



Faculty of Computer Science and Information Technology

***STOP GLOBAL WARMING! AN ANDROID MOBILE GAME TO RAISE  
AWARENESS OF GLOBAL WARMING***

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Bachelor of Computer Science with Honours

(Multimedia Computing)

2019

UNIVERSITI MALAYSIA SARAWAK

THESIS STATUS ENDORSEMENT FORM

TITLE STOP GLOBAL WARMING! AN ANDROID MOBILE GAME TO RAISE AWARENESS OF GLOBAL WARMING

ACADEMIC SESSION: 2019/2020

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**STOP GLOBAL WARMING! AN ANDROID MOBILE GAME TO RAISE  
AWARENESS OF GLOBAL WARMING**

VOON MING CHANG

This project is submitted in partial fulfillment of the  
requirements for the degree of  
Bachelor of Computer Science with Honours  
(Multimedia Computing)

Faculty of Computer Science and Information  
Technology UNIVERSITI MALAYSIA SARAWAK  
2019

**STOP GLOBAL WARMING! PERMAINAN MUDAH ALIH ANDROID UNTUK  
MENINGKATKAN KESEDARAN PEMANASAN GLOBAL**

VOON MING CHANG

Projek ini merupakan salah satu keperluan untuk Ijazah  
Sarjana Muda Sains Komputer dengan Kepujian  
(Pengkomputeran Multimedia)

Fakulti Sains Komputer dan Teknologi Maklumat  
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## **Acknowledgement**

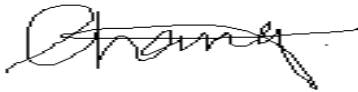
First of all, I would like to give my sincere thanks to University Malaysia Sarawak (UNIMAS) for giving me an opportunity to be part of the member in the last 4 years.

My special thank goes to my final year project supervisor, Madam Amelia Jati Anak Robert Jupit for giving me so much guidance, support and advices during the development of the project. Besides, I gratefully appreciate Dr Cheah Wai Shiang for giving me suggestion and improvement of my final year project. Besides, thank you very much for the 10 students in Faculty Computer Science and Information Technology (FCSIT) as game tester for my game project. Furthermore, I would like to give my sincere thanks to the 16 participants who took part in the final game testing for obtaining the statistical result about the use of game in raising awareness of global warming.

Lastly, I would like to express my deepest gratitude to my family members who motivated me and supported me during the development for my project. Thank you for everyone who had given support to me and I am really appreciate every one of you.

## DECLARATION

I hereby declare that the proposed project, Stop Global Warming! An android mobile game to raise awareness of global warming is my original work. I have not copied from any other student's work or from any other sources. The coding and report part is written by myself with the help of my supervisor, Madam Amelia Jati. The sources that had become my references in this project are cited and written using my own words.



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## **ABSTRACT**

*The global warming issue has been persisting for a very long time. However, people still lack awareness of the severity of global warming. People tend to focus more on their work rather than taking care of their surroundings. Thus, the proposed game is developed to raise awareness of this global warming issue among people nowadays to prevent Global warming from getting worse. The methodology chose to create the proposed game is the agile methodology, which is error-tolerant and supports a fast development process. The overall design of the proposed game is determined after reviewing three existing mobile games present in the Google Play Store. Besides that, requirement analysis is also performed to find out the needs of the proposed game's development. The requirement analysis process includes the distribution of the questionnaire (Appendix A) about people's knowledge of Global warming and educational game. Furthermore, hardware, software and system requirements also analyzed to ensure the smoothness of the game development process.*

## **ABSTRAK**

Isu pemanasan global telah berterusan untuk masa yang sangat lama. Walau bagaimanapun, orang ramai masih kurang kesedaran mengenai kepanasan pemanasan global. Orang lebih cenderung menumpukan perhatian kepada kerja mereka dan bukannya menjaga persekitaran mereka. Oleh itu, permainan yang dicadangkan dibangunkan untuk meningkatkan kesedaran mengenai isu pemanasan global ini di kalangan orang-orang pada masa kini untuk mengelakkan pemanasan Global semakin memburuk. Metodologi yang memilih untuk mencipta permainan yang dicadangkan adalah metodologi tangkas, yang merupakan toleransi ralat dan menyokong proses pembangunan yang cepat. Rekaan keseluruhan permainan yang dicadangkan ditentukan setelah mengkaji tiga permainan mudah alih yang ada di Google Play Store. Selain itu, analisis keperluan juga dilakukan untuk mengetahui keperluan pembangunan permainan yang dicadangkan. Proses analisis keperluan merangkumi pengedaran kuesioner (Lampiran A) mengenai pengetahuan orang mengenai Pemanasan global dan permainan pendidikan. Selain itu, keperluan perkakasan, perisian dan sistem juga dianalisis untuk memastikan kelancaran proses pembangunan permainan.



