

The Elements of User Interface Design

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Preface

For confused and frustrated computer users, especially Max Garrett, my father-in-law. To the continued remembrance of my parents, Dorothy and Siegfried. And to my wife, Edie, for always being there for me.

Computers and User Interfaces

- "Do your programs work together intuitively as if they were all one program?"
 - Can you simply drag text, data and graphics from one program and drop them into another?
 - Is your software intelligent? For instance, can it handle everyday tasks automatically?
 - Are your programs recognized as the best in their category?
 - Do your menus, toolbars and other elements look alike and work in the same easy way?
 - Do your programs have no-charge product support? For how long?
 - Ultimately, is it worth getting software that doesn't do all these things?"
- Software advertisement (1995)

Today's computers utilize a new breed of software that revolutionizes the way people work. The popular belief is that these new systems make people's lives easier and their computing experiences "friendlier." Do they really? If all software products were as well designed as they are advertised to be, all computer users would be very happy in their work and play. Unfortunately, computer software is not as intuitive, easy to learn, easy to use, and as fun as it could be and should be.

Why is software look and feel so important? What makes a product easy to install, easy to learn, or easy to use? What do tests tell us about the usability of software products? How can you tell what software users want or even need? How about your customers? What types of software and user interfaces do they need? Where are computer user interfaces headed in the future? These are all difficult questions, but one thing is certain—the user interface must be a key element in your software solutions.

Who is this Book for?

"Here are some 'typical' attitudes about user interface design from different participants in the software development process.

Executive — 'I'll worry about the user interface when someone can demonstrate that it makes a difference in my sales.'

Project Manager — 'Yes, I'm sure you would love to do some field testing with users, but there's no slack in the schedule or budget.'

System Designer — 'That's trivial, let them handle it in the user interface.'

Software Engineer — 'When I'm done they have somebody who comes around and makes the screen look pretty.'

Interface Engineer — 'Isn't it exciting, I get to design the user interface all by myself!'

Customer — 'We require that any software we buy have a GUI, you know, a Generic User Interface.'

Bill Curtis and Bill Hefley, "A WIMP No More" ACM interactions (1994)

This book is written for a wide range of people involved in software design and development:

- Software developers
- Interface designers
- Information developers and technical writers
- Help and tutorial developers
- Usability professionals
- Project leaders
- Development managers
- Students of software design and development

Key Idea! Software design is a team effort—a key theme throughout this book. When I write about developers, I am addressing the members of design and development teams, which include programmers, interface designers, and others. The final outcome of a product is also influenced by other areas—company owners, senior management, marketing, and sales staff members. This book stresses the cooperation between developer and designer. The intent is to foster this cooperation and to avoid an us versus them mentality.

A major theme of this book is "Know thy users, for they are not you!" (See **Figure P.1.**) Computer users have become extremely consumer oriented and software products must fit how users function in their own environments, or they risk developing an unsuccessful product. You'll learn that the best interface is the one that lets users do what they want to do, when they want to do it, and how they want to do it. Successful software design requires the utmost concern for the appropriateness and usability of the interfaces that are presented to users.

Figure P.1 Know thy users, for they are not you.

This book describes in great detail what a software user interface really is, and its importance for users, designers, and developers. The user interface of any product—especially a computer software program—is probably the most important part, at least to users. You'll find out why the user interface is so critical to



computer software. The user interface must be designed for, and even with, users of a product. When users get frustrated and confused using a software product, the problem usually lies in the user interface.

Think about it—if today's operating systems are so easy to use, then why are there always new products being developed to make popular programs and their interfaces simpler and easier to use? Even before Microsoft's Windows 95 operating system was an actual product, there were other products, such as Norton Utilities, developed for the beta test release of Windows 95. For the past year or more, I have received a daily e-mail "Tip of the Day" for Windows 95. If these interfaces are so easy, why do users need so many tips to use them effectively? You'll learn why any one particular product or user interface can't always be the best for everyone.

An INFOWORLD survey (June 12, 1995) summarized the most difficult computing skills to find and hire for major companies in the United States. At the top of the list was client/server technical architects and second was distributed database experts. Third on the list of difficult skills to find was the GUI designer, a skill this book addresses. Further down on the list, at number five, was the GUI programmer.

Key Idea! While being able to program a graphical- and object-oriented user interface is a critical skill, an even more important skill is being able to design and analyze user interfaces. You don't have to be an expert programmer to be able to design good user interfaces. In fact, software programming and interface design are separate skills that are both needed on a product design team.

What's in This Book?

The book discusses computer software interfaces in general and focuses on today's graphical user interfaces (GUIs) and newer, more high-powered, object-oriented user interfaces (OOUIs). It also covers emerging computer technologies, such as speech recognition, wizards, social user interfaces, and intelligent software agents.

Key Idea! Throughout the book, important information to focus your attention will be highlighted with the Key Idea! graphic shown here.

