4 Future Work	28
7.5 Recommendations	28
7.6 Implication for Further Study	29
<b>APPENDIX</b>	<b>30</b>
<b>REFERENCES</b>	<b>31</b>
<b>PLAGIARISM REPORT</b>	<b>32</b>

## LIST OF FIGURES

<b>FIGURES</b>	<b>PAGE NO</b>
Figure 4.1: Agile methodology in game development	12
Figure 4.2: Use case diagram	14
Figure 4.3: Data Flow diagram	16
Figure 4.4.1: View to the user	17
Figure 4.4.2: Welcome page	17
Figure 4.4.3: Login page	18
Figure 4.4.4: Registration	18
Figure 4.4.5: Home page	19
Figure 4.4.6: Players game page	19
Figure 4.4.7: Coding Task	20
Figure 4.5: Code submission	20
Figure 4.6: Coding hints	21
Figure A1: C# Code	30
Figure A2: Php Code	30



## LIST OF TABLES

<b>NAME OF TABLE</b>	<b>PAGE</b>
Table 1.8: Layout of this report	4
Table 3.5: Requirement of design	11
Table 5.2.1: Test Case of Sign in	24

# CHAPTER 1

## INTRODUCTION

### 1.1 Introduction

We work on games. Nowadays, games are getting more popular and useful in this modern world, mainly gamification. Gamification means if we want to learn something new and during these learning times, it will give us some tasks that are based on a learning topic with some enjoyable stuff. If that stuff is games, then we call it “**Gamification**”. We did something new for computer programming, with more advanced graphics. We developed a 3D hypercasual-type desktop game that will help you learn how to do coding and solve problems with code. Its name is “**Village of Algorithm**”. The Village of Algorithm is a third-person view game where players can create an account and log in to the game and find different types of coding tasks and MCQ questions to solve. Also, players can find hints for solving those problems using hint coins. Players can earn hints and coins by completing new levels.

In the developing phase, we think about students and how can we give some entertainment through this project. We believe that if any students play this game “**Village of Algorithm**” he/she gets some entertainment learning.

We believe that if any students learn something new, he/she can memorize or understand that topic for a short time. But if he/she learns any kind of topic in an enjoyable way then he thinks he/she can memorize or understand that topic for a long time [11].

That wise we developed this type of game where people can learn computer programming by completing the game levels. Computer programming is our base topic in this project. But we can develop this type of project with other topics by just editing the levels task in the game code and database.

### 1.2 Motivation

Right now, there are a lot of games available in the play store and apple app store. Most of those are for entertainment purposes. In this era of video games, we developed a 3D hypercasual type desktop game where people can learn computer programming by

completing the game levels. Our goal is not only to teach programming language through the game but also, we want to set lots of algorithms (levels) for competitive programming. So, that's why we want to make this kind of game, where anyone can interestingly learn programming. We make sure that players (students) learn something with entertainment while enjoying it. We believe that if anyone learns something interestingly, he/she will not forget that very easily, so with this motivation, we started to develop this game project.

We know that plenty of people are bored when they play games or playing games can make them addicted which is pathetic for our society. So, this game can give us an educational interest, as well as students, can enjoy playing this game at the same time.

Our motivation is to help players or game-addicted people to overcome their unhealthy gaming websites and reduce their boring times as well. Finally, this game can be a trustworthy gaming app that will benefit propels. Nowadays lots of games are only made for educational purposes and those are free because we deeply believe that if a student wants to learn something new to develop his/her career we have to provide them with those types of topics for learning without any cost. That's why we starting this type of project. With this type of motivation, we develop our first product "**Village of Algorithm**". We give this project without any kind of cost and subscriptions. Another thing, teachers teach us lots of topics in a course, some are very interesting and some are too boring. If we feel a topic is boring, we did not catch that very well. So, if those topics teachers teach in use enjoyable way, then we feel interested in those boring topics.

### **1.3 Rationale of the study**

A large number of students spent their valuable time in several types of games. It's fun but they don't know they wasting their large amount of time. But nowadays, educational games are getting more popular and useful in this modern world, which is gamification. Gamification means if we want to learn something new and during these learning times, it will give us some tasks that are based on a learning topic with some enjoyable stuff. We didn't find any attractive and high graphic game which is an educational purpose that's why we develop this project. Using this gamification game students learn something new or his/her course materials by game.

## 1.4 Project Questions

In the development period, we face lots of questions. The main questions of this project are:

- ❖ What is gamification?
- ❖ How do gamification games spread?
- ❖ How does gamification work in our study?
- ❖ What are the advantages of gamification in this modern world?
- ❖ What is the dissimilation between gamification games and normal games?
- ❖ What is the gamification of future work?
- ❖ How does the gamification games Model work?

## 1.5 Objectives

The main objectives of this project are:

- To be helpful for the players (students) by this game.
- To create an easier and more enjoyable life for players.
- Create a first learning environment by playing this game (**Village of Algorithm**).
- To learn programming topics (variable, condition, loop, array, string, function, etc.).
- To create an enjoyable learning period, throw this project.
- To add several levels with different types of quiz questions and coding problems to solve.

## 1.6 Expected Output

Since this is an exploration project, our key concern was to create an enjoyable learning platform in an associated field. We believe that game is the best way for creating an enviable learning platform which is called gamification. So, we hope that if any students learn something new, he/she can memorize or understand that topic for a short time. But

if he/she enjoyably learns any kind of topic then he thinks he/she can memorize or understand that topic for a long time [11]. From this expected outcome teacher support this gamification area for study.

## 1.7 Project Finance

We believe that one-day study materials will be free for all. Anyone can learn anything if he/she wants to learn something from the internet or any other platform. So, from this point of view, we developed this game project. This is a completely free-of-cost computer 3D hypernatural type game because this is already made from our own experience and using our ideas and knowledge that we have already learned from outside. If we want to play some paid games, we must have to pay to play those games.