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## **CHAPTER 1: INTRODUCTION**

### **1.1 Project Title**

Stop Global Warming! An android mobile game to raise awareness of global warming

### **1.2 Introduction**

Global warming is defined as the rise of global temperature at a fast rate due to the high emissions of carbon dioxide (CO<sub>2</sub>) into the atmosphere (Macmillan, 2019). There are several main causes of why global warming is getting worse throughout these years. One of the examples is deforestation, where human is clearing forest for various purposes likes farming and urban development (“The Causes of Climate Change,” 2019). Trees are the sources to convert carbon dioxide into oxygen. Hence, a decrease in the number of trees will result in an increase in carbon dioxide's concentration in the air.

On the other hand, human activities like burning fossil fuels to produce gas, oil, and electricity severely increase the concentration of CO<sub>2</sub>, which also worsens the global warming issue (Richards, 2019). The sad truth is, most people still not well conscious of what is going to happen if just let the global warming issue be without any further concern (Bhandari, 2019). The most significant effect is the rise of global temperature, which results in iceberg melting and the rise of sea level. Besides that, it also destroys wildlife's habitat, for example, polar bears and penguins, which iceberg is their main habitat.

Thus, this project uses the serious gaming concept to educate and raise awareness of the player about the cause, effect of global warming to our daily lives and ways to prevent global warming from becoming even severe than it used to be through a mobile game. Serious gaming is a game design for a purpose rather than pure entertainment (Becker, 2018). The serious game has been used as a significant way to provide information in a very effective way. To be precise, all the information needed for the player to receive is proposed in the game form. The player can interact with the information through gameplay instead of just getting the information by reading books, journals or articles from various sources (Stege, 2011). Serious gaming tends to make the learning process more exciting and innovate the player to seek for more information (Zhonggen, 2019).

The purpose of choosing a mobile game is that most of the people nowadays have at least one mobile phone with them, which more people can play the game compared to the desktop



platform, which requires a desktop or laptop to play the game. Besides that, the game is developed in the Android platform, which has the users compared to iOS users.

### **1.3 Problem Statement**

People nowadays are lacking awareness about the severity of global warming. Although there are actions taken to prevent global warming from becoming worse, there are the majority of people stating that global warming may be a problem in their lifetime but will not put more concern in it or try to combat this issue. Besides that, public ignorance about the impact of global warming also one of a serious problem which causes it to become worst.

### **1.4 Aims/Objectives**

The project aims to create a game for people to understand global warming. There are also two objectives needed to be achieved, including:

- ❖ To develop a game that contains the cause and effect of global warming and its prevention
- ❖ To test whether a mobile game is an effective way of raising awareness of global warming

### **1.5 Significance of Project**

The purpose of this project is to raise awareness of the cause and effect of global warming on our daily lives and also its prevention through mobile games. Players should be able to understand how harmful global warming toward our daily lives throughout the gameplay and be more concerned about this issue.

### **1.6 Methodology**

This project is carried out using Agile methodology, an iterative approach that focuses on the rapid development process. Since the final year project schedule is tight, a development process that is error-tolerant, fast and yet ensures the best quality of a project is essential (Lotz, 2018). Agile methodology is the most flexible methodology compared to the waterfall model because it allows the developer to correct any mistakes or make any improvements at any stage (“Agile

Methodology & Model: Guide for Software Development & Testing,” n.d.). For waterfall methodology, it requires the developer to start the project all over if any errors or improvements are required, which is impossible to be used for the tight project schedule. Figure 1.1 below shows the exact stages of agile methodology which will be applied into the game development process

