EMBEDDED AND REAL TIME SYSTEMS

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ISBN-13: 978-93-86258-46-5
FIRST EDITION, MAY 2017, INDIA

Typeset, Printed & Published by:
VSRD Academic Publishing
(*A Division of Visual Soft India Pvt. Ltd.*)

Printed & Bound in India

VSRD ACADEMIC PUBLISHING
A Division of Visual Soft India Pvt. Ltd.

REGISTERED OFFICE
154, Tezabmill Campus, Anwarganj, KANPUR–208003 (UP) (IN)
Mb: 99561 27040, Web: www.vsrdpublishing.com, Email: vsrdpublishing@gmail.com

MARKETING OFFICE (NORTH INDIA)
Basement-2, Villa-10, Block-V, Charmwood Village, FARIDABAD–121009 (HY)(IN)
Mb: 98999 36803, Web: www.vsrdpublishing.com, Email: vsrdpublishing@gmail.com

MARKETING OFFICE (SOUTH INDIA)
340, FF, Adarsh Nagar, Oshiwara, Andheri(W), MUMBAI–400053 (MH)(IN)
Mb: 99561 27040, Web: www.vsrdpublishing.com, Email: vsrdpublishing@gmail.com

PREFACE

Embedded & Real Time systems have grown tremendously in recent years, not only in their popularity, but also in their complexity. This complexity demands a new type of designer, one who can easily cross the traditional border between hardware design and software design. After investigating the availability of courses and textbooks, we felt a new course and accompanying textbook were necessary to introduce embedded computing system design using a unified view of software and hardware. This textbook portrays hardware and software not as different domains, but rather as two implementation options along a continuum of options varying in their design metrics, like cost, performance, power, size, and flexibility.

Three important trends have made such a unified view possible. First, integrated circuit (IC) capacities have increased to the point that both software processors and custom hardware processors now commonly coexist on a single IC. Second, quality compilers and program size increases have led to the common use of processor-independent C, C++, and Java compilers and integrated design environments (IDEs) in embedded system design, significantly decreasing the importance of the focus on microprocessor internals and assembly language programming that dominate most existing embedded system courses and textbooks. Third, synthesis technology has advanced to the point that synthesis tools have become commonplace in the design of digital hardware. Synthesis tools achieve nearly the same for hardware design as compilers achieve in software design: They allow the designer to describe desired functionality in a high-level programming language, and they then automatically generate an efficient custom-hardware processor implementation. The first trend makes the past separation of software and hardware design nearly impossible. Fortunately, the second and third trends enable their unified design, by turning embedded system design, at its highest level, into the problem of selecting and programming (for software), designing (for hardware), and integrating "processors."

✍ *Dr. N. Malmurugan & Mr. J. Sampath Kumar*

ACKNOWLEDGEMENT

We would like to express our special thanks of gratitude to our beloved Chairman **Thirumigu. M.G. Bharathkumar** who gave us the golden opportunity to do this book work which helped us in doing a lot of research related undertakings.

We express our appreciation and thanks to our dynamic Managing Directors, **Er. Ba. Mahendhiran** and **Er. B. Maha Ajay Prasad** for their meticulous support extended in all aspects.

We would like to express a special note of gratitude to the editing team of **VSRD Academic Publishing (A Division of Visual Soft India Private Limited)** in releasing this book.

Finally, this work would not have been possible without the love and support of **our colleagues, family members and friends**. We are extremely grateful to one and all..

✍ *Dr. N. Malmurugan*

✍ *Mr. J. Sampathkumar*

Thirumigu. M.G.BHARATHKUMAR
Founder & Chairman, Mahendra Educational Trust

Forward

"Computing in their capacity as a tool, computers will be but a ripple on the surface of our culture. In their capacity as intellectual challenge, they are without precedent in the cultural history of mankind".

-Edsger Dijkstra, 1972 Turing Award Lecture

The ECE Department seeks to educate engineers who will possess the basic concepts, tools, skills, and vision necessary to enhance the technological and economic competitiveness of society. This fact, combined with the undeniable impact of Electronics and Communication Engineering on the modern world, demands an introductory college text book comparable with commonly-used textbooks in physics, chemistry, or biology. Accordingly, this book is intended to meet the need for an introductory college text in ECE. The distinctive feature of the book is that it has broader coverage of the field than is found in many texts that are currently in use.

I am delighted to note that the Principal of Mahendra College of Engineering Dr.N.Malmurugan along with Faculties of Electronics and Communication Engineering Mr.J.Sampathkumar have written this book on "EMBEDDED & REAL TIME SYSTEMS" nicely, for the benefit of student community. They have accomplished this goal, and I trust their work will encourage and enlighten all who have an interest in Microcontroller, Realtime applications and the growing role on Telecommunication sector in the modern world.

M.G.BHARATHKUMAR
Founder & Chairman, Mahendra Educational Trust

Dedicated
To
Our Family, Friends & Students

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