No Code Required
No Code Required
Giving Users Tools to Transform the Web

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Material in the work originally appeared in:

For Chapter 3, *Proceedings of the 18th Annual ACM Symposium on User Interface Software and Technology* (© ACM 2005),


For Chapter 5, *Proceedings of the 17th Annual ACM Symposium on User Interface Software and Technology* (© ACM 2004),

For Chapter 8, “Clip, connect, clone: combining application elements to build custom interfaces for information access,” by: Jun Fujima, Aran Lunzer, Kasper Hornbæk, Yuzuru Tanaka. (© ACM 2004) and *Proceedings of the 17th Annual ACM Symposium on User Interface Software and Technology* (© UIST 2004),

For Chapter 10, “Programming by a sample: leveraging Web sites to program their underlying services,” by: Björn Hartmann, Leslie Wu, Kevin Collins, Scott R. Klemmer. (© ACM 2007) and *Proceedings of the 20th Annual ACM Symposium on User Interface Software and Technology* (© UIST 2007),


For Chapter 13, “Zoetrope: interacting with the ephemeral Web,” in *Proceedings of the 21st Annual ACM Symposium on User Interface Software and Technology* (© ACM 2008),


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For video demonstrations, please visit this book’s companion Web site at www.mkp.com /nocoderequired.
Foreword

There is no question that the Web has become an integral part of modern life for people around the world, connecting us to each other and to seemingly infinite portals of information in real time.

In the era of Web 2.0, barriers to participation have been lowered further and further, and we’ve seen the birth of myriad new people to connect, learn, share, and collaborate. From blogs to social networks, people are enjoying an increasingly rich online life.

And while the Web has dramatically enriched our lives, we have only just scratched the surface of its potential. Through the rapid expansion and enhancement of the information to which we have access, we’ve also lost a great deal of freedom and flexibility over it; although most people may not have noticed this yet, as “newer” is often perceived as “better.”

Many of the basic abilities we have when consuming and sharing information in the physical world have yet to make the jump to the digital realm. Most Web sites do not yet provide us the ability to integrate our own personal context into the presentation of information and the tools uniquely available to each of us. For instance, before the Web, planning a holiday trip often involved clipping articles and pictures from magazines, collecting brochures, taking tips and hints from friends, writing down details from travel agents, highlighting ratings and reviews of restaurants and hotels from travel books that we’ve bought or borrowed, noting suggestions on the best seats on an airplane from coworkers, and assembling all this information in one place, often the kitchen table, to finalize travel plans and itinerary.

It was a social experience with a great deal of interaction and discussion, integrated your own personal context (e.g., magazine subscriptions you had, books you owned, previous travel experiences, etc.), and was not overly constrained by the media or medium, from any one source (e.g., there were no technical or legal barriers to “mashing up” pictures of hotels with ratings from your guide books), as one could easily pull from all sources at once.

This experience – the ease of cutting and arranging articles and integrating context and tools from disparate sources – is not yet readily possible for people on the Web today. Users can only access the bits and pieces of information per Web page that have been explicitly included by the owner of that page; and while users can open multiple windows at once and switch between them, it becomes confusing, vexing, and often contradictory. Users have become frustrated by these limitations.

There’s increasing demand for flexibility and better tools that put the user in control of their online experience – providing the ability to create, combine, compare, customize, manage, share, and track information to fit their own unique individual needs and interests.

Just in time, exciting tools are coming out of academic and corporate research and development labs that have the potential to give users unprecedented control over information and experiences on the Web. The hope is that users can become much more than simply passive consumers of the content provided to them. They can be tinkerers, hackers (in the good sense), and remixers who build, use, and share tools to suit their needs, including making that kitchen table into an interactive suite of information.

These tools are aiding in the evolution of the Web from isolated silos of information and functionality to a platform that provides intuitive and accessible tools and capabilities that allow for the kind of individual control and access to personal context that we’ve come to appreciate in the physical world.
No Code Required presents these next set of tools that are allowing users, as information omnivores, to participate in the building and remixing of their Web. You’ll find the latest thinking, research, and efforts underway empower the masses to take the Web into their own hands and to provide people everywhere the tools and capabilities to and make it not only say but also do what they want. Leaders in their respective fields, the experts in this book provide us with the tools and the know-how to change the end user from consumer to developer, organizer, editor, or even travel agent.

