<<逻辑设计基础>>

图书基本信息

书名：<<逻辑设计基础>>

13位ISBN编号：9787302135531

10位ISBN编号：7302135533

出版时间：2006-9

出版时间：清华大学

作者：马科维兹

页数：651

前言

This book is intended as an introductory logic design book for students in computer science, computer engineering, and electrical engineering. It has no prerequisites, although the maturity attained through an introduction to engineering course or a first programming course would be helpful. The book stresses fundamentals. It teaches through a large number of examples. The philosophy of the author is that the only way to learn logic design is to do a large number of design problems. Thus, in addition to the numerous examples in the body of the text, each chapter has a set of Solved Problems, that is, problems and their solutions, a large set of Exercises (with answers to selected exercises in Appendix B), and a Chapter Test (with answers in Appendix C). In addition, there are a set of laboratory experiments that tie the theory to the real world. Appendix A provides the background to do these experiments with a standard hardware laboratory (chips, switches, lights, and wires), a breadboard simulator (for the PC or Macintosh), and two schematic capture tools. The course can be taught without the laboratory, but the student will benefit significantly from the addition of 8 to 10 selected experiments. Although computer-aided tools are widely used for the design of large systems, the student must first understand the basics. The basics provide more than enough material for a first course. The schematic capture laboratory exercises and a section on Hardware Design Languages in Chapter 8 provide some material for a transition to a second course based on one of the computer-aided tool sets. Chapter 1 gives a brief overview of number systems as it applies to the material of this book. (Those students who have studied this in an earlier course can skip to Section 1.2.) It then discusses the steps in the design process for combinational systems and the development of truth tables. Chapter 2 introduces switching algebra and the implementation of switching functions using common gates-AND, OR, NOT, NAND, NOR, Exclusive-OR, and Exclusive-NOR. We are only concerned with the logic behavior of the gates, not the electronic implementation. Chapter 3 deals with simplification using the Karnaugh map. It provides methods for solving problems (up to six variables) with both single and multiple outputs. Chapter 4 introduces two algorithmic methods for solving combinational problems-the Quine-McCluskey method and Iterated Consensus. Both provide all of the prime implicants of a function or set of ix x Preface functions, and then use the same tabular method to find minimum sum of products solutions. Chapter 5 is concerned with the design of larger combinational systems. It introduces a number of commercially available larger devices, including adders, comparators, decoders, encoders and priority encoders, and multiplexers. That is followed by a discussion of the use of logic arrays-ROMs, PLAs, and PALs for the implementation of medium scale combinational systems. Finally, two larger systems are designed. Chapter 6 introduces sequential systems. It starts by examining the behavior of latches and flip flops. It then discusses techniques to analyze the behavior of sequential systems. Chapter 7 introduces the design process for sequential systems. The special case of counters is studied next. Finally, the solution of word problems, developing the state table or state diagram from a verbal description of the problem is presented in detail. Chapter 8 looks at larger sequential systems. It starts by examining the design of shift registers and counters. Then, PLDs are presented. Three techniques that are useful in the design of more complex systems-ASM diagrams, one-shot encoding, and HDLs-are discussed next. Finally, two examples of larger systems are presented. Chapter 9 deals with state reduction and state assignment issues. First, a tabular approach for state reduction is presented. Then partitions are utilized both for state reduction and for achieving a state assignment that will utilize less combinational logic. A feature of this text is the Solved Problems. Each chapter has a large number of problems, illustrating the techniques developed in the body of the text, followed by a detailed solution of each problem. Students are urged to solve each problem (without looking at the solution) and then compare their solution with the one shown. Each chapter contains a large set of exercises. Answers to a selection of these are contained in Appendix B. Solutions will be made available to instructors through the Web. In addition, each chapter concludes with a Chapter Test; answers are given in Appendix C. Another unique feature of the book is the laboratory exercises, included in Appendix A. Four platforms are presented-a hardware based Logic Lab (using chips, wires, etc.); a hardware lab simulator that allows the student to “ connect ” wires on the computer screen; and two circuit capture programs, LogicWorks

