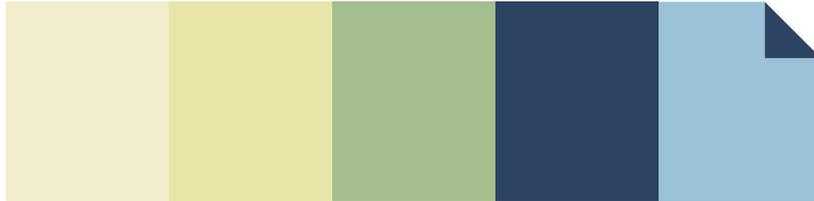


Part I



Problem Solvers using LEGO® Robotics

The main goal of *Eureka! Problem Solving with LEGO® Robotics* is teaching readers how to tackle problems. This book is neither a simple guide nor a tutorial, nor is it a banal repetition script for a specific educational domain. The underlying idea is that the difficult challenges encountered in science and technology have no pre-fabricated solutions. In the field of robotics, these challenges occur at the intersection of a long list of disciplines. Solving such problems presupposes a significant amount of insight, self-confidence, and tenacity to venture into unexplored terrain. Of course, explorations cannot be done blindly and unprepared. Good training in the various disciplines is indispensable. However, we emphasize the development of general problem-solving faculties like strategic thinking, improvisation, and change of perspective, which can be deployed in almost any challenge in order to discover all of the relevant aspects of the problem and, eventually, to crack it.

The smart problem solver can be compared to a piano virtuoso who necessarily is technically brilliant. He or she has reached such a high level through a mixture of talent and engaged, repetitive training of scales, arpeggios, and etudes. However, what makes a truly great pianist is the capacity for intelligent interpretation of great composers' works. Therefore, the artist must understand the spirit of each opus, fathom the sensibility of the creation, and somehow reconstruct the sequences of notes to reflect the dynamics of their genesis. The required faculties address musical, historical, psychological, and instrumental aspects far beyond the simple reproduction of notes. Similarly, the problem solver in robotics needs a solid technical background that he or she can acquire only through highly motivated experience. But what makes a truly great problem solver is the plasticity of the mind—the capacity to perceive the weak point of the problem and to determine where it can be attacked—and the confident knowledge of an arsenal of tools that can be deployed for the solution.