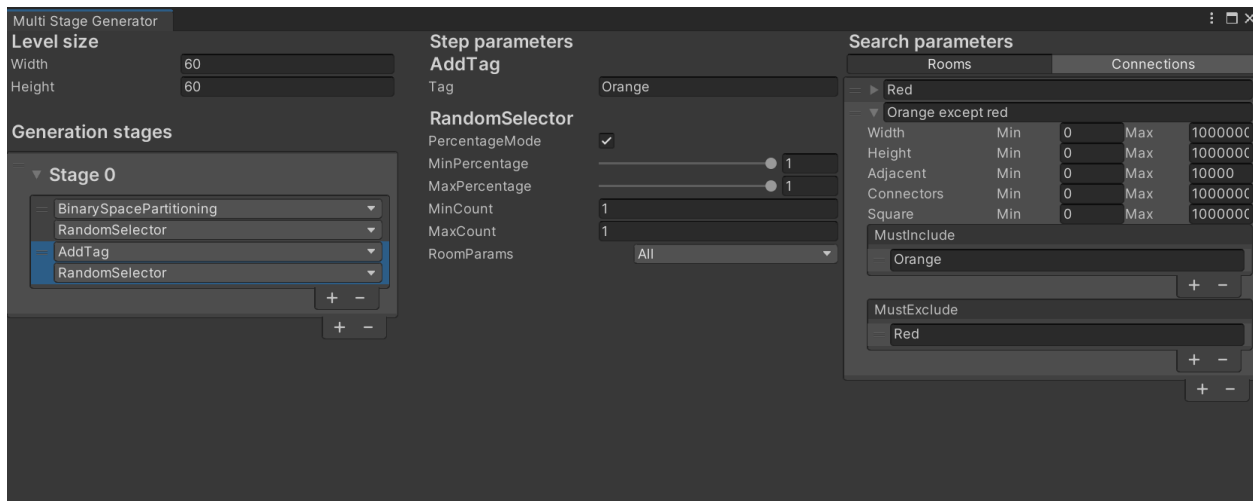


Multi Stage Generator

This generator allows you to set whole layout generation process manually and achieve more complicated dungeon structure.

Overview



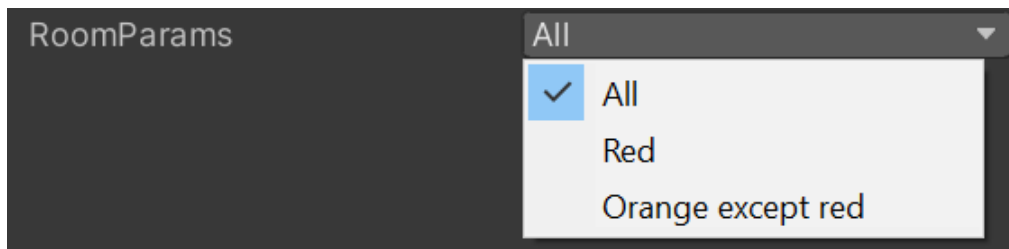
On the left side you can split generation process into multiple stages, and setup generation steps for each stage. Stages are needed only to make it easier to manage, there is no difference between using only one stage or more.

Each generation step has a modifier and selector (you can see it below modifier). To perform a step, generator uses selector to select rooms, and then passes them to modifier.

When you click on the area to the left of each step (blue on the picture) – its parameters appear in the middle.

On the right side you can see Search parameters. They are required as parameters in some modifiers and selectors. Their only purpose is to filter rooms and connectors. MustInclude list specifies which tags are allowed (if room has at least one tag from this list – it will be chosen), and MustExclude specifies tags that are not allowed. For example, on the picture above, “Orange except red” (names is not important, it is used only to make it easy to find) allows Orange rooms, that have no Red tag.

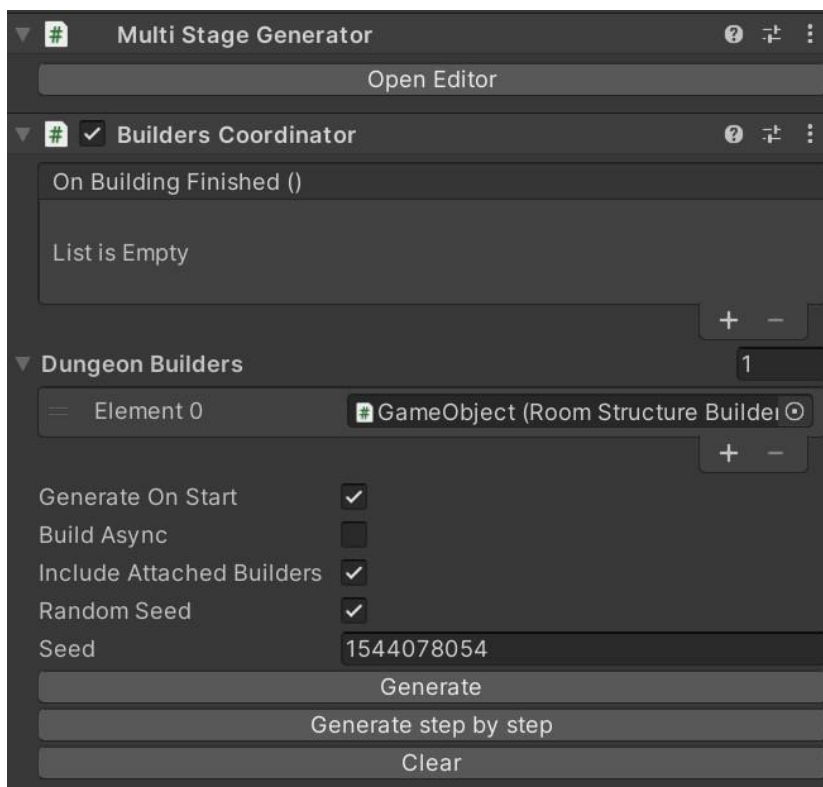
After you added some new search preset – you will be able to choose it from dropdown lists.



You can setup height, square, connectors count and adjacent count requirements as well.

Quick guide

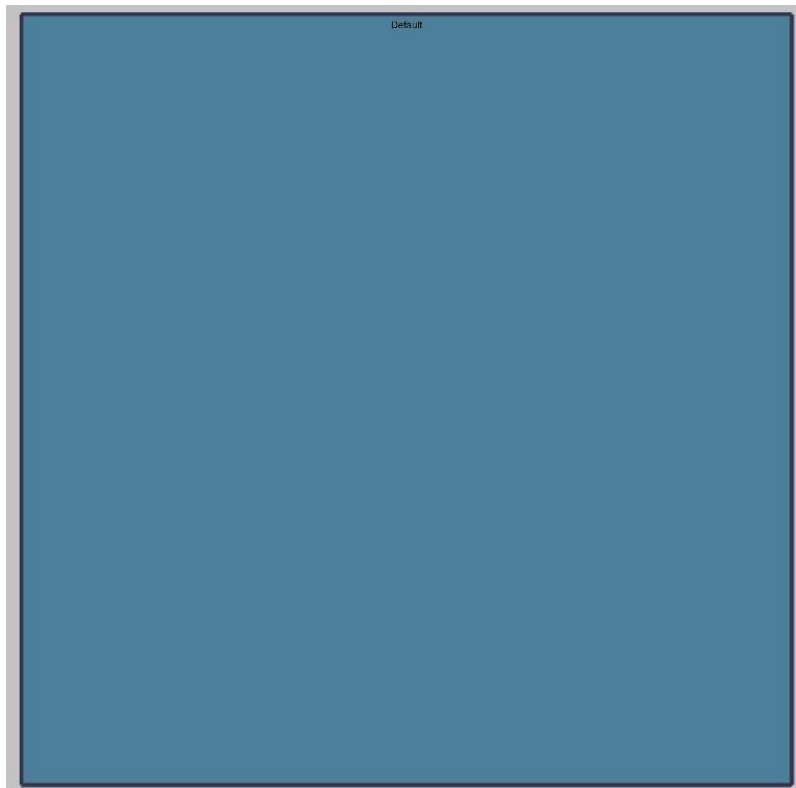
1. Add MultiStageGenerator and BuildersCoordinator components, and setup some RoomStructureBuilder.



