

3. Safety-Critical Software

Designing Principles

- Use hardware interlocks together with computer/software solutions
- New software features add complexity, try to keep software simple
- Plan for avoiding human error – unambiguous human-computer interface
- Remove unused code or modules

Practical Design Of Safetycritical Computer Systems

G Orfield



Practical Design Of Safetycritical Computer Systems:

Practical Design of Safety-critical Computer Systems William R. Dunn,2002 **Development of Safety-Critical Systems** Gopinath Karmakar,Amol Wakankar,Ashutosh Kabra,Paritosh Pandya,2023-10-09 This book provides professionals and students with practical guidance for the development of safety critical computer based systems It covers important aspects ranging from complying with standards and guidelines to the necessary software development process and tools and also techniques pertaining to model based application development platforms as well as qualified programmable controllers After a general introduction to the book s topic in chapter 1 chapter 2 discusses dependability aspects of safety systems and how architectural design at the system level helps deal with failures and yet achieves the targeted dependability attributes Chapter 3 presents the software development process which includes verification and validation at every stage essential to the development of software for systems performing safety functions It also explains how the process helps in developing a safety case that can be independently verified and validated The subsequent chapter 4 presents some important standards and guidelines which apply to different industries and in different countries Chapter 5 then discusses the steps towards complying with the standards at every phase of development It offers a guided tour traversing the path of software qualification by exploring the necessary steps towards achieving the goal with the help of case studies Chapter 6 highlights the application of formal methods for the development of safety systems software and introduces some available notations and tools which assist the process Finally chapter 7 presents a detailed discussion on the importance and the advantages of qualified platforms for safety systems application development including programmable controller PLC and formal model based development platforms Each chapter includes case studies illustrating the subject matter The book is aimed at both practitioners and students interested in the art and science of developing computer based systems for safety critical applications Both audiences will get insights into the tools and techniques along with the latest developments in the design analysis and qualification which are constrained by the regulatory and compliance requirements mandated by the applicable guides and standards It also addresses the needs of professionals and young graduates who specialize in the development of necessary tools and qualified platforms

Safety-critical Computer Systems Neil Storey,1996 Increasingly microcomputers are being used in applications where their correct operation is vital to ensure the safety of the public and the environment from anti lock braking systems in automobiles to fly by wire aircraft to shut down systems at nuclear power plants It is therefore vital that engineers be aware of the safety implications of the systems they develop This book is an introduction to the field of safety critical computer systems written for any engineer who uses microcomputers within real time embedded systems It assumes no prior knowledge of safety or of any specific computer hardware or programming language This text is intended for both engineering and computer science students and for practising engineers within computer related industries The approach taken is equally suited to engineers who consider computers from a hardware

software or systems viewpoint

Hazard Analysis Techniques for System Safety Clifton A. Ericson, II, 2015-06-15

Explains in detail how to perform the most commonly used hazard analysis techniques with numerous examples of practical applications Includes new chapters on Concepts of Hazard Recognition Environmental Hazard Analysis Process Hazard Analysis Test Hazard Analysis and Job Hazard Analysis Updated text covers introduction theory and detailed description of many different hazard analysis techniques and explains in detail how to perform them as well as when and why to use each technique Describes the components of a hazard and how to recognize them during an analysis Contains detailed examples that apply the methodology to everyday problems

Software and System Safety Terry L. Hardy, 2012 System safety is a widely accepted management and engineering approach to analyze and address risks in complex systems in order to prevent accidents Because software and computing systems are integral to most systems software safety has become a critical component of an overall system safety effort Software and System Safety discusses critical elements of the discipline of system safety and shows how software and computing systems fit in the system safety process Software specific aspects of the system safety process are addressed to show concerns common to complex systems The many accidents and incidents presented in this book illustrate important lessons learned and show how software related hazards can be misidentified software risks can be improperly assessed hazard controls may be misapplied and software and system testing may not effectively verify that the risk had been reduced The lessons learned come from a variety of industries and organizations and include the author's personal experience The real world lessons provided in this book can be used to improve existing software safety and system safety efforts and can help when planning new system safety programs

Encyclopedia of Software Engineering Three-Volume Set (Print) Phillip A. Laplante, 2010-11-22

Software engineering requires specialized knowledge of a broad spectrum of topics including the construction of software and the platforms applications and environments in which the software operates as well as an understanding of the people who build and use the software Offering an authoritative perspective the two volumes of the Encyclopedia of Software Engineering cover the entire multidisciplinary scope of this important field More than 200 expert contributors and reviewers from industry and academia across 21 countries provide easy to read entries that cover software requirements design construction testing maintenance configuration management quality control and software engineering management tools and methods Editor Phillip A Laplante uses the most universally recognized definition of the areas of relevance to software engineering the Software Engineering Body of Knowledge SWEBOK as a template for organizing the material Also available in an electronic format this encyclopedia supplies software engineering students IT professionals researchers managers and scholars with unrivaled coverage of the topics that encompass this ever changing field Also Available Online This Taylor E mail e reference

taylorandfrancis.com International Tel 44 0 20 7017 6062 E mail online sales tandf.co.uk

The Use of Computers in Safety-critical Applications Great Britain. Health and Safety Commission, 1998 This reports reviews the current and

potential uses of computer systems in safety critical applications considers the implications for the nuclear industry and considers developments in the design and safety assessment of such computer based systems including other aspects of control systems

Software Engineering Ian Sommerville,2004 This book discusses a comprehensive spectrum of software engineering techniques and shows how they can be applied in practical software projects This edition features updated chapters on critical systems project management and software requirements

Software Engineering: A Practitioner's Approach Roger S. Pressman,2010 For over 20 years this has been the best selling guide to software engineering for students and industry professionals alike This seventh edition features a new part four on web engineering which presents a complete engineering approach for the analysis design and testing of web applications

Object-oriented Techniques in the Design of Safety-critical Software Systems Satish Subramanian,1998 *Design and Safety Assessment of Critical Systems* Marco Bozzano,Adolfo Villafiorita,2010-11-12 Safety critical systems by definition those systems whose failure can cause catastrophic results for people the environment and the economy are becoming increasingly complex both in their functionality and their interactions with the environment Unfortunately safety assessments are still largely done manually a time consuming and error prone

Safety Critical Systems: a Practical Guide Papini,2026-04-08 *Safety-Critical Systems: The Convergence of High Tech and Human Factors* Felix Redmill, Tom Anderson,1996-01-31 Leeds 6 8 February 1996

Human Factors in Safety-critical Systems Felix Redmill,Jane Rajan,1997 Safety critical systems are found in almost every sector of industry An understanding of the basis for the functioning of these systems is therefore vital to all involved in their operation This book provides an overview of the whole subject

International Journal of Computer Systems Science & Engineering ,2002

The Directory of Graduate Studies ,1999

Proceedings, the Sixteenth International Computer Software & Applications Conference ,1991

Safety of Computer Control Systems 1988 (Safecomp '88) W. D. Ehrenberger,1988 This volume provides a comprehensive overview of the many aspects and developments of safety related applications of industrial computer systems The book contains 21 papers covering such topics as the specification and design of safety systems their testing and licensing safety related documentation and management techniques and their uses and limitations in industry with examples in such diverse areas as nuclear power plants the chemical industry and applications in traffic control

Computer Assurance ,1988

The Students' Guide to Graduate Studies in the UK ,1993

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