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Chapter 1 : Free Logic Design Books Download | Ebooks Online Textbooks

Welcome. Logic Design Inc. (LDI) provides fully integrated technical learning solutions ranging from electronics to robotics, utilizing simulation software, multimedia learning material, textbooks, computer-based testing, and course management software.

CircuitLogix electronics lab simulation provides fast, powerful schematic design and simulation in one complete program. It gives you the flexibility to design and test electronic circuits, trying all the "what if" scenarios without ever worrying about faulty parts or bad connections. CircuitLogix supports analog, digital and mixed-signal circuits, and its proven SPICE simulation gives accurate real-world results you can trust. CircuitLogix Pro allows users to simulate any combination of analog and digital components. It essentially converts your computer into a fully-functioning electronics laboratory. Mixed-model simulation is as easy and the speed and accuracy rivals EDA tools costing thousands of dollars. Along with the expanded simulation capability, the professional version features a larger device library of over 10, devices, easier SPICE model import, and no limit on the number of pins for an individual device. The pro version of CircuitLogix allows you to design and edit your own devices and models for an unlimited number of virtual components. RoboLogix Robotics Simulation Software RoboLogix is a state-of-the-art robotics simulation software package that is designed to emulate real-world robotics applications. With RoboLogix, you teach, test, run, and de-bug programs that you have written yourself using a five-axis industrial robot in a wide range of practical applications. These applications include pick-and-place, palletizing, welding, painting and allow for customized environments so that you can design your own robotics application. With RoboLogix, the user can run the simulator to test and visually examine the execution of robot programs and control algorithms, while plotting instantaneous joint accelerations, velocities and positions. RoboLogix is ideal for students as well as robot designers and engineers. The simulation software allows for verification of the reach- ability, travel ranges and collisions. RoboLogix enables programmers to write their own robot programs, modify the environment and use the available sensors. These sensors include video cameras which are used for obtaining the desired position of the robot end effector. In addition, a teach pendant is included with the simulator that allows the user to command the robot to pick up a tracked object and return it to a home location through jogged commands or pre-programmed positions. The ability to preview the behavior of a robotic system in a "virtual" world allows for a variety of mechanisms, devices, configurations and controllers to be tried and tested before being applied to a "real world" system. RoboLogix receives control signals, determines if contact or collision between objects in the system has occurred, and returns simulated sensor information as feedback. This system has the capacity of real-time simulation of the motion of an industrial robot through 3D animation. The principles of 3D motion simulation and both geometry modeling and kinematics modeling are presented in the RoboLogix virtual environment. The Electronics CBT presents an in-depth, interactive coverage of the fundamentals of electronics, built within an innovative state-of-the-art computer-based training and simulation environment. The module material is delivered using video, audio, text, 2D and 3D animations, photos, and over simulation-based laboratory exercises using CircuitLogix Pro. The module content was developed in association with some of the top corporate trainers in North America and focuses on practical applications and troubleshooting techniques. The ElectroMechanical CBT prepares students to install and repair industrial electronic equipment including variable speed drives, automated control equipment, process control systems, and a wide variety of electronic control systems ranging from simple on-off controls to robotics. The ElectroMechanical CBT presents an in-depth, interactive coverage of the fundamentals of electronics and mechanics, built within an innovative state-of-the-art computer-based training and simulation environment. Click on the link below for a demonstration of the lab simulation software used in the ElectroMechanical CBT. This CBT learning program includes 19 interactive modules to help learners gain an in-depth understanding of PLCs and their applications in industry. This CD-ROM based multimedia program includes pre-tests, interactive exercises, sample exams and online technical and tutorial support to help prepare you for online computer-based final exams. As well, it will enable students to provide technical support and