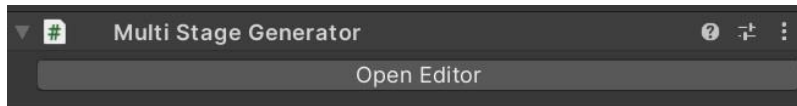


Note: ensure that Base tag is below others.

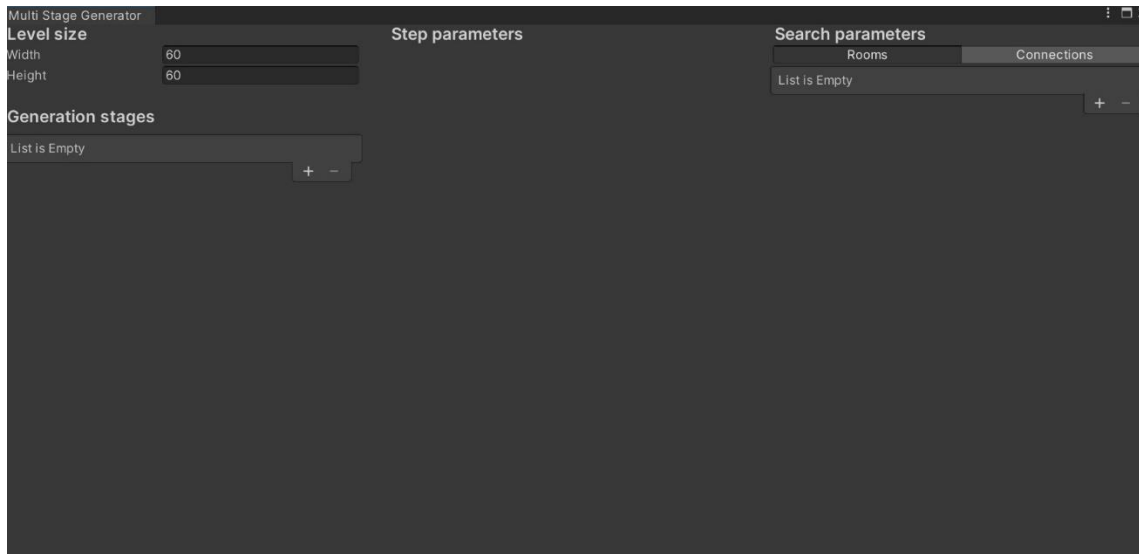
If you press Generate button - you will see big empty room.



2. Open MultiStageGenerator editor.

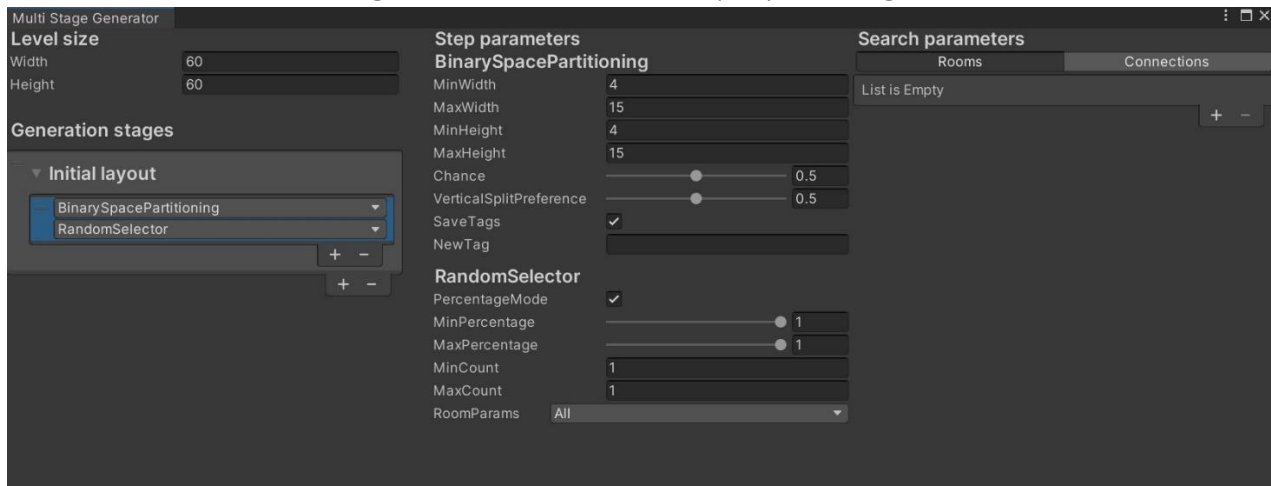


It will open editor window.

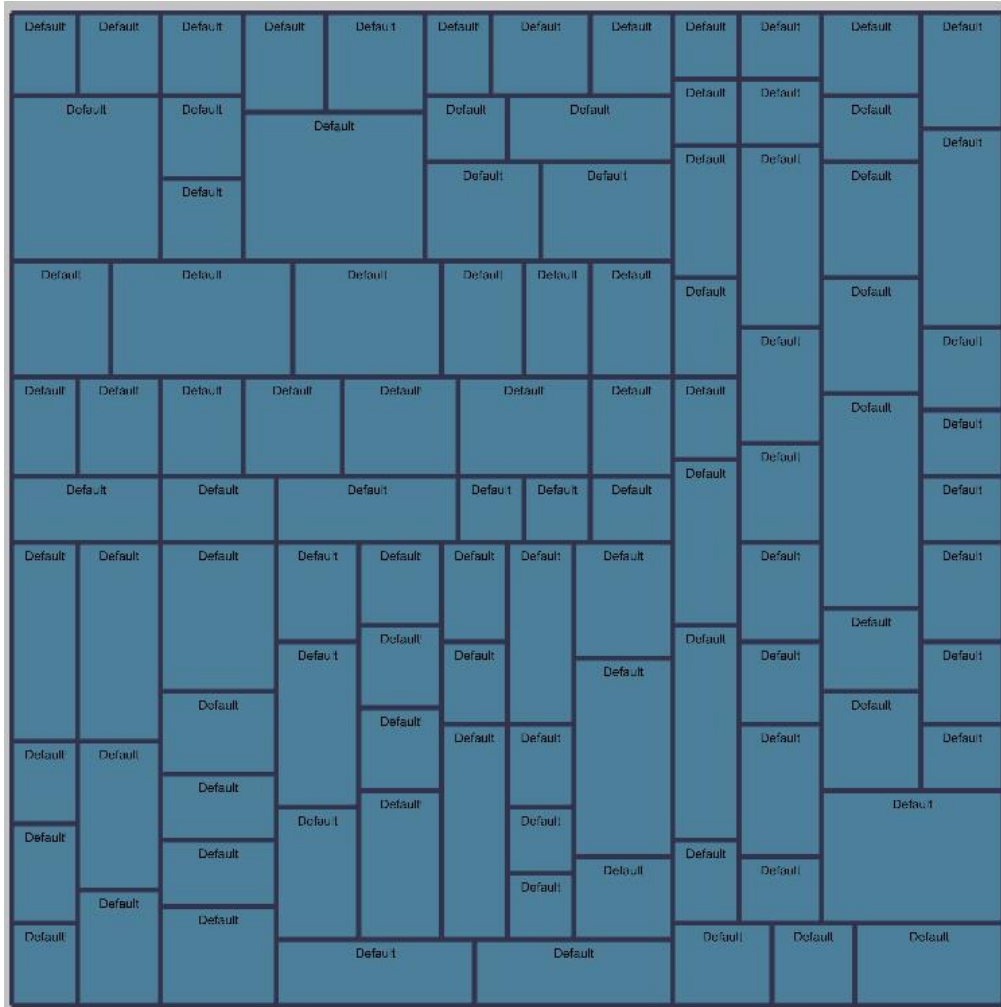


3. Add a new Generation Stage in the left part by clicking "+" button, set it's name to "Initial Layout" or something like this.

