

## Developing Game “C-Hunter” For Learning C++

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**Abstract:** This project is based on developing a video game called C-Hunter for learning the basic function of C++. The purpose of this game is for learning basic functions in C++ while having fun and enjoyable. Rapid Application Development Model is used as the method to develop this game. The notes and code used in this game are all related to the C++ programming language and focus only on function since the objective of this game is learning basic functions in C++. After collecting some information from user feedback, this game is quite as expected it to be that is, C-Hunter is a fun and enjoyable learning platform to use. Overall, this game has served its purpose, making the learning process much more fun and enjoyable. It also gives an impact on students since by using this game they can study in a nicer learning platform.

**Keywords:** *Game, Programming, C++, Development,*

### 1. Introduction

The aim of this study is to create a game-based educational tool for use in the development and validation of serious games for degree students to learn basic C++ more easily and more fun. A game-based educational tool was developed based on the standard operating procedure of making students have more fun and much easier learning environment.

Computer programming has, for decades, posed several difficulties for students of all educational levels [1]. Such as learning functions in Programming C++. The interactive application between teacher and student can make students more understanding of the topic more in-depth. Furthermore, to record the student performance. A system is developed for a teacher to monitor their student performance. This will help In line with technological advancements, game-based education is more efficient and more straightforward. By using a game, the Basic C++ coding will be easier to understand ii and more accessible to the students [6]. It can also make learning more fun and enjoyable [7].

Developing a game-based education tool will not be a waste effort since it can be to good use by teachers and student. In this modern age, we can't escape from technology, so why not use technology to our benefit. Teachers must find different type of learning material to attract student attention so that they can learn more while having fun doing it, so that their interest are on the subject not anything else such as their social media, YouTube, game streamer or etc. In the modern age problem must be solve with modern age solution.

## **2. Literature Review**

### **2.1 Games**

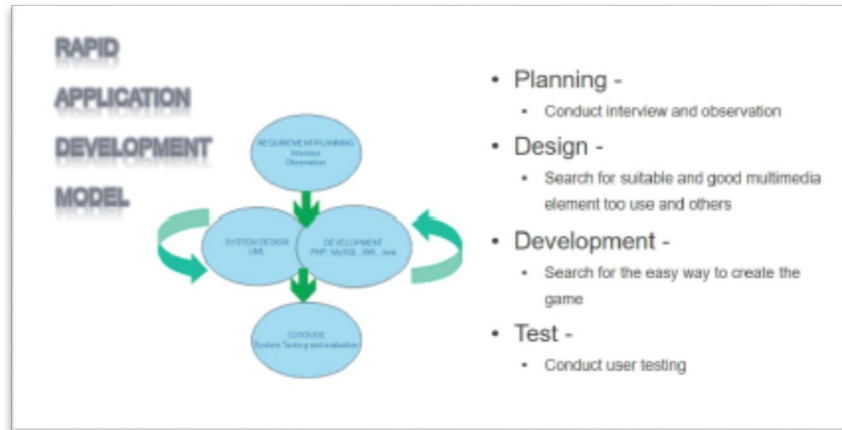
Games is entertainment that many play in their free time to escape from daily life or for some to find their inner peace. For some people, games can also be a place to hang out or interact with friends such as in multiplayer games. It's not just about playing when it comes to games, games are a tool with many purposes such as stress relievers, critical thinking enhancers, team building, and many more. Others might call it a problem solver. As an answer to these problems another definition is proposed, consisting of a game world, participants, shared narrative power, and interaction. This definition is given only after discussing the nature of definitions in general [1].

### **2.2 Games-based learning (GBL)**

A learning environment base on playing games is a type of learning that should be focused on in this type of era because in this modern age technology have taken its place in the heart of the young generation including degree student. Game-based learning (GBL) has gained considerable traction since 2003 when James Gee described the impact of game play on cognitive development. It usually utilizes an interesting narrative and competitive exercises to motivate students to learn according to specifically designed learning objectives [7]. Studies have shown that GBL can engage students with the material and make significant improvements over those participating in learning with other educational software due to the game's feature of inductive reasoning and frequent interactions with content [2].

## **3. Methodology**

The selection of techniques, study samples, study instruments, study design, and data analysis methods used throughout the conduct of this study will be detailed in this chapter. According to [3] the RAD methodology employs similar techniques such as JAD, spiral development, and prototyping. It's also possible to reuse components, which makes it more flexible and methodical, just like other approaches. The Rapid Application Development Model is used for this project since it is simple to use and allows for quick changes as the project progresses. Only the Requirement step is involved in this development.