## 1.8 Layout of this report

Table 1.8: Layout of this report

<b>Chap no</b>	<b>Description</b>
01.	Introduction of games, Motivation of games, objectives of this, outcomes, project finance, report layout.
02.	Gamification, Programming task, Comparative thinking, Coding hints, Challenges.
03.	Requirement's collections, use case model, logical data model, business process model.
04.	Design Specification
05.	Implementation and Testing
06.	Gamification impact on the world
07	Discussion & future scope

## CHAPTER 2

### Background Study of this project

#### 2.1 Introduction

Games are one of the most used recreational things in this world and their market is getting bigger day by day, especially the younger generation who are really in their teenage years and are addicted to mobile or smart electronics gadgets. Today's world is the most updated in this generation and young people are very much dependent on their social websites or social platforms and they can easily use their phones for their brain upgrades. That's why games are more important for those and if those games are serving education, then they will be more addictive and helpful for all types of people who love programming and who are from the background of computers and science as well. Games can be addictive on the educational side. Our game is an educational related game. Where students can learn programming in different ways. Also, if any player doesn't belong to computer science, he/she can play this game and learn programming if he/she wants to learn programming or have an interest in programming.

#### 2.2 Background Study

We have already developed a 3D hypercasual type desktop game that will help the players, how to do programming and solve problems with code. Its name is “**Village of Algorithm**”.

Unity 3D is known as a game engine, which is used for desktop, mobile, web, and console games. We select Unity, which supports visual scripting and also C# programming language. Another beneficial thing is that we develop a game for PC, if we want to make that project for the mobile device or other platforms, we can easily build it from that (PC Build) project. So, we don't need to develop the same project for another device separately [1].

For game programming, we use the C# programming language. Unity game engine only supports C# programming language and framework. .NET [8].

In our project, we add compiling code mechanism. Where player can compile them code into the game. Geeks for Geeks compiler API is used for compiling our code on

the Geeks for geeks website. Here we take this API from Geeks for Geeks and put it on our game project to compile the code into the game scene [2].

We use MySQL live database for this game. We host our database table. Our game insert, update and search data from there [6].

We add different types of game assets for designing our game levels. Some we build our own and some we are downloaded from the unity assets store. This is the unity official website for getting game assets for adding our projects [1].

We used different types of characters in the game. We get those animations from Maximo which is adobe's website where we get all animations of our game [4].

We also used different types of characters in the game. We get those characters from Maximo which is adobe's website where we get all animation of our game [3].

Our motive is to make education more enjoyable and attractive. We read many articles on Wikipedia, about what is gamification and how it is work. We believe that if any students learn something new, he/she can memorize or understand that topic for a short time. But if he/she learns any kind of topic in an enjoyable way then he/she thinks he/she can memorize or understand that topic for a long time [11].

We did game development, MySQL game database, 3D modeling, course from Udemy to learn how can we develop a fully functional game. Courses are Unity C# Scripting: Complete C# For Unity Game Development, The Complete Unity Game Development Course, Learn SQL / MySQL database basic FOR FREE, Blender game assets model, texturing, and rendering course [8].

We ask lots of game development-related questions in the unity community. Which is helpful for us. We face lots of default problems in our game development process, and when we ask for those problem solutions in the unity community the helps us a lot [10].

## 2.3 Related Work

Computer programming games or coding games help students learn faster with hands-on practice and experience. Students feel fun testing their programming skills. There are the 7 best computer programming or coding games which are building student's programming skills in an enjoyable way [12]

### 1. Robocode

Robocode is a computer programming game, where players have to write the artificial intelligence that drives the player's tank to success. Coding languages used for this game like Java, Scala, C#, and more. This game was developed by the unity game engine.

### 2. Codingame

Codingame is a web app game, where players solve puzzles and challenges by writing real code. More than 20 computer programming languages are supported in this game mechanism, those are Java, C#, Python, JavaScript, Lua, Go, Rust, and many more.

### 3. Codecombat

Codcombat is another web app game, where players have to solve puzzles and challenges by writing code. It has a significant educational angle with a Classroom Edition that teachers can use this game to help their students for learning how to write code.

### 4. Codewars

Codewars is not only a game, it is a gamified way to practice computer programming or coding and solve coding and algorithm problems. Players earn points by solving critical puzzles. Point values are determined by how efficient the player's solution was.

### 5. Vim Adventures

Vim Adventures is a fun game like tutorials, where players learn how to use Vim. We all know that Vim is an extremely powerful text editor that many programmers love to use Vim. Also, vim can help students become a more efficient coders.



## **6. TIS-100**

TIS-100 is also a computer programming game. But it is for low-level assembly programming language where players have to solve puzzles. This game is not a joke, it is so difficult and open-ended

## **7. Shenzhen I/O**

From the same game studio behind TIS-100 comes Shenzhen I/O, which is also a computer programming game. But it is for low-level assembly programming language where players have to solve puzzles. But Shenzhen I/O is easier to solve puzzles and much more enjoyable.

## **2.4 Challenges**

Village Of algorithm is a third-person view hypercasual type 3D computer game Competitive thinking, Programming, Problem Solving with code and MCQ, and algorithm questions-based game which is developed for educational purposes.

For this developing process, we face lots of challenges. We planned that make a game where players can solve computer programming-related MCQ questions, which was not that much challenging. But when we decided that we put a compiler it was too much default for us. We used the Geeks for Geeks online C compiler for our game and connect that API using PHP. When we successfully connect that it works but we face another new problem which is sometimes our game can't get code output for internet connection-related issues and sometimes return us garbage value. Getting the right output with the right format was challenging stuff for us. We did lots of R&D for solving these issues. After a few days, we bring out a solution. Now we can claim that the code compiling process in our game, is much more stable from the previous stage. When we tested the game after every part of the development period, lots of gameplay bugs. Game data overflow issues, Game levels issues. Game light rendering issues we faced in this project.

## **CHAPTER 3**

### **Requirement Specification**

#### **3.1 Introduction**

This is a gamification project where players can learn something new with enjoyment [11]. The main purpose of this project, where players to learn computer programming or coding using the C programming language. The player has to log in. if he/she logged in successfully he/she finds the game levels based on his level. Every level has computer programming related 5 MCQ questions and a coding task which is solved by writing code. Our intended audiences are students and those people who want to learn computer programming or coding. We can also use this project in our physical classroom where students learn computer programming or coding in an interesting way. This project is very much interesting for students or all types of players who are playing games for fun and time-passing purposes. That is why we have a big scope for this technology.