After that unfold the stage, and add it's first step by clicking "+" button.



Without changing any parameters, click Generate button - now dungeon has more smaller rooms, which were generated inside initial room.



4. Change parameters as following. To open step parameters - click at it's left part.

Multi Stage Generator

Level size

Width
30

Height
30

Generation stages

Initial layout

BinarySpacePartitioning

RandomSelector

+ -

+ -

Step parameters

BinarySpacePartitioning

MinWidth
4

MaxWidth
9

MinHeight
4

MaxHeight
9

Chance
0.5

VerticalSplitPreference
0.5

SaveTags
☒

NewTag

RandomSelector

PercentageMode
☒

MinPercentage
1

MaxPercentage
1

MinCount
1

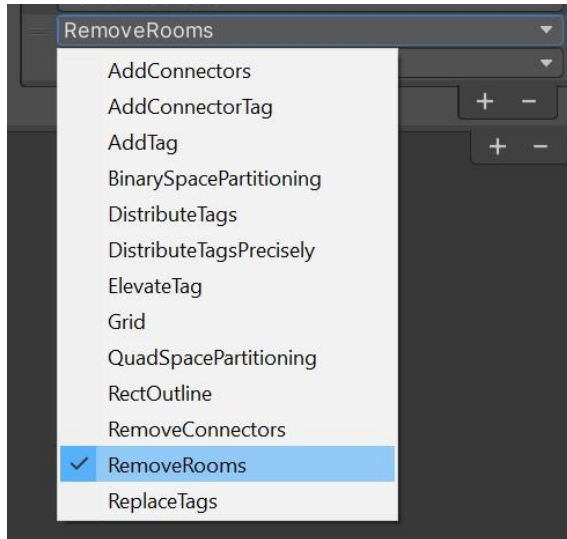
MaxCount
1

RoomParams
All

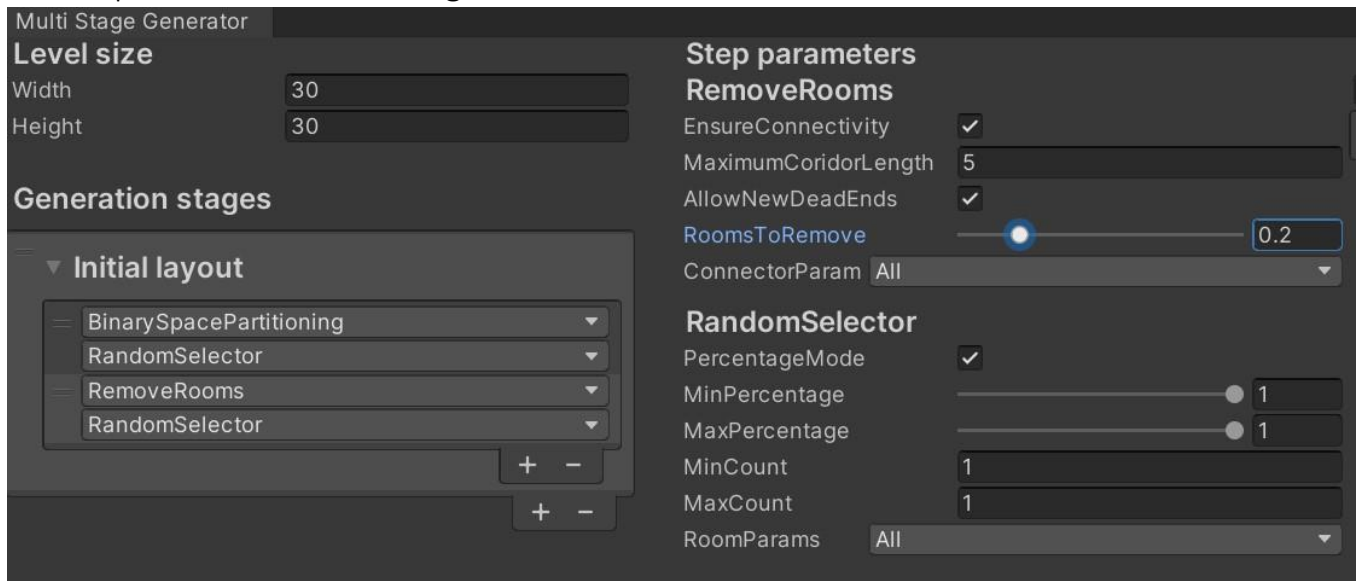
Each step contains modifier(here - BinarySpacePartitioning) and selector(RandomSelector)

Selector chooses room from layout, and then modifier takes these rooms and applies it's modification.

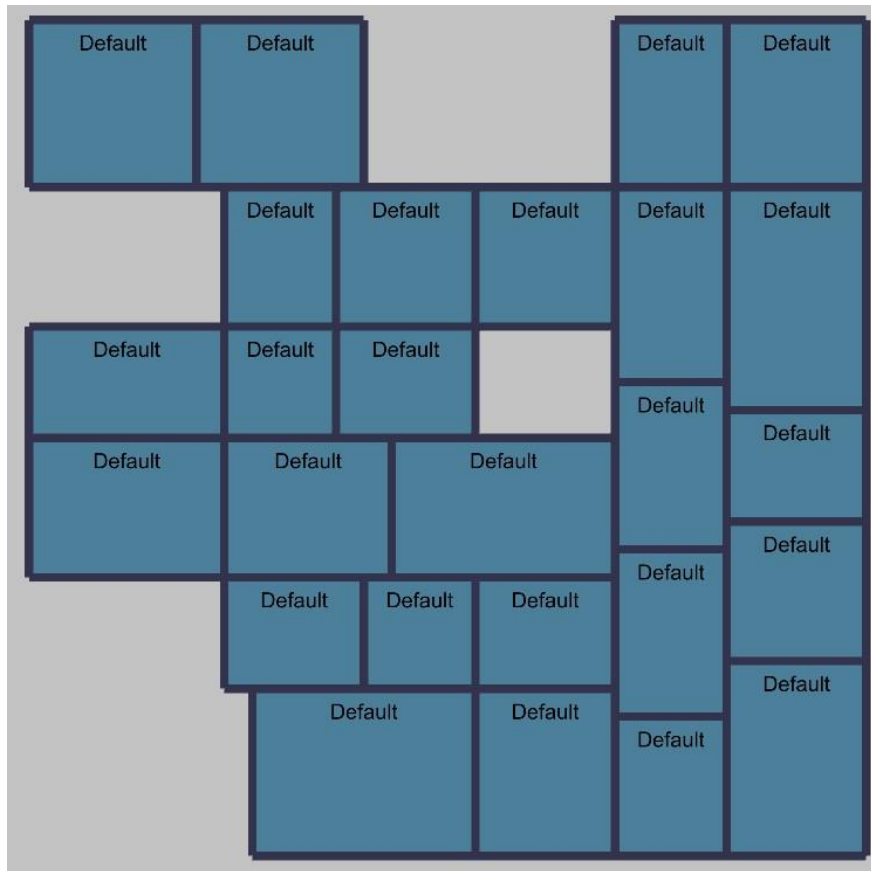
Add another step, and change it's type to RemoveRooms:



