HAND-IN 4

Do either Problem 1,2 and 3, or Problem 2 and 4.

Problem 1.

Implement the Midpoint displacement algorithm and draw a horizon on the screen.

Problem 2.

Implement either the diamond square or the Perlin noise algorithm to create a heightmap. Then **either**

a) convert your height values to colour values, put the colour values into a texture and draw the texture on screen, **or**

b) create a 3d landscape using your height map.

Problem b) is considerably harder than a), so I recommend that you do a) if you have not done any graphics programming before.

Problem 3.

a) Implement Boids in 2d and animate their movement on the screen.

b) How many boids can you put on your screen before your program starts having problems?

c) Do you have any ideas how you could optimise your code? Include brief explanations of what you think might improve your implementation. No implementations necessary.

Problem 4.

In this problem you will implement the Lattice Boltzmann method for computing the vector field of a 2d fluid.

a) Implement the Lattice Boltzmann method to compute the vector field.

b) Create a colour scheme visualising the density and speed of the fluid. Put this information into a texture and draw it on screen.

c) After having computed the vector field, gradually drop 1000 particles into your fluid and animate their movement.

It is more difficult to find on-line resources for this task which are suitable to your level, and so I have included fairly careful explanations with pseudo-code on Fronter on a link just below this one.

and I repeat: you do **either** problems 1,2 and 3, **or** 2 and 4.