Unit: IICT4016 - Programming for Computer Games

Home Assignment 1: Research and Design (24 hours)

Task 1: Game Engines (KU1) – 5 marks:

1. Unity
    - Programming language(s) used: C# or JavaScript.
    - A game programmed: Fall Guys: Ultimate Knockout.
    - Type of engine: 2D/3D.

2. Unreal Engine
    - Programming language(s) used: C++.
    - A game programmed: Batman: Arkham City.
    - Type of engine: 3D.

3. GameMaker
    - Programming language(s) used: GML.
    - A game programmed: 10 Second Ninja X.
    - Type of engine: 2D/3D.

4. CryEngine
    - Programming language(s) used: C++, C#, Lua.
    - A game programmed: Crysis 3.
    - Type of engine: 3D.

5. IW
    - Programming language(s) used: C, C++, Python.
    - A game programmed: Call of Duty.
    - Type of engine: 3D.

Task 2: File types for media assets (KU3) – 5marks

a. SVG – Scalable Vector Graphic, is a standard graphic type used for rendering 2D images on the internet. Unlike the other two mentioned bellow, the SVG format stores images as vectors. SVG files are text files, and they are designed to work with other web conventions like HTML, CSS, JavaScript. That means SVG images can be controlled with scripts.

   JPG – or JPEG (Joint Photographic Experts Groups), is a lossy format compression. It compresses the image to make a smaller file and creates a very small loss in quality. This format is common in digital cameras because you can take more photos on one camera than you can with other formats.

   PNG – or Portable Network Graphic, is a lossless image format designed to replace the GIF format. PNG files can handle 16 million colors, while the GIF format can only 256 colors.

Although they are “lossless”, they are still low resolution. The reason it is used in most web projects is because you can save your image on a transparent background.

b. MP3 – is a popular, compressed format ensures small file size, but not the best sound quality. Convenient for storing music on smartphones.

WAV – is the standard 16-bit//44.1kHz format all CDs are encoded in. Good quality, bug huge, huge file sizes. Poor metadata support.

Task 3: Compression in multimedia (KU4) – 5 marks

a. Image compression is useful for a variety of reasons. Mainly is used to reduce the file size of images. So, more images can be stored in a given amount of memory space. Also, if you intend to view an image from the internet on a mobile phone you might need to wait five seconds to download a RAW image or one second when downloading a compressed image. Same goes to the website speed. If for a website, you are not using compressed image the website will load slow. Compressed image is the optimized one for making a web page load faster.

b. <u>Explanation on how I designed the diagram according to my research:</u>

When audio file is being compressed, if there is data in it from the ultrasonic frequency range, it can be discarded, because humans cannot hear it. On the other hand, humans are very sensitive to frequencies in the vocal range, like people singing. So, it is best to preserve quality there as much as possible. Deep bass is somewhere in between. Humans can here it, but we are less attuned to it. We mostly sense it. Therefore, lossy audio compressors take advantage of this, and encode different frequency bands at different precisions. Even if the result is rougher, it is likely the users will not perceive the difference or at least it does not dramatically affect the experience. Compared to an uncompressed audio format, like WAV or FLAC, compressed audio files, like MP3s are often 10 times smaller.