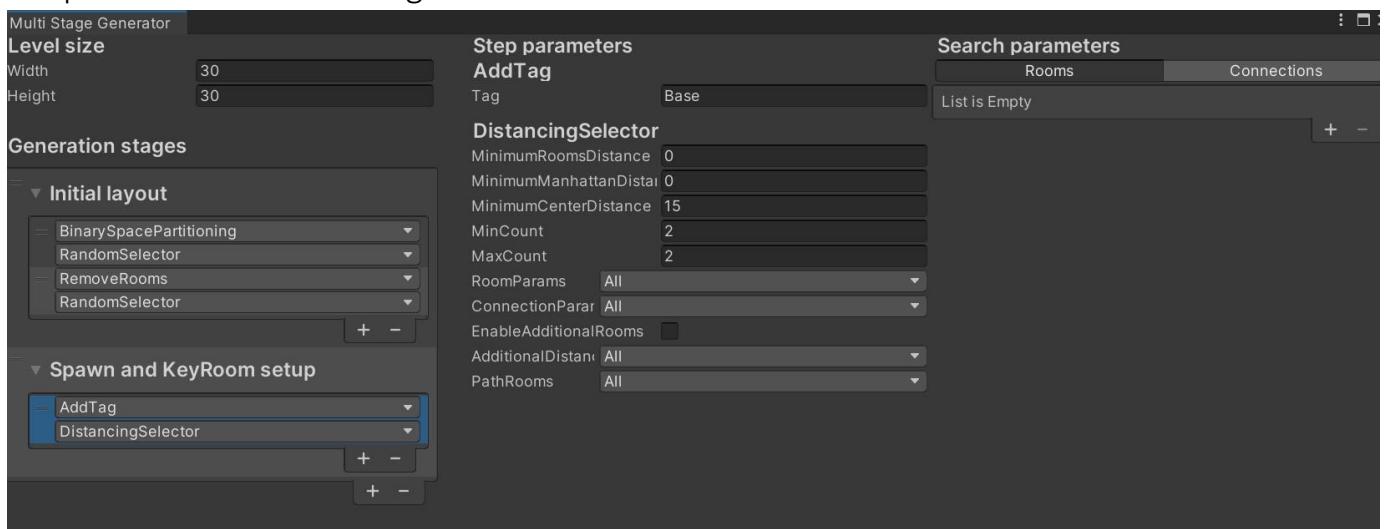
Set it's parameres as following:



Generation result will look like this:

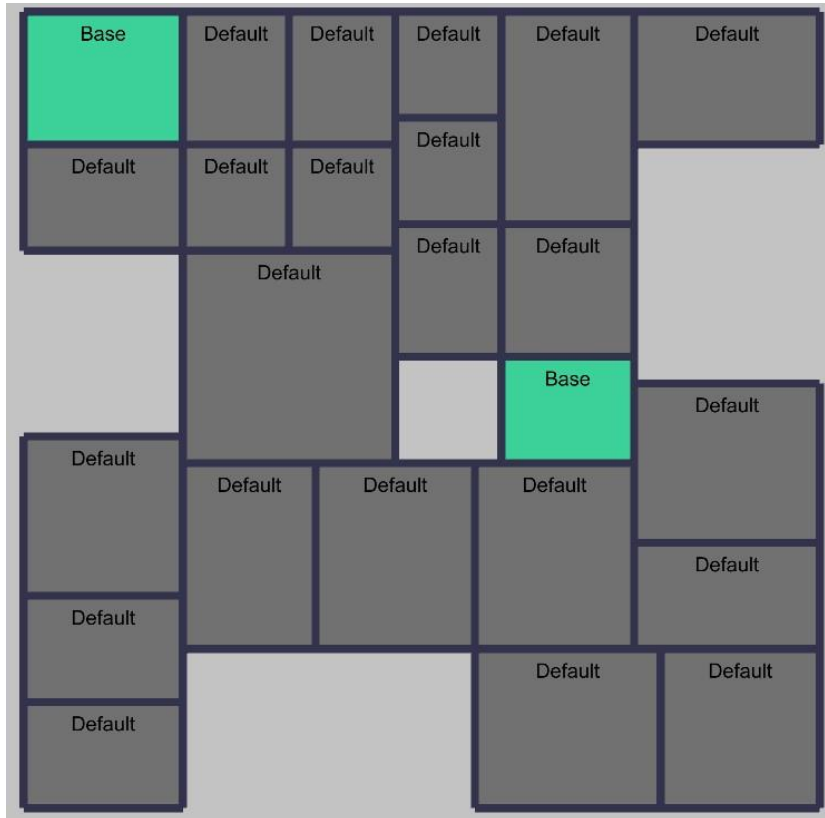


5. Add another generation stage, and first step with AddTag modifier, and DistancingSelector selector.
Set parameters as following.



This will select 2 random rooms, with distance at least 15 between their centers,

and after that modifier will add tag Base to each of them.

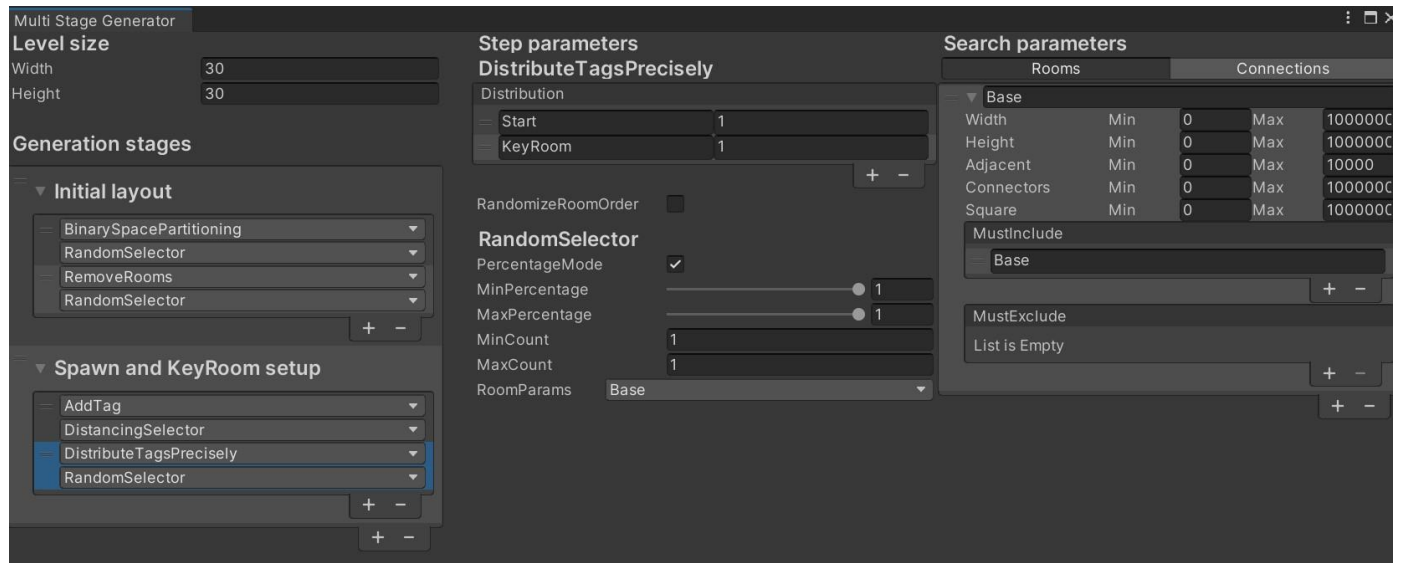


6. In the Search Parameters tab add a new Room, unfold it, and add "Base" to MustInclude tags:

The screenshot shows the "Search parameters" interface. The "Rooms" tab is selected, and a new room named "Base" is added. The "MustInclude" section shows the "Base" tag. The "MustExclude" section is empty.