Discussions are supplemented with examples and pictures of interfaces and objects that demonstrate user interface styles and elements. The book details the key user interface design principles, and guidelines, and an iterative user interface design process you can follow. You'll learn how human psychology affects how computer hardware and software should be designed.

The history of user interfaces is detailed, from the command line interface of DOS to the GUI and OOUI interfaces you see today. Other key user interface topics are also covered, including usability, help and tutorials, and the merging of PC interfaces with Internet Web browser interfaces.

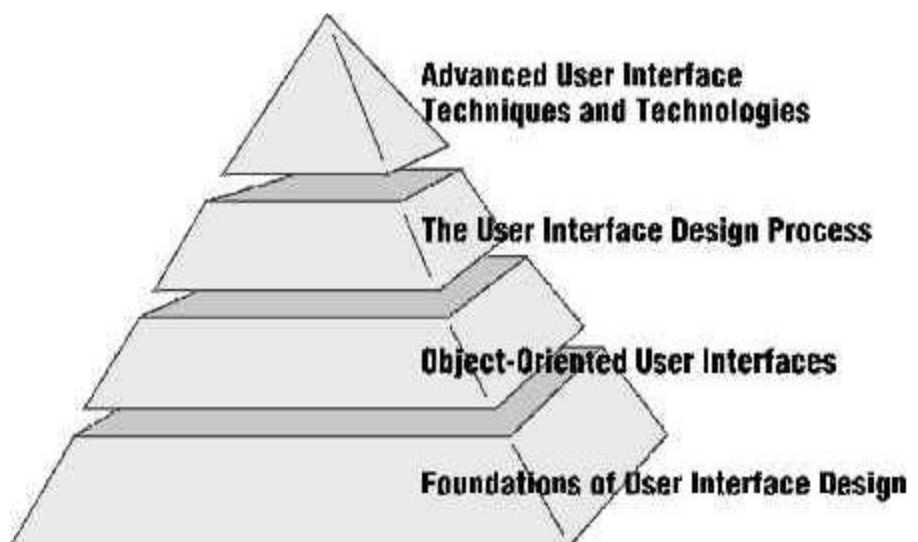
Key Idea! The examples and guidance provided in this book are based on research, guidelines, and practical experience, not just my personal beliefs and ideas about interface design. Whenever possible, historical and expert opinions and guidelines are provided, complete with references.

How This Book is Organized

Figure P.2 What's in this book.

There are four major parts to this book, each with its own roadmap to guide you through it:

- Part 1: Foundations of User Interface Design (Chapters 1-9)
- Part 2: Object-Oriented User Interfaces (Chapters 10-11)
- Part 3: The User Interface Design Process (Chapter 12)



- Part 4: Advanced User Interface Techniques and Technologies (Chapters 13-16).

Use the four-part pyramid design of the book (see **Figure P.2**) to build your skills and knowledge and to go directly to a particular part of the book based on your interests and needs.

Part 1 Contents

If you are fairly new to user interface design, start with Part 1, where you will learn the fundamentals—the whys and hows of good software design. Chapter 1 opens the book with a discussion of quality software design. User interfaces are defined in Chapter 2. Chapter 3 covers user interface models. An overview of the human cognitive and perceptual systems is provided in Chapter 4. I discuss the golden rules (interface design principles) of interface design in Chapter 5. Chapter 6 addresses the role of computer standards and interface guidelines. Software usability is defined, and usability testing goals, objectives, and case studies are found in Chapter 7. Chapter 8 analyzes command-line and menu interfaces, while Chapter 9 covers graphical user interfaces (GUIs).

Part 2 Contents

To learn about the concepts, examples, and architecture of object-oriented user interfaces, or OUIs, go to Part 2. Chapter 10 defines OUIs and discusses objects, views, and core skills needed to use object-oriented interfaces. Chapter 11 shows how to migrate users from GUIs to OUIs and compares OUIs to object-oriented programming (OOP).

Part 3 Contents

An iterative user interface design process is defined in Part 3, and a case study is provided. The four-phase design process is based on object-oriented design, but it also works for designing more traditional GUIs. As such, it is fundamental to good user interface design, and Chapter 12 could be read following Part 1.

Part 4 Contents

To read about new and more advanced user interface technologies and techniques, focus on Part 4. This book is designed to give you practical guidance in designing software that people can use. Chapter 13 offers a designer's toolkit full of topics, such as graphic excellence, using color, animation, and audio, interface terminology, and international interfaces. Key interface design issues are discussed, along with the top 10 problems with GUIs and OUIs. Chapter 14 covers help systems, Electronic Performance Support, tutorials, training, wizards, and multimedia in the interface. New interface technologies of agents and social user interfaces are discussed in Chapter 15. Finally, Chapter 16 introduces the

new world of Internet interfaces, and covers the merging of PC interfaces and Web-browsing interfaces. Web design guidelines are offered, and we'll look at the future of user interfaces.

