Modelling Forest Fires Masterclass: Extension Materials

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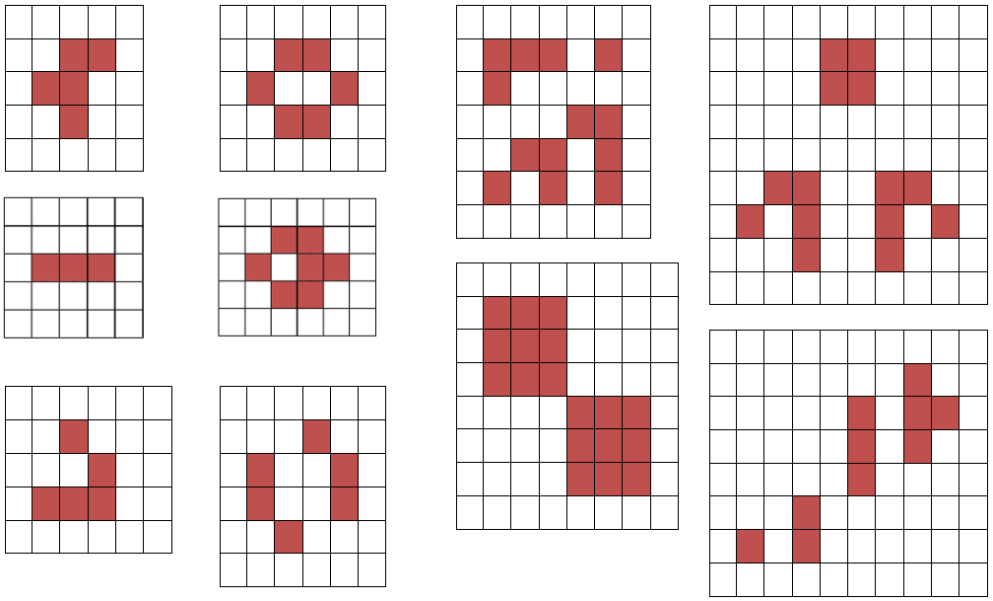
More hands-on Modelling