Search parameters					
Rooms			Connections		
▼ Base					
Width	Min	0	Max	1000000	
Height	Min	0	Max	1000000	
Adjacent	Min	0	Max	10000	
Connectors	Min	0	Max	1000000	
Square	Min	0	Max	1000000	
MustInclude					
Base					
+ -					
MustExclude					
List is Empty					
+ -					

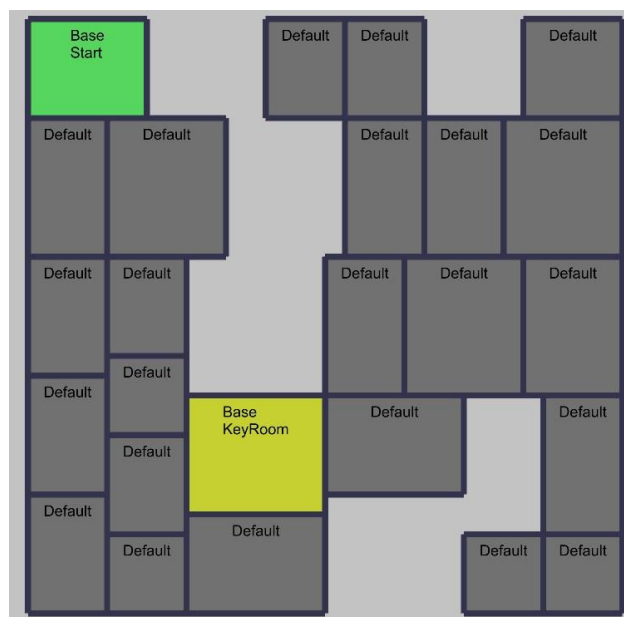
After that add a new step, with DistributeTagsPrecisely and RandomSelector, set their parameters as follows:



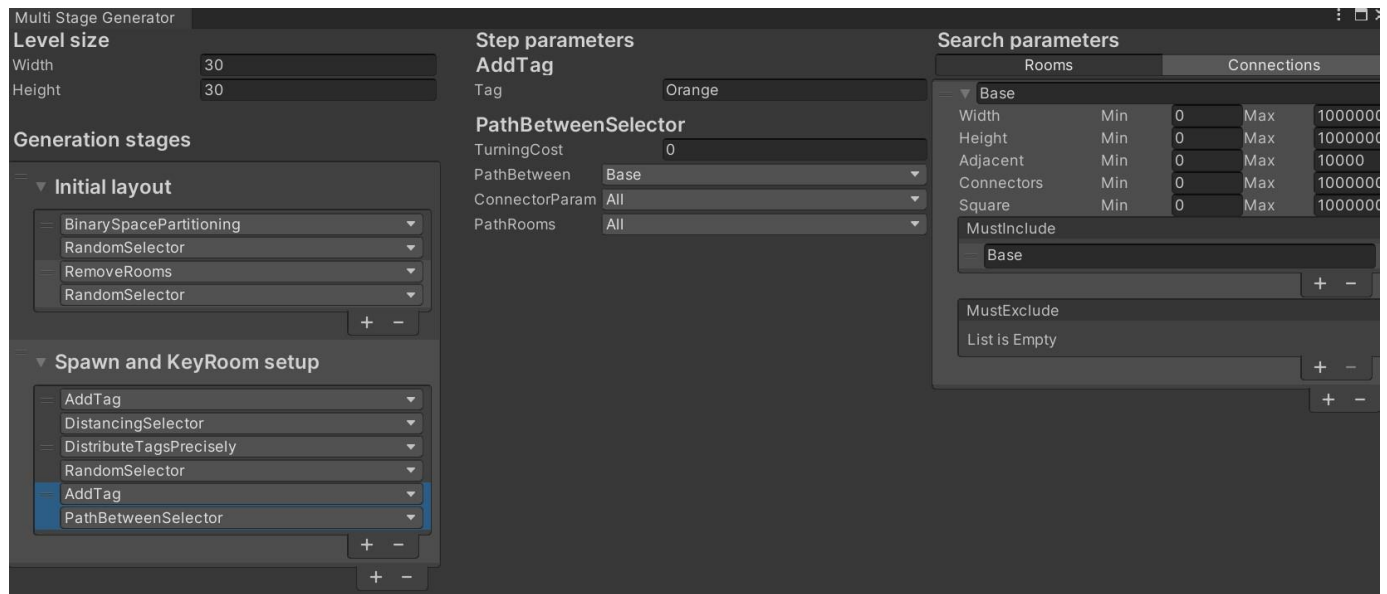
RoomParams of RandomSelector determines the parameters of rooms, which can be selected. In this case we filter all the rooms, and include only rooms with Base tag, and all 2 of them are selected. **MustInclude list means that room must contain at least 1 of the given tags.**

DistributeTagsPrecisely adds tags to the given set according with given values - 1 KeyRoom, 1 Start, total 2 rooms.

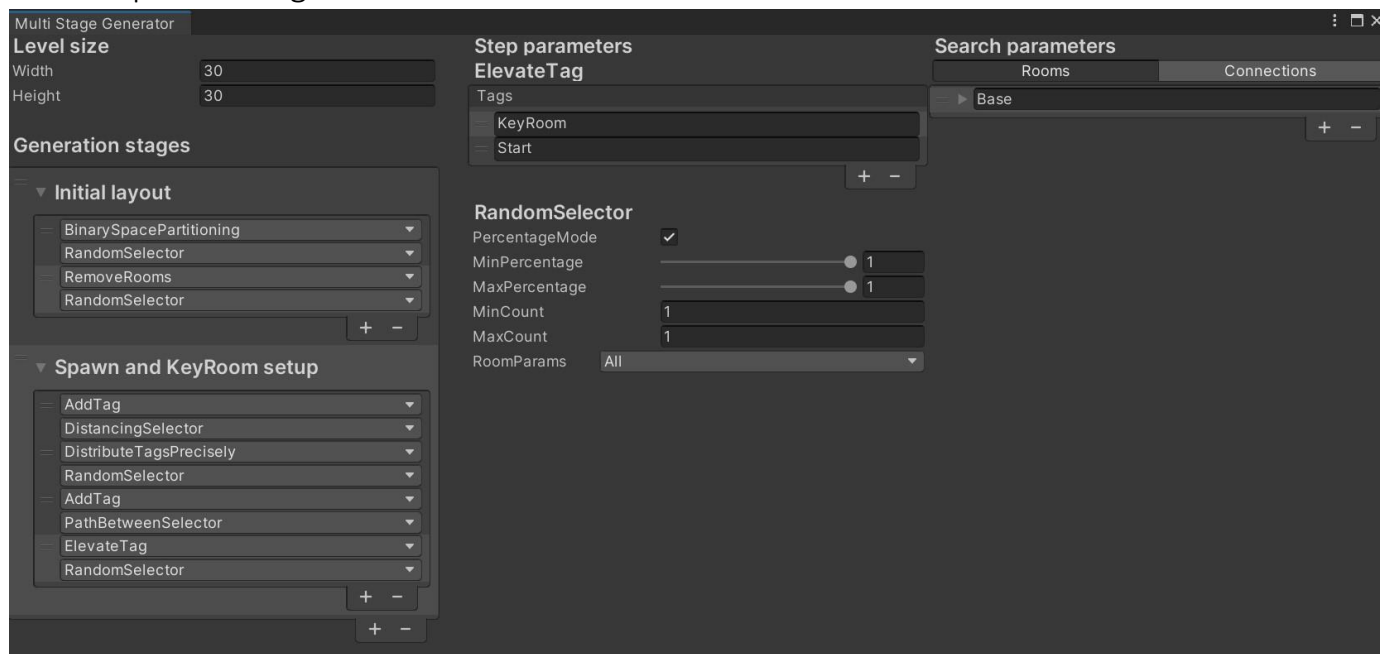
AS a result, we have 1 Start and 1 KeyRoom, and they are situated in some distance from each other, therefore player will have to find a way to get from one to another.



