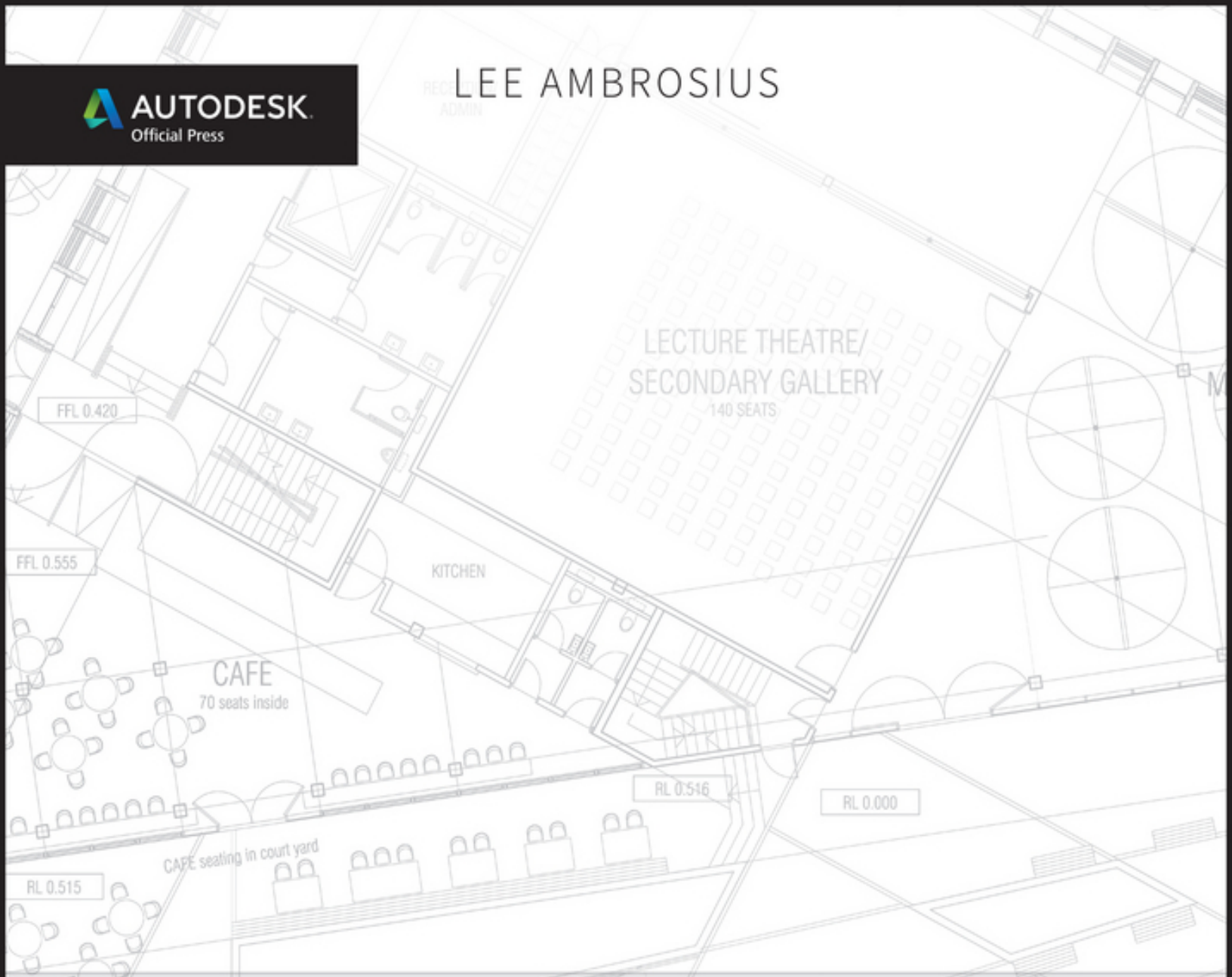
AUTODESK
Official Press

LEE AMBROSIUS



AutoCAD® Platform Customization

User Interface, AutoLISP®, VBA, and Beyond

SYBEX
A Wiley Brand

Table of Contents

- Title Page
- Copyright
- Dedication
- Acknowledgments
- About the Author
- Introduction
  - About This Book
  - Customization in AutoCAD
  - AutoLISP in AutoCAD
  - VBA in AutoCAD
  - What to Expect
  - Other Information
  - Styles and Conventions of This Book
  - Contacting the Author
- Part I: AutoCAD Customization: Increasing Productivity through Personalization
  - Chapter 1: Establishing the Foundation for Drawing Standards
    - Naming Standards for Projects and Files
    - Managing Standards with Drawing Templates
    - Choosing a File Format for Your Drawings
    - Defining Plotter Configurations and Plot Styles
    - Enforcing CAD Standards
  - Chapter 2: Working with Nongraphical Objects
    - Standardizing the Names of Nongraphical Objects
    - Managing Object Properties with Layers