As researchers and developers, we can all play a role in shaping our collective future. The sky is the limit. This book will help take us there.

Chris Beard
Chief Innovation Officer, Mozilla
Preface

The last few years have seen a dramatic upsurge in research in end user programming. Much of this renewed interest is due to the popularity of the Web. The Web browser is rapidly replacing the personal computer’s desktop as the platform for many computer activities, and users can now find information, make purchases, and communicate with each other through a Web browser.

As Chapter 1 explains, the Web browser has turned out to be an ideal platform for end user programming. Researchers and students at a variety of institutions have been exploring how Web browsers can be changed or augmented to better support everyday users’ tasks. Some of these systems have even been released for public use. Unfortunately, there was no common community linking researchers in this area together. As a result, there was relatively little collaboration between different groups and papers describing work in this area were published in a variety of different academic venues. Not only was this hurting the productivity of the field, but it was preventing the potential beneficiaries, such as Web users and developers, from accessing these technologies. As researchers working this area ourselves, the four of us felt that it was time to foster a community for researchers in end user programming on the Web.

“End-User Programming on the Web” workshop at ACM SIGCHI

We began by organizing a workshop at the SIGCHI conference (ACM Conference on Human Factors in Computing Systems) in April 2009. The goals of this workshop were three-fold: (1) to bring together researchers from a variety of institutions and establish a sense of community, (2) to discuss common problems and share lessons from our work, and (3) to plan the publication of an edited book on this topic. The goal of the book was to make it easy for researchers to read about the latest approaches and innovations in the field and to make this interesting topic more readily available to a larger audience.

The one-day workshop was attended by 32 participants representing 20 different institutions across three continents (Asia, Europe, and North America). Participants were selected based on short position papers that were submitted in advance of the workshop. We personally invited a number of people to submit position papers on the basis of their previously published work, and we also conducted an open call for position papers from the research community at large. The authors of all submissions related to end user programming on the Web were invited to attend the workshop, with the condition that attendees were also required to prepare a book chapter by our prespecified deadlines.

We began the workshop with each participant giving a one-minute talk about their work in the space of end user programming on the Web. We then asked five attendees to give longer presentations covering some of the key projects and areas of interest to our research community. The remainder of the workshop was spent alternating between break-out groups and full-group discussion in areas of interest to our research community and specific topics regarding the book. Several of these breakout sessions were instrumental in helping us establish a coherent organization for the book.

Overview of the book

This book brings together the state of the art in interface and language design, system architectures, research methodologies, and evaluation strategies for end user programming on the Web. The book
compiles seventeen systems (Chapters 3–19) and offers a concise system summary at the end of each
system chapter that lists such characteristics as intended users, domain, and scripting ability, and
enables direct comparison between all of the systems. Video demonstrations of the systems are avail-
able on the Morgan Kaufmann Web site at www.mkp.com/nocoderequired.

*No Code Required* may be seen as a companion publication to three previous edited volumes:

   MIT Press.
   Kaufmann.

**Introduction (Chapters 1–2)**

Chapters 1 and 2 look back at the field of end user programming since its beginnings in the 1980s
and discuss the resurgence of this research area in the Web domain. They point to the extensibility
of the Web browser and the open nature of HTML as differentiating factors that have enabled end
user customization and automation across many different tasks and applications on the Web.

**Customizing and automating (Chapters 3–7)**

The second section of the book focuses on approaches for enabling automation and customization of
the Web. We survey five systems – Chickenfoot (Chapter 3), Creo (Chapter 4), CoScripter (Chapter
5), Highlight (Chapter 6), and Atomate (Chapter 7) – that leverage a variety of techniques, including
inventing a new human readable scripting language, allowing programming by example, and lever-
aging a large knowledge base of semantic information.

