

C LANGUAGE GAME APPLICATION

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CHAPTER 1

INTRODUCTION

1.0 PROJECT OVERVIEW

C language is a popular computer language in nowadays because C language is a high-level language that easier to use than an assembly language or language. The C language is used in a variety of applications, such as Programming systems, Experiments science, Control of machinery etc. C language also works with computers ranging from microcomputer to mainframe and C language is a flexible language can compile multiple commands into together. C language is suitable for beginners to practice the programming step by step. Therefore, C language is popular used in the group programmer in nowadays. From the past to the present, C is a language that has been continually developed. The code design is common, and the learning is suitable for use in the curriculum and for creating large-scale program work. Many of University that offer computer courses, the C language is one of the basic subjects in the curriculum that students must learn such as Information Technology major of Fatoni University and assign the C language as a compulsory subject, it is called Computer Programming 1, which is a basic course in the C language. And Computer Programming 2, which is an advance course in the C language.

Nowadays, Computer games are one of the most popular types of entertainment in nowadays, as the world enters the digital and Computer games are something children and young people want to try out because the game is entertaining to the players, making fun. Relax from the tensions arising from today's society and makes the players feel free. In the education said that playing the game properly, it can help children develop and learn in many ways. Games are also used in teaching to encourage children to be more interested in learning more.

Research studies related to application development, games to motivate learning C language none in the Fatoni university before, it will provide students with an interest in learning the C language more. Developing C language game application to assist in learning C language, by bringing C language content designed in the form of games and to encourage students to

learn the C language, motivate students to learn and make fun, not boring. This research will be applied to the complement in the C language subject, from the regular lectures and practical complexity only to be in the form of fun games to stimulate the desire to learn and not to repeat the traditional teaching style.

1.1 PROBLEM STATEMENT

In the beginning of learning C language. Students should start learning basic of C language first. Moreover, they should learn how to use Variable in a simple command. But students have little interest in learn c language because they think is so hard, so they have responded negatively in C language more. In addition, a lot of students playing fighting game which does not have benefit to them. This is why students are addicted by game. Therefore, develop are propose C language game to be an option that will allow them to learn vocabulary, variable and commands through a game because at least they can learn c language at the same time.

1.2 PROJECT OBJECTIVE

To design and develop C language game application for motivate students to learn.

1.3 PROJECT SCOPE AND LIMITATION

This research is design and develop C language game application for motivate students to learn, which applying the theory of game to the learning can helps to learn the C language and develop to be game. After this Developing C language game application will be apply to students who register in C language subject of Information Technology major, Fatoni University. To evaluate that the game application developed based on the principle of gamification and learning game theory helps motivate learning C language better than regular learning. And This project appropriate for android operating system.

1.4 SIGNIFICANT OF STUDY

Developer

- The developers are able to learn the skill of using programs in developing game.
- To review knowledge and understand about C language, functions, tools such as Adobe Photoshop, Adobe Illustrators, Construct 2.

User

- Students increases remember and spelling skill about C language.
- Students able to apply variables and command to use in programming subject.

1.5 SOFTWARE AND HARDWARE REQUIREMENT

1. Software Requirement

The software requirement used in this project are:

- Adobe Photoshop C and Adobe Illustrator CS6
Use to create and design about structures and edit pictures.
- Construct 2
Use to develop game.

2. Hardware Requirement

The hardware requirement used in this project are:

- Processor: Inter Core i7
- Random Access Memory (RAM): 8.00 GB
- Graphic Card: Zotac Nvidia GeForce 970
- SSD: Kingston 120 GB
- Keyboard
- USB Mouse

1.6 CONCLUSION

C language game is C language for android to be alternative learning media for students in Information Technology major, Fatoni University to learn more from the classroom. Develop by using Adobe photoshop CS6, Adobe Illustration CS6 and Construct 2.

CHAPTER 2

LITERATURE REVIEW

This chapter discusses regarding to reviewing of literatures and examining the previous research relevant to this project.

2.1 DEFINITION

2.1.1 Application

According to Margaret Rouse Explained an application program, also referred to as an application program or application software, is a computer software package that performs a specific function directly for an end user or, in some cases, for another application. An application can be self-contained or a group of programs. The program is a set of operations that runs the application for the user.

Examples of applications include word processors, database programs, web browsers, development tools, image editors and communication platforms. Applications use the computer's operating system (OS) and other supporting programs, typically system software, to function. An application requests services from and communicates with other technologies via an application programming interface (API).

2.1.2 Types of applications

Applications can vary in many ways, including how they're built, what platform they run on, whether they are open source or proprietary, or for which market they are used.

For example, a mobile application developer writes their code as a native, web or hybrid application -- and these terms can also describe desktop applications. The developer codes a native application to run on specific hardware, such as a camera or GPS, and in the same programming language as the underlying OS. For example, the Photos application on Mac OS X is written in Objective-C the same language that Mac OS X uses.

An end user typically accesses a web application via a web browser, such as Google Chrome. A developer can write web applications in several languages, including JavaScript, CSS and HTML, but they cannot access the hardware on which the application is installed. Hybrid

applications have APIs that can access device resources, similar to a native application, but are typically written in languages such as HTML and CSS. Additionally, developers often code mobile applications to work on a specific device platform.

Applications can also be grouped into categories by licensing style. Proprietary software programs, such as Adobe Photoshop, are applications that are owned under copyright. End users can buy or license proprietary applications through the vendor providing the software. They cannot modify these applications; they can only add functionality to them via third-party add-ons. Open source applications, such as WordPress, provide the source code for end users and developers to use and modify. Software companies and individual developers typically make open source applications freely available under a generic or public license, such as GNU.

A developer or team of developers can create an application for a specific vertical market. A vertical application typically serves a specific industry or departmental need, such as a medical billing system. By contrast, a horizontal application, such as a word processor or web browser, applies to a wide range of industries.

C language game is an application game on smartphone. This application creates for player to use the phone to learn C language skill.

2.1.3 Game

This invention relates in general to memory-skill games and more particularly, to memory-skill games in which a player can recreate a design on a rotating member by means of playing pieces in a time constrained manner.

In recent years, there have been introduced several forms of memory-skill games. Some of these games have been based on the principle that a player is required to recreate or determine a particular design based on an observation of a portion of the design. For example, several forms of concentration-type games presented on television media require the participants to determine what device or item is being depicted upon seeing a portion of the device or the item forming the design.

Another form of memory-skill game designed for home use involves a rotating tower having a set of non-related pictorial images retained on one flat side of the tower. The players are each provided with two-dimensional playing cards which include cards matching the images on the

tower. The player race each other to select from their cards the ones having the images on the tower, and to arrange the selected cards to reproduce the arrangement of images on the tower. In this way, the player is required to remember the design or a portion thereof in order to assemble a portion of the design with the playing cards with little or no delay during the period in which the design is rotated so that it is out of the view of the player. Continued rotation of the tower renders the design viewable to the player again so that further reconstruction of the design may be enabled.

The playing pieces in this last-mentioned type of memory-skilled game were also only oriental in one direction in order to complete the design, much in the same manner as pieces of a puzzle are assembled to create the design. Thus, little manipulative skill was requiring, since it was not necessary to orient the playing pieces as between several possible orientations in order to create the overall design. Further, the play value of this form of memory-skill game was limited: There is only one design on the rotating tower at any point in time, and each player was provided with only two-dimensional playing cards, each having the same design faces. Thus, the entire player

Had to have at least the same general degree of skill in order to make the play of the game competitive. (Adolph E. Goldfarb, Erwin Benkoe. 1978)

2.1.4 Types of Computer Games

Today's computer games are loaded with action, and there are many different categories or genres of games. But, many games can be considered to be more than one genre. For instance, a soccer game could be considered a sports game, as well as a simulation game. Here is some information that will help player to better understand the various computer game genres.

