Editorial

Combinatorial Optimisation

Associate Editors: Kathryn Dowsland and Bill Dowsland

The Editors are pleased to offer this opportunity for the associate editors for Combinatorial Optimisation to outline their domain, and seek contributions from potential authors.

Combinatorial Optimisation (CO) involves choosing one or more options from a set of possibilities in such a way as to optimise one or more objectives. Thus it covers a diverse range of practical problems arising across the range of business, service, and leisure activities and includes problems in scheduling, routing, location, allocation, space utilisation etc. It is therefore not surprising that such problems have been of interest to those in Operational Research for many years.

Although there are some examples that can be solved to optimality with relatively little computational effort, the majority share with the travelling salesman problem, the property that they are easy to state but very difficult to solve, due to the rapid explosion in the number of potential solutions as the size of the problem increases. Solution techniques can be broadly divided into exact approaches that guarantee optimality, and heuristics, that take the more pragmatic approach of seeking out good, but not necessarily optimal, solutions. The former are usually based on mathematical models, such as integer programming, or graphs and networks, while the latter range from simple greedy construction approaches to sophisticated search methods including local search, evolutionary algorithms and constraint logic programming.

Given the wide range of practical CO problems, and the rapid growth and development in both exact and heuristic solution approaches it is perhaps surprising that since taking over the sub editorship 18 months ago we have not had a single submission in this area. One reason that has been suggested to us is that the field is too technical. While we agree that this is true of many of the new developments in exact solution

approaches, and that many successful heuristic approaches involve a level of technical detail not suited to a publication such as OR Insight, we feel that there are several categories of article that would be particularly appropriate. These are:

- Papers describing situations where the most suitable approach has been found to be the application of a relatively simple heuristic. This may be due to the nature of the problem itself, or to the characteristics of the environment in which it is to be solved. An example of such a paper is the description by Thompson (1999) of the way in which the schedule for the 1999 Rugby Union World Cup was devised given the often conflicting objectives of teams, fans, and broadcasters.
- Papers outlining effective solutions based on standard solution approaches, but involving interesting modelling issues. For example the paper of Hobbs and Neebe (1994) describing a distribution problem in the coal industry in which considerable savings resulted from the implementation of an off-the-shelf IP solution approach.
- Papers describing implementations based on combinatorial optimisation techniques, where the focus of the paper is on the problem analysis and implementation issues, and the way in which they influenced the choice of approach. An example is the description of a decision support system to aid the planning of laboratory visits given by Adlakha and Arslam (1997).
- Introductory tutorial papers describing models or techniques, particularly those with a proven success rate in solving real problems, such as the tutorial paper on

stock-cutting techniques by Cunningham-Green (1992).

As well as articles in these four categories we would welcome any other contributions with a combinatorial optimisation flavour that fall within the editorial guidelines of the journal. When submitting your paper, please remember to address the general aims of *OR Insight* as detailed on the back page, together with formatting instructions.

Please send any electronic copy of papers on Combinatorial Optimisation to Kathryn Dowsland or Bill Dowsland via w.b.dowsland@btconnect.com.

We look forward to receiving your articles.

Adlakha V, Arsham H (1997), Scheduling Travelling Inspectors, *OR Insight* 10, 1, 20-27.

Cunningham-Green R (1992), Cut out Waste! *OR Insight*, 5, 3, 4-7.

Hobbs J, Neebe A (1994), Contracting for Coal, *OR Insight* 8,1, 28-31.

Thompson J M (1999), Kicking Timetabling Problems into Touch - Scheduling the Rugby World Cup, *OR Insight*, 12,3, 7-15.