Homework 5 - Procedural Content Generation

COS498/598 - Video Game AI - Spring 2025

by Zachary Hutchinson

Due Date: April 25, 2025, Midnight, Brightspace

Goals

1. Practice employing algorithms to create game content.
2. Experience the challenges of controlling algorithms such that output is appropriate and interesting.
3. (Alternative) Explore the game AI ecosystem by developing an idea of your own.

Instructions

There are two sets of instructions for this homework. If you would like to explore a particular game AI technique, system or algorithm we have not yet covered in class, you are welcome to develop it as your final homework for the course.

If you do not have something you'd like to explore with respect to game AI, you should develop a system which does some small bit of procedural content generation for an imaginary (or real) game. In other words, this homework is only interested in PCG, not in a full game.

Requirements (for the PCG version)

Your procedural content generation system should be modestly robust. By *robust*, I mean that it could be used in a game. This does not mean that it needs to produce beautiful graphics or a wide variety of content. By *robust*, I mean it should be relatively feature complete with respect to the imaginary game. . . even if the features are not very deep.

Second, there should be an *interesting* algorithm or *interesting* combination of basic algorithms producing the content. For example, randomly choosing a predefined weapon as a loot drop system is not terribly interesting. However, randomly choosing a set of predefined attributes which are then constrained and combined to make a weapon is a bit more interesting.

But ultimately, I leave the space for you to explore.

Requirements (for the DIY version)

No strong requirements except that it should be an AI system for which there is some justification it has or could show up in a game. The system should be testable or demonstrable in some way. This does not mean you need to demo it inside a working game. You can feed it test data and have it spit out results. It does not need to have a graphical component or use Pygame.

If you are concerned about the subject matter for this homework, get in contact with me. Describe what you want to do.

I'm not very interested in "extensions" of previous homeworks. But I'm not ruling it out.

I'm not very interested in the use of preexisting PCG tools to create content. Part of the assignment's goal is to have you code the algorithms yourself.

Just don't scope out more than you can implement in the final weeks of class. Keep it narrow.

PCG examples (but not limited to)

- Map generator (any genre of map): galaxy, world, house, town, etc.
- Nonhuman language generator
- Enemy agent generator
- Loot drop system
- PCG agent behaviors
- Social composition or networks (jobs, relationships, etc)
- Flora or fauna
- Planet atmospheres or Solar systems
- Platformer or Roguelike Levels
- Character history, or just histories in general.
- Economies