Basic BSP Dungeon generation

From RogueBasin

A simple method to generate a basic dungeon using a bsp tree

Building the BSP

We start with a rectangular dungeon filled with wall cells. We are going to split this dungeon recursively until each sub-dungeon has approximately the size of a room. The dungeon splitting uses this operation :

- choose a random direction : horizontal or vertical splitting
- choose a random position (x for vertical, y for horizontal)
- split the dungeon into two sub-dungeons
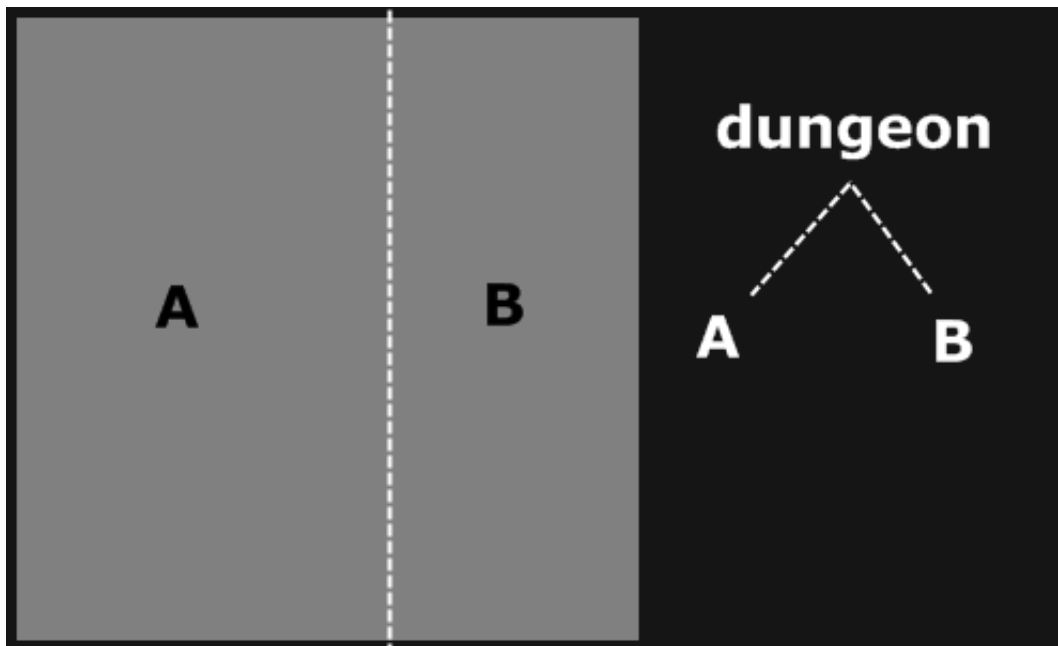
The first splitting iteration.

Now we have two sub-dungeons A and B. We can apply the same operation to both of them :
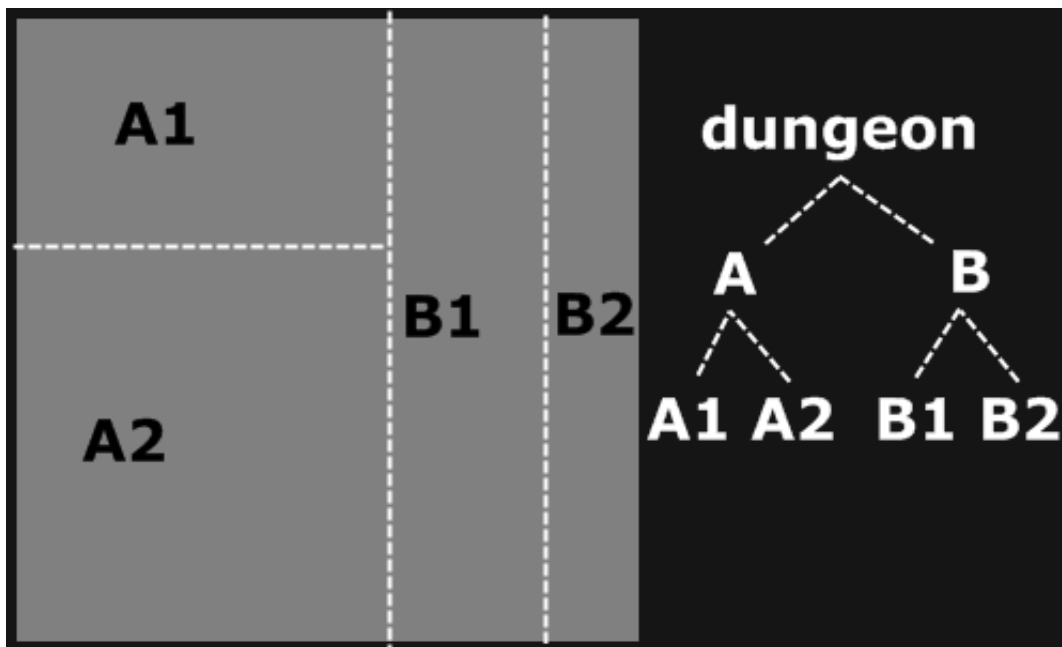
The second splitting iteration

