Team Name: ICE_JIT_ft_WFC

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Contributions: 23%, 23%, 23%, 23%, and 8%

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Submission Option: A

Bonus Challenge (Chronicle Challenge): No participation

1. Main Concept: Japan Immersion Travel!

Some of you might want to but still cannot make a trip to Japan these days. Here we proudly present a solution to you through this competition platform. Into our settlements, we have tried our best to introduce all the very, very Japanese aspects and elements, including Japanese-style rowhouses, bridges, two-storied shrines, shrine gates, and five-storied pagodas + even hidden (transparent) Ninja treasure chests. Our settlements should also be mysteriously beautiful at night due to light up, which helps prevent mobs from spawning. *This generator is a slightly enhanced version of our 2020 generator ICE_JIT, by introducing buildings generated by Wave Function Collapse (WFC). In the rest of this document, new contents are italicized.*

2. Implementation Details

2.1 Flat Land Detection

We use a modified version of the Moore Neighborhood algorithm to locate a flat area within a given area selected by the judge. Namely, the selected area is divided into multiple grids, each having a size of 20x20. For each grid, the Moore Neighborhood algorithm is applied to find its flat neighbors. Then those flat grids are merged, and the center of gravity of the merged area is calculated. Starting from the center of gravity, a rectangle-like boundary is expanded and formed to simulate the construction concept of an ancient town in Japan, having a rectangular-shape layout. Finally, each flat area with an area of not less than 2000 squared units is leveled to the average elevated height of all the residing usable grids, paved with polished andesites, surrounded by walls and fences (for defending mobs), and defined as living area.

2.2 Living Area Layout

The main street is first placed from north to south in the middle of a living area, with a shrine gate on each end. Smaller streets are then placed in parallel with the main street. Next, rowhouses, smaller houses, and shops are randomly placed along each side of a street, following the Kyoto Machiya style. The width of a rowhouse is fixed, but the length (depth) is varied according to the availability of space. The size of a small house and a shop are fixed. Each empty space in a row of houses and shops is filled with a field. A set of flower gardens will be placed in the north-west corner of the living area if there is sufficient space.

2.3 *WFC Buildings*, Placement of Shrines, Pagodas, and Bridges

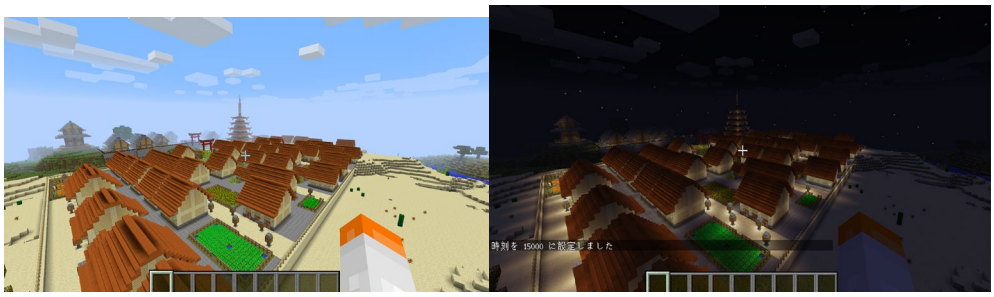
A WFC building is placed on a flat land having a size of at least 40x40 next to a living area.

A pagoda or a shrine is placed on a flat land having a size of at least 17x17. During the generation process, they are alternatively established. A shrine is placed near the water or on a hill. If shrines are located on a hill, stone paths to them will be made and covered with multiple shrine gates, just like Fushimi Inari Shrine. A bridge is built to connect a street crossing over a river.

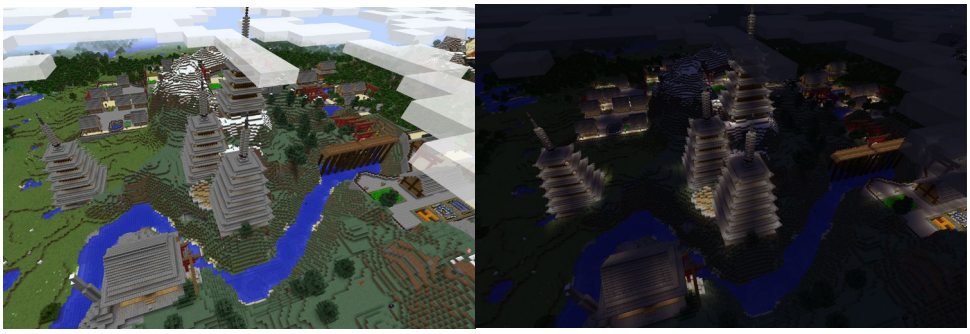
2.4 Terrain Adaption

We consider terrains that are not desert or mountainous Regular. The main feature of our settlements for each terrain is described below.

Desert Terrain**:** a Japanese townscape with orange roof buildings that are noticeable in the desert and with a river along each main street and bridges crossing over the river.



Mountainous Terrain: shrines and pagodas located on a mountain, typically seen in Japan, with rows of shrine gates on a path from the mountain's base up to a shrine



Regular Terrain: a townscape on a flat land organized in a similar fashion to the townscape of Kyoto.

3. Entertaining Elements

As mentioned in Sec. 1, we place a hidden (transparent) Ninja treasure chest inside a house. Please enjoy finding them. In addition, you might be able to see a pattern in our flower gardens. Finally, vistas inside our settlements might be worth taking screenshots and sharing them on your SNS.