#### **3.2 Project Instrumentation**

##### **Hardware and Software**

- Mac OS
- Intel Core i5 / Core i5 including minimum 8GB DDR4 RAM
- 20GB of SSD
- Unity3D
- C#
- Blender
- PHP
- XAMPP
- API
- MYSQL

#### **3.3 Requirements analysis**

In this gaming project, at first, we have to analyze all the designs and diagrams, then fill up the whole requirement from the customers. Our Gaming project has more requirements and we have to fulfill this in our way.

The requirements are given below:

- The project must be educative alongside informative and entertaining.
- The project must be secure and authentic.
- The project must have a user-like third party enrolled system.
- The project must have a quiz system.
- The project must have a code compilation system.
- The project has a programming and problem-solving system like an Online Judge.
- The project must have a hint system.

And we have to follow all the formalities and systems that we are following in our game: Need the concepts as a developer, then must design and after following the design, we have to computer programming or code depending on the design or structure. Then we need the assets that are important in gaming projects. Then finally we need to do the testing of the project and before delivering we have to calculate the bugging [9], which is checking the project and also polishing our overall project first to last.

### **3.4 Game Mechanism**

First of all, if any player wants to play this game, he/she needs to log in. If that player is new in this game first, he/she needs registration first or create his/her account. After creating his/her account successfully then he can log in. In the first log in new players get 1 free hint coin for use. Using hint coins, he/she can get some hints. Which is help him/her solving the game tasks. When a player starts his/her new level by pressing the start button he/she gets 5 computer programming-related MCQ questions. If the player gives the wrong answer to any of the given computer programming-related MCQ questions, the player will die and the game will be over. But players can play that level infinite times to complete that mission. At the last of every mission, players get e coding task, which they have to solve by writing code. We make a code compilation system in our game help by Geeks for Geeks online code compiler API [2]. Where players can run their code and get the code output. If he/she thinks his/her code output is correct then he/she can submit his/her code by pressing submit button.

If the submitted code is the wrong player will die or if the submitted code is correct, that level will complete. Then he can play the next level with the same game mechanism.

### 3.5 Requirement of the design

We develop this project, as the simplest user interface and game mechanism we can. We focus on every type of player. Any player can easily play this game and learn something. We know that if students want to learn something new but they face some default then 80% of students avoid that topic or cannot complete that topic.

The given design, we have added in our 3D hypercasual PC game that is given below:

Table 3.5: Requirement of design

SL NO	Parameter	Admin page	User page
01	Registration	No	Yes
02	Login	No	Yes
03	User service (Provide hints, Contests, etc.)	Yes	No
04	Profile	No	Yes
05	Add Levels	Yes	No
06	Update	Yes	No

### 3.6 Maintaining the project

We know that every successful project go through a good maintenance process. When we successfully hand over a project, after the handover we have to give some maintenance, which are bug fixing, new content development, and patching.

For the maintenance of our project, we fixed unnecessary bugs. we can give new programming contests through this game at a certain time that's why players can do computer programming contests regularly through our project and update their leader board. Also, can maintain the database, and update the game level.

## CHAPTER 4

### Design Specification

#### 4.1 Agile methodology for Game

In a nutshell, Agile in game development means dividing the game development process of game creation into short iterations. Very beginning of working on the whole project instead of working on the release. We know that the developer's team works on small projects, that is called features. The agile methodology used is mostly based on Scrum in game development.



Fig 4.1: Agile methodology in game development

Scrum means working on bugs and enhancements submitted after testing, players' feedback, and product backlog. Because most effective in Scrum in post-development. It provides faster build, and release delivery, budget cutting, and team evolution. The scrum model has 5 steps also called scrum phases.

That is why we chose agile methodology in this game development process. There are lots of games in this world that have a lot of success stories after implementing Agile and scrum in their developing process.

Our project agile methodology scrum phases:

### **Step 1: Initiation**

In this phase, we create a vision of our project. During the initiation phase, we determine the confines of our epic, which is the overall project we working toward. This is also the period in which we assign team members the responsibility for this project and which comprises all the elements our team must complete in order to finish the project.

### **Step 2: Planning and estimation**

During this phase, we create plans for a sprint, which is a short, time-boxed period that helped our team collaborate more effectively. If our team completes each sprint, then we can assign the next work. We repeated this process multiple times throughout the work of a project until it was finished.

### **Step 3: Implementation**

In this phase, we start implementing our project. We take a 1-week deadline period. After the deadline, we arrange e team meeting and ask work-related questions. We repeated this process multiple times throughout the work of a project until it was finished.

### **Step 4: Reviewing**

We all review our works and gave feedback to our works. The review meeting also provides team members working on the project an opportunity to present the results of their contribution to the current sprint.

### **Step 5: Releasing**

The last phase is the release phase in the agile methodology scrum phase. Where we discuss the overall performance of our project and Identify areas that work efficiently. What to aim for and what to avoid in future scrums, in order to get the maximum benefit of future updates for our project.

## 4.2 Use case diagram

In UML, use case diagram model show us the behavior and helps to capture the all requirements of the project. Use case diagram to describe the project functions and scope of a project. It also identifies the interactions between the system and users. We create use case diagram before starting a project, which is why developers fully understand the whole project throw the use case diagram.

Our project is to help the players who like to play games in an educative way. Here is given below the whole procedure of our project in the Use case diagram. This use case diagram is the overall procedure for players.