When choosing the splitting position, we have to take care not to be too close to the dungeon border. We must be able to place a room inside each generated sub-dungeon. We repeat until the lowest sub-dungeons have approximately the size of the rooms we want to generate.
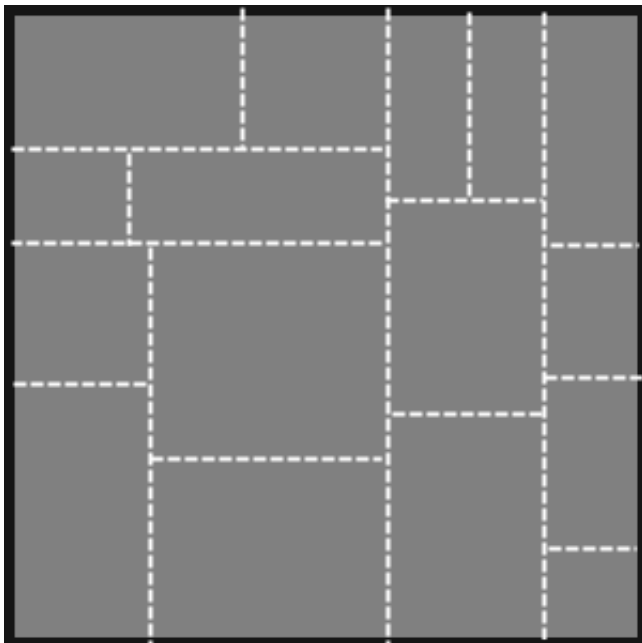

After 4 splitting iterations

Different rules on the splitting position can result in homogeneous sub-dungeons (position between 0.45 and 0.55) or heterogeneous ones (position between 0.1 and 0.9). We can also choose to use a deeper recursion level on some parts of the dungeon so that we get smaller rooms there.

Building the dungeon

Now we create a room with random size in each leaf of the tree. Of course, the room must be contained inside the corresponding sub-dungeon. Thanks to the BSP tree, we can't have two overlapping rooms.
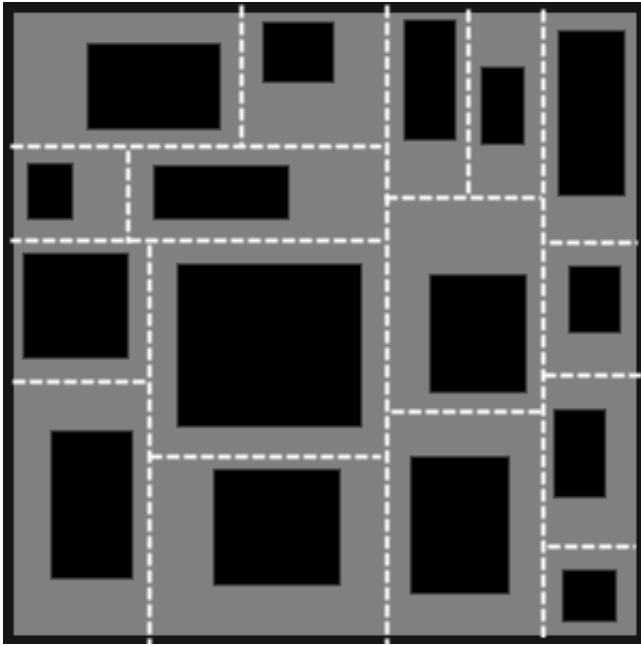
Rooms in the tree leafs

