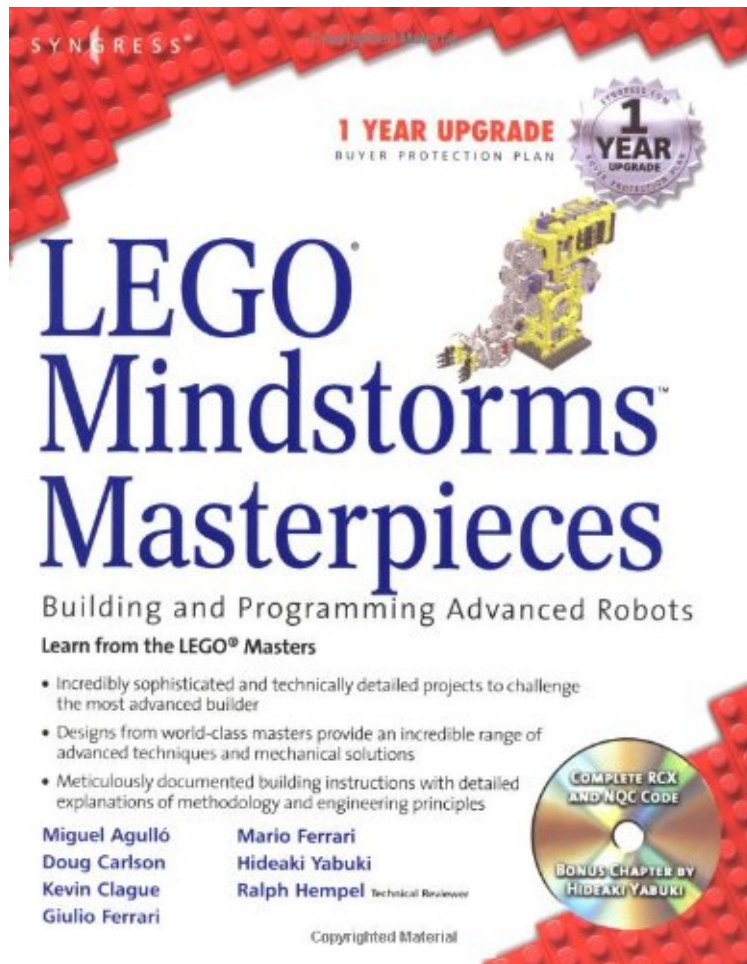


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# LEGO Mindstorms Masterpieces: Building Advanced Robots

*Syngress, Mario Ferrari, Giulio Ferrari, Kevin Clague, J. P. Brown, Ralph Hempel*  
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**Syngress, Mario Ferrari, Giulio Ferrari, Kevin Clague, J. P. Brown, Ralph Hempel : LEGO Mindstorms Masterpieces: Building Advanced Robots** before purchasing it in order to gage whether or not it would be worth my time, and all praised LEGO Mindstorms Masterpieces: Building Advanced Robots:

25 of 25 people found the following review helpful. Great Addition To The Lego Mindstorms CommunityBy Concerned ConsumerAfter building many of the robots presented in Lego Mindstorms Masterpieces published by Syngress, I feel I am now qualified to give a fair personal assessment of this book. I have purchased many Lego Mindstorms books and each one has great ideas and a lot to offer. All books have shortcomings and room for improvement. How good a book is depends on how well it address the readers needs. My needs center on my use of Lego Mindstorms to teach mechanical engineering, logic, programming and robotics to my 13-year-old daughter. Lego Mindstorms Masterpieces is the newest addition to our Lego toolbox. There are so many positive things to say about this publication I'll place the very few items I would have preferred done differently at the end of this review.A

