Wander

> *All that is gold does not glitter, Not all those who wander are lost… – J.R.R. Tolkien*

What is it?

This module is based on Langton's Ant, a cellular automaton invented by Chris Langton in 1986. An ant moves around and changes a cell's state based on the following rules:

- On a white cell, turn 90° clockwise then move forward one cell
- On a black cell, turn 90° counter-clockwise then move forward one cell
- When leaving a cell, flip the color

The above was the original ruleset, but why stop there? In this module, three more states can be added. How the ant turns at each state can be specified as: left, right, continue (don't turn), or make a 180° u-turn. The default ruleset of right on white and left on black implements the original rules.

Editing the current state

Clicking a cell in the display cycles through the active cell states. Shift-clicking a cell that doesn't contain the ant places the ant in that cell. Shift-clicking on the ant rotates the ant. The RAND button generates a random pattern using all active cell states. The CLEAR button sets all cells to the first cell state (white).

Setting the initial state

The STORE button remembers the current state as the initial state. This is important for both getting back to this state via the RESET button and/or trigger jack to restart the simulation as well as recalling this state from a saved patch. Only the stored state, not the current state, is remembered and recalled from a saved patch.

Iterating through generations

The NEXT trigger and button move the ant according to the defined rules, reflecting the new state in both the output jacks and the display. The edges wrap around so the ant can wander forever.

Resetting to the initial state

The RESET trigger and button reset to the initial state, which is the last state remembered via the STORE button.

Specifying the rules

The rules for each cell state are presented to the right of a colored square representing the state. Only 1 rule can be active at a time for a given state. To turn off all rules for a given state, click the active rule (with exceptions, see section below).

L – turn left (90° counter-clockwise)

R – turn right (90° clockwise)

C – continue (do not turn)

U – make a u-turn (180° turn)

Enabling/disabling cell states

When a rule is set for a cell state, that state is considered active. To disable a cell state just unset the rules. Note that the first two states can never be disabled, as this would render the whole thing rather pointless.

Output

The output jacks have two modes, settable by the ANT/GRID switch. When in GRID mode, the output jacks will read whatever is set for the state of the associated cell. In ANT mode, only the jack associated with the current position of the ant will be +5 and all others will be 0.

The reddish output jacks labeled X, Y and DIR reflect the current position of the ant as follows:

X – indicates the current x position in the grid of the ant; in the range [1, 10]

Y – indicates the current y position in the grid of the ant; in the range [1, 10]

DIR – indicates the orientation of the ant; 1 is North, 2 is East, 3 is South, 4 is West

The colorful starfish looking thing is a 1x5 switch. The middle jack is the input. The 5 output jacks represent the 5 possible cell states, starting at the first state (white) from the top and going clockwise to end on the last possible state (magenta). The output will only be active when the ant is on a cell of the associated state. Thus only one output can be active at a time. The DECLICK toggle indicates whether to do a short fade out/in when the state changes.

Setting output values (for grid mode)

The knob to the right of the rules for a given cell state specifies the output for that state. The values go from -5 to +5.

Further reading

https://en.wikipedia.org/wiki/Langton%27s_ant

Last thoughts

I know this is a cliché, but I truly hope you have as much fun with Wander as I did making it. If you have any comments, you can reach me through my Cherry Audio forum. And if you find a way to make something cool with this and feel like sharing, please do!

Thank you!

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