4 and Altera Max+plus II. Enough information is provided about each to allow the student to perform a variety of experiments. A set of 26 laboratory exercises are presented. Several of these have options, to allow the instructor to change the details from one term to the next. We teach this material as a four-credit course that includes an average of 31/2 hours per week of lecture, plus, typically, eight laboratory exercises. (The lab is unscheduled; it is manned by Graduate Preface xi Assistants 40 hours per week; they grade the labs.) In that course we cover Chapter 1: all of it Chapter 2: all but 2.11 Chapter 3: all of it Chapter 4: if time permits at the end of the semester Chapter 5: all but 5.8. However, there is a graded design problem based on that material (10 percent of the grade; students usually working in groups of 2 or 3). Chapter 6: all of it Chapter 7: all of it Chapter 8: 8.1, 8.2, 8.3. We sometimes have a second project based on 8.7. Chapter 9 and Chapter 4: We often have some time to look at one of these. We have never been able to cover both. With less time, the coverage of Section 2.10 could be minimized. Section 3.5 is not needed for continuity; Section 3.6 is used somewhat in the discussion of PLAs in Section 5.7.2. Chapter 5 is not needed for anything else in the text, although many of the topics are useful to students elsewhere. The instructor can pick and choose among the topics. The SR and T flip flops could be omitted in Chapters 6 and 7. Sections 7.2 and 7.3 could be omitted without loss of continuity. As is the case for Chapter 5, the instructor can pick and choose among the topics of Chapter 8. With a limited amount of time, Section 9.1 could be covered. With more time, it could be skipped and state reduction taught using partitions (9.2 and 9.3). ACKNOWLEDGMENTS I want to thank my wife, Allyn, for her encouragement and for enduring endless hours when I was closeted in my office working on the manuscript. Several of my colleagues at Florida Atlantic University have read parts of the manuscript and have taught from earlier drafts. I wish to acknowledge especially Mohammad Ilyas, Imad Mahgoub, Oge Marques, Imad Jawhar, Abhi Pandya, and Shi Zhong for their help. In addition, I wish to express my appreciation to my chairs, Mohammad Ilyas, Roy Levow, and Borko Fuhrt who made assignments that allowed me to work on the book. Even more importantly, I want to thank my students who provided me with the impetus to write a more suitable text, who suffered through earlier drafts of the book, and who made many suggestions and corrections. I want to thank Visram Rathnam for his contributions to the section on Altera tools. The reviewers- Michael McCool, University of Waterloo; Pinaki Mazumder, University of Michigan; xii Preface Nick Phillips, Southern Illinois University; Gary J. Minden, University of Kansas; Daniel J. Tylavsky, Arizona State University; Nadar I. Rafla, Boise State University; Dan Stanzione, Clemson University; Frank M. Candocia, Florida International University; Lynn Stauffer, Sonoma State University; Rajeev Barua, University of Maryland- provided many useful comments and suggestions. The book is much better because of their efforts. Finally, the staff at McGraw-Hill, particularly Carlise Paulson, Melinda Dougharty, Jane Mohr, Betsy Jones, Barbara Somogyi, Rick Noel, Sandy Ludovissy, Audrey Reiter, and Dawn Bercier have been indispensable in producing the final product, as has Michael Bohrer-Clancy at Interactive Composition Corporation.

<<逻辑设计基础>>

内容概要

逻辑设计是计算机科学、计算机工程和电气工程等专业的理论基础。
学好逻辑设计需要三个环节：理论知识、习题和实验。
因此，本书在强调基础知识的同时，结合着大量实例进行讲授，并给出了大量例题，同时还附有大量习题和每章的测验题。
此外，还安排有4个实验操作平台和26个实验，以便把理论和实践紧密联系起来。
　本书是计算机、电气工程和通信、电子等专业的学生学习逻辑设计的教材，同时也是相关专业工程技术人员的参考用书。

作者简介

作者：(美国)马科维兹 (Marcovitz.A.B.)

书籍目录

章节摘录

插图：

版权说明