

**“THE LONE ANDROID SHORT PREVIEW”: THE EFFECTS OF CEL  
SHADING IN 2D ANIMATION**



**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

## BORANG PENGESAHAN STATUS LAPORAN

JUDUL: “THE LONE ANDROID SHORT PREVIEW”: THE EFFECTS OF CEL SHADING IN 2D ANIMATION

SESI PENGAJIAN: [2020 / 2021]

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**“THE LONE ANDROID SHORT PREVIEW”: THE EFFECTS OF CEL  
SHADING IN 2D ANIMATION**



This report is submitted in partial fulfillment of the requirements for the  
Bachelor of [Computer Science (Interactive Media)] with Honours.

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY  
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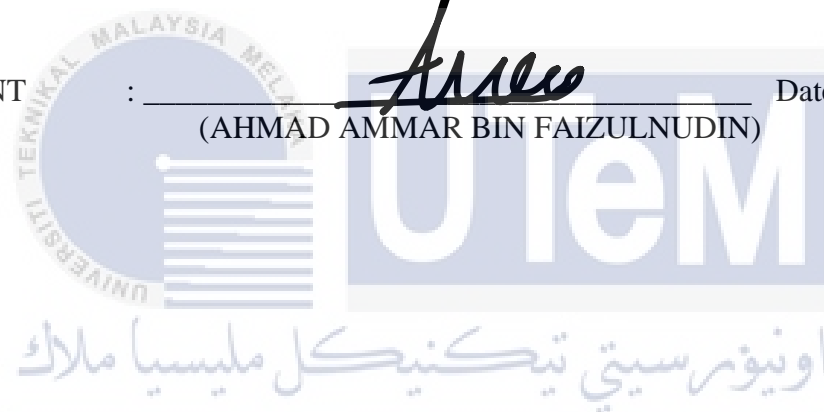
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## DECLARATION

I hereby declare that this project report entitled  
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## DEDICATION

This page is dedicated for the people who had help and support me through the entire process of bringing this project to its completion.



## ACKNOWLEDGEMENTS

I would like to give my gratitude and appreciation to those who have helped me along the way. To Dr. Mohd Adili Norasikin who has gave me the guidance as well advice to this project. It is because of him that I was able to finish this project on time.

Furthermore, I would like to give my heartfelt thanks to both my parents who have help support my entire education financially even though the troubles faced during the covid-19 pandemic going on at the time this project was developing.

And finally, to my friends in the Piggievern Discord server who have support me emotionally and mentally by using their time to have chats together and helping me let loose occasionally. Thanks for hearing my rant guys! اويور سيتي

## ABSTRACT

“The Lone Android Short Preview” is a 2D-based animation that showcase a short preview of a planned animated short about an android waking up to a post-apocalyptic earth with no memories of what happened. The focus of the project is to research on the effects of cel shading in 2D animation. Cel shading has been a common method for many artists as well animators in their works as means to provide the illusion of dimensions and realism. However, it is common knowledge that cel shading is not often used by animators since they find the method to be too time-consuming and are just satisfied with the use of the base color. Therefore, the purpose to develop this 2D-based animation is to collect data on how cel shading effects the process of 2D animation and how it effects the visuals of the animation entirely. In this project, the animation will be created by using Clip Studio Paint EX, and Adobe Premiere Pro.

## ABSTRAK

"The Lone Android Short Preview" adalah animasi 2D yang memperlihatkan pratonton pendek dari animasi pendek yang dirancang mengenai seorang android yang bangun pada bumi pasca-apokaliptik tanpa kenangan tentang apa yang berlaku. Fokus projek ini adalah untuk meneliti kesan cel shading dalam animasi 2D. Cel shading telah menjadi metode umum bagi banyak seniman dan juga animator dalam karya mereka sebagai alat untuk memberikan ilusi dimensi dan realisme. Namun, sudah diketahui umum bahawa cel shading tidak sering digunakan oleh animator kerana mereka menganggap kaedah ini terlalu memakan masa dan hanya berpuas hati dengan penggunaan warna dasar (base color). Oleh itu, tujuan untuk mengembangkan animasi 2D ini adalah untuk mengumpulkan data tentang bagaimana cel shading mempengaruhi proses animasi 2D dan bagaimana ia mempengaruhi visual animasi sepenuhnya. Dalam projek ini, animasi akan dibuat dengan menggunakan Clip Studio Paint EX, dan Adobe Premiere Pro.



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**LIST OF ABBREVIATIONS**

<b>FYP</b>	-	<b>Final Year Project</b>
<b>2D</b>	-	<b>Two Dimensional</b>
<b>3D</b>	-	<b>Three Dimension</b>
<b>PC</b>	-	<b>Personal Computer</b>
<b>CPU</b>	-	<b>Central Processing Unit</b>
<b>GPU</b>	-	<b>Graphics Processing Unit</b>
<b>KyoAni</b>	-	<b>Kyoto Animation</b>
<b>SOP</b>	-	<b>Standard Operating Procedure</b>

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## Chapter 1: INTRODUCTION

### 1.1 Introduction

The shading process of an animation is mostly done on the animation production and post-production stage of the 2D animation production. In general, shadings are mostly done after the entire animation is finished with all the frames applied with their base colors and outlining, this is called the cleanup animation. After finishing the cleanup animation, the production team will sit down and plan out how the lighting of the animation is applied particularly in the direction of the light for each animation scene.

