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**Project title:**

Creating realistic procedurally generated cities including road maps and buildings

**Rationale:**

-why have you chosen this

-why do you want to do it

Many survival and last-player-remianing type games

I have also been personally interested in procedurally generated worlds/levels. Previously outside of Academics I have created a dungeon crawler using a fully-random dungeon generated algorithm and this gives me an opportunity to explore controlled-randomness of a generated world.

**Method(s) and project timeline with milestones:**

Try and build prototypes for some of these ssytems and pick oen having decided on some pros and cons andon each section I will decide what I will evaluation each system on and based on those evaulations I will decide what system to take on and use for the rest of the project

Milestones:

* Read in user input in the form of 2D image maps (elevation, water boundaries, etc).
* Create Major roads
* Create minor roads
* Plot buildings
* Create more advanced buildings

**Clear employability statement of how the completed project will demonstrate the relevant specialist skills:**

**Examples of specific organisations and/or current jobs in the relevant industry sector in which the specialist skills will be of value:**

**What do I wish to be marked on in the final project?**

**Annotated bibliography:**

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| **Annotated bibliography** | |
| **Item** | **Description/Annotation** |
| G Kelly, H Mccabe. (2006). "A Survey of Procedural Techniques for City Generation". In ITB Journal, No. 14. | This paper starts by introducing multiple procedural techniques such as fractal, l-systems and noise. It goes on to evaluate these techniques in city generation based on criteria such as realism, scale, input, efficiency, etc. |
| Sun, J. Yu, X. Baciu, G. Green, M. (2002). "Template-based generation of road networks for virtual city modeling". In Proceedings of the ACM symposium on Virtual reality software and technology (VRST '02). Acm, New Work, NY, USA, 33 - 40. | This paper talks about various road-templates such as population-based, raster and radial which are used in template-based generation. It explains each of these templates and goes onwards to talk about validity control in the creation of major and minor roads. |
| Parish, Y, I, H. Muller, Pascal. (2001). "Procedural modeling of cities". In Proceedings of the 28th annual conference on Computer graphics and interactive techniques (SIGGRAPH '01). Acm, New York, NY, USA, 301 - 308. | In this paper, the authors present CityEngine which is a system capable of procedurally generated cities using user-controlled input data such as height maps and population density maps. They talk about using L-Systems and road patterns for creating the city layout and go on to talking about procedural building geometry and textures. |
| Interactive Procedural Street Modelling  @@THIS NEEDS TO BE REFERENCED PROPERLY@@ | This paper discusses the use of tensor fields and focuses more on user interactivity. It talks about a system which creates a tensor graph and allows the user to edit/adjust this to edit the generated city. |
| Evans, M. (2015). Procedual Generation For Dummies: Road Generation. [Online] 11 December 2015. Available online: [http://martindevans.me/game-development/2015/12/11/ Procedural-Generation-For-Dummies-Roads/](http://martindevans.me/game-development/2015/12/11/Procedural-Generation-For-Dummies-Roads/) [Date of access: 19 May 2016] | This article also talks about the use of tensor fields and references the above paper. It talks about the use of global goals and local constraints when creating major and minor roads and shows how they created road networks using different road templates (radial, grid). |
| Greuter, S. Parker, J. Stewart, N. Leach, G. (2003). "Real-time procedural generation of 'pseudo infinite' cities". In Proceedings of the 1st international conference on Computer graphics and interactive techniques in Astralasia and South East Asia (GRAPHITE '03) Acm, New York, Ny, USA, 87 - ff. | This paper focuses on creating cities with a diverse range of buildings, and thus focuses on building generation and not generating the city layout. It proposes a method of building generation by splitting the city up into cells and using a hash function to create a number for each cell to be used as seed. This seed determines the properties of the buildings in the cell (number of floors, height, number of shapes, etc). The building is created by creating and placing several shapes together within the confined space of the building and then extruding each shape to the height of a specific floor. This creates a diverse range of buildings. |
| Procedural modelling of buildings  @@ THIS NEEDS TO BE REFERECNED PROPERLY@@ | This paper focuses on the procedural modelling and texturing of buildings. It talks about the use of shape grammars in procedural building creation. When it comes to procedural texturing, it talks about using occlusion for checking for intersections between shapes and then uses snapping to avoid texturing errors that previous procedural texturing methods have faced such as having a window placed where an intersection of the building occurs. |
| Martz, P. (1997). Generating Random Fractal Terrain. [Online] 1997. Available Online: [http://www.gameprogrammer .com/fractal.html](http://www.gameprogrammer.com/fractal.html) [Date of access: 09 May 2016] | This article speaks about creating fractal two-dimensional and three-dimensional terrains, and later goes onwards to show how these can create height maps. |
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