From the Author

"We need better hardware for the desktop applications part of the market, better software and communications infrastructure, and, perhaps most important, contributions from the solution providers, the people who have provided the consulting and training, who can take these standardized building blocks and put them together in a way that's meaningful for the incredible variety of users out there." Bill Gates (1996)

These are exciting times in software development and user interface design. The emergence of the Internet and World Wide Web has transformed the face of computing and the look and feel of software is again a hot topic. As with any new technology, users, designers, and developers are jumping head-first into uncharted areas. Although user interface design is changing, it is still well-grounded in the history of traditional interface design, which is based on human perception and cognition and commonly accepted design principles and guidelines.

This book is based on my experiences as a user interface architect, designer, and usability professional over the past fifteen years in the computer industry, and is grounded in my training and research as a cognitive psychologist. I have been involved in the planning, design, and usability testing of all aspects of computer hardware and software, from product installation, online and hardcopy publications, and developing product and corporate style guides, to designing and developing software user interfaces and help systems. In my 11 years at IBM, I was part of the Common User Access (CUA) team that developed the Windows and OS/2 style guide and reference and wrote the only industry user interface guide for designing object-oriented user interfaces, *Object-Oriented Interface Design: IBM Common User Access Guidelines*. I also developed technical education courses on user interface design and usability, and performed usability tests on many software products.

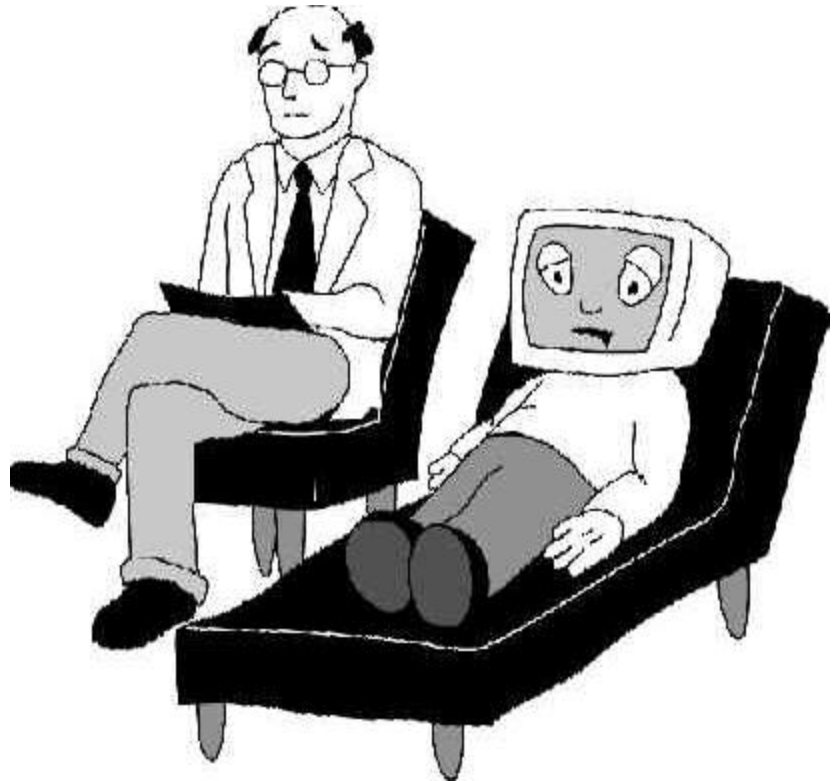
This book was written to describe the explosion of new ideas in software user interfaces that have come about since my first book, *The GUI-OOUI War: OS/2 vs. Windows, The Designer's Guide to Human-Computer Interfaces*, published by John Wiley & Sons, 1994. In addition to drawing from my experiences in user interface architecture design and consulting, I have included examples and materials from my seminars and courses on designing user-oriented and object-oriented interfaces.

User interface design is more than placing controls on the display screen. Cognitive psychologists bring an understanding of how humans read, learn, and think to help design computers that work within the psychological capabilities and limitations of the people for which they are designed (**Figure P.3**).

Figure P.3 Computer user interfaces from a psychologist's perspective.

I've spent hundreds of hours watching people try to use computers in their own work environments and in usability labs. Over the years, users have gradually (and often painfully) migrated from command-line interfaces to graphical user interfaces and are now moving on into the wonderful world of object-oriented user interfaces, with new operating systems like OS/2 Warp and Windows 95.

I've seen the confusion and frustration (and only occasionally the joy) that users experience in their work with computers. The insights I've gained regarding this intricate and interesting relationship that has formed between humans and computers should help the reader focus on the user's perspective and the fact that software must be designed to meet the user's needs, not the designer's or programmer's needs. Designing and building sensible and usable software user interfaces is both an art and a science. This book is designed to enhance your artistic and scientific interface design skills.



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