Reverse Engineering Processes

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Implementing Reverse Engineering Springer Science & Business Media
This book contains the refereed proceedings of the 12th International Conference on Business Process Modeling, Development and Support (BPMDS 2011) and the 16th International Conference on Exploring Modeling Methods for Systems Analysis and Design (EMMSAD 2011), held together with the 23rd International Conference on Advanced Information Systems Engineering (CAiSE 2011) in London, UK, in June 2011. The 22 papers accepted for BPMDS were selected from 61 submissions and cover a wide spectrum of issues related to business processes development, modeling, and support. They are grouped into sections on BPMDS in practice, business process improvement, business process flexibility, declarative process models, variety of modeling paradigms, business process modeling and support systems development, and interoperability and mobility. The 16 papers accepted for EMMSAD were chosen from 31 submissions and focus on exploring, evaluating, and enhancing current information modeling methods and methodologies. They are grouped in sections on workflow and process modeling extensions, requirements analysis and information systems development, requirements evolution and information systems evolution, data modeling languages and business rules, conceptual modeling practice, and enterprise architecture.

Enterprise, Business-Process and Information Systems Modeling CRC Press
A comprehensive look at reverse engineering as a legitimate learning, design, and troubleshooting tool This unique book examines the often underappreciated and occasionally maligned technique of reverse engineering. More than a shortcut for the lazy or unimaginative to reproduce an artless copy of an existing creation, reverse engineering is an essential brick – if not a keystone – in the pathway to a society's technological advancement. Written by an engineer who began teaching after years in industry, Reverse Engineering reviews this meticulous analytical process with a breadth and depth as never before. Find out how to: Learn by "mechanical dissection" Deduce the role, purpose, and functionality of a designed entity Identify materials-of-construction and methods-of-manufacture by observation alone Assess the suitability of a design to purpose from form and fit The rich heritage of engineering breakthroughs enabled by reverse engineering is also discussed. This is not a dry textbook. It is the engaging and enlightening account of the journey of engineering from the astounding creations of ancient cultures to what, with the aid of reverse engineering, promises to be an even more astounding future! Coverage includes: Methods of product teardown Failure analysis and forensic engineering Deducing or inferring role, purpose, and functionality during reverse engineering The Antikythera mechanism Identifying materials-of-construction Inferring methods-of-manufacture or -construction Construction of Khufu's pyramid Assessing design suitability Value and production engineering Reverse engineering of materials and substances Reverse engineering of broken, worn, or obsolete parts for remanufacture The law and the ethics of reverse engineering

Model Driven Architecture for Reverse Engineering Technologies: Strategic Directions and System Evolution Springer Science & Business Media
Reverse engineering encompasses a wide spectrum of activities aimed at extracting information on the function, structure, and behavior of man-made or natural artifacts. Increases in data sources, processing power, and improved data mining and processing algorithms have opened new fields of application for reverse engineering. In this book, we present twelve applications of reverse engineering in the software engineering, shape engineering, and medical and life sciences application domains. The book can serve as a guideline to practitioners in the above fields to the state-of-the-art in reverse engineering techniques, tools, and use-cases, as well as an overview of open challenges for reverse engineering researchers.

Ghidra Software Reverse Engineering for Beginners "O'Reilly Media, Inc."
This edited collection of essays from world-leading academic and industrial authors yields insight into all aspects of reverse engineering. Methods of reverse engineering analysis are covered, along with special emphasis on the investigation of surface and internal structures. Frequently-used hardware and software are assessed and advice given on the most suitable choice of system. Also covered is rapid prototyping and its relationship with successful reverse engineering.

Reversing Springer Science & Business Media
"This thesis presents a literature review of current reverse engineering technologies and processes, with an emphasis on tools commonly used in Software Reverse Engineering (SRE). Using the foundation of the literature review, the thesis will then propose a standard process, referred to as 'A Reverse Engineering Process for Mechanical Engineering Systems (REPMES).' The REPMES tool

is intended to enable engineers to understand how current products work. Additionally, REPMES may allow engineering design teams to more effectively revise their product designs through competitive benchmarking. The REPMES is illustrated through application to case studies of a consumer flashlight and an automotive torque converter. Unlike the field of Software Reverse Engineering (SRE), there is not currently a published standardized procedure to successfully implement reverse engineering of mechanical engineering systems. The REPMES process introduced here differs from SRE in that the target for SRE is to understand the inner workings of a computer program or system. However, REPMES has to account for the materials used, the limitations of the same materials, the physical conditions under which the system must operate, the mean time between failure, manufacturing processes and tolerances, and a variety of other factors not typically encountered in software systems. Following the introduction and illustration of REPMES using the flashlight case study, the REPMES tool will be applied to the analysis of a traditional mechanical device, a torque converter, to evaluate the robustness of the REPMES in the context of a typical application. Use of the REPMES will be demonstrated to provide a thorough understanding of torque converter operation, design, and manufacturing. The REPMES structure will be employed to provide a list of recommended improvements to the baseline torque converter, following benchmarking against competitive technologies"--Abstract.

