

Turmites Code Documentation

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This document gives a brief description of my termite program. This code was written in the Java version of the Processing environment. This program was not originally developed for distribution, but as a tool for myself. As such, it is a fairly sloppy program. Hopefully it still can be useful for those wishing to reproduce the results of my paper, and perhaps also to get started on your own explorations of turmites.

When the program is run, it opens a window that shows a grid of cells. There are a number of pre-made patterns that can be created that were illustrated in my paper. These can be initialized by pressing the keys “1” through “9”, “0”, “-” and “=” (all in a row on the keyboard) and “!”. After initialization, the simulation will start by pressing the space bar. Pressing the space bar a second time will stop the program.

Here is a list of the vants and/or turmites that are run with these keys pressed:

- 1 : original RL vant due to Langton
- 2 : RLLL vant, rounded bilateral symmetry
- 3 : RLLR vant, boxy bilateral symmetry
- 4 : binary counter
- 5 : (B)RL slow symmetric growth
- 6 : Fibonacci spiral
- 7 : dragon curve
- 8 : prime number sieve
- 9 : universal machine that is calculating Fibonacci numbers
- 0 : universal constructor the simulates the RL vant
- minus sign : self-reproducing machine (close up)
- equals sign : self-reproducing machine (zoomed out)
- exclamation mark : infectious disease spread (SIR)

Some of the patterns grow very slowly. For this reason, you can adjust the speed of simulation by pressing various keys. For instance, pressing “g” will cause the program to calculate 100 time-steps between each screen update. Note that these keys (“s” to single-quote) are in a row on a QWERTY keyboard.

- space bar : toggle simulation off / on
- s : take a single simulation step
- d : 1 step at a time
- f : 10 steps at a time
- g : 100 steps
- h : 1,000 steps
- j : 4,000 steps
- k : 10,000 steps
- l : 40,000 steps
- semi-colon : 320,000 steps

single-quote : 2,560,000 steps

Many of the slower-changing pre-made patterns (e.g. the dragon curve) set the time step jumps to be larger than 1.

There are several additional commands that change the behavior of the program. They are:

- ? : toggle help screen
- c : clear the grid
- t : toggle whether the vant or termite is shown
- x : toggle whether a grid is drawn
- z : toggle whether the state and step count is shown
- r : toggle whether to show the rule table
- i : toggle whether the SIR graph is drawn
- period : increase grid size
- comma : decrease grid size
- w : write a snapshot of the currently displayed image to a file
- m : prepare to write out many image files, for movie creation
- Z : check which cells are un-touched during self-reproduction
- q : quit program

In most cases, the program will allow turmites to travel off the screen. When the SIR simulation is run, however, the program is put into toroidal wrap mode.

Some of the pre-made simulations read patterns from a text file. For example, the close-up version of the pattern for self-reproduction is described in the file “copy_block_no_comments_close.txt”. You can find a commented version of the pattern in “copy_block_comments.txt”.

(end)