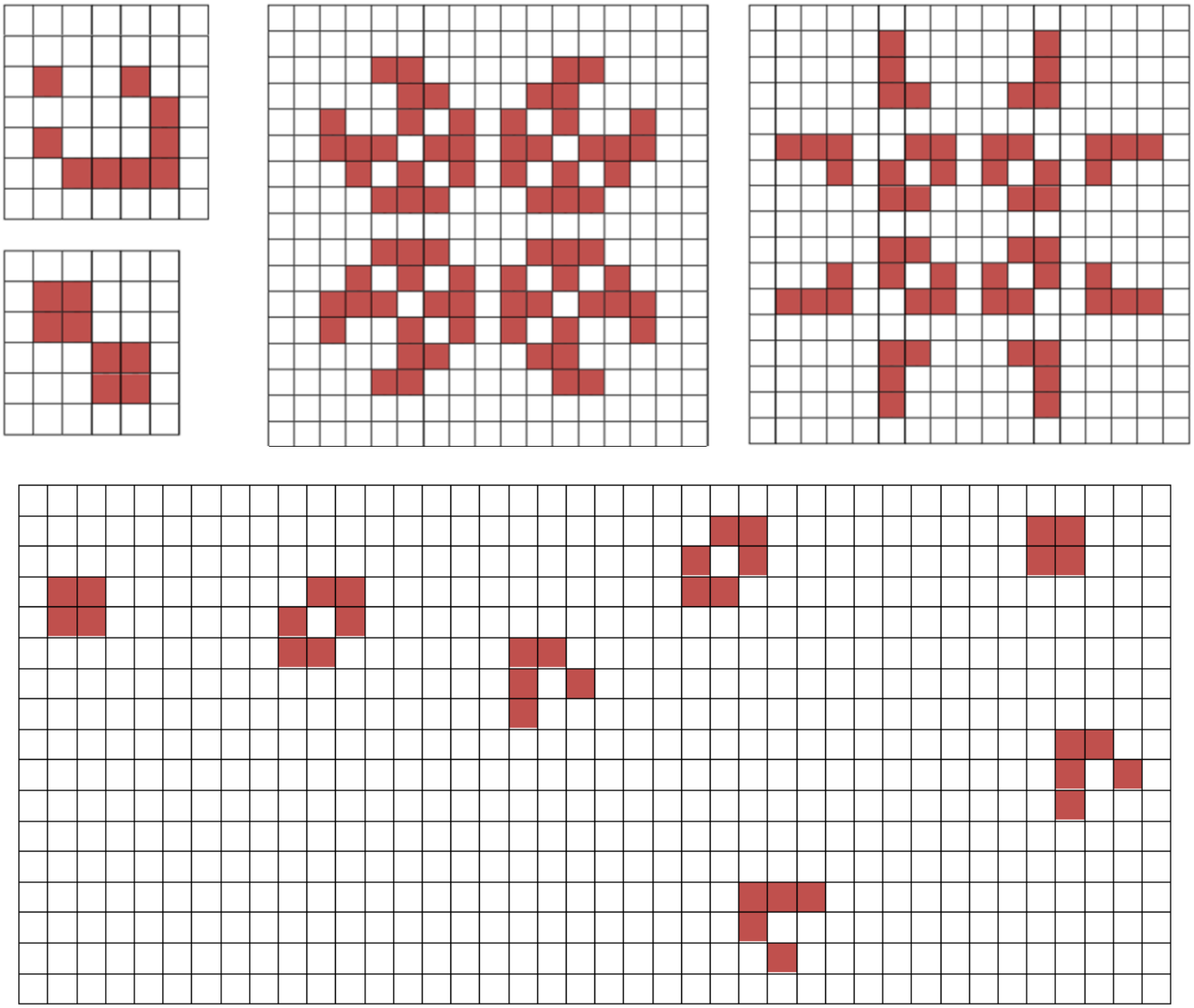
You can investigate more agent-based models through a programme called "NetLogo". Agent-based models look at each individually and how it affects its surroundings, as well as how the surroundings affect it. This is similar to the tree modelling we have been doing, as we were looking at each individual tree.
With NetLogo you can model a range of different scenarios, including complex systems like birds flocking. There are lots of example models in the library, and you can adapt and modify them with a bit of programming. You can use this online or download it:
http://ccl.northwestern.edu/netlogo/index.shtml

Game of Life

The game of life is a mathematical game which uses Cellular Automata to investigate a wide range of patterns. Using simple rules, the "population" rows and changes in surprising ways!

There is an Android and iPhone App called 'The Game of Life' which is a free download. It allows you to change the rules for births and deaths and choose starting configurations. Warning: this is addictive – you can spend hours watching populations change and develop. If you want to play on your computer, you can download a very simple and easy-to-use programme: http://www.bitstorm.org/gameoflife/. You can either watch some saved patterns or create your own by clicking on the cells. Here are some patterns to experiment with:





You can find out more about the Game of Life online. The following links have also been recommended to me to investigate The Game of Life online:
http://golly.sourceforge.net/ (powerful and in-depth – only for the very interested)
http://www.mirekw.com/ca/index.html

More Cellular Automata

If you want to investigate one-dimensional cellular automata, you can buy Wolfram's book 'A New Kind of Science'. You can also look on the Wikipedia page 'Elementary Cellular Automata' and I believe you can download tools to play with 1-D cellular automata on the Wolfram Demonstrations website, http://demonstrations.wolfram.com/index.html.

References

The following books were used in the creation of this Masterclass:
Nature's Patterns: Shapes by Philip Ball
Mathematical Biology by J.D. Murray

Various articles on Cellular Automata were also used (all downloaded from the internet, journals or copied from university library books in 2006). This includes the articles by Martin Gardner on The Game of Life in his column 'Mathematical Games' in *Scientific American* between 1981 and 1983.