**Figure 1 Rapid Application Development Model**

### 3.1 Requirement Planning

This phase is equivalent to a project scoping meeting. The planning phase is condensed compared to other project management methodologies; this is a critical step for the ultimate success of the project. Hence if the requirement is not layout properly it will make a delay in the project itself since the other phase will have more work done. During this stage, 5 students from the Faculty of Computer Science & Information Technology are interviewed, and 2 observations were made to determine the goals and expectations for the project as well as current and potential issues that would need to be addressed during the build. A basic breakdown of this stage involves:

- Researching the current problem
- Defining the requirements for the project
- Finalizing the requirements with each stakeholder’s approval.

### 3.2 Functional and Non-Functional Requirements

#### a. Functional Requirements

**Table 1: functional requirement analysis**

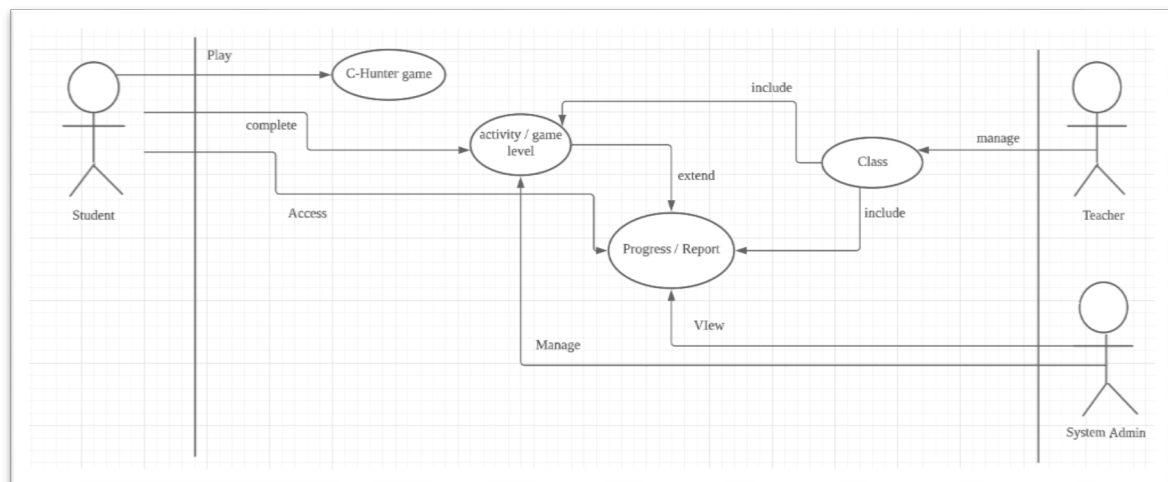
No.	Modules	Functionalities
1	Registration	<ul style="list-style-type: none"> <li>• System should allow user registration</li> <li>• System show save registration information for login modules</li> </ul>
2	Login	<ul style="list-style-type: none"> <li>• System should allow user to login using information input during registration</li> <li>• System should allow users to login as a certain user type</li> </ul>
3	Home	<ul style="list-style-type: none"> <li>• The system will display all the student data</li> </ul>
4	Game	<ul style="list-style-type: none"> <li>• The game allow user to play</li> <li>• System should allow user to see to progress of student</li> </ul>

**b. Non-Functional Requirements**

**Table 2: non-functional requirement analysis**

No.	Requirement	Description
1	Performance	<ul style="list-style-type: none"> <li>System and user interaction should be quick, should not take more than 5 minutes.</li> <li>System should have good runtimes</li> </ul>
2	Operational	<ul style="list-style-type: none"> <li>System should be user friendly</li> <li>System should be easily maintained</li> <li>System should work on any computer or any web browser</li> <li>Game should work on any computer</li> </ul>
3	Security	<ul style="list-style-type: none"> <li>User account are protected with encrypted password and only they can access their account</li> <li>User account can only be of one type (Educator, Student or Developer)</li> </ul>