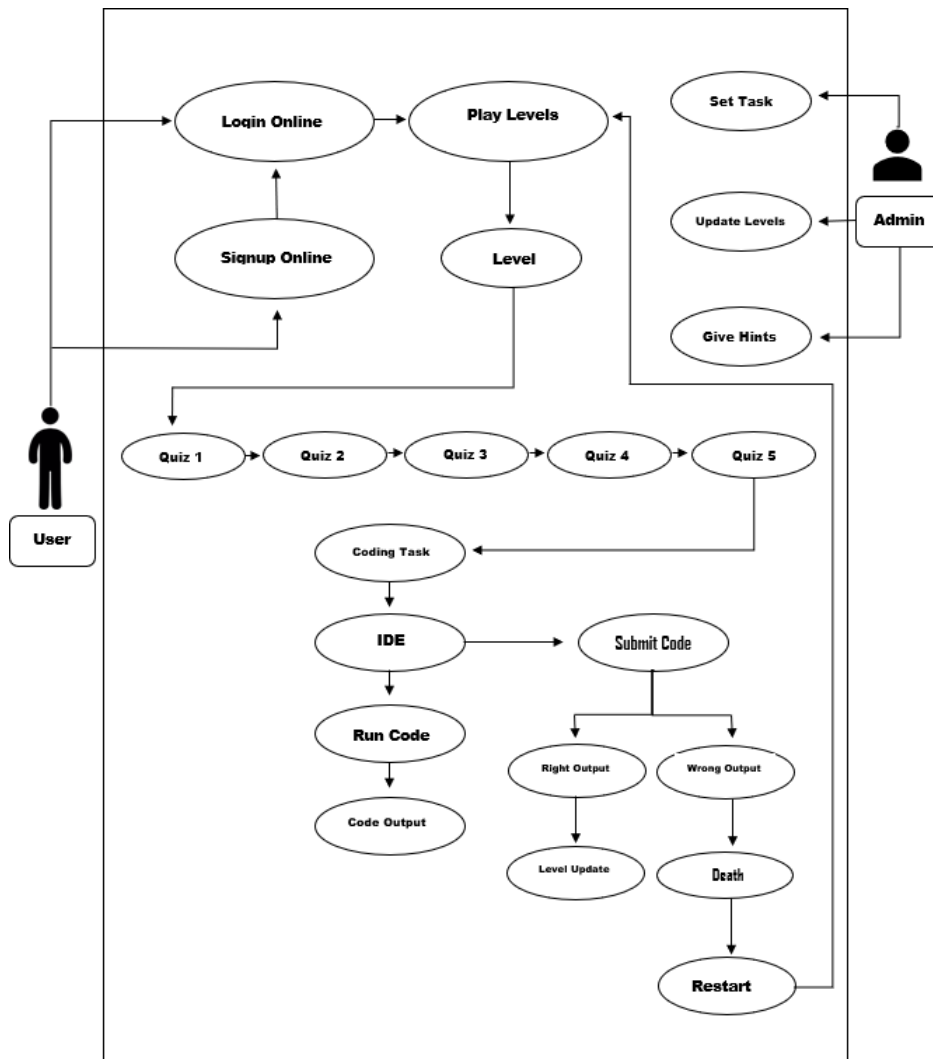


Fig 4.2: Village of Algorithm Use case diagram

### **The use case diagram functionality of our project**

In our use case diagram functionality, first of all, players need to log in. If that player is new in this game first, he/she needs registration first or create his/her account. After creating his/her account successfully then he can log in. In the first log in new players get 1 free hint coin for use. Using hint coins, he/she can get some hints. When a player starts his/her new level by pressing the start button he/she gets 5 computer programming- related MCQ questions. If the player gives the wrong answer to any of the given computer programming-related MCQ questions, the player will die and the game will be over. But players can play that level infinite times to complete that mission. At the last of every mission, players get a coding task, which they have to solve by writing code. We make a code compilation system in our game. Where players can run their code and get the code output. If he/she thinks his/her code output is correct then he/she can submit his/her code by pressing submit button. If the submitted code is the wrong player will die or if the submitted code is correct, that level will complete. Then he can play the next level with the same game mechanism.

### **4.3 Data Flow Diagram**

A data flow diagram is an important technique for modeling a system with detail by showing how input data is transformed into output results through a sequence of functional transformations. A data flow diagram is part of structured systems analysis and defines methodology. It is a graphical representation of data flows in the information system and for analysis of data processing during the structural projection.