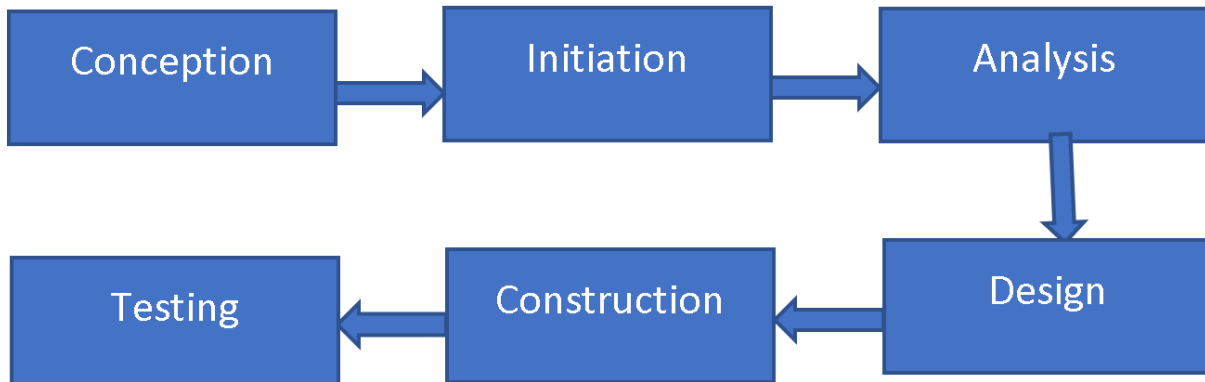


Figure 1.1: Agile Methodology stages in game development

### **Conception**

Brainstorming an idea about how to implement the concept of global warming into the flow of gameplay. A lot of questions will be asked during this phase, including what is the objectives of creating this game and what problems compel me to this project. All the questions will be answered and then listed down for the initiation phase later.

### **Initiation**

Search all related information about global warming through the internet, which will be used for the project. This is because the project schedule is tight, and it is almost impossible to look for information through books, journals or articles in a library or any bookstore. All the information found will be used to decide what I am going to do in this project. Besides that, all the games that can find online which have related topic about global warming will be used as examples to act as guidance in my game development. Furthermore, all the programming skills and software tutorials related to developing the game will be listed down for later development processes.

## **Analysis**

The analysis will be done to decide the suitability of the information gained from online sources to be used in game development. Information such as the cause and effect of global warming with its prevention should be justified with a reliable source before being used as the material for the game development. Additionally, the game examples which are related to the global warming issue will be picked and chosen after I had played through the game and use as the examples to compare with the game I developed.

## **Design**

Global warming will be used as the main theme of the gameplay. Players will experience the game flow from the cause of global warming, then how it affects our lives, an last how to prevent it from getting worse. The game designed will be a 2D game based on an android platform, which is open source and has the largest amount of users worldwide.

## **Construction**

Unity engine will be used for game development. This game development software is chosen because it is free with a lower game code's complexity compared to another popular game engine like Cry Engine and Unreal engine. Although it is free, it contains all the necessary functionality in building a game. Adobe Photoshop will be used in the overall graphic design of the game because most of the tutorials and guidelines can be found online, which ease the game development process.

## **Testing**

This mobile game prototype will be tested on how well it provides global warming information toward the player since it was the aim of this project. Apart from that, the gameplay smoothness is also one of the aspects that need to be considered. This is because a faulty game will result in a bad review and the important message from the game will be ignored. All the data gain from players experienced after finishing the gameplay will be used as evidence to prove that the game I developed will help in raising awareness of global warming.

### **1.7 Scope of Project**

The scope of the project will cover the topic about the cause, effect of global warming and its prevention through a 2D android single-player mobile game.

## 1.8 Project Schedule

A Gantt chart is used to illustrate the schedule of the project to be finished within a given time, as shown in Figure 1.2 below. Besides, the Gantt chart for final year project 2 is shown in Appendix C.