7. Add a new step with AddTag and PathBetweenSelector. Set Tag to Orange, and PathBetween to Base.



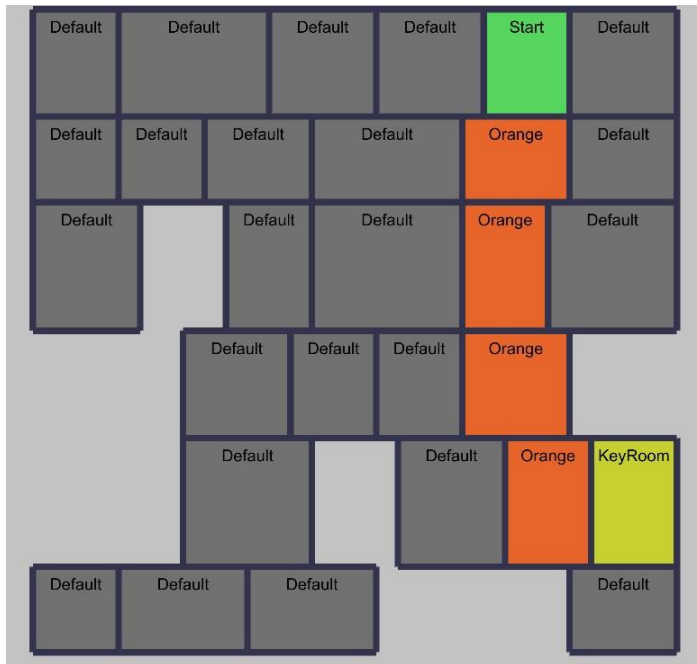
Next to it add step with ElevateTags and RandomSelector, with "KeyRoom" and "Start" specified tags.



This will find a path between all rooms with "Base" tag, and then AddTag will add "Orange" to all of them, including start and end.

After that ElevateTags will examine each room, and if it has one of specified tags("KeyRoom" or "Start") - all other tags will be removed.

As a result, we have Start and KeyRoom, and path of Orange rooms between them.



8. Add two more Rooms in SearchParameters:

One that excludes Orange, Start and KeyRoom

▼ Not Orange, Start, KeyRoom

Width	Min	0	Max	100000
Height	Min	0	Max	100000
Adjacent	Min	0	Max	10000
Connectors	Min	0	Max	100000
Square	Min	0	Max	100000

MustInclude

List is Empty

+ -

MustExclude

- Orange
- Start
- KeyRoom

+ -

Another that include Start and KeyRoom.

A configuration panel titled "Start and KeyRoom" with a dark theme. It contains several input fields for parameters: Width (Min 0, Max 100000), Height (Min 0, Max 100000), Adjacent (Min 0, Max 10000), Connectors (Min 0, Max 100000), and Square (Min 0, Max 100000). Below these are two sections: "MustInclude" and "MustExclude". The "MustInclude" section has two entries: "Start" and "KeyRoom". The "MustExclude" section is currently empty, displaying the text "List is Empty". Both sections have expand/collapse buttons (+ and -).

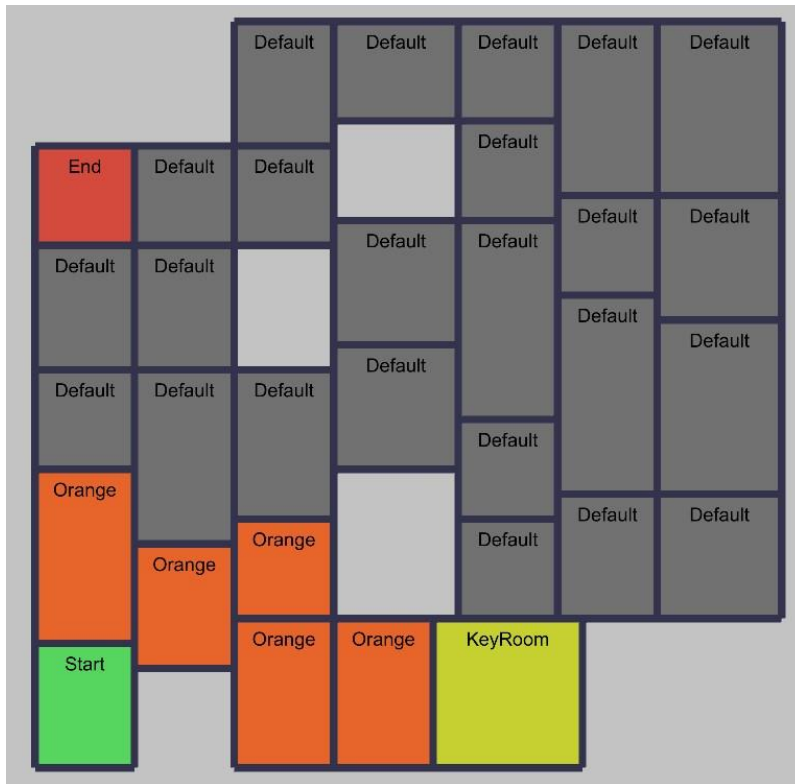
Add a new stage, and it's first step with AddTag and DistancingSelector, with parameters as follows:

The "Multi Stage Generator" interface with a dark theme. On the left, the "Level size" is set to Width 30 and Height 30. Under "Generation stages", the "Initial layout" section includes BinarySpacePartitioning, RandomSelector, RemoveRooms, and another RandomSelector. The "Spawn and KeyRoom setup" section is expanded, showing "Adding End Room" with "AddTag" and "DistancingSelector" selected. On the right, the "Step parameters" for "AddTag" (Tag: End) and "DistancingSelector" are shown. The "DistancingSelector" parameters are: MinimumRoomsDistance (1), MinimumManhattanDistance (0), MinimumCenterDistance (5), MinCount (1), and MaxCount (1). The "RoomParams" dropdown is set to "Not Orange, Start, KeyRoom", and "AdditionalDistance" is set to "Start and KeyRoom". On the far right, the "Search parameters" panel shows a list of rooms: Base, Not Orange, Start, KeyRoom, and Start and KeyRoom. The "Start and KeyRoom" room is selected.

This will select all rooms, that don't have Orange, Start or KeyRoom tags, and have specified distance between each other, and return only 1 of them. Additionally, distance from selected rooms to Start and KeyRoom to all selected rooms will follow the requirements too.

