AutoCAD: The Complete Reference, Second Edition

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Nelson Johnson

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AutoCAD: The Complete Reference, Second Edition

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Introduction

With its elegant command language and the responsive, open-ended way in which its commands interact, AutoCAD is one of those software packages that will far exceed your expectations. When you start to use AutoCAD, you will be impressed by the simple way it all goes together. You can work with the software at the most superficial level and be quite productive, but if you need to do more complicated things, the power is there to do them too.

In AutoCAD you will find all the interaction tools that today's software user has come to expect, including pop-up menus, pull-down menus, a sidebar menu, a command line, and tablet menus. All the user-interaction systems are thoroughly programmable. You can use a host of input and output devices, perhaps more than with any other software package of any kind on the market today. You will find the installation process easy to follow and the features of each device well integrated.

AutoCAD Release 11 adds a great deal to an already excellent program. AutoCAD could easily be considered an operating system in itself—an operating system devoted to graphics. After working with Release 11 you will find that AutoCAD has achieved a new level of excellence. This latest release further expands AutoCAD's versatility. AutoCAD has always provided the building designer, the mechanical engineer, and other designers with graphics tools to prepare working drawings and specifications; now it can be used to serve the 3-D graphics artist as well as the motion picture animator.

How This Book Is Organized

AutoCAD: The Complete Reference, Second Edition is designed to get you started quickly and to teach you how to use more advanced features, enhance your drawings, and write programs and menu files. This book is divided into five parts that present AutoCAD from the simple to the complex. Part I, "AutoCAD Fundamentals," describes how to get started and how to use the basic commands for drawing and editing. Part II, "Enhancing AutoCAD Drawings," shows you how to use special commands to organize, crosshatch, dimension, and plot your drawings. Part III, "AutoCAD Techniques," discusses the many ways you can use AutoLISP and other programming methods to expand AutoCAD's capabilities. Part IV, "Function and Command References," describes all of the Release 11 AutoLISP functions and AutoCAD commands, and it provides essential information for the UNIX user in Chapter 17, "The AutoCAD Development System."

Part I, "AutoCAD Fundamentals"

Chapter 1, "A Quick Start," is a thorough tutorial for the AutoCAD beginner. It walks you through this powerful program, showing you what features actually can do. You will find the important new features of AutoCAD introduced here, such as Paper Space and the Advanced User Interface.

Chapter 2, "Drawing," shows you how to use most of the commands that draw lines, arcs, circles, and other entities. The chapter gives examples of commands and includes each line of the command sequence. Release 11's three-dimensional surface modeling commands are covered in detail in Chapter 2.

In Chapter 3, "Editing," you will find out what to do after you have drawn entities. You can erase them, copy them, move them, and perform many other functions once you have drawn them. No more erasing holes in paper drawing!

Part II, "Enhancing AutoCAD Drawings"

Blocks are such an important part of AutoCAD that an entire chapter is devoted to them. Chapter 4, "Working with Blocks," describes this powerful feature of AutoCAD. Any drawing can be used within any other drawing by being included as a block. You can have drawings that contain drawings that in turn contain drawings.

You will learn how to add dimensions to your drawings in Chapter 5, "Dimensioning." Dimensions in AutoCAD can be *associative*; that is, they can be made to change when the objects they describe change. You will learn how to create many kinds of dimension entities, how to change arrowhead types and sizes, and how to create text callouts.

In Chapter 6, "Crosshatching Techniques," you will find out how to fill or crosshatch areas in your drawings and how to create your own crosshatching patterns.

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Chapter 7, "Text and Fonts," shows you how to add text to your drawings. Text entities can be in various fonts and styles. You will learn how to use the commands that create and format AutoCAD text.

After you have drawn and edited your drawings, you may wish to plot them. Chapter 8, "Working with Plotters," gives you a complete description of AutoCAD's plotting options for pen and printer plotters.

Attributes are text information that can be attached to graphic entities. With attributes you can make your drawings more than a graphical database; each object in a drawing can contain information about itself. The management of attributes is a new frontier for CAD, and Chapter 9, "Attribute Management," is an introduction to this exciting new feature. You will see how to assign this information to objects and extract the information in the form of reports. You will also see many suggestions for the use of attributes in your work.