## The Data Flow diagram functionality of our project

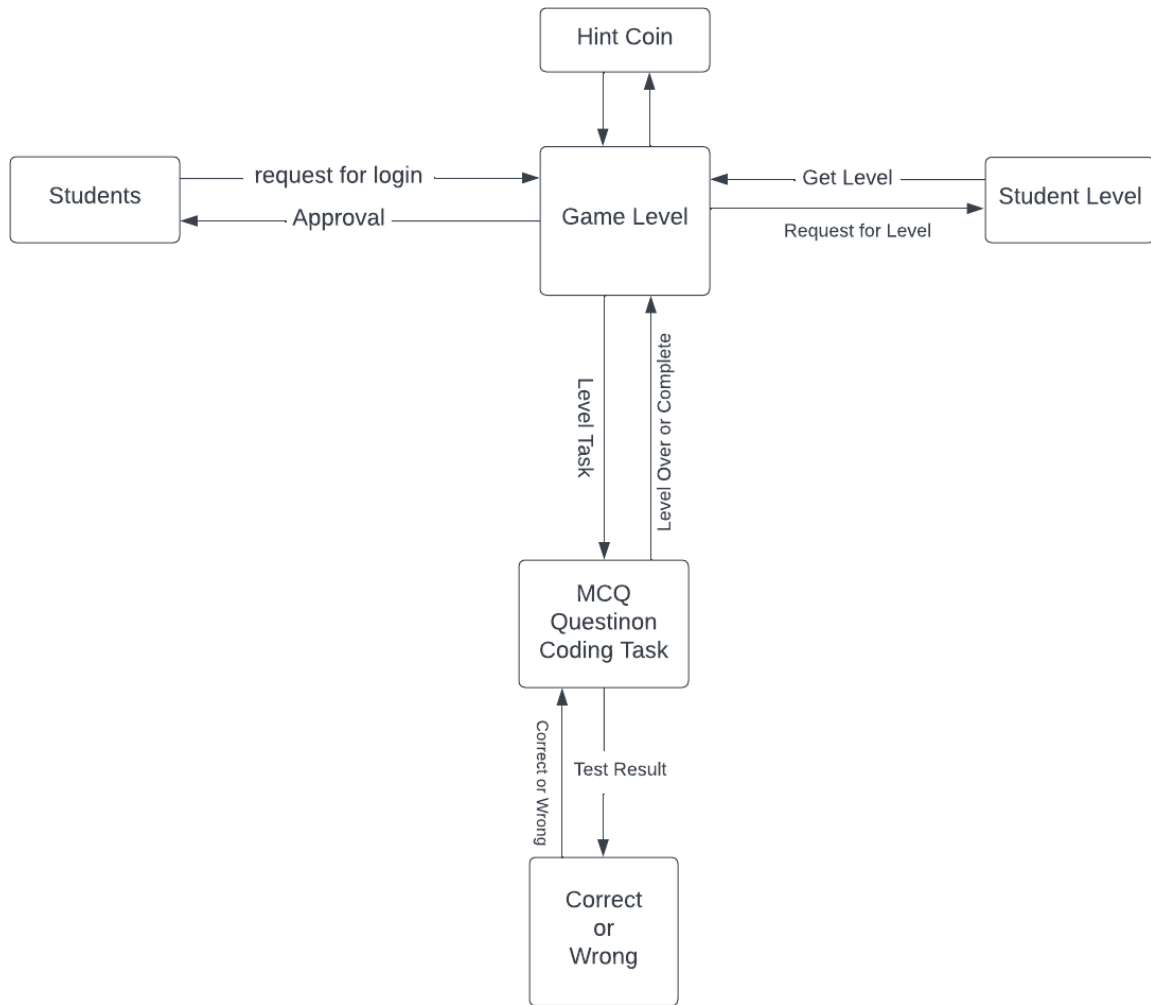


Fig 4.3: Data Flow diagram

## 4.4 Frontend

### Welcome page (Gameplay)

This is the welcome plate of our game. On the welcome page, we get a short story about this game. 15 seconds later we get the Login and Sign Up for login and sign up.



Fig 4.4.1: View to the user



Fig 4.4.2: Welcome page

## User login & registration page

This is our login and registration page, where players can log in using their username and password or if he or she is a new user, he or she can easily create their new account by signing up the button by giving their information.

If a player is not a member or if they can't register then he will be unable to log in to this project. That's why they have to create registration first and then log in. Without registration, players can't enroll in this system.



Fig 4.4.3: Login page



Fig 4.4.4: Registration page

## Home Page

When a player registers his/her account successfully and successfully login then he/she finds this page. This is the home page of our game. If the player wants to start playing this game, then he/she has to press the start button. When he/she starts the game he/she:

1. Can view his/her pieces of information.
2. Can view MCQ and coding tasks.
3. Can view UI for writing code and compiling it.
4. Complete levels for a gain hint coin.
5. Can show the task hint amount.
6. Use the task hint for completing the game levels.



Fig 4.4.5: Home page

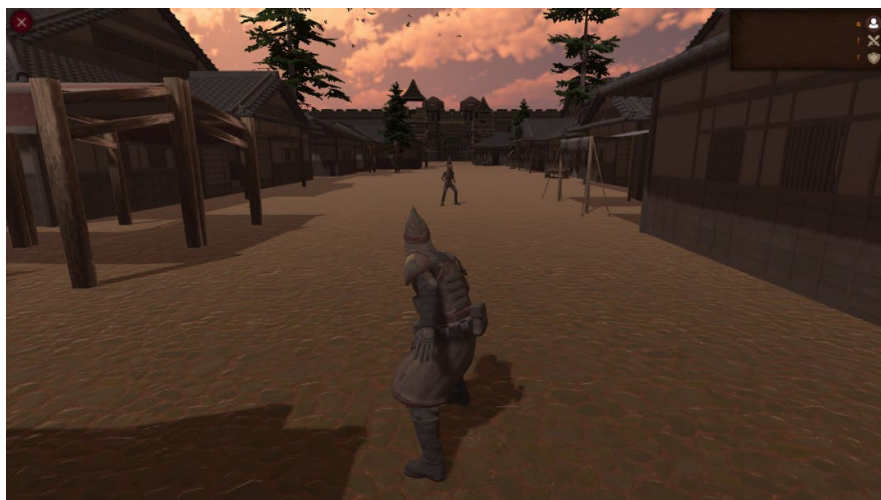


Fig 4.4.6: Players game page

## Tasks Page

After completing their quiz, players can gain coins or not. If their Ans is right then the user/players task will be completed and players can move to their next level. Otherwise, their code will be wrong. Now given below are the two systems:

- Wrong code submission
- Right code submission

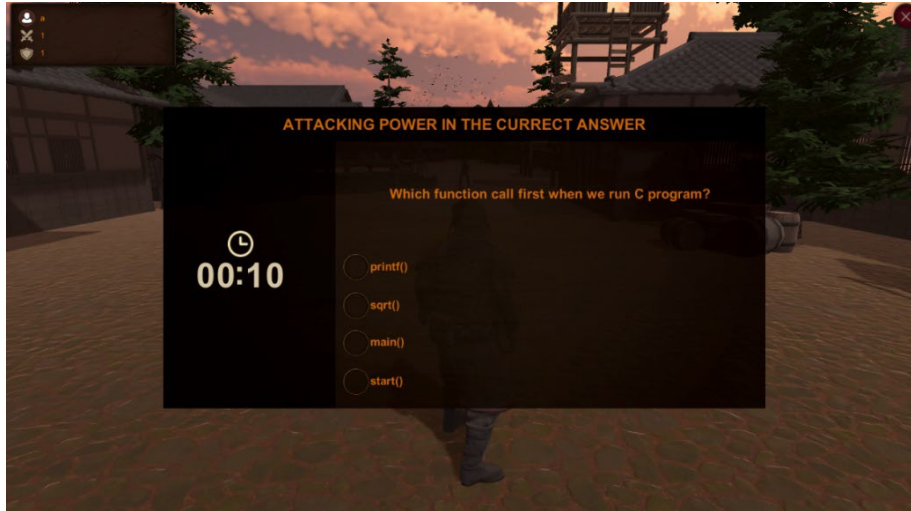


Fig 4.4.7: Coding Task

## 4.5 Special Features

There are some unique features that we have already add our project which is to compile the code in gameplay.



Fig 4.5: Code submission

## 4.6 Coding Hints

Players earn hints coins by completing game levels. Why coding hints are important? If any new player wants to play this game and he/she is new to computer programming and coding then he/she need some help to complete the computer programming MCQ-related tasks and coding task. That's why we put the hints system in our project.



Fig 4.6: Coding hints

## 4.7 API (Geeks for Geeks Compiler)

Geeks for Geeks compiler API is used for compiling our code on the Geeks for geeks website [2].

Here we take this API from Geeks for Geeks and put it on our game project to compile the code into the game scene.