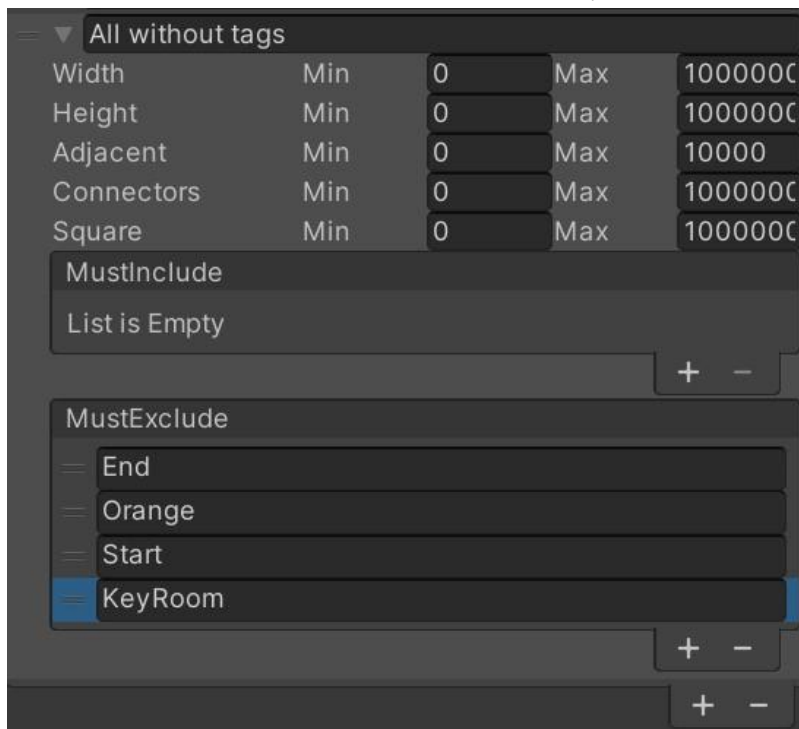
As a result, End room will not disturb any of our rooms, and will be placed in some

distance from Start and KeyRoom.



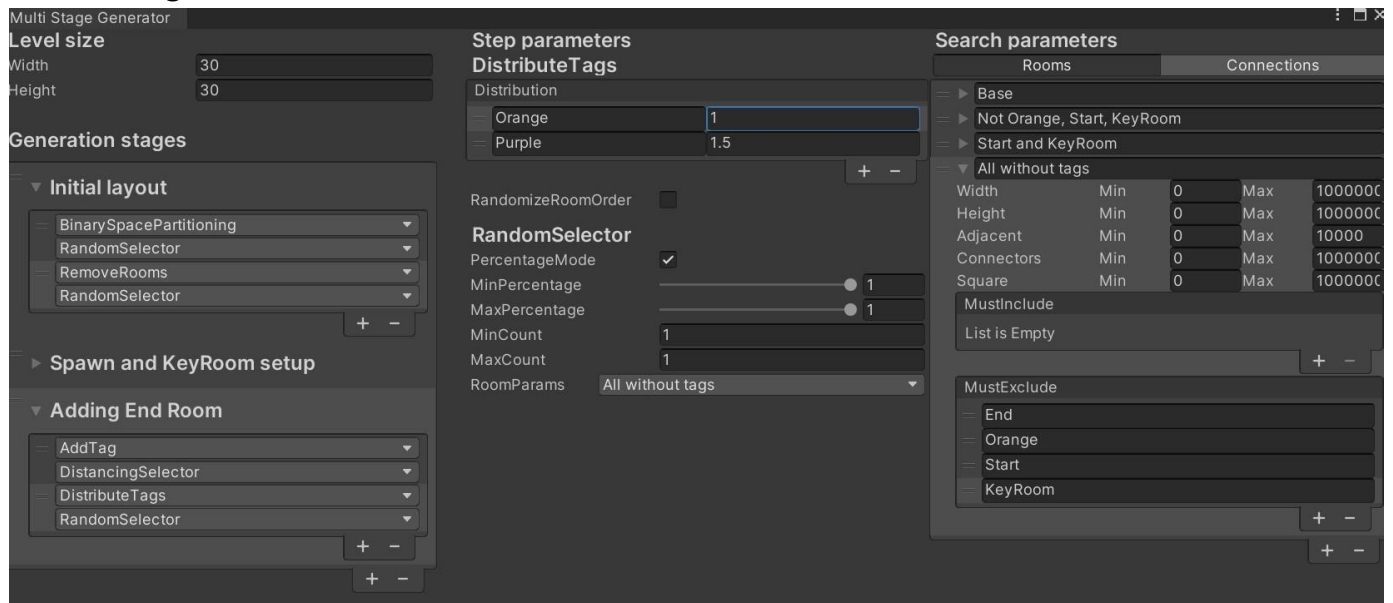
8. Now we can add tags to other rooms.

In SearchParameters create new Room, and exclude Start, End, Orange, KeyRoom.



Add a new step with DistributeTags and RandomSelector. Set DistributeTags to

distribute Orange and Purple rooms, and RandomSelector to choose all rooms without tags.



Now all unused rooms were given either Orange or Purple tag, while player still has guaranteed way from Start to KeyRoom.



8. Add another room to Search Parameters, that includes only Purple and End rooms.

Search parameters

Rooms		Connections	
▶	Base		
▶	Not Orange, Start, KeyRoom		
▶	Start and KeyRoom		
▶	All without tags		
▼	Purple and End		
Width	Min	0	Max 1000000
Height	Min	0	Max 1000000
Adjacent	Min	0	Max 10000
Connectors	Min	0	Max 1000000
Square	Min	0	Max 1000000
MustInclude			
▶ Purple			
▶ End			
+ -			
MustExclude			
List is Empty			
+ -			
+ -			

Add a new stage with AddConnectors and RandomSelector. RandomSelector must select only Purple and End rooms. Set AddConnectors Tag to Locked and check ConnetToOuterRooms

Multi Stage Generator

Level size

Width: 30
Height: 30

Generation stages

- ▶ Initial layout
- ▶ Spawn and KeyRoom setup
- ▶ Adding End Room
- ▼ Adding doors
 - ▶ AddConnectors
 - ▶ RandomSelector

Step parameters

AddConnectors

Random

ConnectToOuterRooms: ☒

MinWidth: 1
MaxWidth: 1

AlwaysMaximize: ☐

MinDistanceToCorner: 1

ErrorIfImpossible: ☐

ConnectorsLimit: 1

Tag: Locked

Must Include

ConnectedRoomPairs

List is Empty

RandomSelector

PercentageMode: ☒

MinPercentage: 1
MaxPercentage: 1

MinCount: 1
MaxCount: 1

RoomParams: Purple and End

[illegible]

Multi Stage Generator

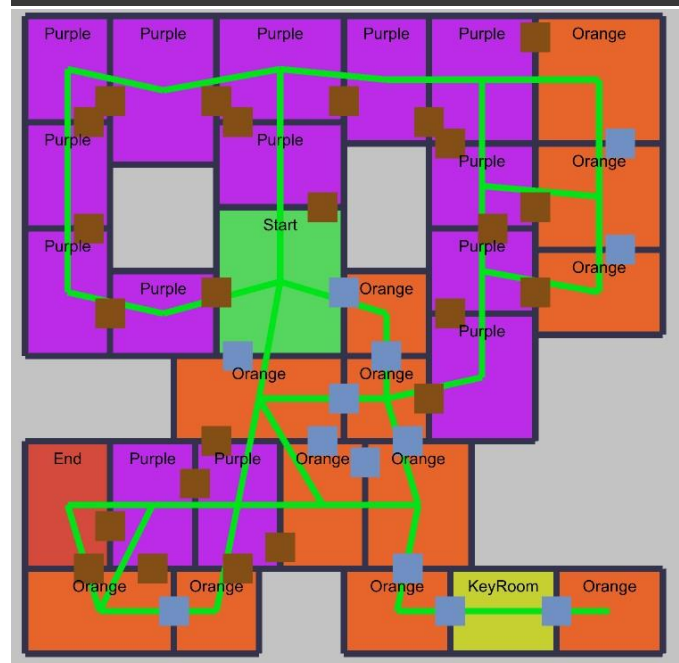
Level size
Width 30
Height 30

Generation stages

- Initial layout
- Spawn and KeyRoom setup
- Adding End Room
- Adding doors
 - AddConnectors
 - RandomSelector
 - AddConnectors
 - RandomSelector