Chapter 10, "Working with Menus," shows you how to write your own menus for use with AutoCAD. Even if you are not a computer programmer, you can make routine tasks less tedious if you standardize them and perform them through menus.

Part III, "AutoCAD Techniques"

In Chapter 11, "Introduction to AutoLISP," you will learn about this powerful programming language, some of the language's history, and its structure.

Chapter 12, "Programs in AutoLISP," contains many useful programs that you can copy and use in your work. By using the techniques shown here you can automate your design process and save a great deal of effort.

Chapter 13, "Putting It All Together in 3D," presents a detailed application—the automated assembly of kitchen cabinets from standardized components. If you follow the principles in this chapter, you will be able to create automated systems for other assembly processes.

In Chapter 14, "AutoCAD's Other Programming Languages," you will read about the "hidden" command languages in AutoCAD and how to use them. You will find out about shape files. You will even see how to write a program in C language that converts files for use with AutoCAD.

Part IV, "Function and Command References"

Chapter 15 is a complete guide to AutoLISP's many functions, organized by category for easy reference. As you use functions you often find yourself working with functions of a certain type; for example, the input and output functions include those that open, read, write, and close files. You will find out about the details of each function and see many examples.

You will find a complete alphabetical list of all the AutoCAD commands in Chapter 16. Each command name is shown in large type so that you can quickly thumb through the pages and find the command. Commands are organized alphabetically because you will be using them interactively from the keyboard

rather than as functions in a programming language. The commands included in the command reference in Chapter 16 are also used in many other places in this book. As you read this book, you should refer to the command reference to read about the range of options that are available with each command.

Read about the AutoCAD Development System (ADS) in Chapter 17. Release 11 expands the universality of AutoCAD by adding programming support for users of the C language. ADS makes AutoCAD even more like an operating system. True programming support, with access to all the low level operating system features, is now available to the programmer. Until now the software developer was limited to what AutoLISP has to offer, which, although formidable, is slower and less flexible than the C language.

AutoCAD's new Advanced Modeling Extension (AME) is covered in Chapter 18. AME provides true Constructive Solid Geometry capabilities. Three-dimensional objects can be combined with other three-dimensional objects using logical operations like union, subtraction, and intersection.

Part V, Appendixes

Appendix A, "Command Summary," is a complete list of AutoCAD commands in an abbreviated form for quick reference. Appendix B, "Using Drawing Exchange Files," contains information on AutoCAD's Drawing Exchange Format (DXF). You can use this information (including a program in C language) to extract drawing information from DXF files.

AutoCAD now functions very well under the UNIX operating system. Appendix C, "UNIX Essentials for the AutoCAD User," includes a beginning discussion of some simple aspects of UNIX that may help you work within the UNIX operating system environment. A file-locking feature has been added that enables groups of users to work on drawings without losing their revisions. Remember that only one user may work on a drawing at a time.

Conventions Used in This Book

In order to be consistent in the discussion of the many AutoCAD features, the following conventions have been observed throughout this book.

- Text that you type in from your keyboard is represented in **boldface** type.
- Keys on your keyboard, such as ENTER and CTRL-C, are represented in small capital letters.
- AutoCAD functions and options are represented in quotes.
- AutoCAD commands are represented in all capital letters, for example, BLOCK and ZOOM.

Icons

Icons that indicate changes in the level of difficulty of material—beginning, intermediate, and advanced—are positioned throughout the book. This allows you to scan through the book and read about topics that are meaningful for your level of experience. Where an icon appears, it indicates that all material following the icon is written at that level until the icon changes. Some entire chapters are written at one level. In these instances, only one icon appears at the beginning of the chapter, which establishes the level of experience needed to understand the entire chapter.

Inside Cover Command Reference

The inside front and back covers of this book contain condensed listings of all the most important AutoCAD commands and system variables. Although you can enter the HELP command in AutoCAD to obtain this information, you must often wait for the graphics display to disappear and the help screen to be listed. You may be able to avoid using the HELP command, and thus redisplaying your graphics screen, by consulting the inside covers of this book.

Companion Disk

Source code shown in this book is available on a companion disk, including an ASCII text editor that you may find useful for creating and editing menus and AutoLISP code, as well as for other purposes. You will also find an executable version of extraction software. To order your copy, fill out the coupon that follows, and send it with your check in the amount of $29.95, U.S. shipping included, to

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