## CHAPTER 5

### Implementation and Testing

#### 5.1 Project Implementation

We have already developed this project through our own experiences, helped by a unity learning community [10], and also using our programming language skills that are important for us to develop our brain thinking, our knowledge, our language skills as well as our demanding to the audience or players or third party. Here, we already used the programming language and coding hints for solving those problems using hint coins. And the most important and necessary thing is that the players can use this coin and earn hint coins in an interesting way that they will gain more entertainment.

#### 5.2 Project Testing

After completion of all requirements designing and analyzing, we have to set up the testing, because testing is so important for any development project and coding is also important. Firstly, we have to set up the design and design the model, then we have to do the code implementation and setup the coding, and finally test it.

There are several game testing phases right now. Those game testing phases are:

1. Functionality testing
2. Compliance testing
3. Combinatorial testing
4. Mobile game testing
5. Compatibility testing
6. Localization testing
7. Soak testing
8. Security testing
9. Alpha/Beta testing
10. Regression testing
11. Load testing
12. Multiplayer testing

We do **Functionality testing** for our project. Functionality testing – Functionality QA testers look for every generic problem within the game or its user interface & graphics, such as game mechanic issues, stability issues, and game asset integrity. User interface testing ensures the user-friendliness of the game. In our test process we do:

- The project was having several types of game mechanics errors or not.
- This project can run properly or not.
- This project is well organized or not.
- Is this project's quiz system or not?
- Our game compiler is working currently or not?
- Our compiler gives us the correct result or not.
- Reads data from the database correctly or not.
- Updates data in the database correctly or not.

## **Bug fixing**

We do Functionality testing on our project and find lots of functionality bugs. Character collider problems, trigger enter functionality problems, some game physics problems, MCQ did not work properly, player animation latency problems, code Compilation problems, and Player level did not update properly. We fixed those functionality bugs during the functionality testing phase. When we figure out those bugs, we ask in unity community for bits of help. We write those problems with descriptions there and provide our C# code help to solve those bugs [10].



### 5.2.1 Test Case of game mechanism

In the given table, we have added our game test case given below:

Table 5.2.1: Test Case of project

Test Case	Checking
Test input	User data
Expected outcomes	Game mechanism
Tested on	10-06-2022
Result	passed

### 5.3 Result

This project is very much interesting for students or all types of players who are playing games for fun and time-passing purposes. So, for this project here are some bugs that I have already fix up.

- ✓ Smoothing character movement.
- ✓ Game collider bug fixing.
- ✓ The level gets set into the database.
- ✓ User-friendly environment.
- ✓ Individuals and interactions over processes and tools.
- ✓ Working game over comprehensive documentation.
- ✓ Customer collaboration over contract negotiation.
- ✓ Responding to change by following a plan.

## CHAPTER 6

### Gamification impact on the world

#### 6.1 Impact on Society

Society will be always beside this site. This website can help them to get flexibility and comfort and authentic side. Other gaming sites will be a disaster for students or game lover person who are loving to play games for their funny purpose. Like:

- Blue whale
- Killing life
- Pubg

And so on. All the games are at risk for people who are teenage because teenage are very much emotional in their lifetime.

#### 6.2 Impact on Environmentally

Our country's maximum number of people is unknown about what gamification. That's why they rely on this technology. So, these generations are updated over time. And all those people are living a life that's technology-based and mobile-based. So, people are addicted to technology. So, gamification is not bad for people. It's very helpful for students and all types of people who love enjoyable learning.

#### 6.3 Impact on Educationally

This project, as we previously said, will help the young generation and game-addicted people. It's not harmful to them. So, it will be beneficial for those. Because it's a fun game as well as an educative game.

#### 6.4 Impact on Competitive thinking

Village of Algorithm is a third-person view hyper casual type 3D computer game where players can create an account Log In to the game and find different types of coding tasks and quiz questions to solve. Here, given the question pattern, question levels, and different tasks that are related to computer science and engineering or any programming

and problem-solving, and programming-related MCQ question that is important for us. All that question is important for the players to complete and move to the next level. In that way, players can think in competitive thinking and feel very interested in that and learn something new topic of programming for completing the next level of this game Here given below the competitive way of thinking of programming tasks:

This is our first level coding task, where the player will have to give the right answer to all five of the given MCQ question then he/she find a final task where he/she have to write a code and submit that. If his/her code is right he/she can go next level otherwise he/she has to play this level again.

Here players earn hint coins by completing every level which is set in this game. We give this hint coins mechanism because most of the new player who is new to programming play this game. We set this for those players for getting clues for solve levels coding tasks.

## **6.5 Summary**

In a nutshell, we can say that we have implemented the idea that we had dreamt of. We wanted to grave educational side by games and make it more interesting, we did it. And we hope that we are pretty much successful in that attempt.

## **CHAPTER 7**

### **Discussion & Future Scope**

#### **7.1 Discussion**

This is the best game development project that front end is so nice and it's related to upgrade generation. And this project is a positive benefit tour society. So, I recommended to people who love to play games and based on Computer-based, must try this game for the experience.

#### **7.2 Conclusion**

The fundamental worry of this exploration work is creating and expanding gamification territory. We want to update the education system. From the outset, we construct that makes this type of gamification project with other topics. Our game mechanism is not that much large. Because we want to make it simple as we can. Because players (students) can play this game very easily within a short time. Another goal is for students to learn something new in an enjoyable environment within a short period and develop his/her career. I already used the programming language and coding hints for solving those problems using hint coins. And the most important and necessary thing is that the players can use this coin and earn hint coins in an interesting way that they will gain more entertainment.

#### **7.3 Summary of the Study**

Our motive is to make education more enjoyable and attractive. We read many articles on Wikipedia, about what is gamification and how it is work. We believe that if any students learn something new, he/she can memorize or understand that topic for a short time. But if he/she enjoyably learns any kind of topic then he thinks he/she can memorize or understand that topic for a long time. The entire synopsis of the project is given bit by bit.

First, we develop our game mechanism with unity default assets. Then we figure out what kind of problem we solve throw this project so we do some problem Analysis of the recent situation.

Then we start game objects and assets designing with blender 3D software and UI using photoshop. We select unity game engine and other helping hand software selection. We summarize all things together before start developing. At first phase of development process we design the game levels. Then optimize the levels for better FPS (Frame Per second). Then we start game programming. When we finish game programming then we test the game. In testing period, we find lots of bugs and game play problems. We fix those bugs and game play problems.