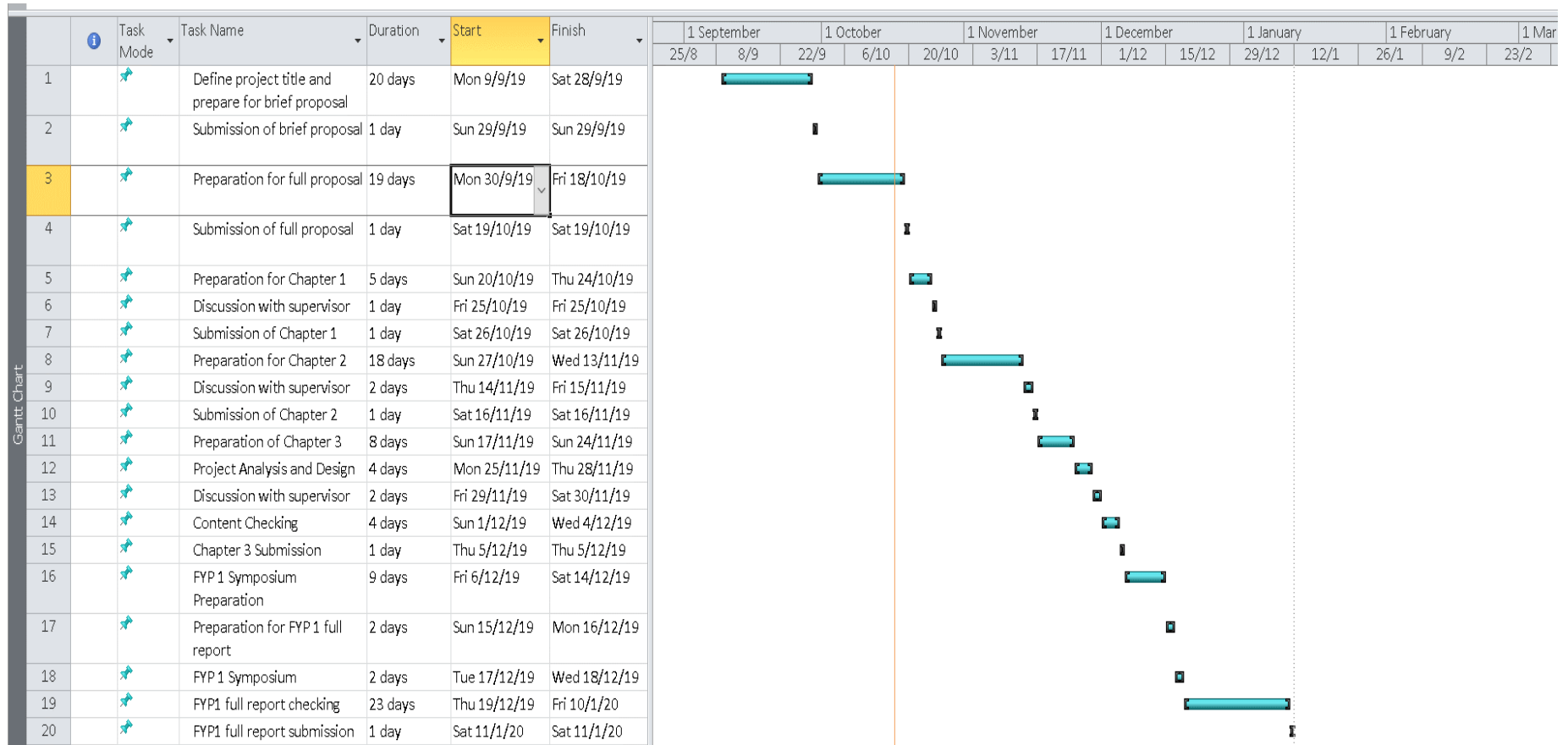


Figure 1.2: Gantt chart for final year project 1 schedule

## **1.9 Expected Outcome**

A working mobile game prototype which the cause, effect of global warming towards human lives and its prevention

## **1.10 Summary**

This final year project is about creating an android mobile game called Stop Global Warming! The purpose of developing this game is to raise awareness of global warming cause, effect, and prevention. Agile methodology is chosen for the development of this mobile game because it is error-tolerant and provides a fast developing process that is most suitable for my final year project, which has a tight schedule. The player who had played this game should have a better understanding of what global warming is and be more concerned about this issue.

## **CHAPTER 2: LITERATURE REVIEW**

### **2.0 Introduction**

(“The Importance Of Literature Reviews In Academic Writing,” n.d.) defines the literature review as a survey of literature that helps to clarify the overall concept and knowledge of the research. The literature review is important because it helps to show the originality and provide support for the proposed project (LibGuides: Conducting a Literature Review: Benefits of Conducting a Literature Review, n.d). Besides that, it also helps to clarify the sources of information that are used in the proposed project (Why Write a Literature Review? - Proofread My Essay, 2014).

In this chapter, three existing mobile games in the current market will be reviewed to compare them with the proposed project. The purpose is to ensure that the proposed project will fill up the weaknesses of the existing mobile game in presenting the global warming issue towards the public. All the reviewed mobile games will be compared to each other by their overall gameplay, visual graphic, audio, and content. The result will be used as references to improve the proposed project.

### **2.1 Review on existing related mobile game**

#### **2.1.1 Stop Climate Change!**

Stop Climate Change! It is an android mobile game developed by Daniel Erdmann and released in August 2018 on the Playstore platform (Erdmann, 2018). The player will be a penguin who will fight for other penguins to survive on a melting ice floe. Players need to stay as long as possible until he is the last one standing to win this game. Before starting the game, the player can choose the number of enemies and the size of the ice floe to increase or decrease its difficulty, as shown in Figure 2.1 below.