few key benefits this book offers to anyone involved with Lego Mindstorms are complete, well illustrated assembly instructions, detailed commentary by the authors with additional tips to aid in the construction, explanations of where the inspirations for the creation came from with historical references, web site listings for additional information and an e-book CD-ROM with program files. Many of the authors have active web sites of their own and are available to generously help people stuck during construction. Lego Masterpieces not only expand the reader's knowledge of Lego Mindstorms applications, but engineering and robots in general. The concepts presented can be applied anywhere the logic, computers, or machines are designed and built. The book shows that the construction of a machine must go hand in hand with the programming to best fit an application. Giulio Ferrari explores basic Artificial Intelligence and the foundations of modern computers with the Turing Machine. Another chapter presents the mechanics and theory of creating logic cells amazingly through the use of pneumatics and then combining them into the synchronous PneumADDic II calculating machine by Kevin Clague. And again by Kevin, the building of an asynchronous artificial muscle using Autonomous Pneumatic Circuits in the Synchropillar without RCX programmed control. An all terrain wheeled vehicle by Doug Carlson uses his Tri-Star drive design called the Stair Climber and will crawl over and out of almost anything. A spy robot by Miguel Aguilio called The Shape-Shifting Camera Tank utilizes Vision Command's camera, can increase or decrease its height and you may control it with its own Lego parts constructed joystick. The Learning Brick Sorter by Mario Ferrari, which combines a robotic arm with an automated task, blends the machine with excellent basic AI programming, which can learn new tasks. And finally, the most advanced Lego robotic arm I've ever seen is in the chapter on CyberArm IV by Hideaki Yabuki. Not only does this arm have five Degrees of Freedom and 180-degree rotation, but you can also build the optional Power Glove to operate the robotic arm from your own hand movements! The few complaints I have of this book are that the Bill Of Materials on some of the chapters are printed so small and illegible that I couldn't read them with a magnifying glass! Adding a page and printing the illustrations larger and clearer would have better represented the quality of the overall material. The other complaint is found in most books. Someone should proof read it before publication. Spell checkers don't think! My final message about this book is BUY IT and start collecting the parts you'll need. It expands the frontiers of Lego Mindstorms and you'll need all the parts you can get your hands on! 16 of 17 people found the following review helpful. Real robots, backed by real robotics, and made with LEGOs. By Amorette Pedersen This book has gathered together "Masterpieces" from some of the world's greatest LEGO creators. Builders from the US, Canada, Italy, Netherlands, and Japan have brought you their passions, the theories behind each masterpiece, and detailed building and programming techniques. "LEGO Mindstorms Masterpieces" is truly at the zenith of all related books and I believe it will become a true masterpiece both in name and in reality. This book began in July of 2002. And, while the creation, writing and editing was extremely difficult, the authors fought mightily to accomplish our goal: to build LEGO robots both suitable for Master Builders and worthy of this book's title! Amazing PneumADDic II and Synchropillar by Kevin as a computer processor specialist and creator of LPub and LSynth. Splendid Stair-Climber by Doug who is a well known creator of several Omni Drive Vehicles. And, two awesome works - Learning Brick Sorter and The LEGO Turing Machine that were invented by the famous Ferrari brothers - they are co-authors of the best selling "Building Robots with LEGO Mindstorms" and have been called the "DaVincis of LEGO". Biped robot expert Miguel created complex SSCT faithfully based on the real robot that was active for life search and explore in WTC, New York. Lastly, a robotic arm driven by 10 motors and feedback system - CyberArm IV that I have created as a series in four years. All of these are the real robots that are backed by real robotics - only the materials are LEGO! We are very pleased that we could explore a new frontier in LEGO Mindstorms, and be able to offer it in book form. As the one of pioneers of LEGO robots, I have had my experience of the results in the MIT Media Lab fortunately in the middle of the 80s, and the result of my writing of over half year keeping is included in bundle CD-ROM as a over 50 pages bonus chapter. I have tried to write about a lot of topics to explain the world of robots and LEGO Mindstorms - history of LEGO robot or their philosophy of the LEGO Group, precious list and description of early LEGO educational sets for control learning, personal robot boom in the 80s, from a more than 300-year-old Japanese automata (the Karakuri) to the latest state-of-the-art robotics. I believe that my discussion and description about the way of thinking and creation - included building, programming, CAD and even about Art - are useful in particular. We hope that this book will never lose its value and that it will become loved by people of all generations. From Tokyo Hideaki Yabuki Media Activist 3 of 3 people found the following review helpful. If you like Mindstorms, buy this book. By B. Houghton Included are complete building instructions for some truly amazing robots/machines. You'll need LOTS of Lego to build them though. Even if you haven't you'll be inspired by the authors imagination and ingenuity. The writing is good, and the descriptions/instructions detailed and clear. The best reason though for buying the book is the included CD which contains no less than ten other Mindstorms books in PDF format, including the most excellent 'Building Robots with Lego Mindstorms'. I had expected to find software and sample programs, but their absence is more than made up for by the books.

In LEGO Mindstorm Masterpieces, some of the world's leading LEGO Mindstorms inventors share their knowledge and development secrets. The unique style of this book will allow it to cover an incredibly broad range of topics in