- **Massively Multiplayer Online (MMO)**

These games are played over a LAN (local area network) or via the Internet. Players use a network and interact with other players in the virtual game room. Player can play against people from all over the world. The creation of these games involves thousands of hours of programming, giving player, the player, the most amazing gaming experience possible.

- Simulations

These games involve taking control of real-world vehicles, including tanks, ships, and aircraft. Player learns how to control these vehicles, and use simulation games that can also be used to train professionals. In fact, many pilots are trained using airplane simulators before they actually take flight.

- Adventure

These are usually single player games, and are often set in fantasy or adventure worlds. Player completes puzzles to advance levels. The game generally starts with a back story of player's character, and let player know what your mission is. Player has to figure out how to complete the mission.

- Real-Time Strategy (RTS)

For these games, player usually needs to build up your inventory of items, armies, etc. Similar to a strategy game, RTS games move in real-time and players can play at once without taking turns so you can play together at the same time.

- Puzzle

These games appeal to those who love to solve difficult puzzles. There are many levels, from beginner to expert, and games usually have colour shapes and simple actions. These are brain games, with no action involved.

- Action

Player need to be fast to enjoy these fast-paced games, and player need to have excellent reflexes. Complete challenges by fighting with enemies, and use a character of player's choice to represent yourself and jump into the action.

- Stealth Shooter

These tend to be war games or spy-based games, where player use stealth to defeat your enemies.

- Combat

Fight one on one with opponents, up close and personal. Player needs good reflexes, and the ability to use the controls for all kinds of fighting moves.

- First Person Shooters (FPS)

Player is the protagonist, and the game is viewed through your eyes. Player can really get into these games. The only downfall is that you are not able to see how player look in the game, because you are seeing things through your own eyes.

- Sports

Play real-world sports like baseball, basketball, soccer, and more. As player work up through the various skill levels, your game will involve mimicking real professional athletes and how they move. The most popular sports games are usually based around specific popular sporting events.

- Role-Playing (RPG)

If player love fantasy, player will love role-playing games. Player get to act out the part of the main character, be the hero, etc. and make decisions that go along with the games' story lines. Many of these games have narrative guides.

- Educational

While many parents and teachers complain about video games, there are some great educational games out there that can help with the learning process. Train in a variety of subjects, using games to make learning fun instead of boring. There are testing functions, where player can answer multiple choice questions. The most common types of education games are for math, science, and ICT.

The type of C Language Games is Educational are often created to be a form of learn and using games to make learning fun instead of boring. An educational game is answer the question to tests a student's knowledge about c language. In an educational game, the player has to answer the following questions.

2.1.5 Android

Android is a mobile operating system developed by Google. It is used by several smartphones, such as the Motorola Droid, the Samsung Galaxy, and Google's own Nexus One.

The Android operating system (OS) is based on the open Linux kernel. Unlike the iPhone OS, Android is open source, meaning developers can modify and customize the OS for each phone. Therefore, different Android-based phones may have different graphical user interfaces GUIs even though they use the same OS.

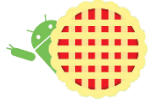
Android phones typically come with several built-in applications and also support third-party programs. Developers can create programs for Android using the free Android SDK (Software Developer Kit). Android programs are written in Java and run through Google's "Davlik" virtual machine, which is optimized for mobile devices. Users can download Android "apps" from the online Android Market.




Since several manufacturers make Android-based phones, it is not always easy to tell if a phone is running the Android operating system. If you are unsure what operating system a phone uses, you can often find the system information by selecting "About" in the Settings menu. The name "Android" comes from the term android, which refers to a robot designed to look and act like a human. (Android.2010)





Android versions














Figure 2.1: Android Versions





Android Version	Version Name	Key user features added	Release date	Picture
Android 9	Pie	<ul style="list-style-type: none"> • User interface updates: <ul style="list-style-type: none"> ◦ Rounded corners across the UI ◦ Quick settings menu change. ◦ Notification bar, the clock has moved to the left. ◦ The "dock" now has a semi-transparent background. ◦ New transitions when switching between apps, or within apps ◦ Volume slider updated • Richer messaging notifications: with full conversation, large images, smart replies • The power options now have a "screenshot" button • Biometric authentication can now be disabled only once 	2018 Aug 9	






Android 8.1	Oreo	<ul style="list-style-type: none"> • Show battery level in "Quick Settings" for devices connected via Bluetooth • Navigation buttons dim when not in use • UI updates to 'Power Off' and 'Restart' • Toast messages are now white in color with same existing transparency • Automatic light and dark themes • Emoji updates (ie: Hamburger move the cheese slice position) 	2017 Dec 5	 Android 8.1
Android 8.0	Oreo	<ul style="list-style-type: none"> • PIP: Picture-in-Picture with resizable windows • Android Instant apps • Improved notifications system • Improved system settings • Lock screen redesign 	2017 Aug 21	 Android 8.1
Android	Nougat	<ul style="list-style-type: none"> • Battery usage alerts • Nexus and Pixel specific improvements 		7.1.1 







7.1.2			2017 Apr 4	
Android 7.1.1	Nougat	<ul style="list-style-type: none"> • Long press on the app icon enable new launch actions • The default keyboard allows now to send GIFs directly • New set of emojis 	2016 Dec 5	
Android 7.1	Nougat	<ul style="list-style-type: none"> • Daydream Virtual Reality mode • Night Light • Storage manager improvements • Performance improvements for Touch and Display managements • Option to enable fingerprint swipe down gesture • Seamless system updates 	2016 Oct 4	
Android 7.0	Nougat	<ul style="list-style-type: none"> • Unicode 9.0 emoji • Better multitasking • Multi-window mode (PIP, Freeform window) • Seamless system updates (with dual system partition) • Better performance and code size thanks to new JIT Compiler 	2016 Aug 22	
Android 6.0.1	Marshmallow	<ul style="list-style-type: none"> • New emojis 	2015 Dec 7	
Android	Marshmallow	<ul style="list-style-type: none"> • USB Type-C support • Fingerprint Authentication support 	2015	





6		<ul style="list-style-type: none"> • Better battery life with "deep sleep" • Permissions dashboard • Android Pay • MIDI support • Google Now improvements 	Oct 5	
Android 5.1	Lollipop	<ul style="list-style-type: none"> • Multiple SIM cards support • Quick settings shortcuts to join Wi-Fi networks or control Bluetooth devices • Lock protection if lost or stolen • High Definition voice call • Stability and performance enhancements 	2015 Mar 9	 <small>Android 5.1 Lollipop</small>
Android 5.1.1	Lollipop	<ul style="list-style-type: none"> • Speed improvement • Bug fixes 	2015 Apr 21	 <small>Android 5.1 Lollipop</small>
Android 5.0.2	Lollipop	<ul style="list-style-type: none"> • Performance improvements and bug fixes 	2014 Dec 19	 <small>Android 5.1 Lollipop</small>
Android 5.0.1	Lollipop	<ul style="list-style-type: none"> • Bug fixes, fix issues with video playback and password failures 	2014 Dec 2	 <small>Android 5.1 Lollipop</small>
Android 5.0	Lollipop	<ul style="list-style-type: none"> • New design (Material design) • Speed improvement • Battery consumption improvement 	2014 Oct 17	 <small>Android 5.1 Lollipop</small>