service during the production, installation, operation and repair of PLC equipment and systems. The primary focus of the program is on automated manufacturing processes as well as the role of robots and all support equipment. The tutorial learning package provides both both theoretical and laboratory support through a combination of multimedia learning resources and a robotics simulation software package to allow for the programming, testing, and debugging of robot programs. Areas of study include motion programming, palletizing, conveyor systems, computer networking, automated sorting systems, vision and tactile sensors and computer integration. The learning package is divided into 13 modules, each consisting of about ten sections, or major topics. The robot simulation software used in the program is based on the Fanuc LR series robot, which is regarded as the industry standard for industrial robots throughout North America and the world. Learners gain practical, "hands on" programming of an industrial robot through a combination of teach-pendant programming, and 3D animations diplaying the robot arm movement. The interactive curriculum uses text, video, 2D and 3D animations, photos, audio clips and interactive robotics simulations. Principles of Electronics Textbook Written by Colin Simpson, award-winning author of five textbooks in the electronics field, the book Principles of Electronics is designed to accompany the Electronics Technician CD-ROM and offers a concise and practical overview of the basic principles, theorems, circuit behavior and problem-solving procedures of Electronic circuits and devices. The textbook reinforces concepts with practical "real-world" applications as well as mathematical solution, allowing readers to more easily relate the academic to the actual. Assuming that readers have a basic understanding of algebra and trigonometry, Simpson offers a concise and practical overview of the basic principles, theorems, circuit behavior and problem-solving procedures. The book contains relevant, up-to-date information, giving students the knowledge and problem-solving skills needed to successfully obtain employment in the electronics field. Programmable Logic Controllers Textbook This book provides a basic understanding of programmable logic controllers to people in all aspects of the industry. Covering the most popular PLC manufacturers, the book walks readers through a step-by-step introduction necessary to understanding ladder logic, peripheral devices, analog inputs and outputs, member systems and codes, and even programming languages. A useful guide for potential users of PLCs in any industry application. The first part of the book introduces the necessary theory behind the development of programmable logic controllers. The second half of the book provides numerous worked-out examples and practical applications. The latter part of the book includes in-depth treatment of higher level languages such as FBD, SFC, instruction list, and structured text. The last chapter provides a detailed overview of robotics and their application in PLC environments. Introduction to Robotics Textbook The textbook, Introduction to Robotics, provides comprehensive treatment of the concepts of industrial robots and explains how they can be used in a plant or manufacturing system. The primary focus of the book is on automated manufacturing processes as well as the role of robots and all support equipment. The book provides a unique, interdisciplinary treatment of robotics, and shows the contributions of the various fields of mechanical, electrical, and industrial engineering, and computer science, to robotics. It covers state-of-the-art topics such as artificial intelligence, CAD and graphic simulators, object-oriented software, communications systems, and micro- and nano-robots. Introduction to Robotics is intended for students who will install, design, repair, maintain and develop industrial robotic systems. The level of content is suitable for colleges, universities, and technical institutes. Students using this book should have an understanding of algebra up to quadratic equations and of trigonometry to the simple properties of triangles. Knowledge of programming languages is useful, but not essential. This well-illustrated volume, with its numerous worked-out examples and chapter-ending questions, is sure to become indispensable in bridging the gap between design, automation, and control. The book focuses on the most commonly used robots in industry, and on issues and criteria related with designing, building and operating flexible and agile robotic systems. LogixSim Simulation Suite LogixSim combines four simulators in one, and provides unlimited possibilities for the design, testing, and debugging of control devices and automated equipment as well as circuit schematics and systems. From the simplest control circuits to the most complex, LogixSim has the versatility to suit almost any requirement for real-world simulation. Some, like CircuitLogix, are 2D schematic circuits and diagrams while others such as 3DLab and RoboLogix have single 3D environments including a workbench with shelves, or a robot arm

and conveyor system. LogixSim is the only simulation product of its kind. Other simulators provide one, or possibly two types of simulation and all with a limited range of circuit configurations and control capability. Most commercial simulators are focused on electronics circuit simulation, which has been around for decades and while it is still useful, it is no longer the core requirement for knowledge of electronics and control systems. Engineers, technologists, technicians, electricians and maintenance mechanics are all required to have current, up-to-date knowledge in control systems applications. In addition to knowledge of electronics, those with education and experience in PLCs and robotics are in the greatest demand in the 21st century. LogixSim provides realistic simulation of equipment costing hundreds of thousands of dollars. In order to properly understand the operation of a PLC as complex and powerful as the RSLogix , it is necessary to spend considerable time programming, testing, and de-bugging ladder logic programs. PLC systems are inherently expensive, and down-time is often very costly. In addition, if a PLC is programmed incorrectly it can result in lost productivity and dangerous conditions. It is essential in the understanding and learning of PLCs and to keep this knowledge refreshed and up to date. By using PLCLogix, you are able to gain much-needed programming practice by creating and running your own ladder logic programs using tag-based memory. The application organization is based on using tasks, programs, and routine structures. In addition, it features sophisticated data handling and incorporates both arrays and user-defined structures to provide maximum flexibility and emulation of real world control applications. PLCLogix also includes a free-form ladder editor that allows you to modify multiple rungs of logic at the same time. The point-and-click graphical interface provides a simple, realistic, method of entering and editing ladder logic programs.

