**Unit: IICT4016 - Programming for Computer Games**

*Home Assignment 1 – Research and Design*

**Task 1: Game Engines**

Game Engine 1**: Unity**

* In **Unity** the standard scripting language used is **C#**.
* The game ‘**Hearthstone**’ was made using **Unity**.
* **Unity** supports **both 2D** and **3D** games.

Game Engine 2**: Unreal Engine**

* In **Unreal Engine** the standard scripting language used is **C++**.
* The game ‘**Tekken 7**’ was made using **Unreal Engine**.
* **Unreal Engine** supports **only** **3D** games.

Game Engine 3**: CryEngine**

* In **CryEngine** the standard scripting language used is **C++**.
* The game ‘**Crysis**’ was made using **CryEngine**.
* **CryEngine** supports **only** **3D** games.

Game Engine 4**: Frostbite**

* In **Frostbite** the standard scripting language used is **C++**.
* The game ‘**Battlefield V**’ was made using **Frostbite**.
* **Frostbite** supports **only** **3D** games.

Game Engine 5**: GameMaker**

* In **GameMaker** the standard scripting language used is **Game Maker Language**.
* The game ‘**Undertale**’ was made using **GameMaker**.
* **GameMaker** supports **both 2D** and **3D** games.

**Task 2.A: File types for media assets**

Image Format 1: **JPG**

The **JPG** image format stands for **J**oint **P**hotographic **G**roup, it is of type **raster** format. This image format is a **lossy** compressed version of an image which means that the image format will **lose quality** when **compressed**. In addition, **JPG** **does** **not** support **transparency** and is **small** in **size**.

Image Format 2: **PNG**

The **PNG** image format stands for **P**ortable **N**etwork **G**raphics, it is of type **raster** format. The PNG file format is a **lossless** compressed version of an image which means that the image does **not compress** that much, but **keeps** all most of **data**. **PNG** **supports transparency** and is usually **high** in **size**.

Image Format 3: **SVG**

The **SVG** image format stands for **S**calable **V**ector **G**raphic, it is of type **vector format**, which means that the image format can be **scaled without** **losing quality**. The SVG file format is also **small** in **size** since it does not store what colour each pixel in the image is, unlike the two file formats mentioned above (JPG, and PNG).

**Task 2.B: File types for media assets**

Audio Format 1:MP3

The **MP3** audio format stands for **MP**RG Layer-**3**, it is the most popular audio format, it is mainly used for **storing music**. MP3 is **lossy**, which means that the compression **takes away** the **data** which **cannot be heard by humans**, this is why MP3 files are able to be **smaller** in **size**.

Audio Format 2:WAV

The **WAV** (Waveform Audio File Format) is the standard audio format used mainly in Windows PCs, it is mainly used for **CD-quality sound files**. WAV is commonly used for storing **uncompressed** sound files, which means that it’s **large** in **size**, thus, the it produces the **highest** **quality** possible. It’s a **lossless** file format, meaning there is **no** **data loss**.

**Task 3.A: Compression in Multimedia**

The importance of compression in images:

The main goal of compression is to **reduce file size**, this is done by removing redundant information from the image file. One of the most common contributors to a **slow website** is **large images** which are not **optimized**, this adds up to images having a **high loading time**. Compression is also important as it requires **less time** for **transfer** while **consuming less** **network bandwidth**. **Supporting old** or **slow devices** is crucial as most older devices are **unable** to **load uncompressed** **images** quickly. Image compression is also important in **communication platforms** companies were **storing** all the **images** sent between multiple users have to be **saved** on the **servers** **without taking much** **storage**.

**Task 3.B: Compression in Multimedia**

How compression in an audio file works:

As can be seen in the diagram below, the threshold set will scale the **whole audio** down below -, making the audio compressed since it will **not exceed** the **threshold**.