**3.1.2 UML Application Diagram**



**Figure 2: UML Application Diagram**

**3.1.3 Class Diagram**

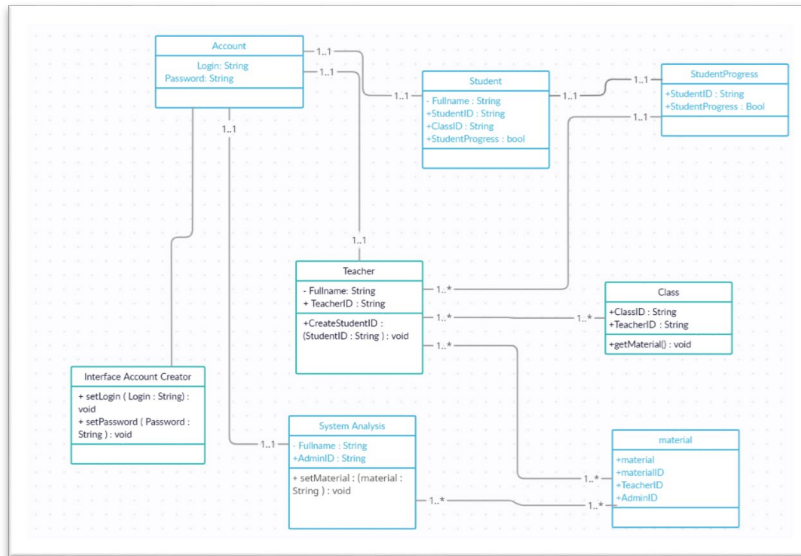


Figure 3: Class Diagram

### 3.1.4 Flowchart

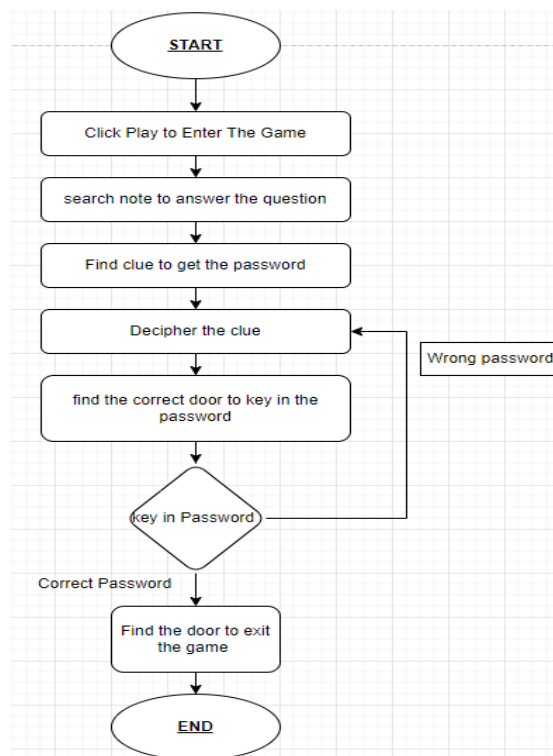


Figure 4: flowchart of the game

### 3.2 System Design

C-Hunter will focus on developing a game that can be used by any student of all levels of education to learn in a fun environment learning style. This game will provide some features that would be sign up for register, sign in, and the game for students to learn basic c++. Once the project is scoped out, development on the game storyboard, game layout, and design are developed before going through the

actual development. During this phase, the work is double-checked with the supervisor and another expert to ensure the needs are being met at every step in the design process.

This main page serves to view the content of student records. The record display student detail that is stored in the database.

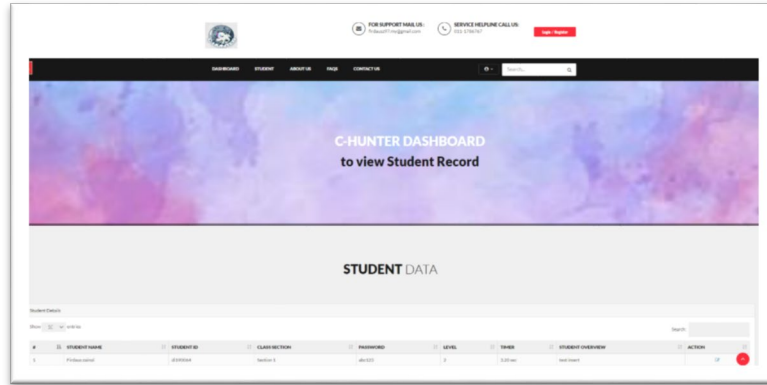


Figure 5: Dashboard Interface

Figure 5 show the main page interface for user to view the dashboard that shows student record

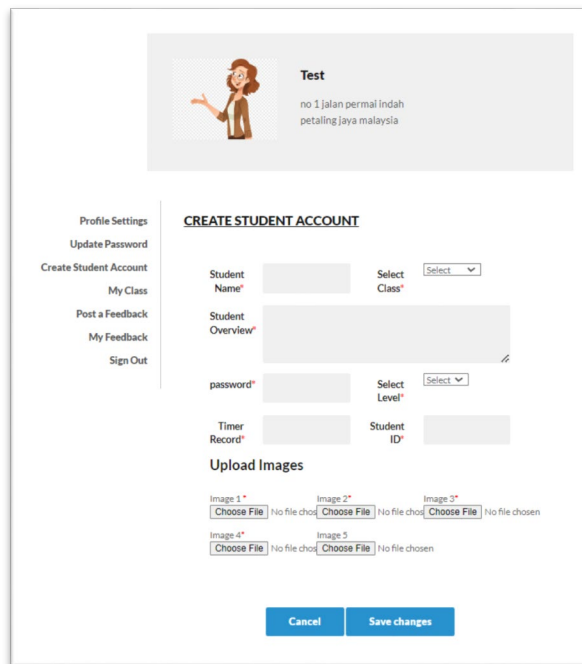


Figure 6 Create Student Account

Figure 6 show the user can insert new data for new student such as student id, student name, student overview, student time record.

