

# Modern Assembly Language Programming with the ARM Processor

By Larry D. Pyeatt

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**Modern Assembly Language Programming with the ARM Processor** By Larry D. Pyeatt

*Modern Assembly Language Programming with the ARM Processor* is a tutorial-based book on assembly language programming using the ARM processor. It presents the concepts of assembly language programming in different ways, slowly building from simple examples towards complex programming on bare-metal embedded systems.

The ARM processor was chosen as it has fewer instructions and irregular addressing rules to learn than most other architectures, allowing more time to spend on teaching assembly language programming concepts and good programming practice. In this textbook, careful consideration is given to topics that students struggle to grasp, such as registers vs. memory and the relationship between pointers and addresses, recursion, and non-integral binary mathematics. A whole chapter is dedicated to structured programming principles. Concepts are illustrated and reinforced with a large number of tested and debugged assembly and C source listings. The book also covers advanced topics such as fixed and floating point mathematics, optimization, and the ARM VFP and NEONTM extensions. PowerPoint slides and a solutions manual are included.

This book will appeal to professional embedded systems engineers, as well as computer engineering students taking a course in assembly language using the ARM processor.

- Concepts are illustrated and reinforced with a large number of tested and debugged assembly and C source listing
- Intended for use on very low-cost platforms, such as the Raspberry Pi or pcDuino, but with the support of a full Linux operating system and development tools
- Includes discussions of advanced topics, such as fixed and floating point mathematics, optimization, and the ARM VFP and NEON extensions

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## **Modern Assembly Language Programming with the ARM Processor** By Larry D. Pyeatt Bibliography

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### **Editorial Review**

From the Back Cover

Quickly master structured assembly language programming practices with this tutorial-based book

Using the ARM processor, this book explains carefully the concepts of assembly language programming, slowly building from simple examples towards complex programming on bare-metal embedded systems. Considerable emphasis is put on showing how to develop good, structured assembly code. More advanced topics such as fixed and floating point mathematics, optimization and the ARM VFP and NEON extensions are also covered.

This book will help you to:

- Understand representations of, and arithmetic operations on, integral and real numbers in any base
- Gain a basic understanding of processor architectures and instruction sets
- Write efficient and well-designed ARM assembly language programs
- Quickly learn any new assembly language
- Implement the procedures and mechanisms for handling interrupt processing and performing I/O
- Interface assembly language with high-level languages such as C and C++
- Explore ethical issues involving safety-critical applications

#### **About the Author**

Larry D. Pyeatt earned his doctorate in Computer Science, focusing on Artificial Intelligence, from Colorado State University in 1999. He spent 13 years as a professor at Texas Tech University before moving to the South Dakota School of Mines and Technology in 2012. He has programmed in over 15 assembly languages, from mainframes to 8-bit embedded systems, and teaches a variety of courses including assembly language, operating systems, computer architecture, and probabilistic artificial intelligence.

### **Users Review**

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##### **Linda Enders:**

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**Michelle Bachman:**

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