K.C. Wang

Embedded and Real-Time Operating Systems

Springer

K.C. Wang
School of Electrical Engineering
and Computer Science
Washington State University
Pullman, WA
USA

ISBN 978-3-319-51516-8 ISBN 978-3-319-51517-5 (eBook)
DOI 10.1007/978-3-319-51517-5

Library of Congress Control Number: 2016961664

© Springer International Publishing AG 2017
This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.
The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.
The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, express or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Printed on acid-free paper

This Springer imprint is published by Springer Nature
The registered company is Springer International Publishing AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Dedicated to

Cindy

Preface

Since the publication of my first book on the Design and Implementation of the MTX Operating System by Springer in 2015, I have received inquiries from many enthusiastic readers about how to run the MTX OS on their ARM based mobile devices, such as iPods or iPhones, etc. which motivated me to write this book.

The purpose of this book is to provide a suitable platform for teaching and learning the theory and practice of embedded and real-time operating systems. It covers the basic concepts and principles of operating systems, and it shows how to apply them to the design and implementation of complete operating systems for embedded and real-time systems. In order to do these in a concrete and meaningful way, it uses the ARM toolchain for program development, and it uses ARM virtual machines to demonstrate the design principles and implementation techniques.

Due to its technical contents, this book is not intended for entry-level courses that teach only the concepts and principles of operating systems without any programming practice. It is intended for technically oriented Computer Science/Engineering courses on embedded and real-time systems that emphasize both theory and practice. The book's evolutional style, coupled with detailed source code and complete working sample systems, make it especially suitable for self-study.

Undertaking this book project has proved to be yet another very demanding and time-consuming endeavor, but I enjoyed the challenges. While preparing the book manuscripts for publication, I have been blessed with the encouragements and helps from numerous people, including many of my former TaiDa EE60 classmates. I would like to take this opportunity to thank all of them. I am also grateful to Springer International Publishing AG for allowing me to disclose the source code of this book to the public for free, which are available at http://www.eecs.wsu.edu/∼cs460/ARMhome for download.

Special thanks go to Cindy for her continuing support and inspirations, which have made this book possible. Last but not least, I would like to thank my family again for bearing with me with endless excuses of being busy all the time.

Pullman, WA K.C. Wang
October, 2016

Contents

About the Author

K.C. Wang received the BSEE degree from National Taiwan University, in 1960 and the Ph.D. degree in Electrical Engineering from Northwestern University, Evanston, Ill in 1965. He is currently a Professor in the School of Electrical Engineering and Computer Science at Washington State University. His academic interests are in Operating Systems, Distributed Systems and Parallel Computing.