Security Warrior CRC Press

"This book proposes an integration of classical compiler techniques, metamodeling techniques and algebraic specification techniques to make a significant impact on the automation of MDA-based reverse engineering processes"--Provided by publisher.

The Art of Reverse Engineering John Wiley & Sons

When it comes to network security, many users and administrators are running scared, and justifiably so. The sophistication of attacks against computer systems increases with each new Internet worm.What's the worst an attacker can do to you? You'd better find out, right? That's what Security Warrior teaches you. Based on the principle that the only way to defend yourself is to understand your attacker in depth, Security Warrior reveals how your systems can be attacked. Covering everything from reverse engineering to SQL attacks, and including topics like social engineering, antiforensics, and common attacks against UNIX and Windows systems, this book teaches you to know your enemy and how to be prepared to do battle.Security Warrior places particular emphasis on reverse engineering. RE is a fundamental skill for the administrator, who must be aware of all kinds of malware that can be installed on his machines -- trojaned binaries, "spyware" that looks innocuous but that sends private data back to its creator, and more. This is the only book to discuss reverse engineering for Linux or Windows CE. It's also the only book that shows you how SQL injection works, enabling you to inspect your database and web applications for vulnerability.Security Warrior is the most comprehensive and up-to-date book covering the art of computer war: attacks against computer systems and their defenses. It's often scary, and never comforting. If you're on the front lines, defending your site against attackers, you need this book. On your shelf--and in your hands.

Reverse Engineering BPB Publications

Beginning with a basic primer on reverse engineering-including computer internals, operating systems, and assembly language-and then discussing the various applications of reverse engineering, this book provides readers with practical, in-depth techniques for software reverse engineering. The book is broken into two parts, the first deals with security-related reverse engineering and the second explores the more practical aspects of reverse engineering. In addition, the author explains how to reverse engineer a third-party software library to improve interfacing and how to reverse engineer a competitor's software to build a better product. * The first popular book to show how software reverse engineering can help defend against security threats, speed up development, and unlock the secrets of competitive products * Helps developers plug security holes by demonstrating how hackers exploit reverse engineering techniques to crack copy-protection schemes and identify software targets for viruses and other malware * Offers a primer on advanced reverse-engineering, delving into "disassembly"-code-level reverse engineering-and explaining how to decipher assembly language

Process Control Systems Security Analysis Utilizing Reverse Engineering Springer Science & Business Media

Looking at modern industrial products, one can recognize a variety of different complex shapes. All these products are not only designed, they are styled. Everybody knows about the importance of styling, if the product is a car, but today even "simple" consumer appliances do not only have to fulfil their function, they must also look nice. In addition, even purely technical products like turbines or valves are designed with very complex shapes to make them work more efficiently. Thus, optimising the shape of products is one of the key factors in the process chain of development. Today, there are various CAx-systems, which have evolved to be the basic tools for design, calculation, simulation and manufacturing in almost all kinds of industrial environments, but the improvement of the product's shape is -in most cases -done manu ally on the physical model. This break in the CAD information flow can be overcome with REVERSE ENGINEERING techniques reconstructing the shape-describing CAD surfaces (Bezier-, NURBS-surfaces or others) from the modified physical model. nd Therefore the 2 Workshop on current CAx-problems was dedicated to REVERSE ENGINEERING. During the workshop were presented • the newest research results of surface reconstruction for a given set of points • the methods and tools for problems.in Reverse Engineering of some of the most important CAD vendors (Holometric Technology, IBM/Dassault, ICEM, Imageware, Matra Data vision, Tebis). Additionally, structural aspects in Reverse Engineering, possible future developments and new research directions were discussed.

Rapid Prototyping, Rapid Tooling and Reverse Engineering Springer Nature

The collection of papers in this book comprises the proceedings of the 23rd CIRP Design Conference held between March 11th and March 13th 2013 at the Ruhr-Universit ä t Bochum in Germany. The event was organized in cooperation with the German Academic Society for Product Development – WiGeP. The focus of the conference was on ≫Smart Product Engineering≪, covering two major aspects of modern product creation: the development of intelligent (“ smart ”) products as well as the new (“ smart ”) approach of

engineering, explicitly taking into account consistent systems integration. Throughout the 97 papers contained in these proceedings, a range of topics are covered, amongst them the different facets and aspects of what makes a product or an engineering solution “ smart ” . In addition, the conference papers investigate new ways of engineering for production planning and collaboration towards Smart Product Engineering. The publications provide a solid insight into the pressing issues of modern digital product creation facing increasing challenges in a rapidly changing industrial environment. They also give implicit advice how a “ smart ” product or engineering solution (processes, methods and tools) needs to be designed and implemented in order to become successful.

