Evolutionary algorithms - CT20A6300
Alternative Project work 2008
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If the problems in WCCI seem too difficult, you can do alternative project work – Solving Sudoku’s with using Evolutionary algorithms.

Sudoku is a logic-based number puzzle game, where 9x9 grid should be filled so, that each column, row 3x3 subgrid contains all numbers: {1, 2, 3, 4, 5, 6, 7, 8, 9} once and only once. See more info on Sudoku’s: http://en.wikipedia.org/wiki/Sudoku

In addition, in Sudoku puzzle there is some fixed numbers, givens that should appear exactly in the same given position in the final solution.

Because Sudoku is a combinatorial problem, the natural approach would be code permutation genetic algorithms. However, it is possible to approach this problem also with totally different ways; you can use genetic programming, ant colony optimization, cultural algorithms etc. It is also totally possible to use normal floating point coded GA or differential evolution, where the solution will be rounded to integers.

Your task is to code a program that solves Sudoku puzzles by using some evolutionary algorithm. You should analyze the efficiency of your program by solving the given example Sudoku’s (next page). It is probably best to start with Easy Sudoku’s 1-3, then continue to the medium Sudoku’s 1-4 (4 in this page), and if your program is successful with these then try to continue to the Super difficult Sudoku’s 1-3.

You can code your program whatever programming language you prefer, even with Matlab etc. You should return report and program code.

The next page gives some references to papers that have studied the solving of Sudoku’s with different evolutionary algorithms. You can start by reading how these have approached the Sudoku problem, then you can code either similar approach or totally different based on your belief on how Sudoku’s should be solved with EAs.
Reference to articles that have presented Sudoku solving with EAs:


6. Mantere, Timo; Koljonen, Janne; Analyzing and solving Sudoku’s with cultural algorithms. Accepted to be published in IEEE Congress on Evolutionary Computation, CEC 2008, 1-6 June 2008 (available later via IEEE Explore)