



# Winning Design!: LEGO MINDSTORMS EV3 Design Patterns for Fun and Competition

*James Trobaugh*

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Design that works! It's what you need if you're building and competing with LEGO MINDSTORMS EV3 robotics. You'll find uses for the new light sensors and gyro sensors in navigation, helping you to follow lines and make turns more consistently. Approach collision detection with greater confidence through EV3's ultrasonic sensor. Learn new designs for power attachments.

*Winning Design!* is about building with LEGO MINDSTORMS EV3 for fun, for education, but especially for competition. Author James Trobaugh is an experienced coach and leader in the FIRST LEGO League. In this book, he shares his hard-won knowledge about design principles and techniques that contribute toward success in robotics competitions

*Winning Design!* unlocks the secrets of reliable design using LEGO MINDSTORMS EV3. You'll learn proven design patterns that you can employ for common tasks such as turning, pushing, and pulling. You'll reduce and compensate for variation in performance from battery charge levels and motor calibration differences. You'll produce designs that won't frustrate you by not working, but that will delight you with their reliable performance in the heat of competition.

Good design is about more than just the hardware. Software counts for a lot, and *Winning Design!* has you covered. You'll find chapters on program design and organization with tips on effective coding and documentation practices. You'll learn about master programs and the needed flexibility they provide. There's even a section on presenting your robot and software designs to the judges.

*Winning Design!* is the book you need if you're involved in competitions such as FIRST LEGO League events. Whether coach, parent, or student, you'll find much in this book to make your design and competition experience fun and memorable, and educational. Don't be without this book if you're leading a team of young people as they build skills toward a future in technology.

## What You Will Learn

- Build winning robots on a foundation of good chassis design
- Reduce variability in robot mechanical movements
- Design modular attachments for quick change during competition
- Solve navigation problems such as steering, squaring up, and collision detection
- Manage software using master programs and other techniques
- Power your robot attachments via motors and pneumatics

## Who This Book Is For

*Winning Design! LEGO Mindstorms EV3 Design Patterns for Fun and Competition* is aimed at students, parents, teachers, and coaches involved in LEGO MINDSTORMS EV3 robot design and programming.

Teachers and coaches will find the book to be a valuable teaching resource. Students and parents will find insight into good design practices. And all readers will enjoy the increased satisfaction that comes from building designs that actually work, and that can be relied upon to continue to work every time.

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