Android 4.4.4	KitKat	<ul style="list-style-type: none"> • Fix Heartbleed / OpenSSL vulnerability 	2014 Jun 23	
Android 4.4.3	KitKat	<ul style="list-style-type: none"> • Bug fixes • Enable Sprint Spark band 26 And band 41 	2014 Apr 14	
Android 4.4.2	KitKat	<ul style="list-style-type: none"> • Bug fixes • Security enhancements 	2013 Dec 9	
Android 4.4.1	KitKat	<ul style="list-style-type: none"> • Bug fixes • Enhance the camera on the Nexus 5 	2013 Dec 5	
Android 4.4	KitKat	<ul style="list-style-type: none"> • Screen recording • New Translucent system UI • Enhanced notification access • System-wide settings for closed captioning • Performance improvements 	2013 Oct 31	
Android 4.3	Jelly Bean	<ul style="list-style-type: none"> • Dial pad auto-complete • Photo Sphere enhancements • Camera app UI updated • 4K resolution support • Ability to create restricted profiles for tablets • Hebrew and Arabic right-to-left (RTL) support 	2013 Jul 24	







		<ul style="list-style-type: none"> • Bluetooth Low Energy (BLE) support • Bluetooth Audio/Video Remote Control Profile (AVRCP) 1.3 support • Security and performance enhancements 		
Android 4.2.2	Jelly Bean	<ul style="list-style-type: none"> • Allow toggling Wi-Fi and Bluetooth state in Quick Settings using long-press • Shows the percentage and estimated time remaining in the active download notifications • Wireless charging and low battery sounds changed • Gallery app updated for faster loading with new image transition • Performance enhancements and bug fixes (Bluetooth A2DP audio streaming fix...) 	2013 Feb 11	
Android 4.2.1	Jelly Bean	<ul style="list-style-type: none"> • Fix missing December bug in the People app • Add support for Bluetooth gamepads and joysticks HID device 	2012 Nov 27	
Android 4.2	Jelly Bean	<ul style="list-style-type: none"> • Lock screen widgets • 360 degree images with Photo Sphere • Gesture Typing, for faster typing • Wireless display with Mira cast • Daydream to display information when idle or docked 	2012 Nov 13	

		<ul style="list-style-type: none"> • Multi-user for tablets 		
Android 4.1.2	Jelly Bean	<ul style="list-style-type: none"> • Enable Home screen rotation • Fix bugs and enhance performances 	2012 Oct 9	
Android 4.1.1	Jelly Bean	<ul style="list-style-type: none"> • Fix a bug on screen orientation 	2012 Jul 23	
Android 4.1	Jelly Bean	<ul style="list-style-type: none"> • Voice Search • Speed enhancements • Camera app improvements • Accessibility: gesture mode, enable braille external keyboards. 	2012 Jul 9	
Android 4.0.4	Ice Cream Sandwich	<ul style="list-style-type: none"> • stability improvements • better camera performance • smoother screen rotation 	2012 Mar 28	
Android 4.0.3	Ice Cream Sandwich	<ul style="list-style-type: none"> • Social stream API in Contacts provider to show updates associated to your contacts • Video stabilization and QVGA video resolution API access • Accessibility API refinements for screen readers • Calendar provider updates 	2011 Dec 16	

Android 4.0.2	Ice Cream Sandwich	<ul style="list-style-type: none"> • Minor fixes 	2011 Nov 28	
Android 4.0.1	Ice Cream Sandwich	<ul style="list-style-type: none"> • Facial recognition (Face Unlock) • UI use Hardware acceleration • Better voice recognition (dictating/Voice typing) • Web browser, allows up to 16 tabs • Updated launcher (customizable) • Android Beam app to exchange data through NFC 	2011 Oct 19	
Android 4.0	Ice Cream Sandwich	<ul style="list-style-type: none"> • New lock screen actions • Improved text input and spell-checking • Control over network data • Email app supports EAS v14 • WI-FI direct • Bluetooth Health Device Profile 	2011 Oct 18	
Android 3.2.6	Honeycomb	<ul style="list-style-type: none"> • Minor fixes 	2012 Feb 15	
Android 3.2.4	Honeycomb	<ul style="list-style-type: none"> • Added "Pay as you go" for tablets 	2011 Dec 15	
Android 3.2.2	Honeycomb	<ul style="list-style-type: none"> • Minor fixes 	2011 Sep 30	

Android 3.2.1	Honeycomb	<ul style="list-style-type: none"> • Android Market updates including easier automatic updates • Google Books updates • Wi-Fi improvements • Chinese handwriting prediction improved 	2011 Sep 20	
Android 3.2	Honeycomb	<ul style="list-style-type: none"> • Optimizations for a wider range of tablets • Compatibility display mode (zoom for fixed-sized apps) • Media sync from SD card 	2011 Jul 15	
Android 3.1	Honeycomb	<ul style="list-style-type: none"> • UI improvements • Open Accessory API • USB host API • Mice, joysticks, gamepads...support • Resizable Home screen widgets • MTP notifications • RTP API for audio 	2011 May 10	
Android 3.0	Honeycomb	<ul style="list-style-type: none"> • Multi core support • Better tablet support • Updated 3D UI <ul style="list-style-type: none"> - Customizable home screens - recent applications viewing - redone keyboard layout • Media/Picture transport protocol • Google Talk video chat • Google eBooks • Private browsing" • System-wide Clipboard • HTTP Live streaming 	2011 Feb 22	

Android 2.3.7	Gingerbread	<ul style="list-style-type: none"> Google Wallet support for the Nexus S 4G 	2011 Sep 21	Android 2.3 
Android 2.3.6	Gingerbread	<ul style="list-style-type: none"> Voice search issue fixed 	2011 Sep 2	Android 2.3 
Android 2.3.5	Gingerbread	<ul style="list-style-type: none"> Improved network performance for the Nexus S 4G Fixed Bluetooth issues on the Samsung Galaxy S Gmail app. improvements 	2011 Jul 25	Android 2.3 
Android 2.3.4	Gingerbread	<ul style="list-style-type: none"> Voice or video chat using Google Talk 	2011 May10	Android 2.3 
Android 2.3	Gingerbread	<ul style="list-style-type: none"> Updated UI Improved keyboard ease of use Improved copy/paste Improved power management Social networking features Near Field Communication support Native VoIP/SIP support Video call support 	2010 Dec 6	Android 2.3 
Android 2.2	Froyo	<ul style="list-style-type: none"> Speed improvements JIT implementation 	2010 May 20	

		<ul style="list-style-type: none"> • USB Tethering • Applications installation to the expandable memory • Upload file support in the Browser • Animated GIFs 		
Android 2.1	Éclair	<ul style="list-style-type: none"> • Updated UI 	2010 Jan 12	
Android 2.0	Éclair	<ul style="list-style-type: none"> • HTML • Digital zoom • Microsoft Exchange support • Bluetooth 2.1 • Live Wallpapers • Updated UI 	2009 Oct 26	
Android 1.6	Donut	<ul style="list-style-type: none"> • Gesture framework • Turn-by-turn navigation 	2009 Sep 15	
Android 1.5	Cupcake	<ul style="list-style-type: none"> • Bluetooth A2DP, AVRCP support • Soft-keyboard with text prediction • Record/watch videos 	2009 Apr 30	
Android 1.1	Banana bread	<ul style="list-style-type: none"> • Show" & "Hide" numeric keyboard, in caller application • Ability to save MMS attachments 	2009 Feb 9	


Android 1.0	Apple pie	<ul style="list-style-type: none"> • Download and updates via Android Market • Web Browser • Camera support' • Gmail, Contacts and Google Agenda synchronization • Google Maps • YouTube application 	2008 Sep 23	
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Table 2.1: Android Comparisons. (Businnes.2010)

The world's favourite cookie is your new favourite Android release. For C Language Game will use latest version is Android 8.0 version that name is Oreo, although this year there will be version 9.0, but there are many people still using version 8.0 because smarter, faster, more powerful and sweeter than ever. And also have working to keep your device safe it will make peace of mind in the palm of your hand.

