Game Notes

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April 29, 2022

Position within square stored as an odd signed integer in half-pixels, e.g.

101	011	001	011
-3	-1	1	3

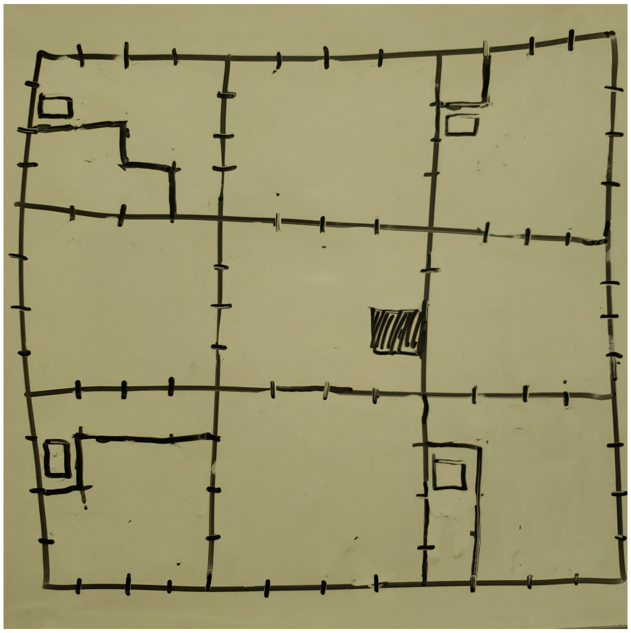
Requires entities to have odd pixel dims to be centered
Edge/vertex states are not possible
Updating position requires doubling velocity first
Store position as x and y seen on screen or relative to a square's axes?
Screen position:

- Graphics and movement are easier
- Collision would be most convenient by loading the current square rotated

Relative position:

- Collision is easier, just check against stored square
- Need to ensure that rendering is done correctly

View splitting is decided by determinant sign: will always give edge to cell further (counter?)clockwise
Vertices/edges are on the border between pixels (even position): do not require a special case



Shaded pixel: camera
Lines: region boundaries

Inlined pixels: edge cases (given to clockwise region in this case)
Going through a singularity and back is a holonomy loop
Entity gravity is ambiguous when not in the same square as the player:

- Freeze when player leaves the square: unintuitive, esp for flat regions
- Based on last player interaction: better, but initial direction must be set: could be none

Have "naked" singularities or cover them up?
Naked is easier to implement if accounted for at the cost of real physics:
an object of finite size can't actually pass through one
Not checking self-collisions would obviate this but may result in graphical glitches
Covering singularities would prevent glitches and restore accuracy but might hurt level design
Larger squares → fewer singularities → less harm in covering them
Also, must be regions accessible in only one orientation: side longer than 2x jump height
However, smaller squares → more convenient to travel/execute holonomy

Render method 1 (recursive):
Accept left+right boundary points, square to render, position/orientation of square, quadrant
Render given square in full
Check if furthest vertex given by quadrant ("splitting vertex") falls strictly within bounds
If not, call with same bounds/quadrant, single adjacent square with new position/orientation
If so, make 2 recursive calls changing appropriate bounds to splitting vertex
Store the result of the 2nd call in a separate buffer
Could maintain a stack of buffers and add depth as an argument: depth necessary anyway
Mask buffer with line between camera and splitting vertex (anti-aliasing here!)
Overlay with original buffer
4 base cases starting from current square with left/right bounds along x/y axes
Renders current square 4x and squares in same row/col 2x

Render method 2 (polygons):
Build a tree of regions, starting from current square
Region info: left and right boundary points, square rendered, position, and orientation of square
Region is split if strictly contains singularity (i.e. not on edge)
4 quadrants constructed separately, contains duplicate regions like previous method
For each position, the regions are laid on top of each other using z depth in (counter)clockwise order
Each region gets transparency based on just one separating point: layer underneath gives anti-aliasing effect
Masking areas behind opaque objects should only be done at the end:
ensure consistent behavior inside/outside square containing object

Render method 3 (pixel shader):
Build tree as in method 2, using a queue for BFS
Regions in the same position are contiguous in the queue
Store index of first region in array
Given a pixel, find position, access array for queue index, iterate through queue until pixel is in bounds
Apply orientation of region to find color

Art style between pixel and vector: each "pixel" is not a solid color but one of a few predefined shapes, e.g. solid color, 2 colors split diagonally, split by circular arc