**Mashups (Chapters 8–11)**

This section includes four systems – C3W (Chapter 8), Mash Maker (Chapter 9), d.mix (Chapter 10),
and ITL (Chapter 11) – that mix information from multiple Web sites and applications to create
mashups. Their approaches vary from proposing a specialized platform to building on top of the
Web browser and mapping the interface to existing Web services.

**Visualization and exploration (Chapters 12–14)**

In contrast to the systems described earlier in the book, the three systems in this section – Web Summaries
(Chapter 12), Zoetrope (Chapter 13), and RecipeSheet (Chapter 14) – focus on providing end user
customization tools for visualizing and exploring the large amounts of data that live on the Web.

**Natural language (Chapters 15–17)**

Any type of Web customization is possible through code, but writing code – at least as it exists today
– is not the right interface for most Web customization tasks. The three systems in this section – Inky
(Chapter 15), PLOW (Chapter 16), and MOOIDE (Chapter 17) – propose new approaches to
programming that are inspired by or incorporate natural language.

**Accessibility (Chapters 18–19)**

A large portion of Web content does not conform to accessibility standards, making it difficult
for visually impaired users to use the Web. The systems in this section – Social Accessibility
(Chapter 18) and TrailBlazer (Chapter 19) – leverage third-party tagging and demonstrations to improve Web accessibility.

**User studies (Chapters 20–23)**

We conclude the book with four ethnographic user studies that provide a deep understanding for the target end users and their needs for Web use, code reuse, and debugging.
About the Editors

Allen Cypher, PhD, Research Staff Member, User Experience Research, IBM Almaden Research Center. Allen Cypher has been creating tools to bring the power of programming to nonprogrammers for 20 years. His Eager system from 1988 observed users’ actions and automatically wrote programs to automate repetitive activities. Eager was one of the first intelligent agents. In 1993, he edited Watch What I Do: Programming by Demonstration. In the 1990s, he co-developed a visual programming language called Stagecast Creator that enabled children to create their own games and simulations and publish them on the Web. His current work with CoScripter is aimed at bringing end user programming to the Web. Dr. Cypher received an A.B. in Mathematics from Princeton University in 1975, a PhD in Computer Science from Yale University in 1980, and spent 4 years as a post-doctoral student in the Psychology department at the University of California, San Diego. He was in the Advanced Technology Group at Apple Computer for 9 years, and has been at the IBM Almaden Research Center for the past 7 years.

Mira Dontcheva, PhD, Research Scientist, Adobe Systems. Mira Dontcheva is a research scientist at Adobe Systems. Her research focuses on new interfaces and tools that help people make use of the vast amount of information found on the Web in the context of their daily activities. Before joining Adobe in 2008, Mira completed her PhD in Computer Science at the University of Washington with David Salesin, Michael Cohen, and Steven Drucker. Her thesis focused on novel interaction techniques for managing and repurposing Web content. Mira was an undergraduate at the University of Michigan in Ann Arbor and completed her B.S.E. in Computer Engineering in 2000.

Tessa Lau, PhD, Research Staff Member, IBM Almaden Research Center. Tessa has been doing research on end user programming since 1997, resulting in more than a dozen technical papers on the various aspects of EUP. Tessa’s research goal is to develop innovative interfaces for enhancing human productivity and creativity through the use of techniques drawn from artificial intelligence. Her research interests include intelligent user interfaces, machine learning, artificial intelligence, human-computer interaction, programming by demonstration, and email classification. She also contributed a chapter about her SMARTedit system to the second EUP book, Your Wish Is My Command. PhD, University of Washington’s Department of CS&E.

Jeffrey Nichols, PhD, Research Staff Member, IBM Almaden Research Center. Jeffrey currently leads the Highlight project, which is building technology that allows users to easily create their own mobile versions of existing Web sites. His research interests are in the field of human-computer interaction, with a specific focus on automated design, mobile computing, end user programming, and ubiquitous computing. He received his PhD in December 2006 from the Human-Computer Interaction Institute in Carnegie Mellon University’s School of Computer Science. His thesis described the first system to automatically generate interfaces that are consistent with a user’s previous experience and provided the first evidence from user studies that automatically generated interfaces can be more usable than human-designed interfaces in certain situations. He received a B.S. degree in computer engineering from the University of Washington in 2000.
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