Dungeon Assignment Writeup

John Heiden

What algorithm did you use and why?

I used Wave Function Collapse to generate the dungeon because it is my favorite PCG algorithm, and I had already coded that algorithm for a research project in IGME-760.

Did you make changes to code you used from another source?  
What were they?

The PCG algorithm I wrote was made by following a video from The Coding Train on YouTube which I translated from JavaScript to C#. I also added a preliminary function that runs before the WFC function that will generate a critical path from the start to the end of the dungeon.

What type of dungeon did you make?

My dungeon is a typical rogue-like dungeon. Dark and Darker has a dungeon layout that looks close to what my dungeon would ideally look like.

What were problems you needed to overcome to generate a  
dungeon?

Arguably the most apparent issue with WFC is the fact that it will not always generate a valid result. WFC seems to be an algorithm that is great at filling in the blanks left by a separate set of generation techniques which is why I chose to create my critical path first before running the algorithm. If some of the space is effectively filled before the algorithm runs, it will fail much less frequently. If I created more key tiles that could spawn into the world before running WFC, I could probably get the algorithm to successfully finish more often than it currently does.

Another issue is that of repetitiveness. Since WFC receives a pattern as input, all its results will be like that pattern which is easily noticeable. This is another reason that WFC seems to feel more like a filler algorithm rather than a primary one. However, solving the issue of obvious repetition of the same content is a common issue with PCG in general, so it is not entirely WFC that is the problem here. With a robust ruleset and many inputs to provide the algorithm, it could potentially generate many interesting and unique levels.

Where did you find all your assets (please list sites and the assets  
you got from them)?

All of my assets were found in the Unity Asset Store.

* Treasure Chest
* Wooden Crates / Barrels
* Gold Coins
* Stone Wall Texture
* Dark Cloudy Skybox

How would you extend this project to be used in a game?

I would first modify my WFC algorithm to accept inputs that are non-uniform in size since currently it only accepts square inputs. This would allow me to create more interesting templates to spawn into the world. I would also allow the dungeon to span multiple floors so the player must progress vertically a certain number of times to complete the level. I would add functionality to interact with the props in the world as well as add gear like weapons, armor, potions, etc. Finally, I would add enemies to the dungeons, so the player has an opposition to face.