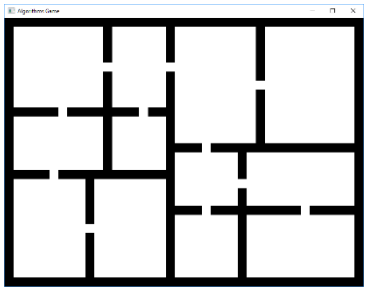
Assignment 1: Dungeons

In this first assignment you have to implement a dungeon generation algorithm based on the principle of binary space partitioning. In other words, starting from a big room (rectangle), you keep splitting rooms into smaller rooms, placing doors where necessary, until you have a dungeon (see the detailed requirements below).

Documented starting code for all assignments can be found on blackboard. Read this code carefully, since it contains boilerplate and visualization code for all assignments.
In addition, a walkthrough for the code will be provided during the lectures.
Using the provided starting code is **mandatory**, but you are allowed to research algorithms online, citing references. Check the rubrics in the manual for an overview of the non-functional requirements (for example: keep **a notebook** to document your algorithms in pseudocode or flowcharts before programming).

1.1 'Sufficient' requirements:



- All the rooms are generated with a random width & height that is bigger than a given minimum.
- All doors are placed randomly in a correct position along a shared wall (e.g. not floating in space or locked in corners).
- The dungeon is fully connected (in other words, every room is 'reachable' from every other rooms).

Optional challenge:
- only add the minimum number of doors required to keep the dungeon fully connected

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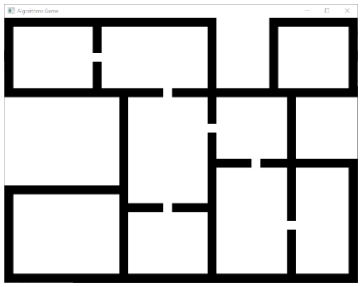
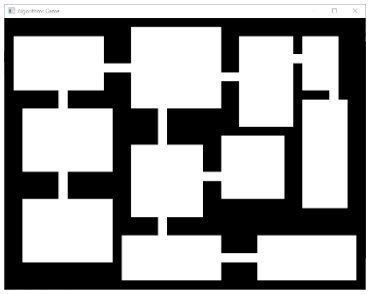
1.2 'Good' requirements:



- You have implemented all the 'Sufficient' requirements.
- All rooms and doors are generated 'predictably' random.
- All rooms that have either the smallest or the biggest area (= w * h) have been removed (note: multiple rooms can have the same area).
- Paint all rooms with 0 doors red, 1 door orange, 2 doors yellow, 3+ doors green.

1.3 'Excellent' requirements:



- You have implemented all the 'Good' requirements.
- The sizes of the rooms are reduced by a random amount, turning the doors into hallways.

Notes:
- Offsetting the room position randomly is allowed but not required.
- As a variation the background on the right has been made black as well, but this is also not required.