Chapter 2 : Electronics, Robotics, PLC Training Software & eLearning Courses

Logic design is the area of computer science that deals with the design of electronic circuits to carry out the operations of the control unit, the ALU, the I/O controllers, and more.

In , Claude Shannon showed that the two-valued Boolean algebra can describe the operation of switching circuits. In the early days, logic design involved manipulating the truth table representations as Karnaugh maps. The Karnaugh map-based minimization of logic is guided by a set of rules on how entries in the maps can be combined. A human designer can typically only work with Karnaugh maps containing up to four to six variables. The first step toward automation of logic minimization was the introduction of the Quineâ€"McCluskey algorithm that could be implemented on a computer. This exact minimization technique presented the notion of prime implicants and minimum cost covers that would become the cornerstone of two-level minimization. Nowadays, the much more efficient Espresso heuristic logic minimizer has become the standard tool for this operation. The applications for logic synthesis lay primarily in digital computer design. The evolution from discrete logic components to programmable logic arrays PLAs hastened the need for efficient two-level minimization, since minimizing terms in a two-level representation reduces the area in a PLA. However, two-level logic circuits are of limited importance in a very-large-scale integration VLSI design; most designs use multiple levels of logic. As a matter of fact, almost any circuit representation in RTL or Behavioural Description is a multi-level representation. It used local transformations to simplify logic. Within a decade, the technology migrated to commercial logic synthesis products offered by electronic design automation companies. Logic elements[edit] Logic design is a step in the standard design cycle in which the functional design of an electronic circuit is converted into the representation which captures logic operations , arithmetic operations , control flow , etc. A common output of this step is RTL description. Logic design is commonly followed by the circuit design step. In modern electronic design automation parts of the logical design may be automated using high-level synthesis tools based on the behavioral description of the circuit. Arithmetic operations are usually implemented with the use of logic operators. Circuits such as a binary multiplier or a binary adder are examples of more complex binary operations that can be implemented using basic logic operators. High-level synthesis or behavioral synthesis[edit] Main article: High-level synthesis With a goal of increasing designer productivity, research efforts on the synthesis of circuits specified at the behavioral level have led to the emergence of commercial solutions in , [3] which are used for complex ASIC and FPGA design. Multi-level logic minimization[edit] See also: Logic optimization and Circuit minimization Typical practical implementations of a logic function utilize a multi-level network of logic elements. Starting from an RTL description of a design, the synthesis tool constructs a corresponding multilevel Boolean network. Next, this network is optimized using several technology-independent techniques before technology-dependent optimizations are performed. The typical cost function during technology-independent optimizations is total literal count of the factored representation of the logic function which correlates quite well with circuit area. Finally, technology-dependent optimization transforms the technology-independent circuit into a network of gates in a given technology. The simple cost estimates are replaced by more concrete, implementation-driven estimates during and after technology mapping. Mapping is constrained by factors such as the available gates logic functions in the technology library, the drive sizes for each gate, and the delay, power , and area characteristics of each gate. Commercial tools for logic synthesis[edit] Software tools for logic synthesis targeting ASICs[edit].

Chapter 3 : Combinational Logic Circuit Design

In electronics, logic synthesis is a process by which an abstract specification of desired circuit behavior, typically at register transfer level (RTL), is turned into a design implementation in terms of logic gates, typically by a computer program called a synthesis tool.

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Chapter 4 : Course: Introduction to Logic Design

A.F. Kana Digital Logic Design. Page 1 Digital Logic Design Introduction A digital computer stores data in terms of digits (numbers) and proceeds in discrete steps from one state to the next.

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Boolean Expressions Addition represents OR Multiplication represents AND Not is represented by a prime a' or an overbar a Examples: s = a'bc + ab'c + abc' + a'b'c'.

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EENG/INFE Introduction to Logic Design. This is core course of Electrical and Elecronic Engineering and Information System Engineering that presents basic tools for the design of digital circuits.

Chapter 7 : Electronic Logic Design Index

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Chapter 8 : calendrierdelascience.com - Build and simulate logic circuits

DigitalSignals Use voltage thesholds to extract discrete values from a continuous signal. Simplest version: 1-bit signal Either high range (1) or low range (0).

Chapter 9 : About | Logic Design

Industry Defined. Digital logic design is the basis of electronic systems, such as computers and cell phones. Digital logic is rooted in binary code, which renders information through zeroes and ones, giving each number in the binary code an opposite value.