# Map Algorithm

The mapping algorithm comprises of 3 coding stages: Pathing, Sampling and Drafting.

## Pathing Stage

The pathing section starts with two randomly selected tiles. One on the left most side, is designated the starting zone and one on the right most side is designated the end zone. Then the computer will randomly select a path through the other tiles until it reaches the end zone. This method is inspired by Spelunky and its cave design (Yu, 2016).

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In this case:

* [0][1] has been selected as the start zone.
* [3][0] has been selected as the end zone.
* Each next path has 1/3 chance of being picked.

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At the end:

* A permutation is created with a clear path between the start and end zone.
* [0][0] was filtered out.
* [3][2] was filtered out.

The problems with this stage is that there are tiles which need to be filtered out. Before a tile is randomly selected, each tile option is assessed. If a tile breaks the track by not reaching the end or being already apart of the track, it is removed.

## Sampling Stage

Only three styles of tiles need to be created; Blank, Straight path, Turn path. Each tile is randomly selected depending on which tile is required.

### Blank

These tile sprites don’t have a visible path on them. They are to be used on the sections that aren’t connected to the track.

### Straight Path

These tile sprites have one entry and one exit on the exact opposite side. These tiles can be rotated to 0 degrees (north/south) and 90 degrees (west/east) depending on the path required.

### Turn Path

These tile sprites are used within the corners of the track, and are rotated 0/90/180/270 degrees depending on the turn required.

Blank

Straight

Straight (90 Degrees)

Turn

Turn (270 Degrees)

Turn (180 Degrees)

## Drafting

The final stage to add flair and towers to the map. Towers are placed on the track, while additional flairs like shrubs, trees, etc, are added onto the blank tiles. The tower quantity would be decided by a difficulty level, which is predetermined.

# Bibliography

Yu, D. (2016). *Spelunky.*