Step parameters
AddConnectors
Random
ConnectToOuterRooms
MinWidth 1
MaxWidth 1
AlwaysMaximize
MinDistanceToCorner 1
ErrorIfImpossible
ConnectorsLimit 1
Tag Simple
Must Include
ConnectedRoomPairs
List is Empty

RandomSelector
PercentageMode
MinPercentage 1
MaxPercentage 1
MinCount 1
MaxCount 1
RoomParams All



9. In Search Parameters, open Connectors tab, and add 2 new connectors. Make sure to check RequireConnector.

The screenshot shows the 'Search parameters' window with the 'Connections' tab selected. It displays two connector types: 'Simple' and 'Locked'. Both have 'Border Width' (Min: 3, Max: 100000) and 'Connector Width' (Min: 0, Max: 10000). The 'Require Connector' checkbox is checked for both. The 'MustInclude' list contains 'Simple' and 'Locked' respectively, while 'MustExclude' is empty for both.

Parameter	Simple	Locked
Border Width	Min: 3, Max: 100000	Min: 3, Max: 100000
Connector Width	Min: 0, Max: 10000	Min: 0, Max: 10000
Require Connector	Checked	Checked
MustInclude	Simple	Locked
MustExclude	List is Empty	List is Empty

Add a new stage, with a step that has RemoveConnectors and RandomSelector. RemoveConnectors must specify Simple connectors to walk and to remove.

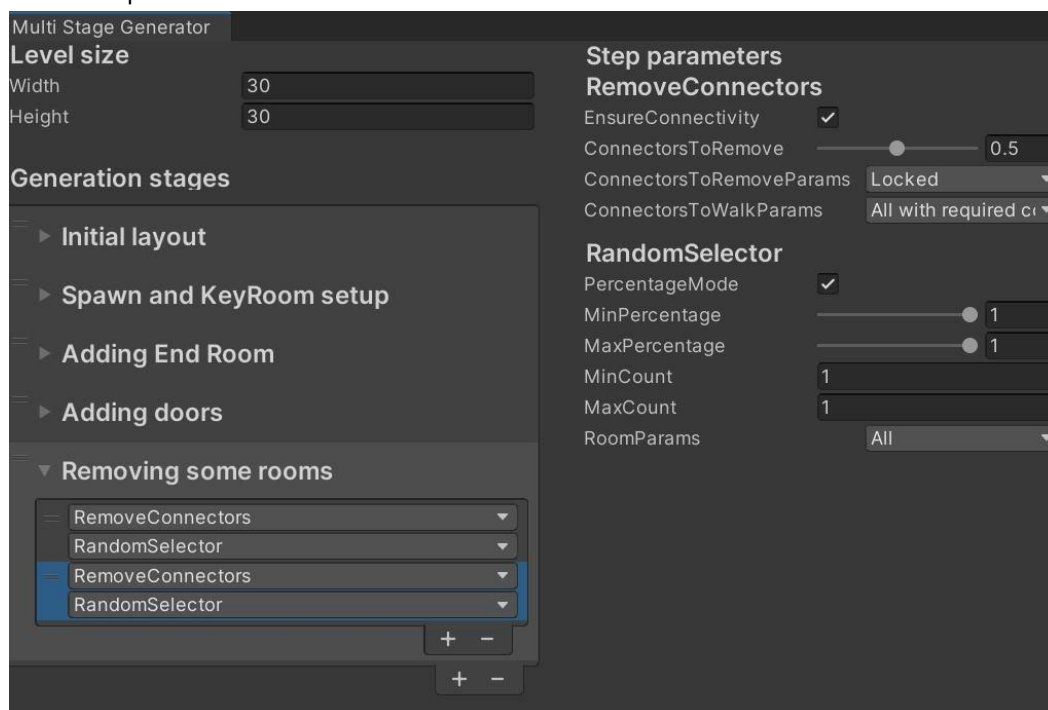
The screenshot shows the 'Multi Stage Generator' window. On the left, the 'Generation stages' list includes 'Initial layout', 'Spawn and KeyRoom setup', 'Adding End Room', 'Adding doors', and 'Removing some rooms'. The 'Removing some rooms' stage is expanded, showing 'RemoveConnectors' and 'RandomSelector'. On the right, the 'Step parameters' for 'RemoveConnectors' are shown: 'EnsureConnectivity' is checked, 'ConnectorsToRemove' is 0.689, 'ConnectorsToRemoveParams' is 'Simple', and 'ConnectorsToWalkParams' is 'Simple'. The 'RandomSelector' parameters are also shown: 'PercentageMode' is checked, 'MinPercentage' and 'MaxPercentage' are 1, 'MinCount' and 'MaxCount' are 1, and 'RoomParams' is 'All'.

Parameter	Value
Width	30
Height	30
Generation stages	Initial layout, Spawn and KeyRoom setup, Adding End Room, Adding doors, Removing some rooms
RemoveConnectors - EnsureConnectivity	Checked
RemoveConnectors - ConnectorsToRemove	0.689
RemoveConnectors - ConnectorsToRemoveParams	Simple
RemoveConnectors - ConnectorsToWalkParams	Simple
RandomSelector - PercentageMode	Checked
RandomSelector - MinPercentage	1
RandomSelector - MaxPercentage	1
RandomSelector - MinCount	1
RandomSelector - MaxCount	1
RandomSelector - RoomParams	All

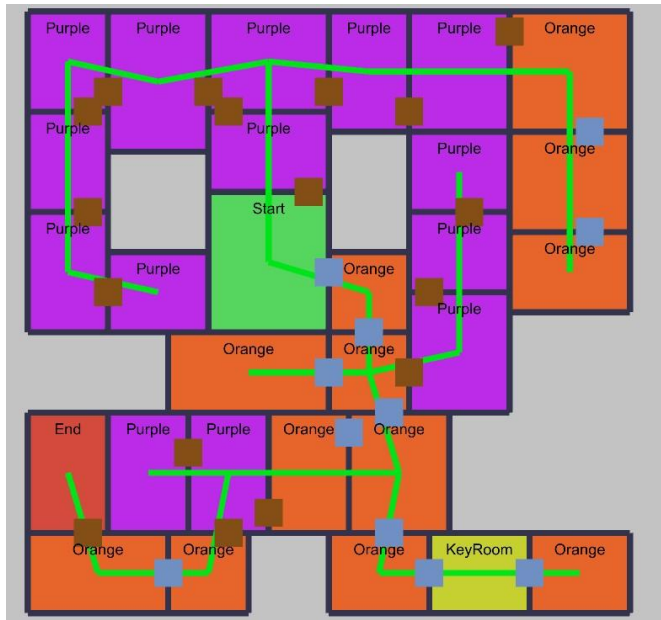
It will delete some Simple connectors, while maintaining connectivity. In other words, if you can go from one room to another using only Simple connectors - it will not change after this modifier, when EnsureConnectivity is set, all critical connectors will remain.



Now we can also delete some of the Locked connectors. Add a similar step, with Locked ConnectorsToRemoveParams, and ConnectorsToMoveParams set to "all with required connector"



In this case much more connectors will be removed, since we can also use Simple connectors to move between rooms.



As a result, we have a dungeon where the player can spawn in the Start room, only with access to a Simple (unlocked) door. While walking through orange doors, he can come across a KeyRoom, and obtain a key to unlock all Locked doors, and get to the End room.

You can learn more about Modifiers and Selectors in their documentation files.