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Class: 4BS2 Computer Science pathway

Project Definition Document

Project description:

Procedural (random) map generation in computer games This project will investigate the techniques used for procedural map generation in computer games, and will develop a random map making tool. The map could be 2D or 3D, could use a game engine if desired, and could use the student’s own artwork or open-source artwork. The project would involve investigation of various techniques (Perlin noise, cellular automata, Voronoi maps etc.). The requirement is to be able to specify various parameters, a random seed, and generate a map which can then be scrolled around to view. There is no requirement for any functioning gameplay. E.g. see <http://pcg.wikidot.com/category-pcg-algorithms>

Aims of the project:

1. To look at the different algorithms that are used in the world of procedural map generation such as perlin noise and its successor simplex noise. This will take up a large portion of the project as there are many algorithms that people use to procedurally generate game worlds.
2. To look at both 3D and 2D map generation and to decide on which model will be implemented in the end product of the project.
3. To assess the tool that can be used to generate game worlds such as for 3D worlds a game engine could be used to ease the process, or for a 2D world one would need to investigate the many languages that can be used to render and create a game world.
4. To implementation of procedural generation in popular games such as Minecraft or Terraria which implement procedural generation to a high level in their game worlds.

My initial approach to the project:

The first major question I have to answer is whether or not I am going to design a tool that generates a 2D or a 3D map, to do this I will have to investigate the many different tools available to both mediums and to decide on which one better suits my end goals for this project. Once I have then decided on which medium I am going to pursue I will then delve deeper into the tool available to that medium such as game engines, render libraries, relevant algorithms etc. The main goal of the first month of my project is to decide on which medium and to the get some sort of model up and running to help visualize the problems that may be encountered.