Features of version are as follows:

Picture-in-Picture: allows you to see two applications at once, it's like having super strength and laser vision.

2 x faster : Get started on your favourite tasks more quickly with 2x the boot speed when powering up.

Android Instant Apps: Teleport directly into new apps right from your browser, no installation needed.

Emoji: Share the feels with a fully redesigned emoji set, including over 60 new emoji.

Google Play Protect: Working to keep your device and data safe from misbehaving apps by scanning over 50 billion apps per day, even the ones player have not installed yet.

Battery Saving: Whether you're talking, playing, working or streaming, you can feel confident about keeping your battery strong and full of life. (octopatr.2017)

2.1.6 Education Game

Educational games are games explicitly designed with educational purposes, or which have incidental or secondary educational value. All types of games may be used in an educational environment. Educational games are games that are designed to help people to learn about certain subjects, expand concepts, reinforce development, understand a historical event or culture, or assist them in learning a skill as they play. Game types include board, card, and video games. An educational game is a game designed to teach humans about a specific subject and to teach them a skill. As educators, governments, and parents realize the psychological need and benefits of gaming have on learning, this educational tool has become mainstream. Games are interactive play that teach us goals, rules, adaptation, problem solving, interaction, all represented as a story. They satisfy our fundamental need to learn by providing enjoyment, passionate involvement, structure, motivation, ego gratification,

Adrenaline, creativity, social interaction and emotion in the game itself while the learning takes place. (Green, C., & Bavelier, D.2012)

For C Language Game it is a learning medium that insert the content of the lesson into the game to help the learner to engage in learning to play and practice in self-learning. While playing the game, learner will gain skills and knowledge from the content of the lesson while playing the game. Games created to be a form of learn and using games to make learning fun instead of boring.

2.1.7 C language

C is a general-purpose, imperative computer programming language, supporting structured programming, lexical variable scope and recursion, while a static type system prevents many unintended operations. By design, C provides constructs that map efficiently to typical machine instructions, and therefore it has found lasting use in applications that had formerly been coded in assembly language, including operating systems, as well as various application software for computers ranging from supercomputers to embedded systems.

C was originally developed by Dennis Ritchie between 1969 and 1973 at Bell Labs, and used to re-implement the Unix operating system. It has since become one of the most widely used programming languages of all time, with C compilers from various vendors available for the

majority of existing computer architectures and operating systems. C has been standardized by the American National Standards Institute (ANSI) since 1989 (see ANSI C) and subsequently by the International Organization for Standardization (ISO).

C is an imperative procedural language. It was designed to be compiled using a relatively straightforward compiler, to provide low-level access to memory, to provide language constructs that map efficiently to machine instructions, and to require minimal run-time support. Despite its low-level capabilities, the language was designed to encourage cross-platform programming. A standards-compliant C program that is written with portability in mind can be compiled for a very wide variety of computer platforms and operating systems with few changes to its source code. The language has become available on a very wide range of platforms, from embedded microcontrollers to supercomputers.

For C language game Use C language as the content in the game. For students who register Progmaning1 subject or who are interested in learning C language can

learn basic C language and repeat the lesson about the use of commands. The C language games to make learning fun instead of boring.

2.1.8 Programing language

According to David Bolton (2018) a programming language is used to write computer programs including applications, utilities, and systems programs. Before the Java and C# programming languages appeared, computer programs were either compiled or interpreted.

A compiled program is written as a series of humanly understandable computer instructions that can be read by a compiler and linker and translated into machine code so that a computer can understand and run it. Fortran, Pascal, Assembly Language, C, and C++ programming languages are almost always compiled in this way. Other programs, such as Basic, JavaScript, and VBScript, are interpreted. The differences between compiled and interpreted languages can be confusing.

- Compiling a Program

The development of a compiled program follows these basic steps:

1. Write or edit the program

2. Compile the program into machine code files that are specific to the target machine
3. Link the machine code files into a runnable program (known as an EXE file)
4. Debug or run the program

- Interpreting a Program

Interpreting a program is a much faster process that's helpful for novice programmers when editing and testing their code. These programs run slower than compiled programs. The steps to interpret a program are:

1. Write or edit the program
2. Debug or run the program using an interpreter program

- Java and C#

Both Java and C# are semi-compiled. Compiling Java generates bytecode that is later interpreted by a Java virtual machine. As a result, the code is compiled in a two-stage process.

C# is compiled into Common Intermediate Language, which is then run by the Common Language Runtime part of the .NET framework, an environment that supports just-in-time compilation.

The speed of C# and Java is almost as fast as true compiled language. As far as speed goes, C, C++, and C# all are sufficiently speedy for games and operating systems.

- Are There Many Programs on a Computer?

From the moment you turn on your computer, it is running programs, carrying out instructions, testing RAM and accessing the operating system on its drive.

Each and every operation that your computer performs has instructions that someone had to write in a programming language. For example, the Windows 10 operating system has roughly 50 million lines of code. These had to be created, compiled and tested—a long and complex task.

- What Programming Languages Are Now In Use?

Top programming languages for PCs are Java and C++ with C# close behind and C holding its own. Apple products use Objective-C and Swift programming languages.

There are hundreds of small programming languages out there, but other popular programming languages include:

- Python
- PHP
- Perl
- Ruby
- Go
- Rust
- Scala

There have been many attempts to automate the process of writing and testing programming languages by having computers write computer programs, but the complexity is such that, for now, humans still write and test computer programs.

- The Future for Programming Languages

Computer programmers tend to use programming languages they know. As a result, the old tried-and-true languages have hung around for a long time. With the popularity of mobile devices, developers may be more open to learning new programming languages. Apple developed Swift to eventually replace Objective-C, and Google developed Go to be more efficient than C. Adoption of these new programs has been slow, but steady.

For C language game use C# and Java to write program with Unity. Because Unity supports C#, an industry-standard language with some similarities to Java or C++.

2.2 RELATED WORK

According to Bouras et al (2003) Researched on web based games is a learning game, played through the Internet, to research on learning through student game media. The aim of the research is to bring the results to the improvement and development of innovative learning materials for lifelong learning. By designing a game called "UNIGAME: Social Skills and Knowledge Training" encourage students to interact, solve problems, communicate, collaborate, team up, manage projects, and skills such as Responsibility, creativity. For this

research shows that learning games can help students understand theories well. Because of the practice in the game. Students are also interested in learning more about themselves. Teamwork uses communication to discuss issues. He concludes that learning games help in the development of feedback in the game, helping to understand and use visualization.