To build corridors, we loop through all the leafs of the tree, connecting each leaf to its sister. If the two rooms have face-to-face walls, we can use a straight corridor. Else we have to use a Z shaped corridor.
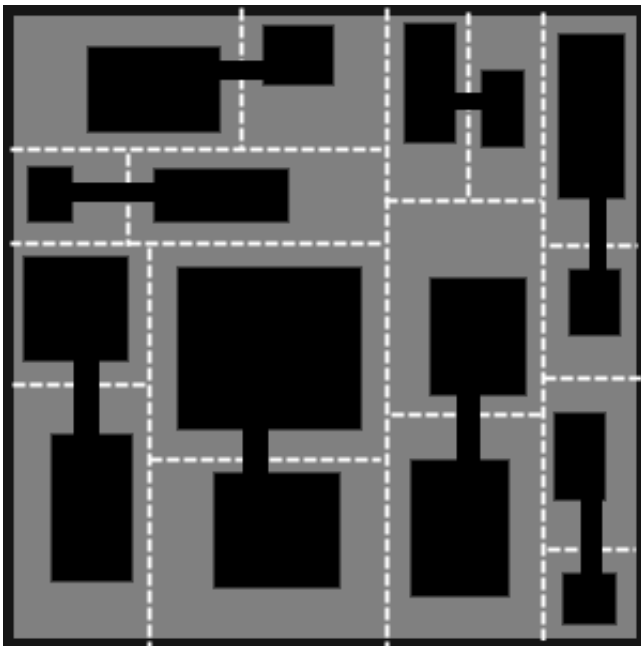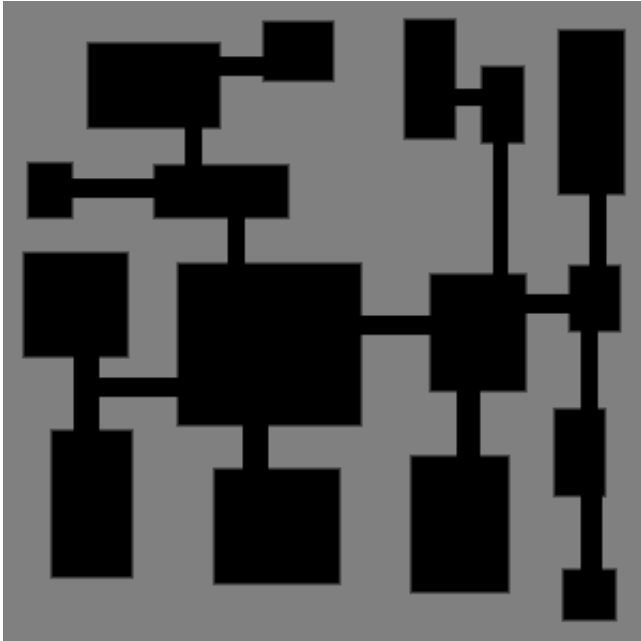

Connecting the level 4 sub-dungeons

Now we get up one level in the tree and repeat the process for the parent sub-regions. Now, we can connect two sub-regions with a link either between two rooms, or a corridor and a room or two corridors.
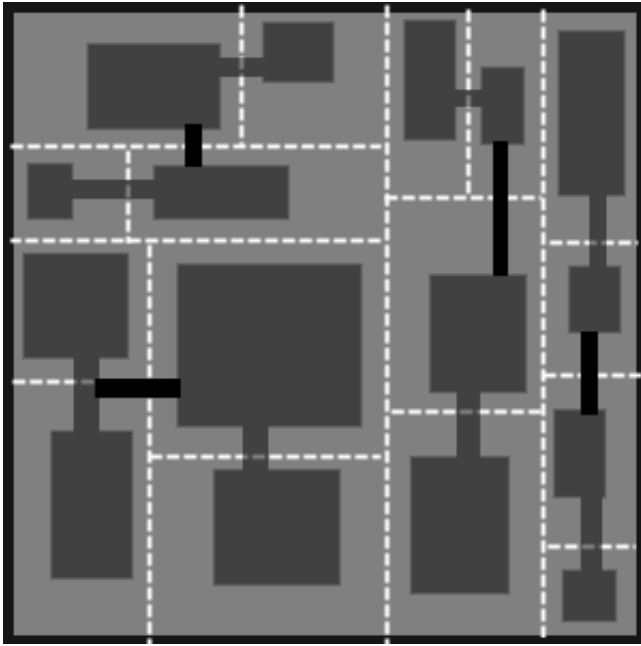
Connecting the level 3 sub-dungeons

We repeat the process until we have connected the first two sub-dungeons A and B :

If we allow some rooms to fill the whole leaf, we can even have less boring dungeons.

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