Shading comes in play to illustrate the existence of light and to show the illusion of dimensions and realism for 2D animation. After planning the lighting for the animation scene, animators will then apply shading using the basic concept of light and shadows. Which is an object's shadow should be located on where the light does not cover the object and vice versa for the object's highlight.

Although 2D animation does not have the same automatic shading options as its 3D counterpart, shading can still be achieved although can be quite tedious. Which brings us to cel shading. Cel shading in general has been used in 2D animation because of how simple it is on giving the animation a 3D look. Thus, achieving its goal on showing the illusion of dimension and realism for the animation (Juha 2020).

## 1.2 Problem Statement

As simple as it sounds, cel shading is not often used by animators nowadays because of how tedious it is. In reality, the idea of applying shading to a frame-by-frame animation can be quite time consuming. As stated before, 2D animation does not provide automatic lighting as its 3D counterpart since the animation is done on a 2D plane. The process itself requires the animators to have an understanding on lighting and dimension to give their animation a more realistic look. Because of this, animators tend to stay away from shading their animation and leave with the base color only.

## 1.3 Objective

Objectives of this project are as follows:

1. To investigate the cel shading to the 2D animation production process
2. To develop a 2D story-based animation with the application of cel shading
3. To evaluate the rendering time of using cel shading in 2D animation

## 1.4 Scope

The target audience of this project is localized to animation enthusiast or anyone who is interested in learning 2D animation in general. Since the animation does not involve any voice acting, no subtitles are required. Furthermore, the entirety of the animation does not contain any adulterated scenes. Thus, making it suitable to be viewed by anyone from any age group.

## 1.5 Project Significance

This project aims to study on how to approach and apply cel shading to 2D animation. The findings of this project will redound to many animators, especially young animators, on how cel shading is implemented and will affect their own 2D animation. Furthermore, it allows them to have a better understanding to how cel shading works in terms of technical aspect such as layer management and the time it takes to render

scenes when it is applied. Thus, implying to young animators on what they will have to confront when it comes to the application of cel shading to their animation.

## 1.6 Conclusion

To conclude, this chapter covers the project topic “The effects of cel shading in 2d animation” with the objective and goal of the project. The project will follow the activities schedule which are listed in the Gantt Chart and milestone that proposed in the proposal to ensure the project can be carry out on time within the period. In the next chapter, the literature review and project methodology will be conducted.



## CHAPTER 2: LITERATURE REVIEW AND PROJECT METHODOLOGY

### 2.1 Introduction

This chapter will discuss about the research of the related topic about cel shading in 2D animation. Besides that, this chapter also recover the project methodology to show the procedure or process of the project development and the requirement such as software and hardware.

### 2.2 Literature Review

#### 2.2.1 What is Cel Shading

From my perspective, Cel Shading can be simplified as a shading technique of applying shadows and highlights to an animation. This is mostly due to the idea that cel shading is mostly used by artists to give their works the characteristics of dimensions and lighting.

Cel shading is stated Juha (2020) as an art style of non-photorealistic rendering designed to make animation look three dimensional by creating flat colors on top of base color, making it look three dimensional while stile still keeping that 2D effect in it. Aside from that, McKella (2019) wrote that cel shading is a shading technique used in cartoons and comic books. The basic idea of this technique is that artist shade and highlight with chunky, simplified colors rather than the subtle gradients we see in real life. Both definitions differ from each other, but the concept is the same. Cel shading in general is a simplified shading technique used by most artists and animators to achieve a 3D look for their works.

The term cel shading pays it homage from the medium that traditional animation was drawn on which are celluloids or cels for short. There have been arguments regarding on how the term itself should be spelled out. Both Juha (2020) and McKella (2019) emphasize on the matter by stating:

*This celluloid is traditionally used for painting within 2D artworks, and the name cel shading came from shortening the name down. So while it could have been cell shading, it's not. It's called cel, not having the second l-letter in it. (Juha, 2020)*

*Quick history lesson: Cel shading, commonly misspelled as "cell shading," is named for celluloids, which are clear sheets of painted acetate used in classic 2D animation. (McKella, 2019)*

Cel shading is common when it comes to modern animation. Particularly anime, which is Japanese animation. Animation companies tend to not only use cel shading but expand it to the extent of making technique as an artform itself. One of the most well-known company that practice this is Kyoto Animation or KyoAni. When looked into, the beauty of all of their works contributes to not only their way of storytelling but also their way of using cel shading heavily in them to the point that it is considered as their style of animation. We can see an example of their works in Figure 2.1 and Figure 2.2.



**Figure 2.1: A scene in Hyouka (An Animation Made By KyoAni) Utilizing Complex Cel Shading**



**Figure 2.2: A poster of Violet Evergarden(An Animation Made By KyoAni)  
Using Complex Cel Shading**

Judging from these statements and applications by a professional company, cel shading can be simplified as a technique of applying a simple shading of shadows and lighting to animation. Not only that, but it can also be an art form for animations if used in a complex manner.

### 2.2.2 How Cel Shading is achieved

It is crucial to understand how cel shading can be achieved. This is due to the idea that shading plays a major role in giving life to your animation.

Nicca (2017) states that there are many advantages to cel shading which are:

- Low difficulty level
- Does not take a lot of time
- Easily applied and changed
- Easily adapted to other coloring styles

However, it does come with the caveat that the artist or animators must understand color theory, and light and shadow values. Based on the article by Nicca (2017), one