Introduction to Artificial Intelligence Coursework[1]

(Submission by groups of two students allowed/welcome)
Due date: Monday 3 March 2014
Electronic submission (code + this worksheet) on CATE

1. Introduction

We will be looking at a two player board game called "war of life" which will be played on an 8x8 board. Player 1 will start with a random configuration of 12 blue pieces and player 2 will start with a similar random configuration of 12 red pieces. An example initial configuration might be (where `b` stands for "blue piece" and `r` stands for "red piece"):

	1	2	3	4	5	6	7	8
1								r
2		r						
3				b	b		r	b
4	b	b				r		
5		b	r	b		b	b	
6		b				r		
7			b		b	r	r	r
8			r				r	r

We call the board places where pieces can be placed *cells* (there are 64 cells on an 8x8 board). In the game, player 1 goes first and moves one of his/her pieces. A piece can be moved to one of its neighbour cells (vertically, horizontally or diagonally) as long as no other piece is occupying the cell to be moved to. So, for example, the blue piece at (3, 8) can move to (2,7), (2,8) or (4,7) or (4,8), but not (3,7) because there is a red piece there already. We say that a piece is *surrounded by* the pieces in neighbouring cells.

There is a twist: after each player moves, "life" on the board "evolves" according to the following rules (referred to as Conway's Crank):

For each of the (64) cells C on the board:

- If C contains a piece and the piece is surrounded by 0 or 1 other pieces, then the piece dies of loneliness and is taken away (i.e., the cell becomes empty).
- If C contains a piece and the piece is surrounded by 4, 5, 6, 7 or 8 pieces, then the piece dies of overcrowding and is taken away.
- (If C contains a piece and the piece is surrounded by 2 or 3 pieces, then it is happy and survives.)
- If C is empty and C is surrounded by
  - 2 blue pieces and 1 red piece, or
  - 3 blue pieces,

  then a blue life is born and C is filled with a blue piece.
- If C is empty and C is surrounded by
  - 2 red pieces and 1 blue piece, or
  - 3 red pieces,

  then a red life is born and C is filled with a red piece.

[1] Thanks to Simon Colton