PREFACE

The main goal of this book is to make an overview of main recent approaches and methods for modelling and solving project scheduling problems. Methodological aspects are stressed, such as interpretation of assumptions made in the models, properties of schedules and algorithms for finding them, interconnections with other problems of scheduling (i.e. machine, production) and resource allocation (static or dynamic). It does not mean that practical aspects are ignored. It simply means that we do not present arbitrarily or heuristically chosen methods for solving more or less efficiently some specific cases, but we rather show a methodology of choosing methods (exact, heuristic and even analytical) which are most adequate and efficient for solving a given class of problems. In this way, the book gives a background for building methodologically correct decision support systems for a large class of scheduling problems.

The material is divided into three parts: two dealing with deterministic models, and one with stochastic ones. The first part is devoted to models which are basic in the sense that they preserve some traditional assumptions made in classical project scheduling models (non-preemptive schedules, discrete resource requirements). However, they considerably exceed the classical framework, e.g. by considering different categories of resources (renewable, nonrenewable and doubly constrained), many alternative modes of performing activities and many project performance measures considered in single- or multi-objective optimization.

In the second part, there are gathered chapters either relaxing the basic assumptions (preemptive scheduling with the minimization of the number of preemptions, continuous resource requirements) or lying near to the conventional border of project scheduling from the side of machine/production scheduling or resource allocation problems. The goal of this part is on the one hand to characterize methods for solving non-classical models which are important in some modern practical applications (e.g. computer scheduling), and on the other hand, to show advantages of relaxing the basic

assumptions mentioned above. It may lead to polynomial (including linear programming) algorithms for finding non-preemptive schedules in some cases, or even to analytical solutions when resource requirements can be treated as continuous, i.e. arbitrary within given intervals. The third part deals with basic concepts concerning stochastic and GERT networks.

The potential readership of the book follows from its methodological character, however strictly related to real-world problems and emphasizing algorithmic aspects of the methods presented. Thus, it includes researchers and graduate or advanced undergraduate students within the following disciplines: Business Administration, Management Science, Operations Research, Industrial Engineering, System Analysis and Control, Computer Science and Applied Mathematics. It should be also useful for decision makers, executive managers, consultants and practitionners in business corporations, service industries, governmental organisations etc.

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