

## CPSC 335-02

### Project 1: Cella Ant #12

Team: CPT

#### Complexity Order

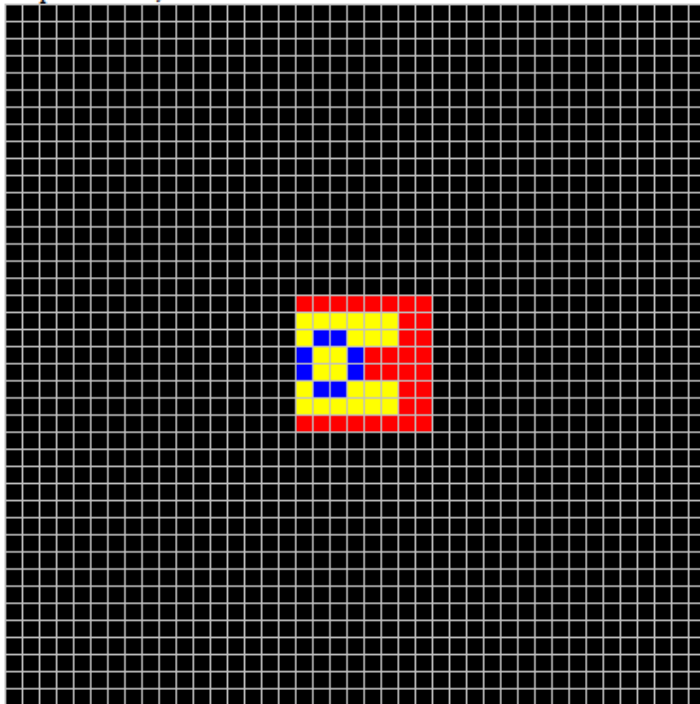
#### Cella Ant #12:

Turk & Propp's Ant #12 is a cellular automaton (Cella). It contains a 2D grid in which every cell of the grid has a color. For this program all the cells are black. As the ant moves, its direction and color on the cell change simultaneously. For Ant #12, 12 decimal in binary are 1100, 1 for left and 0 for right. As each cell has 4 states, each state on the grid has a color associated with it from low to high bit: black=0->red=1->yellow->2->blue=3. The ant turns right on black and red and left on yellow and blue.

#### Program:

Our program initializes a canvas that is black on which we draw a grid 41x41. Once the grid is drawn the ant is placed at the center of the grid. Using the Ant #12 rule, each cell on the grid is populated with the color that is associated for the rule and the state. The ant then moves and changes direction depending on the color of the cell. The program runs until the maximum number of iterations requirement is met.

Step Count: 1,000



**Solution:** Loop until grid is drawn for defined size. Loop until all cells have been populated for defined iterations.

**Complexity:**  $N \times N \times N = O(N^3)$