unparalleled detail. Chapters within the book will include detailed discussions of the mechanics that drive the robot - and also provide step-by-step construction diagrams for each of the robots. This is perfect book for LEGO hobbyists looking to take their skills to the next level whether they build world-class competitive robots or just like to mess around for the fun of it. For experienced users of LEGO Mindstorms, LEGO Mindstorms Masterpiece is composed of three fundamental sections: Part One: A review of the advanced robot building concepts and theories. Part Two: Step-by-step building instructions for a series of complex models. The companion programming code is included, along with in-depth explanations of concepts needed for the specific models. Robots include Line Followers, Biped, Stair and Wall Climbers, a Joystick Controlled Cannon, a Robotic Game Player, Plant Waterer, and a Drink Mixer. Part Three: Ideas for modifying the building instructions by expanding the pieces and kits. Topics covered: 1. Behavior: This section includes robots designed to interact with the environment, or with other robots. Behavior is the key word as the robots are designed to behave in some specific way, and all the technical details and implementations are secondary to this main goal. 2. Motion: The projects in this category are aimed at solving some specific motion problem. The focus of these robots is on the mechanical techniques rather than on software. 3. Interaction: These projects allow the reader to build robots for the purpose of interacting with the user by playing games or responding to user commands in real time. 4. Automation: Opposite of the previous category, this one hosts robots designed to perform totally automated operations. These projects will build robots able to complete tasks without human intervention. 5. Calculus: The most abstract of the sections contain robots with minimum knowledge of the external world. Pneumatic ALUs, and Turning machines are fully explained. Advanced users need inspiration too! Advanced projects with suggestions for enhancements and improvements make the explanations of the theories and physics of the robots as well as the complete building instructions, make this book extremely useful to readers long after the building of the robots has been completed. Written by the "DaVincis of LEGO" and other highly regarded LEGO personalities. This experienced authoring team is assembled of highly respected and visible superstars in the LEGO community. Proven success in the LEGO MINDSTORMS market. Syngress has already had a hit with the bestselling book, Building Robots with LEGO MINDSTORMS

From the Publisher These incredibly sophisticated and technically detailed projects will challenge the most advanced builder: Stair-Climber by Doug Carlson is based on the tri-star wheel concept and can drive, step, and climb over obstacles! Learning Brick Sorter by Mario Ferrari uses the theory of adaptability, as it has the ability not only to sort bricks by color, but also the ability to learn how. The LEGO Turing Machine by Giulio Ferrari is a revolutionary device created to study computability, and which allows us to journey to the time of Artificial Intelligence. PneumADDic II by Kevin Clague describes a collection of building and pneumatic techniques that should be fundamental tools for any serious Mindstormer. Synchropillar by Kevin Clague, demonstrates that by using pneumatics you can achieve some simple automation characteristics. Shape-Shifting Camera Tank by Miguel Agullo is based on a real-life search-and-explore robot, the Variable Geometry Tracked Vehicle (VGTV). When built, the SSCT is a cool toy that allows us a peek into a very practical application of real life robotics: telepresence. CyberArm IV by Hideaki Yabuki, featuring many famous pneumatics components, is controlled by a sensor feedback system. The book's CD-ROM features complete RCX and NQC Code files, movies of robots, and a bonus chapter by Hideaki Yabuki. About the Author Called the "DaVincis of LEGOS," Mario and Giulio Ferrari are world-renowned experts in the field of LEGO MINDSTORMS robotics. Mario Ferrari received his first LEGO bricks in 1964, when he was 4, and they remained his favorite toy for many years-until he thought he was too old to play with them. Then in 1998 the revolutionary LEGO MINDSTORMS Robotics Invention System reignited his childhood passion, leading him to conclude that LEGO is the closest thing to the perfect toy. Managing director at a leading Italian finishing and packaging solutions company, Mario has long been a hyperactive member of the online MINDSTORMS community and estimates he owns over 60,000 LEGO pieces. Fluent in many programming languages-with a background both as an IT manager and as a project supervisor-he has also pushed LEGO robotics to its limits. Giulio Ferrari is a student in economics at the University of Modena and Reggio Emilia, where he has also studied engineering. Fond of computers and possessed of a strong curiosity about the physical and mathematical sciences, he has developed utilities, entertainment software, and web applications for several companies. Giulio discovered robotics with the arrival of MINDSTORMS in 1998, shares a love of LEGO bricks with his oldest brother, Mario, and holds a prominent place in the founding of the Italian LEGO community. Ralph Hempel (B.A.Sc., P.Eng) is an Independent Embedded Systems Consultant. He provides systems design services, training, and programming to clients across North America. His specialty is in deeply embedded microcontroller applications, which include alarm systems, automotive controls, and the LEGO RCX system. He is also the creator of the pbForth language for the RCX. Kevin Clague graduated in 1983 from Iowa State University with a B.S. in Computer Engineering. For the past 18 years, Kevin has worked as a Diagnostic Engineer at the Amdahl Corporation. For the last two years he has also acted as a Senior Staff Engineer doing verification work at Sun Microsystems on their Ultra-Sparc V RISC processor. Kevin has two major hobbies: Theatrical Lighting and LEGO Mindstorms. Kevin has been playing with the RIS 1.5 for a few years now and is

currently working on an application to revolutionize the world of creating online LEGO building instructions.