## **7.4 Future Work**

We want to add some more new features in the upcoming future, which will expand my project from others. Given below that point:

1. In the future we will add more contests to my project.
2. In the future we will set up more players fighting third parties for a better view.
3. In the future we will add get permission from the player to create a contest.
4. In the future we will add more programming languages game level so that, players are lessened all-important language that will necessary for daily workstations.
5. In the future we will add more characters, animation, and game stories.

## **7.5 Recommendations**

In the following phase of our work, we will expand the game mechanism with other study topics. We will attempt to fabricate other games for other subjects and those are for all levels. We work only for the computer programming language, which is C programming language. Some recommendations for Bangla fake news detection are given below,

- ❖ Make a big gamification project for all subject
- ❖ Understand the students' needs
- ❖ Understanding which subjects are more suitable for gamification
- ❖ Make a better version of this game
- ❖ Try to get more attractive

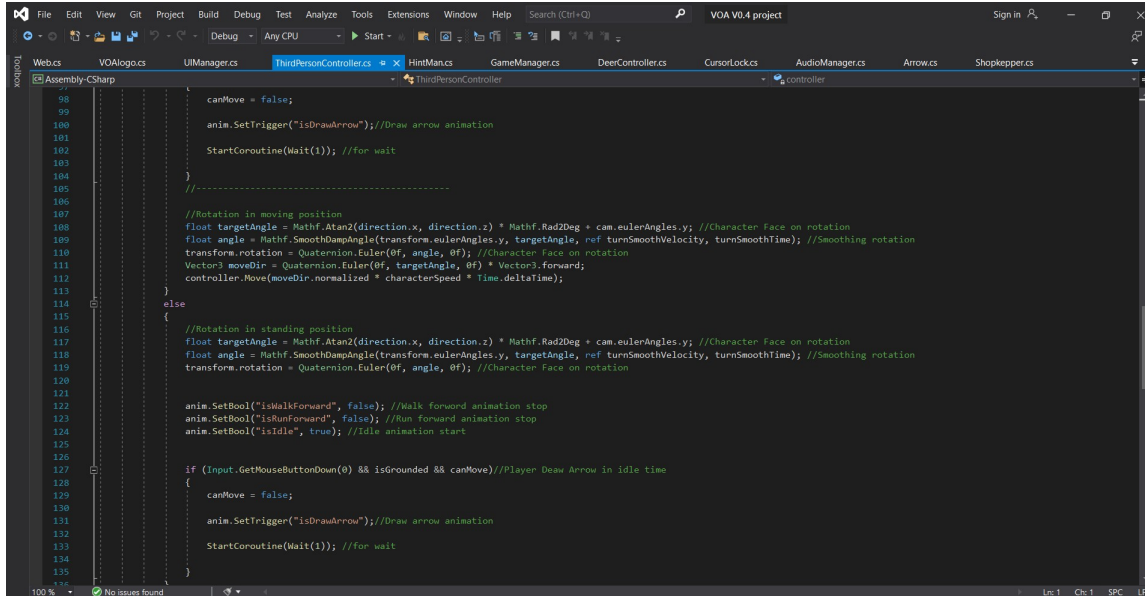
## **7.6 Implication for Further Study**

Some restriction is introduced in our project work, for example, work using only the In programming language tasks, the dataset isn't sufficient. In any case, the model is worked for the future turn of events. Whereas any exploration work is a consistent cycle. Hence, this game will be created step by step for the other side of education like physic, math, chemistry, and many more.

Consequently, making an application like games and portable applications is significantly dependent on the fate of computerized reasoning. Such an application can easily give the proper education.

# Appendix

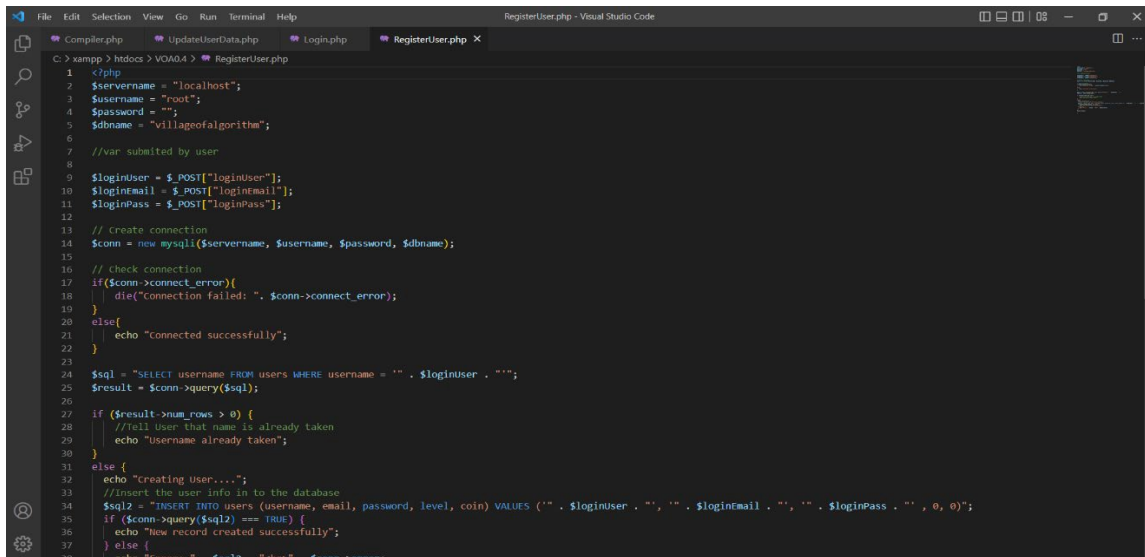
Following is the figure of C# Code



```
98     canMove = false;
99
100     anim.SetTrigger("isDrawArrow");//Draw arrow animation
101
102     StartCoroutine(Wait(1)); //for wait
103
104 }
105
106 //-----
107 //Rotation in moving position
108 float targetAngle = Mathf.Atan2(direction.x, direction.z) * Mathf.Rad2Deg + cam.eulerAngles.y; //Character Face on rotation
109 float angle = Mathf.SmoothDampAngle(transform.eulerAngles.y, targetAngle, ref turnSmoothVelocity, turnSmoothTime); //Smoothing rotation
110 transform.rotation = Quaternion.Euler(0f, angle, 0f); //Character Face on rotation
111 Vector3 moveDir = Quaternion.Euler(0f, targetAngle, 0f) * Vector3.forward;
112 controller.Move(moveDir.normalized * characterSpeed * Time.deltaTime);
113
114 }
115 else
116 {
117     //Rotation in standing position
118     float targetAngle = Mathf.Atan2(direction.x, direction.z) * Mathf.Rad2Deg + cam.eulerAngles.y; //Character Face on rotation
119     float angle = Mathf.SmoothDampAngle(transform.eulerAngles.y, targetAngle, ref turnSmoothVelocity, turnSmoothTime); //Smoothing rotation
120     transform.rotation = Quaternion.Euler(0f, angle, 0f); //Character Face on rotation
121
122     anim.SetBool("isWalkForward", false); //Walk forward animation stop
123     anim.SetBool("isRunForward", false); //Run forward animation stop
124     anim.SetBool("isIdle", true); //Idle animation start
125
126 }
127
128 if (Input.GetMouseButtonDown(0) && isGrounded && canMove)//Player Draw Arrow in idle time
129 {
130     canMove = false;
131     anim.SetTrigger("isDrawArrow");//Draw arrow animation
132
133     StartCoroutine(Wait(1)); //for wait
134
135 }
```

