# Project 1, 2013

Set: 22nd August

Electronic submission: 4pm, 6th September

Marks: This project counts towards 10% of the marks for this subject

Marks: This project must be done individually
(Note: project 2 can be done in groups)

## Aim

The purpose of this project is to get you acquainted with programming using Direct3D.

## Task

In this project you will use fractals to automatically generate a 3D landscape. The landscape must demonstrate a variety of colours.

## Plasma Fractal

You must use the *Plasma Fractal*, also known as the Random Midpoint Displacement Fractal, which is a de facto standard in fractal landscape generation. Your fractal will generate a *heightmap* which can then be used to construct the 3D landscape geometry.

The LMS page has a number of links that have simple explanations of the Plasma Fractal algorithm.

## Specifications and marking criteria

A project that satisfies all of the criteria listed below will receive 10 marks. Two marks will be deducted for each (bullet) point not met.

- Modelling of fractal landscape:

  - You must automatically generate a randomly seeded fractal landscape at each invocation of the program, and correctly implementat the plasma fractal.

  - You must use Direct3D appropriately to draw the landscape.

  - There must be no significant problems with the polygonal representation.

- Camera motion:

- The user must be able to rotate the landscape about the vertical axis either by using the arrow keys on the keyboard, or the mouse. (Rotation about other axes is optional.). You must utilise perspective projection, and choose a suitable default perspective, so that the landscape is clearly visible.

- Surface properties:

    - The surface colour of the terrain must correspond in sensible way with the height of the terrain at any particular point (for example rocky outcrops or snow on top of mountains and grass or soil in valleys).

# Electronic submission

Your code *must* compile and run on Visual Studio 2012 Professional using Windows 7 or Windows 8. Sample Windows 7 and Windows 8 projects have been provided that you may modify and base your submission on.

Your projects must include a *Microsoft Visual Studio project file*.

You must create a .zip archive of all your source code and project file required to run your programs and electronically submit using the *submit* system by the due date, using the following command

*submit 30019 1 \*.zip*

Your submission must include a *readme.txt* file that must (briefly) describe your implementation. Be sure to include a brief description of how you generate the terrain using Direct3D. Several paragraphs of text are sufficient and concise descriptions are preferred over long, verbose descriptions.

**Important:** if your code contains code from other sources (other than from the provided project files), in particular from other web sites, you have to clearly indicate this in *readme.txt*, which classes or methods are your own and which are from a different source. Remember that copying code from the Internet or from your colleagues will be considered cheating. We will be checking for similarity between submissions and with code available over the Internet.

# Further challenges

Project 2 will rely on code you develop in project 1.

Although not marked in this project, you may choose to try implementing some of the functions required in project 2, including

- Arbitrary movement of the camera, allowing the user to move anywhere in the world (including up into the sky), and prohibiting the user from moving "underground"

- Maintenance of a constant and reasonable frame refresh rate during program execution (i.e., more than 30 frames per second)

# Extensions

Requests for extensions should be directed to the lecturer for the subject, Adrian Pearce.