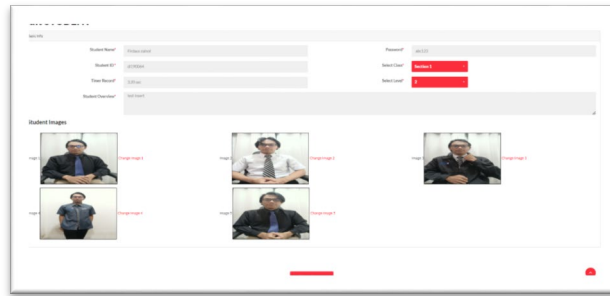


Figure 7 Edit Student Detail interface

Figure 7 show the user can update their student data such as student name, student id, and student overview.

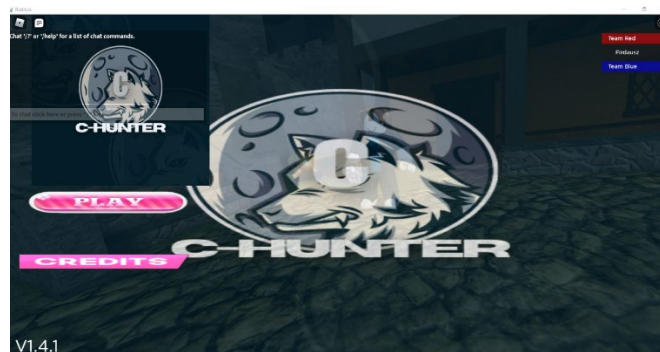


Figure 8 C-Hunter Main Menu

Figure 8 show the main menu before player start the game



Figure 9 Game Environment

Figure 9 show the game environment which player can start play the game

### 3.3 Development

The prototype and beta system from the design phase are converted into the working model. This process is where the coding begins and if the majority of the problem and changes were addressed during the iterative design phase, the project can still be constructed as the final working model more quickly than they could by following a traditional project management approach. Since the development work can still be running even if there is a change in the requirement.

The phase breaks down into several smaller steps:

- Preparation for rapid construction
- Program and application development
- Coding

### 3.4 Testing and Evaluation

During the testing phase, the development and design of the existing game is implemented according to the requirements and planning set. The complete game developed is tested by 5 students involved in the interview. After they have played the game, a set of form or questionnaire are given to take their feedback for the game C-Hunter. All final changes are made while the code and requirement continue to compile in the system includes data conversion, testing, and changeover to the new system, as well as user training.

## 4. Results and Discussion

This Game is a video game specially developed based on the content of learning basic function in C++ programming language for degree student. This game has interesting features to be used as a Teaching Aids for teachers during learning session whether in a class room or during an online session because this game is well used to attract the attention and interest of students. After obtaining and analyzing all the data successfully obtained from the respondents, the researcher is confident that this video game will be able to help student to learn basic function in C++ programming language more effectively and students will also enjoy learning it by playing this game.

the system will be tested to ensure that all system functions can run as specified. There are two levels of testing that will be tested on this developed system. This involves testing the functionality of the application as well as testing user acceptance. Usually, testing is done after the prototype system is developed to enable the process of testing and evaluation of the application. Therefore, the implementation phase emphasizes the testing process to find weaknesses in a product. In addition, system testing is important to ensure the quality of the system run can meet the requirements of the objectives of this project. Testing of this system includes the administrator and user parts.

Each module has its own function. The email address, first name, password, and id of the user and student detail such as student id, student name, student class, and student overview are collected and stored in the system database. The system interface is also developed in this phase to ensure that users are able to maximize the user experience while using the system. In addition, functionality tests are performed to obtain feedback on how the system operates for use.

The analysis of the data is related to the research questions that have been set. There are several items that must be included so that this game can be tested to prove its efficiency as being learning tool for students.

In order to develop this video game, there are various phases that need to be gone through to achieve its results and complete for full use, but there is no denying that there are still some weaknesses that have been successfully identified. Here are some suggestions and improvements that can be implemented on C-Hunter Games.

1. Make a storyline for the game to make it more interesting.
2. The sounds and graphics can be upgraded to make the player feel like alive while playing the game so that they can be immersed fully in the game.
3. Add more notes so that the player can be more understanding of what they are learning.



## 5. Conclusion

This Game is a video game specially developed based on the content of learning basic functions in C++ programming language for degree students. This game has interesting features to be used as a Teaching Aids for teachers during learning sessions whether in a classroom or during an online session because this game is well used to attract the attention and interest of students. After obtaining and analyzing all the data successfully obtained from the respondents, the researcher is confident that this video game will be able to help a student to learn basic functions of the C++ programming language more effectively and students will also enjoy learning it by playing this game.

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