According to FH JOANNEUM Researched name “UniGame : Game based Learning in Universities and lifelong learning” using computer games and games in general for educational purposes several aspects of the learning process are supported: learners are encouraged to combine knowledge from different areas to choose a solution or to make a decision at a certain point, learners can test how the outcome of the game changes based on their decisions and actions, learners are encouraged to contact other team members and discuss and negotiate subsequent steps, thus improving, among other things, their social skills.

According to Cameron (2004) Researched about game is develops digital games to help students in Mass Communication subject, to test the effect of this course through the game. Experiment with a group student of Charles Sturt University. The research found that learning games helped learners develop their skills as writers.

Reduce training time. Always keep learners alert and find out that the learner has made the right decision.

For the research can help my research:

1. To apply knowledge in various areas with various content to develop the system. Including programming, the cognitive like Mass Communication subject and security in information systems.
2. The types of development vary depending on the purpose of each research such as Developed to be in the online game online game format and mobile applications but most of them have developed in the form of digital games.

For the research was found that the application of the concept of game education to use in the real. The result is that it benefits both the students and other person. This research has applied the principle of game to the teaching of the C language to develop as a game application. For students in C language subject use the game application created alongside the regular course. The goal is to provide students with the motivation to learn the C language.

2.3 TOOLS USED

Developer develops the application using the following software:

2.3.1 Adobe Photoshop

Adobe Photoshop is an image editor. What this means is that any digital image, be it a photo you shot or an image you pulled from online, can be edited, tweaked, played with, etc. in this program. There is an enormous amount of features and things you can do with CS6, much more than could be included in one Libguide, so further references and lists of books on CS6 have been added for you to explore. (Savvy Researcher: Aug 2018)

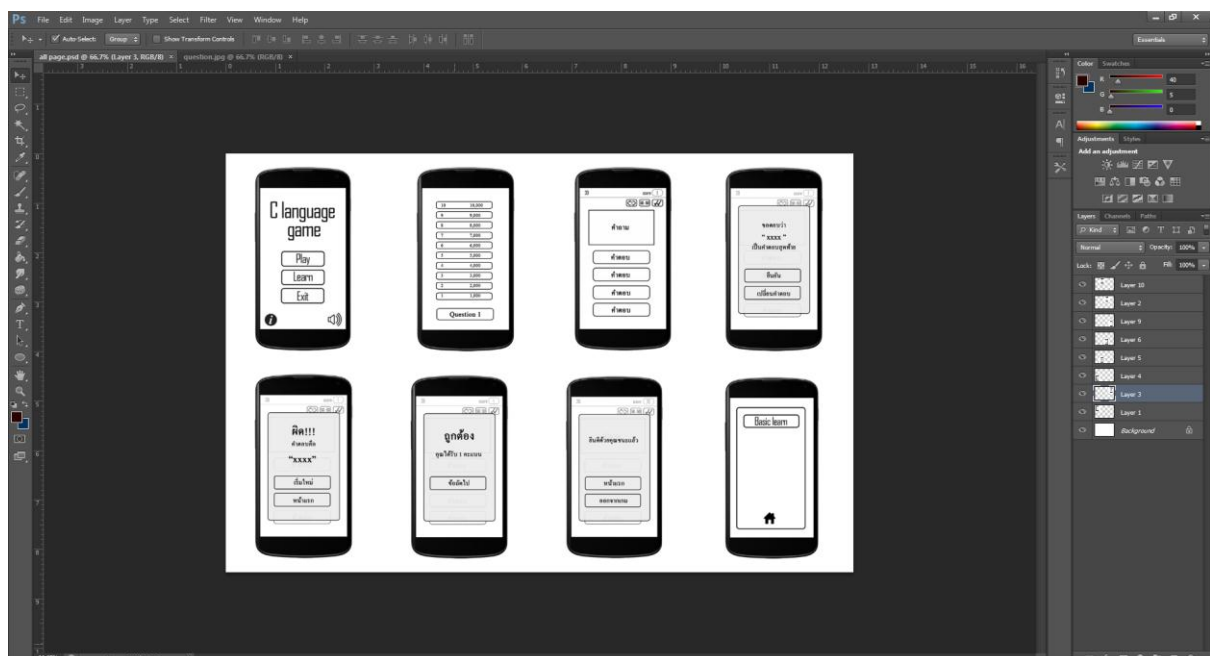


Figure 2.2: Adobe Photoshop

For C Language Game the developers using Adobe Photoshop for design of storyboard. The developer creates colourful background for students it interests in learning.

2.3.2 CONSTRUCT 2

CONSTRUCT 2 is a program developed by SCIRRA LTD. The ASHLEY and THOMAS GULLEN brothers originally owned the CONSTRUCT CLASSIC, which used DIRECTX 9 for the WINDOW operating system, and with the introduction of HTML5 technology, changed and developed. CONSTRUCT 2 is based on the idea that creating games without programming.

Construct 2 is a powerful engine and a user-friendly development environment. Easy enough for the beginner and powerful enough for the expert; Construct 2 should interest anybody who wants to easily create games and applications for mobile, desktop, the web, and consoles. (Kru Chain.2013)

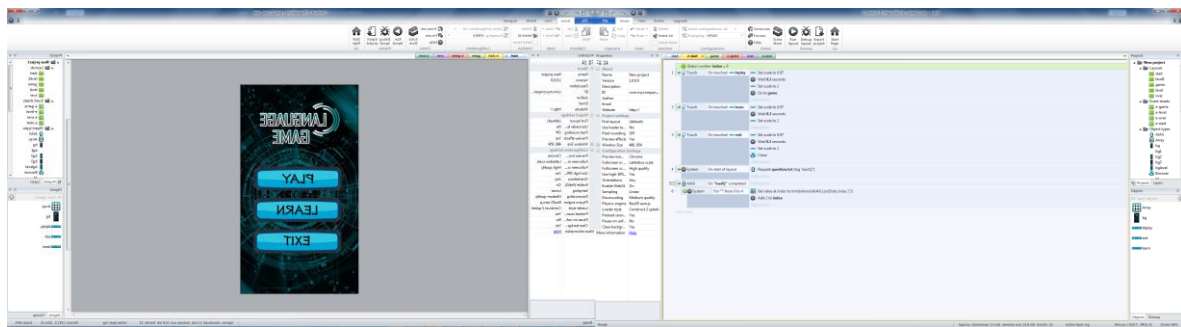


Figure 2.3: Construct 2

For C Language Game using program Unity to develop game for easy to setting motion in application such as working each page of application.

2.3.3 Adobe Illustrator

Adobe Illustrator is a vector graphics editor developed and marketed by Adobe Inc. Originally designed for the Apple Macintosh, development of Adobe Illustrator began in 1985. Along with Creative Cloud (Adobe's shift to monthly or annual subscription service delivered over the Internet), Version CS6 was the sixteenth generation of Adobe Illustrator. Adobe added many more features and several bug fixes such as a new user interface, layer panels, RGB codes, and color ramp to increase performance. CS6 was released on April 23, 2012.



Figure 2.4: Adobe Illustrator

For C Language Game the developers using Adobe Illustrator for design such as background and button. The developer creates colourful button for students it interests in learning.

2.4 CONCLUSION

In this chapter, it shown begun in which describes previous study and used to develop the application to learn C language, Mobile Games, Types of Computer Games, Education Games, Mobile Application, Android, also discussion about tools used and related work.

