CHAPTER I
INTRODUCTION

1.1 Background

Video games are a form of entertainment that involves Video games has been a big part of our culture for the past few decades, and is a steadily maturing industry over the years, with revenues going as far as $91 billion in 2016 and is expected to increase at a 6.3% rate annually through 2020, and online video game contents and its users increase rapidly, doubling year by year in video streaming sites such as Twitch and Youtube (Sjöblom & Hamari, 2017).

With the growth of revenue and the exponential increase of its users, the video game industry becomes a highly competitive industry and with demands increasing for more sophisticated and more realistic games with every iterations of games. Washburn, Sathiyanarayanan, Nagappan, Zimmermann, & Bird (2016) found out in a research that the majority of game development teams finishes their games in 2 years or less. This makes it so that games requires a lot of resources such as time, expertise, and technology in order to keep up with other games in the market. Therefore smaller game studios has a harder time in creating a compelling product for the masses. Some of the tools used to overcome this challenge is Autonomous design, where in which contents inside a game are generated in a vast amount and is has an random variant due to its nature (Seidel, Berente, & Gibbs, 2019).

One of the few aspects required to be developed inside of a video game is its game assets. Video game assets are objects created by game’s developers to be included inside of the game and interact with the players of the game. There are a lot of methods in creating game assets, and for 3 dimensional games in particular there are methods such as sculpting, image based rendering and procedural generation. In a research by Raptis, Katsini, Fidas, & Avouris (2017), by conducting a comparative evaluation between two game developers in a creation of a game prototype, where one is using a traditional method of development while the other uses image based rendering method, it’s concluded that the latter is significantly more efficient and resulted in a better end product as a result.
The conventional method in creating 3D models inside a 3d software are through manual interaction and development of a 3D model. This method has been proven to be great at creating quality game assets but due to its nature, the time required to create these assets are of a considerable length (Baig & Kavakli, 2018), and thus enter procedural generation. Through the method of procedural generation, game asset creation can be created much faster than the other methods mentioned before (Erath, Maheshwari, Joos, Kupferschmid, & van Eggermond, 2017).

One of the most prominent software utilizing procedural generation is Houdini, this software has been used in various industries, including the Filmmaking and visual effects industries to game industries for creating 3d models as their tool of choice because of its efficiency in creating simulations and procedural generation arguably better than many other softwares (Saario, 2019). And thus, through the cases mentioned above, procedural generation would greatly benefit the game development asset creation process and its use case will be demonstrated inside of this project titled “The Design and Development of a Video Game Asset using Procedural Generation inside Houdini”.

1.2 Research Problem
The research scope consists of:
1. How to use Procedural Generation to develop a Video Game Asset
2. How to use Houdini to create a Procedural Generation Environment

1.3 Project Objectives
The objectives of the project are:
1. To understand how to develop a video game asset using the procedural generation method in Houdini
2. To fulfill one of the requirements to graduate from Universitas Internasional Batam.
3. To show the our expertise in video game development, especially in developing assets using procedural generation.
1.4 **Project Benefits**
The benefits of this project are:

1. Benefits for the writer are to gain a knowledge and understanding of the methods and techniques required in creating a procedurally generated asset and as an opportunity to employ the skills learned in Universitas Internasional Batam.

2. Benefits for the society is to contribute a general knowledge in the creation of a procedurally generated asset.

3. Benefits for academics, this will serve as a contribution to the studies of procedural generation and upcoming researches regarding it.

1.5 **Report Writing System**

**CHAPTER I INTRODUCTION**
This chapter will look into the theories being used in the making of this project and how it correlates to the project.

**CHAPTER II THEORETICAL BASIS**
This chapter will look into the theories being used in the making of this project and how it correlates to the project.

**CHAPTER III METHODOLOGY**
This chapter will contain the methodology being used in the process of creating the project.

**CHAPTER IV IMPLEMENTATION**
This chapter will contain the output of the project.

**CHAPTER V CONCLUSION AND SUGGESTION**
This chapter will contain the conclusion of the project, and some final thoughts from the writer.