Fig A1: C# Code

Following is the figure of Php Code



```
1 <?php
2 $servername = "localhost";
3 $username = "root";
4 $password = "";
5 $dbname = "villageofalgorithn";
6
7 //var submitted by user
8
9 $loginUser = $_POST["loginUser"];
10 $loginEmail = $_POST["loginEmail"];
11 $loginPass = $_POST["loginPass"];
12
13 // create connection
14 $conn = new mysqli($servername, $username, $password, $dbname);
15
16 // check connection
17 if ($conn->connect_error){
18     die("connection failed: ". $conn->connect_error);
19 }
20 else{
21     echo "connected successfully";
22 }
23
24 $sql = "SELECT username FROM users WHERE username = '$loginUser' ";
25 $result = $conn->query($sql);
26
27 if ($result->num_rows > 0) {
28     //tell user that name is already taken
29     echo "Username already taken";
30 }
31 else {
32     echo "Creating User...";
33     //insert the user info in to the database
34     $sql2 = "INSERT INTO users (username, email, password, level, coin) VALUES ('$loginUser', '$loginEmail', '$loginPass', 0, 0)";
35     if ($conn->query($sql2) == TRUE) {
36         echo "New record created successfully";
37     } else {
38         echo "Error: " . $sql2 . " " . $conn->error;
```

Fig A2: PHP Code

## REFERENCES

- [1] Unity official assets store, trees pack, Japanese village pack, castle pack, VFX pack [Online]. Available: <https://assetstore.unity.com/> [Accessed: 8 June 2021]
- [2] Geeks for Geeks online compiler API, Compile C program in the game by this API, [Online]. Available: <https://ide.geeksforgeeks.org/> [Accessed: 1 February 2022]
- [3] Adobe Maximo, game character, [Online]. Available: <https://www.mixamo.com/> [Accessed: 9 December 2021]
- [4] Adobe Maximo, free game character animation, [Online]. Available: <https://www.mixamo.com/> [Accessed: 12 February 2021]
- [5] Game assets texturing, Level skybox, game shedder, [Online]. Available: <https://www.textures.com/> [Accessed: 12 December 2021]
- [6] Single table game database, Insert, update, search, [Online]. Available: <https://www.mysql.com/> [Accessed: 27 December 2021]
- [7] Player controller, Game physics, Unity observer pattern, Animator, Sound manager, Game manager, C# game scripting, Scene management, Unity UI, Unity project optimization, [Online]. Available: <https://learn.unity.com/> [Accessed 9 July 2022]
- [8] Unity C# Scripting: Complete C# For Unity Game Development, The Complete Unity Game Development Course, Learn SQL / MySQL database basic FOR FREE, Blender game assets model, texturing, and rendering course, [Online]. Available: <https://www.udemy.com> [Accessed 5 September 2022]
- [9] Debugging the code, Getting ideas about optimized code, [Online]. Available: <https://stackoverflow.com/> [Accessed 9 August 2022]
- [10] Asking the question, get a problem-solving idea [Online]. Available: <https://unity.com/community> [Accessed 30 August 2022]
- [11] Educational Game 2008 [Online]. Available: [https://en.wikipedia.org/wiki/Educational\\_game](https://en.wikipedia.org/wiki/Educational_game) [Accessed 1 September 2021]
- [12] 9 best computer programming or coding games which build your programming skills: Robocode, Codingame, Vim Adventures, Codewars, Codecombat, TIS-100, Shenzhen I/O [Online]. Available: <https://www.makeuseof.com/tag/best-programming-games/> [Accessed 5 September 2021]



# PLAGIARISM REPORT

VOA\_Final-Defense\_Report.pdf

## ORIGINALITY REPORT

<b>19%</b> SIMILARITY INDEX	<b>19%</b> INTERNET SOURCES	<b>1%</b> PUBLICATIONS	<b>13%</b> STUDENT PAPERS
--------------------------------	--------------------------------	---------------------------	------------------------------

## PRIMARY SOURCES

<b>1</b>	<b>dspace.daffodilvarsity.edu.bd:8080</b> Internet Source	<b>7%</b>
<b>2</b>	<b>Submitted to Daffodil International University</b> Student Paper	<b>5%</b>
<b>3</b>	<b>www.indeed.com</b> Internet Source	<b>2%</b>
<b>4</b>	<b>www.makeuseof.com</b> Internet Source	<b>2%</b>
<b>5</b>	<b>meliorgames.com</b> Internet Source	<b>1%</b>
<b>6</b>	<b>Submitted to RMIT University</b> Student Paper	<b>&lt;1%</b>
<b>7</b>	<b>Submitted to Gateshead College, Tyne &amp; Wear</b> Student Paper	<b>&lt;1%</b>
<b>8</b>	<b>www.conceptdraw.com</b> Internet Source	<b>&lt;1%</b>
<b>9</b>	<b>www.coursehero.com</b> Internet Source	<b>&lt;1%</b>