CHAPTER 3

METHODOLOGY

The C Language Game Application is used the Multimedia Development Life Cycle method. This method is suitable for develop multimedia project. It has 6 phases. For C Language Game Application use only five phases are Define the system, System Design, Tool selection, Authoring and Testing as shown in figure 3.1 below

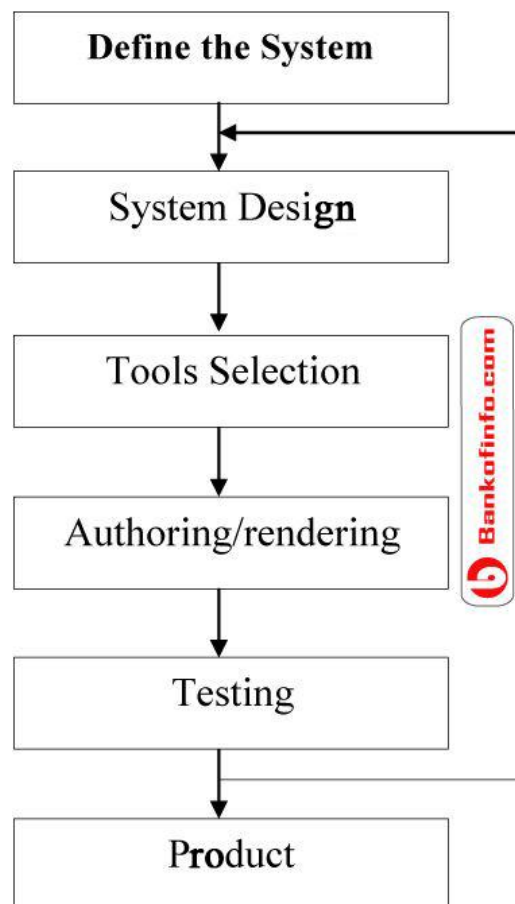


Figure 3.1: Multimedia Development Life Cycle Apply Method (RASEL, 2018)

3.1 DEFINE THE SYTEM PHASE

To development project, the developer should consider the following:

1. Idea and function: C language Game application is developed for Students who register the programming1 subject and normal person who interesting. It is name C Language Game. The C Language Game is Game Question and Answer about basic C language. Players must answer questions within 40 seconds to get 5,000 Bath for 1 score. In game have hint to help player to answer but can help only 3 time.
2. Propose: This project proposes is developed C Language Game application to understanding about C language and make learning fun instead of boring and to study and develop android application used in C Language Game
3. Target audios: C language is design and developed skill for student who registered the Computer Programing Fundamental subject.

3.2 SYSTEM DESIGN PHASE

Most common way to start design is by composing an outline of the sequences and locks of information that will appear on the screen.

3.2.1 Flow Chart

A flowchart is a formalized graphic representation of a logic sequence, work or manufacturing process, organization chart, or similar formalized structure. The purpose of a flow chart is to provide people with a common language or reference point when dealing with a project or process.

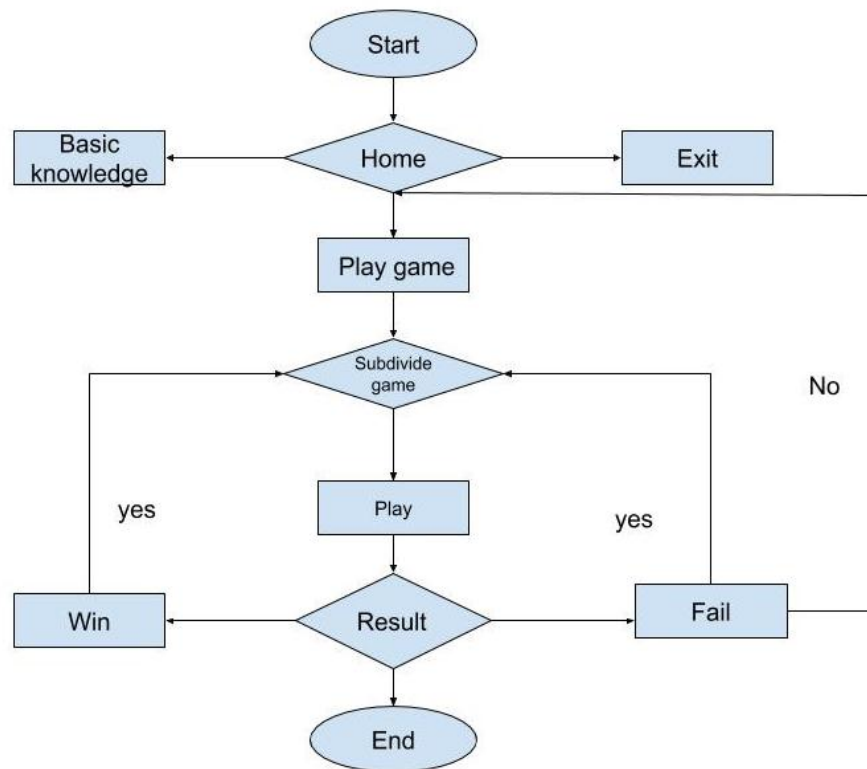


Figure 3.2: Flowchart Diagram of C Language Game

For C language Game will start the application from start page. It automatically goes to home page then player can select the button to select three ways are basic knowledge, game, and exit. If the player selects basic knowledge, he/she can learn the information about each C language. If the player selects game button, the game will process to Play game. From Play game it will continue process to Subdivided game, Subdivided game have the decision is the Player won or Player lose. When the player won the games, he/she can go to next question but when the player loses the game, it will ask to play games again, or when finish the game player can go to home and the last exit button is to exit from the game as figure 3.2

3.3 TOOLS SELECTION

3.3.1 Adobe Photoshop

Adobe Photoshop is an effectively program used for decoration of photos and graphics. The developer is using Adobe Photoshop for preparing and design storyboard of user interface.

3.3.1.1 Preparing and Designing Storyboard

The preparedness of data before start develop C language Game, it is importance step. It is easily of create project “which one doing first” and decrease of time table to develop project. In preparing and design storyboard, the developer prepare two things are storyboard of user interface as figure 3.3 below.

1. Designing of User Interface

Is all interfaces in C language Game such as Main menu page, About page, Basic knowledge page, Play games page, Continue page, Game over page by following storyboard user interface.