Figure 2.1: Start Screen of the “Stop Climate Change!” mobile game

After that, the player will play as a penguin with a light blue skin color while the enemies will be black skin color. There are two virtual joysticks to interact with the gameplay. The left side virtual joystick controls the movement of the penguin and the right side one is the attack button, which player can push other penguins off the ice floe as shown in Figure 2.2 below. The enemy penguins will try to attack the player by pushing the player out of the ice floe. Thus, the player can either attack other penguins first or try to dodge their attack.

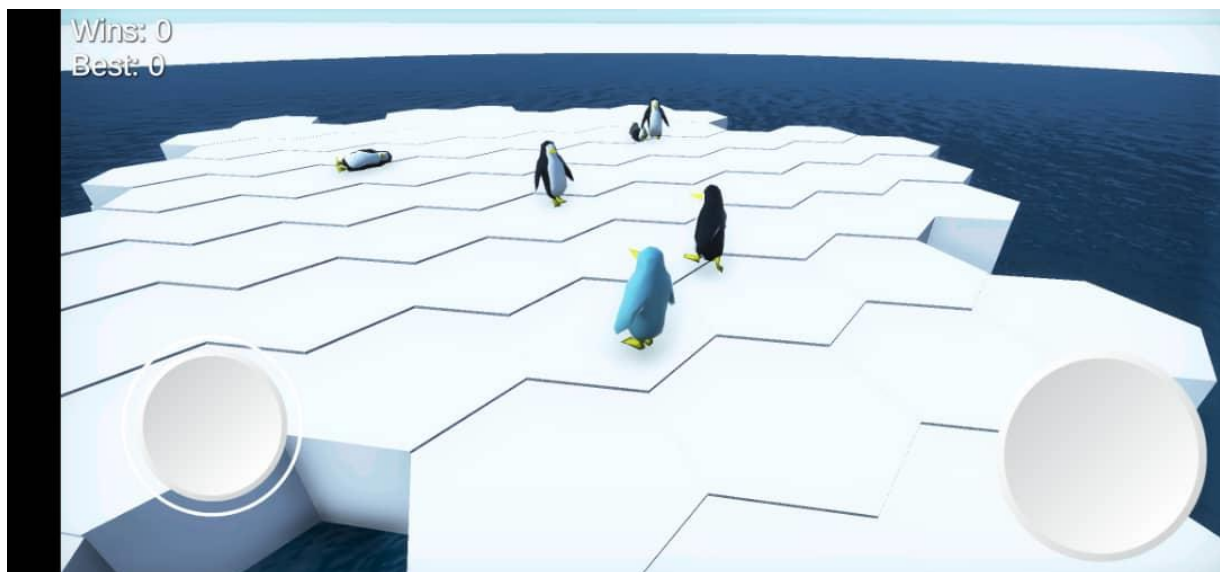


Figure 2.2: Gameplay scene of the “Stop Climate Change!” mobile game

Stop Climate Change is a simple yet exciting mobile game to tell us the effect of global warming on penguin's habitat. The decrease of the iceberg due to higher global temperature causes the number of penguins to keep decreasing throughout the year. This mobile game wants to tell their player how penguins struggle to survive and try to raise awareness of how harmful global warming towards penguin species.

### 2.1.2 Climate Quest

The Earthgames team has developed a mobile game called Climate Quest in August 2016. It is an 8-bit style graphics game with the retro soundtrack. This game is developed to educate the player about how climate changes will affect the surrounding we are living in (Climate Quest,2016). Figure 2.3 below shows the start screen of the Climate Quest mobile game. The player can enter the game by clicking anywhere on the screen. The player will need to interact with the specialists to tackle the climate change disaster, which will occur randomly within the map shown in Figure 2.4 below. There four people to interact with this game. Rick(climate scientist), Cierra(urban planner), Theodore(agricultural scientist) and Eleanor(ecologist).



Figure 2.3: Start screen of Climate Quest mobile game

There is a description provided to explain the disaster happened, preparation and specialist from which field is needed to solve that problem. Thus, the player needs to select an appropriate specialist to counter the issue by clicking on one of the specialists and move them towards the intended disaster needed for them to solve, as shown in Figure 2.4. The player will be given 18 in-game years to solve all of the disasters that happened. Every disaster has its time