

Beyond the Job-Shop: Scheduling in the Real World

Abstract

It is a curious feature of scheduling as an applied discipline that the problems whose features we understand the best are among those whose solution is least likely to be useful. Job-shop, flow-shop, assignment, sequencing, time-tabling, are all in their pure forms well-studied, but usable only in special cases, as gross approximations, or as analogies used to suggest solution approaches for the real problem. Real scheduling applications present novel challenges, exhibiting structure that is in many cases poorly understood, and so there is frequently much room for improvement in the solution methods applied.

In this tutorial, we shall describe and explore the messy details of real-world scheduling problems ranging from manufacturing (batch, continuous, and semi-continuous processes), to professional sports leagues, to space and aviation applications including satellite support, image processing, and communications scheduling. While we shall touch upon methods for solving some of these problems, the primary objective of this tutorial is to elucidate the complexities of these domains, rather than to prescribe solutions for them.

Bio

Dr. Mark Boddy is an internationally recognized expert in several areas of computer science research, including planning and scheduling, automated reasoning, and constraint satisfaction. During the past seventeen years he has published more than 30 peer-reviewed articles in journals and conference proceedings, presented tutorials on temporal reasoning, constraint-based reasoning, and domain modeling for planning at international conferences, and given numerous invited talks. Dr. Boddy continues to play an active role in the research community, serving on program committees and reviewing for national and international conferences, as well as serving as a journal reviewer for Artificial Intelligence Journal, Computational Intelligence, IEEE Transactions on Pattern Recognition and Machine Intelligence, and is on the editorial board for the Journal of Artificial Intelligence Research. He has helped to organize numerous workshops and conferences in related research areas, and served as a program reviewer for NASA, the National Science Foundation, and the Air Force Office of Scientific Research.

Over his career, Dr. Boddy has worked on or lead the implementation of scheduling products and prototypes for applications including petroleum refineries (production scheduling, blend scheduling), batch and semi-continuous manufacturing (edible oils, petroleum waxes), PC board assembly, satellite operations, earth science image processing, and avionics processor and communications scheduling.