Process Improvement Through Reverse Engineering Reverse Engineering

Reverse engineering has the potential to be a strategic advantage for many engineering companies. As companies continuously look for new ways to improve their business and technical expertise, reverse engineering facilitates detailed knowledge capture for many possible applications. These applications open new channels of revenue, create more options in the market, and drive value to customers. Although reverse engineering is nothing new to industry and has been actively researched, this thesis seeks to understand the key enablers that promote successful reverse engineering at scale in a modern corporation. Given that many large firms are set up with the forward engineering process in mind, what are the differentiated characteristics of an effective reverse engineering organization? By treating reverse engineering as a system of interconnected dependent events, an organization can be shaped to build a workflow with the necessary linkages for successful execution and scaling. This "pull" more than "push" process that establishes clear communication between functions is key to preventing rework, shortening flow time, and increasing quality. Reverse engineering, like traditional forward engineering, must be organized as an integrated multifunctional process with organized information sharing, compromise, and iteration. Additionally, the teardown process itself is a central piece of the puzzle for successful reverse engineering. This is due to the multiple strategic linkages associated and interconnectedness required by key stakeholders for understanding the investigated component. A teardown is defined as an observant disassembly of a component for information gain. This thesis focuses more deeply into the teardown process. By showcasing challenges that lead to common errors, teardown process recommendations are made for a more efficient way to reverse engineer. A lack of early stakeholder engagement prior to teardown frequently leads to inefficient knowledge sharing. More active stakeholder participation is recommended to improve the overall quality of teardown reports and serve as an additional opportunity to discover a component ’ s hidden complexities. It is also recommended that formal design tools, such as functional analysis, be utilized for truly understanding a component ’ s physical behavior. Implementing these recommendations and tools will increase the efficiency and output quality of reverse engineering teams, reducing rework.

Smart Product Engineering IGI Global

The process of reverse engineering has proven infinitely useful for analyzing Original Equipment Manufacturer (OEM) components to duplicate or repair them, or simply improve on their design. A guidebook to the rapid-fire changes in this area, Reverse Engineering: Technology of Reinvention introduces the fundamental principles, advanced methodologies, and other essential aspects of reverse engineering. The book ’ s primary objective is twofold: to advance the technology of reinvention through reverse engineering and to improve the competitiveness of commercial parts in the aftermarket. Assembling and synergizing material from several different fields, this book prepares readers with the skills, knowledge, and abilities required to successfully apply reverse engineering in diverse fields ranging from aerospace, automotive, and medical device industries to academic research, accident investigation, and legal and forensic analyses. With this mission of preparation in mind, the author offers real-world examples to: Enrich readers ’ understanding of reverse engineering processes, empowering them with alternative options regarding part production Explain the latest technologies, practices, specifications, and regulations in reverse engineering Enable readers to judge if a "duplicated or repaired" part will meet the design functionality of the OEM part This book sets itself apart by covering seven key subjects: geometric measurement, part evaluation, materials identification, manufacturing process verification, data analysis, system compatibility, and intelligent property protection. Helpful in making new, compatible products that are cheaper than others on the market, the author provides the tools to uncover or clarify features of commercial products that were either previously unknown, misunderstood, or not used in the most effective way.

Mobile App Reverse Engineering John Wiley & Sons

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Innovations and Advances in Computer Sciences and Engineering BoD – Books on Demand

Reverse Engineering is a term that comes originally from the field of mechanical engineering. Reverse Engineering indicates the process of analysing an existing object or system by laying out its construction plan to then rebuild it in every detail. This manner of reconstruction allows for modifications and adjustments to new demands and requirements, it signifies creative appropriation, democratisation of knowledge, further development. The contributions in this volume take Reverse Engineering to another level, applying it to the fields of arts, sciences and politics in an attempt to reveal the procedures of culture and technology at work, and the importance of access, knowledge and skills in reshaping our present times and future.

Reverse Engineering Process, Design Recovery and Structure Charts McGraw Hill Professional

Reverse Engineering brings together in one place important contributions and up-to-date research results in this important area. Reverse Engineering serves as an excellent reference, providing insight into some of the most important issues in the field.