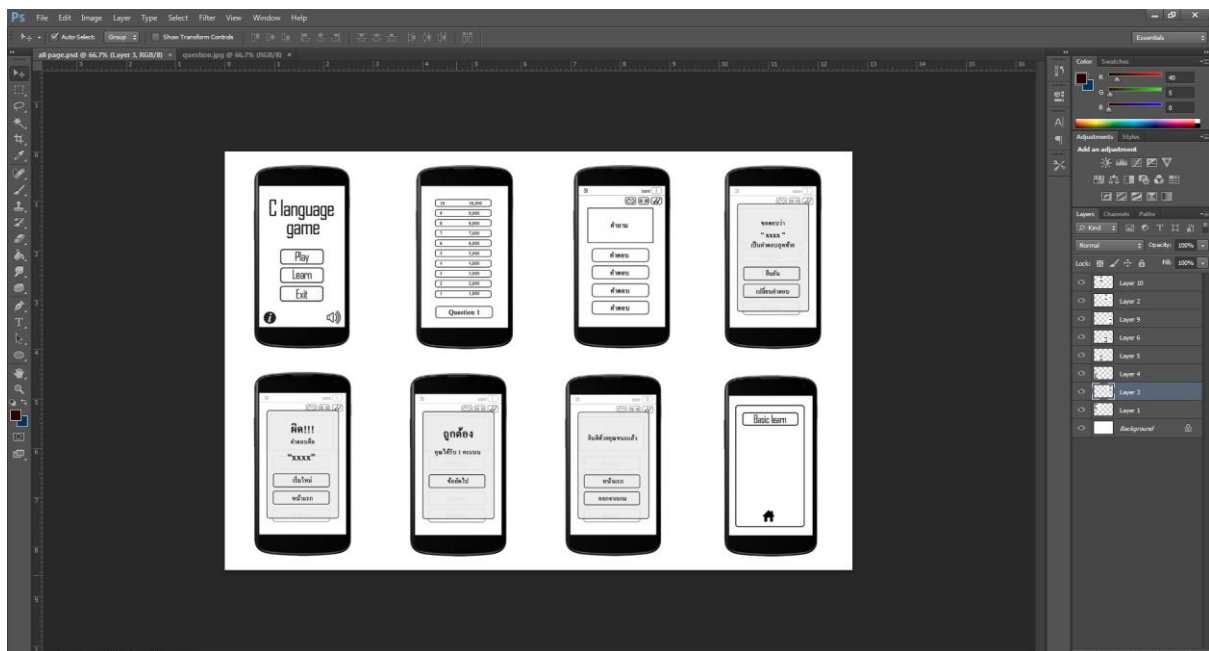


Figure 3.3: Design Storyboard of Application in Adobe Photoshop CS6

3.3.2 Adobe Illustrator

Adobe Illustrator is an effective program used to decoration of graphics and vector image, developer use Adobe Illustrator as tools for preparing and designing button, and background as show in figure 3.5 below.

3.3.1.1 Designing

The design step, the developer is taking information from preparing and design storyboard to design background, user interface, and button as figure 3.4-3.9 below.

1. Designing Button

Is designed the button in C language Game such as about button, play button, home button, continue button, turn back button, sound button, Exit button as figure 3.4 below.

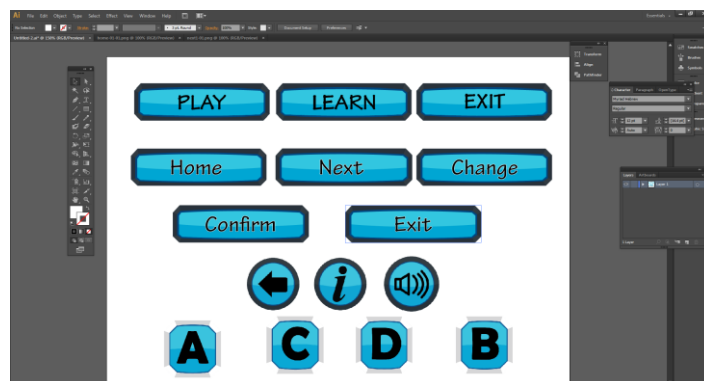


Figure 3.4: Designing Button in Adobe Illustrator CS6.

2. Design Background

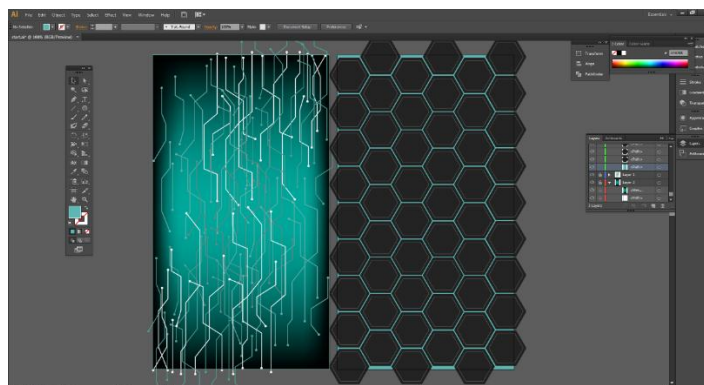


Figure 3.5: Designing Background in Adobe Illustrator CS6.

3.3.3 Construct2

Construct2 is a powerful engine and a user friendly development environment. Easy enough for the beginner and powerful enough for the expert; Construct2 should interest anybody who wants to easily create games and applications for mobile, desktop, the web, and consoles. For C language game using Construct 2 program as a tool to coding and putting sound in game as figure 3.6 below.

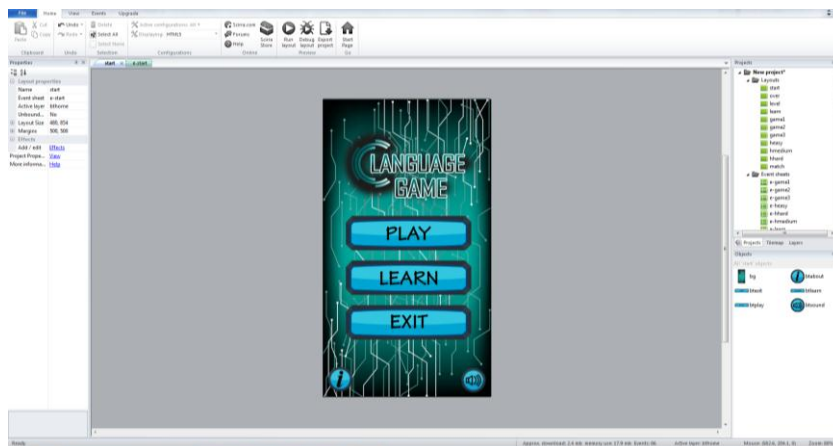


Figure 3.6: Setting C language Game in Construct2 Program.

Work Instruction of Construct 2

Create a new project-new empty project-open. New is the way that you'll start every project. Doing this will launch the project template options. For all of projects will be using the New empty projectsetting. There's however many options and possibilities that can use to customize the project. Customize to start at different widths or fit certain screens as figure 3.7 below.

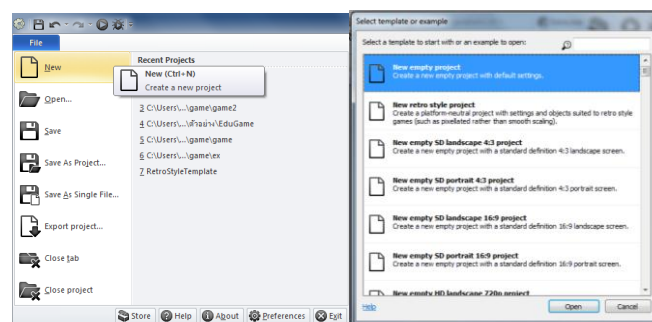


Figure3.7: Create New Project

Set layout, change the layout name and size, it is click on the layout in layout properties set name change from layout 1 to start and set layout size change value is 480, 854 as figure 3.8 below.

