

Preface

Matching is always part of life. No one likes to be mismatched, and no one wants to be poorly matched. In playing “musical chairs,” children try to catch a seat when the music stops, and there are always some that are left unmatched, without a seat. Is it just a game? Throughout life, we try to match ourselves with the right partners, the right friends, the right places, and the right programs.

Our interest in matching began in the 1990s, soon after we established the PRISM Center for Production, Robotics, and Integration Software for Manufacturing and Management, at Purdue University. Through industry projects, we identified two related problems that appeared commonly: The process of matching (the procedure, algorithm, protocol of matching), and the result of the matching (the match, sometimes called “the catch”). As industrial engineers, we sought to optimize both, looking for the best matching process, and for the best match.

Two prominent example areas that engaged us were: The selective matching of components in construction and assembly; and the matching of suppliers (providers) to clients (consumers). The purpose in both these areas is similar: To assure the best quality and reliability; resilience, and sustainability. In assembly – matching in simpler assemblies, such as hand-tools, and matching in complex assemblies, such as jet engines. Similarly, in team-building – we are looking to match the right suppliers of needed knowledge or of demanded parts to corresponding clients.

Increasingly, it became evident that there are fascinating art and science in matching. This book attempts to present a comprehensive look at what has been discovered and developed, validated, and implemented in this area, by many others and by our PRISM team, both at the PRISM Center and throughout our PGRN, the PRISM Global Research Network. There are also other types of matching and best matching that are beyond the scope of this book, such as in forensics, database search, visual and musical pattern matching, and social matching. In all these areas, best matching and best match have similar meaning, significance, and value.

We owe thanks and gratitude to our many students, colleagues, visiting scholars, and industry partners, who have participated in the development of this exciting

field of study. Many of them are mentioned throughout this book. Our thanks also go to the Springer colleagues, who have helped us bring this book to light. It is part of the Springer's ACES book series, which is dedicated to Automation, Collaboration, and E-Services. As it becomes clear in reading this book, best matching is essential for automation, for collaboration, and for e-services.

We hope this book will inspire you to get as excited as we are about best matching. There are still open and fascinating questions about it, for further exploration and discovery, some of which we describe in this book.

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