Reverse Engineering of Rubber Products John Wiley & Sons

"This paper investigates the processes and tools necessary to reverse engineer proprietary file formats. As a proof of concept, common control software, known as Supervisory, Control, and Data Acquisition, or SCADA, will be investigated. This software, which controls and monitors nation-wide Critical Infrastructure, is among the most important software to protect. Unfortunately, as we will discover, control software is quite vulnerable to attack. Particular attention is paid to the security configuration and alarm mechanisms. In this paper, several new vulnerabilities are identified and explored in both the security configuration and alarm system of one particular system, known as Wonderware. Finally, methodologies utilizing digital forensics will be discussed in order to protect against the identified vulnerabilities"--Abstract, leaf iii.

Performance Characterization and Improvement in a 3-D Reverse Engineering Process Packt Publishing Ltd

A guide to using the Ghidra software reverse engineering tool suite. The result of more than a

decade of research and development within the NSA, the Ghidra platform was developed to address some of the agency's most challenging reverse-engineering problems. With the open-source release of this formerly restricted tool suite, one of the world's most capable disassemblers and intuitive decompilers is now in the hands of cybersecurity defenders everywhere -- and The Ghidra Book is the one and only guide you need to master it. In addition to discussing RE techniques useful in analyzing software and malware of all kinds, the book thoroughly introduces Ghidra's components, features, and unique capacity for group collaboration. You'll learn how to: • Navigate a disassembly • Use Ghidra's built-in decompiler to expedite analysis • Analyze obfuscated binaries • Extend Ghidra to recognize new data types • Build new Ghidra analyzers and loaders • Add support for new processors and instruction sets • Script Ghidra tasks to automate workflows • Set up and use a collaborative reverse engineering environment Designed for beginner and advanced users alike, The Ghidra Book will effectively prepare you to meet the needs and challenges of RE, so you can analyze files like a pro.

Process Enablers for Successful Reverse Engineering Inside Large Organizations Open Dissertation Press

Reverse EngineeringSpringer Science & Business Media

Reverse Engineering 清华大学出版社有限公司

Detect potentials bugs in your code or program and develop your own tools using the Ghidra reverse engineering framework developed by the NSA project Key FeaturesMake the most of Ghidra on different platforms such as Linux, Windows, and macOSLeverage a variety of plug-ins and extensions to perform disassembly, assembly, decompilation, and scriptingDiscover how you can meet your cybersecurity needs by creating custom patches and toolsBook Description Ghidra, an open source software reverse engineering (SRE) framework created by the NSA research directorate, enables users to analyze compiled code on any platform, whether Linux, Windows, or macOS. This book is a starting point for developers interested in leveraging Ghidra to create patches and extend tool capabilities to meet their cybersecurity needs. You'll begin by installing Ghidra and exploring its features, and gradually learn how to automate reverse engineering tasks using Ghidra plug-ins. You'll then see how to set up an environment to perform malware analysis using Ghidra and how to use it in the headless mode. As you progress, you'll use Ghidra scripting to automate the task of identifying vulnerabilities in executable binaries. The book also covers advanced topics such as developing Ghidra plug-ins, developing your own GUI, incorporating new process architectures if needed, and contributing to the Ghidra project. By the end of this Ghidra book, you'll have developed the skills you need to harness the power of Ghidra for analyzing and avoiding potential vulnerabilities in code and networks. What you will learnGet to grips with using Ghidra's features, plug-ins, and extensionsUnderstand how you can contribute to GhidraFocus on reverse engineering malware and perform binary auditingAutomate reverse engineering tasks with Ghidra plug-insBecome well-versed with developing your own Ghidra extensions, scripts, and featuresAutomate the task of looking for vulnerabilities in executable binaries using Ghidra scriptingFind out how to use Ghidra in the headless modeWho this book is for This SRE book is for developers, software engineers, or any IT professional with some understanding of cybersecurity essentials. Prior knowledge of Java or Python, along with experience in programming or developing applications, is required before getting started with this book.

Reverse Engineering: Mechanisms, Structures, Systems & Materials Packt Publishing Ltd

Reverse engineering is the process of analyzing hardware or software and understanding it, without having access to the source code or design documents. Hackers are able to reverse engineer systems and exploit what they find with scary results. Now the good guys can use the same tools to thwart these threats. Practical Reverse Engineering goes under the hood of reverse engineering for security analysts, security engineers, and system programmers, so they can learn how to use these same processes to stop hackers in their tracks. The book covers x86, x64, and ARM (the first book to cover all three); Windows kernel-mode code rootkits and drivers; virtual machine protection techniques; and much more. Best of all, it offers a systematic approach to the material, with plenty of hands-on exercises and real-world examples.