

Final Year Project Report

Full Unit - Constraint Satisfaction

Playing Games and Solving Puzzles Using AI

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A report submitted in part fulfilment of the degree of

BSc (Hons) in Computer Science

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December 13, 2019

Declaration

This report has been prepared on the basis of my own work. Where other published and unpublished source materials have been used, these have been acknowledged.

Word Count: N/A

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Date of Submission: 05/10/2019

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A Constraint Satisfaction Problem is modelled as having variables, domains of each variable and constraints between variables, Sudoku can be represented as such with each square being a variable, the domain being the numbers one to nine and the constraints being that a number cannot be repeated in a row, column or box. A variable can be made node consistent by eliminating all values in its domain that do not satisfy the variables unary constraints. A variable is arc consistent if all the values in its domain satisfy the variables binary constraints. This would mean that between two variables and for all values in the first variables domain there is a value in the second variables domain that satisfies the binary constraint on the arc joining them. This represents how constraint propagation can be modelled to reduce the possible numbers for all squares on a Sudoku grid and make solving the puzzle significantly easier.