Linkers and Loaders (The Morgan Kaufmann Series in Software Engineering and Programming)

By John R. Levine

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Whatever your programming language, whatever your platform, you probably tap into linker and loader functions all the time. But do you know how to use them to their greatest possible advantage? Only now, with the publication of **Linkers & Loaders**, is there an authoritative book devoted entirely to these deep-seated compile-time and run-time processes.
The book begins with a detailed and comparative account of linking and loading that illustrates the differences among various compilers and operating systems. On top of this foundation, the author presents clear practical advice to help you create faster, cleaner code. You'll learn to avoid the pitfalls associated with Windows DLLs, take advantage of the space-saving, performance-improving techniques supported by many modern linkers, make the best use of the UNIX ELF library scheme, and much more. If you're serious about programming, you'll devour this unique guide to one of the field's least understood topics. **Linkers & Loaders** is also an ideal supplementary text for compiler and operating systems courses.

*Includes a linker construction project written in Perl, with project files available for download. *Covers dynamic linking in Windows, UNIX, Linux, BeOS, and other operating systems.
*Explains the Java linking model and how it figures in network applets and extensible Java code.
*Helps you write more elegant and effective code, and build applications that compile, load, and run more efficiently.

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Editorial Review

Amazon.com Review
Written for any programmer who works with compiled code, *Linkers and Loaders* surveys today's hardware platforms with a tour of how code is linked and executed on IBM mainframes, Unix, and Windows. This handy title fills a valuable niche for anyone who wants to understand how programs are built and run on today's computing systems.

It's the cross-platform perspective that distinguishes this book. The author's wide-ranging perspective on IBM 370 mainframes, RISC platforms like the SUN SPARC and, of course, Microsoft Windows makes this book a commendable reference on the internals of linkers and program execution in each environment. There's also a digestible guide to the computer architecture (including registers, instruction formats, and memory addressing) for each platform. (Unix programmers will be pleased that the book has more information on non-Windows platforms than on Windows itself.) For C++ programmers, this text gives you a glimpse into the internals of such language features as macros, templates, and name mangling, and how linkers deal with them at build time.

The book closes with useful material on static libraries and dynamic linking, plus a short tour of Java and its class loader (which can resolve classes on the fly as they are downloaded over the Internet). Short exercises are provided for each chapter, making this a useful resource for both classroom and self-study on what is an often overlooked topic. *--Richard Dragan*

Topics covered: History of linkers and loaders, application binary interfaces (ABIs), computer architecture basics, big- and little-endian memory addresses, register and instruction formats for IBM 370, SPARC and Intel x86, paging and virtual memory, position independent code (PIC), Intel x86 segmentation, embedded architectures, object files for DOS COM and EXE files, Unix a.out, Unix ELF, IBM 360 object format, Microsoft Portable Executable (PE) format, Intel Object Module Format (OMF), storage allocation, linking details for C++, symbol management, name mangling, weak and strong references, debugging information, library formats, COFF and ELF formats, relocation, loading and overlays, bootstrap loading, shared libraries, dynamic linking for Unix ELF and Microsoft Windows DLLs, advanced linking techniques for C++, and linking in Java.

Review
"I enjoyed reading this useful overview of the techniques and challenges of implementing linkers and loaders. While most of the examples are focused on three computer architectures that are widely used today, there are also many side comments about interesting and quirky computer architectures of the past. I can tell from these war stories that the author really has been there himself and survived to tell the tale."?Guy Steele

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Features:
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From reader reviews:

Amanda Moberly:

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