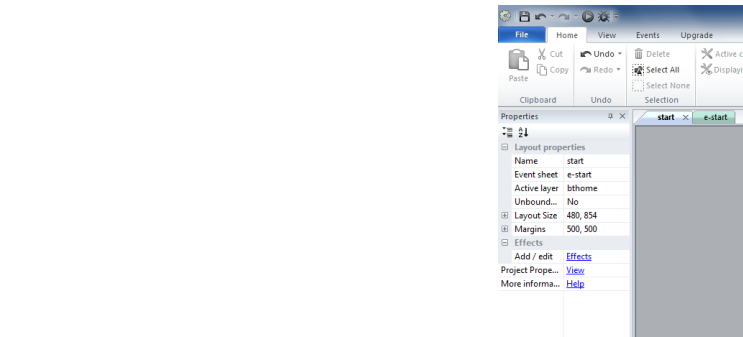


Figure3.8: Set Layout Name and Size

Set the background image, it's double on layout it has the insert new object dialog pop up select the sprite click insert. The image editor window will pop up, click on folder select image and click on image set size at position 0,0 and size 480, 854 as figure 3.9 below.

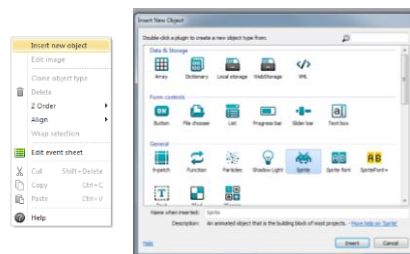


Figure3.9: Insert the Object

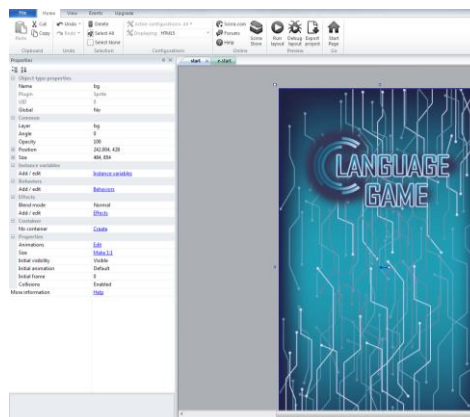


Figure3.10: Set the Image Size

Set the layers, it is click on layer tab, click on layer 0 choose pen for change name as figure 3.11

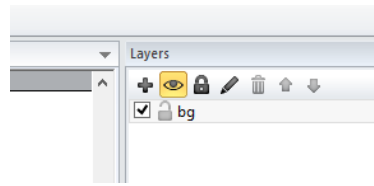


Figure3.11: Set the Layer

Set the object button, such as play button it is set in event sheet page, click on add event select touch - on touched-select object- add action - system -go to layout- select name layout page from go to the next page as figure 3.12 below

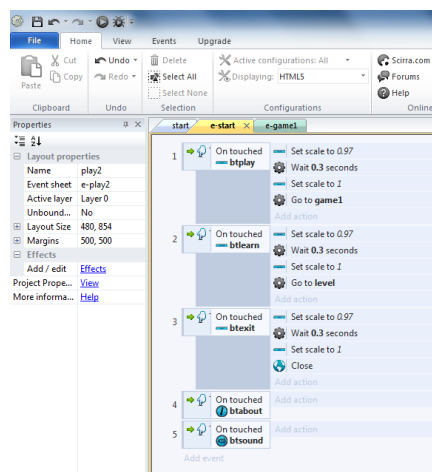


Figure3.12: Set the Object Button in Event Sheet Page

3.4 AUTHORING PHASE

Authoring phase is all processing of doing project including: storyboard and designing. First step, the preparing of doing game in term of interface, button, and background in Adobe Photoshop CS6 program then design in Adobe Photoshop CS6 program.

3.4.1 Preparing and Designing Storyboard

1. Storyboard User Interface


Project name: C language game	
	Functional Info: Home Page
	Button: <ul style="list-style-type: none"> - Play button - Learn button - Exit button Icon <ul style="list-style-type: none"> - About icon - Sound icon
Note: This page will show the home page.	

Figure 3.13: Home Page

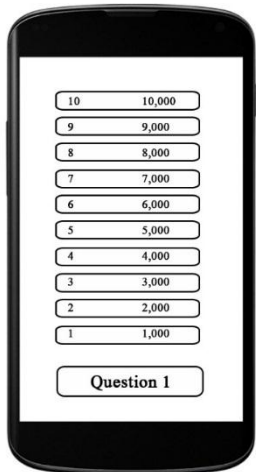
Project name: C language game	
	Functional Info: Level
	- Money list Button: <ul style="list-style-type: none"> - Number of Question
Note: This page will show the number level of game and Money list.	

Figure 3.14: Level


Project name: C language game	
	Functional Info: Game page.
	<ul style="list-style-type: none"> - Score and Time
<p>Note: This page will show the game page.</p>	

Figure 3.15: Game Page


Project name : C language game	
	Functional Info: Show the result of game
	<p>Button</p> <ul style="list-style-type: none"> - Next level icon
<p>Note: This page will show the correct answer.</p>	

Figure 3.16. Result of correct answer.


Project name: C language game	
	Functional Info: Show the result of game
	Button <ul style="list-style-type: none"> - Home icon - Replay icon
Note: This page will show the wrong answer.	

Figure 3.17: Result of wrong answer.


Project name: C language game	
	Functional Info: Basic learn page.
	Icon <ul style="list-style-type: none"> - Home Icon
Note: This page will show the Basic learn page.	

Figure 3.18: Basic learn page.

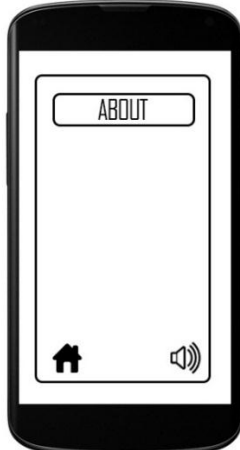
Project name: C language game	
	Functional Info: About page
	Icon: <ul style="list-style-type: none"> - Home icon - Sound icon
Note: This page will show about page.	

Figure 3.19: About page.


Project name: C language game	
	Functional Info: Congratulation game
	Button <ul style="list-style-type: none"> - Home button - Exit button
Note: This page will show congratulation game page.	

Figure3.20: Congratulation Page

3.4.2 Designing

The result of bringing the preparing storyboard to design

1. Designing item

Is the result of designed the button in C language Game such as play button, learn button, exit button, easy button, medium button, hard button, answer button and about icon, sound icon, home icon, play icon, next icon, replay icon as figure: 3.20 below.



Figure 3.21: Button Home Game



Figure 3.22: Button in C language Game



Figure 3.23: Button Choice Game



Figure 3.24: Helper Choice in Game

2. Designing User Interface

Is all interfaces in C language Game such as Main menu page, About page, Basic knowledge page, Play games page, Continue page, Game over page by following storyboard user interface.

2.1 Main menu page

This page will show the main menu page and it will have 3 button that can select is Play button, Learn button, About us, The setting sound button and Exit button as figure 3.23 below.



Figure3.25: Home/Main Menu Page

2.2 Game Page (Subdivided Game)

The game is Quiz game. In Quiz game have 10 questions, player need to get 10 scores that mean player can win the game.

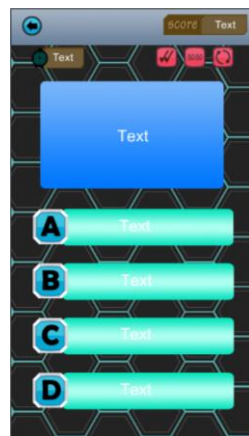


Figure3.26: Game Page

1.3 SUMMARY

The developer used the Multimedia Development Life Cycle method to develop game. This method is suitable for develop multimedia project.

It has 5 phases, are Define the system, system design, Tool selection, Authoring/rendering and Testing. It begins form gathering initial information and finally to maintenance to keep up to date and current.