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Assignment 1
Constraint Satisfaction For Decision Making (CE884-7-SP), 2011-12
Set by Edward Tsang, University of Essex

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1.   Introduction:

This is an assignment on problem formulation. This assignment accounts for 10% of your total marks in this course. This assignment should be submitted electronically. The deadline of this assignment is ***11:59:59, Friday 24 February 2011***.

2.   Objective:

The objective of this assignment is to test your ability to formulate a constrained optimization problem.

3.   The Constrained Portfolio Optimization Problem:

Your job is to pick at most 10 stocks from FTSE 350 (which comprises 350 stocks) to invest in. You will have to decide how much to invest in each stock in order to maximize your performance according to a performance function that you are given. This function will return a value for any portfolio that you input to it. You should make no assumption of how this function computes the performance. You have to satisfy the following constraints:

   (a) You are not allowed to invest more than 10% on each stock.

   (b) Each stock belongs to a sector. You are not allowed to invest more than 20% of your investment in any single sector.

4.   Your task:

Formulate the above problem as a constrained optimization problem. You must state clearly what the variables, domains and constraints are, and why they should be part of the formulation. You must state clearly any assumptions that you may make, and any domain-specific knowledge that you may use. Evaluate the size of your search space. Describe the constraint graph. (Hint: in this problem, you will have to define constants.)

5.   Submission requirements:

Submit a report of strictly no more than 1,000 words (you can probably do not need so many words), stating your formulation of this problem. State precisely the variables, domains, constraints and any constants that you may define. Clearly explain how you arrive at your formulation. Write your name and registration number clearly on the first page of your submission. Underline your surname.

6.   Assessment criteria for this assignment:

Clarity is essential for a pass mark (which is 50%): you must explain your formulation clearly. On the basis of clarity, correctness is the main criteria for assessing your submission.

7.   Notes:
   • Please be aware that the module supervisor may ask students for an interview to explain their submitted work.
   • Please refer to the Student's handbook on the School's Policy on Plagiarism and Late Submission