Creating and Managing Annotation Styles
Defining and Managing Other Nongraphical Objects
Removing Unused Nongraphical Objects
Chapter 3: Building the Real World One Block at a Time
Defining and Editing a Block Definition
Using and Managing Block Definitions
Embedding Information in a Block Definition with Attributes
Adding Dynamic Properties to a Block Definition
Extracting Properties and Values from a Block Reference
Chapter 4: Manipulating the Drawing Environment
Getting Started with Drawing-Environment Customization
Customizing the AutoCAD Startup Process
Specifying Application Preferences
Customizing the Elements in the Drawing Window
Configuring Command and Dynamic Input
Creating and Modifying Command Aliases
Working with System and Environment Variables
Chapter 5: Customizing the AutoCAD User Interface for Windows
Getting Started with the CUI Editor
Creating Commands and Defining Command Macros
Customizing User-Interface Elements
Setting Up Rollover Tooltips and the Quick Properties Palette

- Organizing the User Interface with Workspaces
- Working with Customization Files
- Controlling the Tools on the Status Bars

Chapter 6: Customizing the AutoCAD User Interface for Mac
- Getting Started with the Customize Dialog Box
- Creating Commands and Defining Command Macros
- Customizing User-Interface Elements
- Controlling the Tools on the Status Bar

Chapter 7: Creating Tools and Tool Palettes
- What Is a Tool Palette?
- Using the Tool Palettes Window
- Defining Tool Palettes
- Adding and Modifying Tools
- Organizing Tool Palettes with Tool-Palette Groups
- Sharing Tool Palettes and Tool-Palette Groups

Chapter 8: Automating Repetitive Tasks
- Creating and Running Scripts
- Recording Action Macros (Windows Only)

Chapter 9: Defining Shapes, Linetypes, and Hatch Patterns
- Creating and Compiling Shapes
- Creating and Using Custom Linetypes
- Creating and Applying Custom Hatch Patterns

Chapter 10: Using, Loading, and Managing Custom Files
- Deploying Your Custom Files
- Using and Loading Custom Programs

Backing Up and Migrating Customization
Part II: AutoLISP: Productivity through Programming
Chapter 11: Quick Start for New AutoLISP Programmers
Working with AutoLISP Expressions
Storing and Loading AutoLISP Expressions
Chapter 12: Understanding AutoLISP
Getting Started with AutoLISP
Storing and Retrieving Values
Exploring Data Types
Leveraging AutoCAD and Third-Party Commands
Defining and Using Custom Functions
Example: Drawing a Rectangle
Chapter 13: Calculating and Working with Values
Calculating Values with Math Functions
Manipulating Strings
Converting Data Types
Returning a Value from a Custom Function
Exercise: Drawing a Rectangle (Revisited)
Chapter 14: Working with Lists
What Are Lists?
Creating a List
Getting an Element from a List
Appending, Substituting, and Removing Elements
Determining Whether an Item Exists in a List
Sorting the Elements of a List
Using Point Lists to Calculate Geometric Values
Converting Lists to Strings and Strings to Lists

- Exercise: Adding Holes to the Plate

Chapter 15: Requesting Input and Using Conditional and Looping Expressions

- Interacting with the User
- Conditionalizing and Branching Expressions
- Repeating and Looping Expressions
- Exercise: Getting Input from the User to Draw the Plate

Chapter 16: Creating and Modifying Graphical Objects

- Working with Entity Names and Dotted Pairs
- Adding Objects to a Drawing
- Selecting Objects
- Modifying Objects
- Working with Complex Objects
- Extending an Object's Information
- Exercise: Creating, Querying, and Modifying Objects

Chapter 17: Creating and Modifying Nongraphical Objects

- Working with Symbol Tables
- Working with Dictionaries
- Exercise: Creating and Incrementing Room Labels

Chapter 18: Working with the Operating System and External Files

- Storing Information in the Windows Registry or a Plist File
- Accessing Data from External Files
- Working with Directories and Files in the Operating System

Exercise: Reading and Writing Data
Chapter 19: Catching and Handling Errors
Identifying and Tracking Down Errors
Catching Errors in a Program
Defining and Using a Custom Error Handler
Grouping Functions into a Single Undo Action
Exercise: Handling Errors in the *drawplate* Function
Chapter 20: Authoring, Managing, and Loading AutoLISP Programs
Storing AutoLISP Expressions
Writing Modular Code
Adding Comments
Undefining and Redefining Standard AutoCAD Commands
Defining a Startup Function
Loading AutoLISP Files
Managing the Locations of AutoLISP Files
Deploying AutoLISP Files
Exercise: Deploying the *drawplate* Function
Chapter 21: Using the Visual LISP Editor (Windows only)
Accessing the Visual LISP Editor
Managing AutoLISP Files with the Visual LISP Editor
Formatting an AutoLISP File
Validating and Debugging Code
Creating a Visual LISP Project
Compiling LSP and PRJ Files into a VLX File

- Exercise: Working with the Visual LISP Editor
- Chapter 22: Working with ActiveX/COM Libraries (Windows only)
  - Understanding the Basics of ActiveX
  - Importing COM Libraries
  - Using the AutoCAD COM Library
  - Leveraging the Windows and Microsoft Office COM Libraries
- Chapter 23: Implementing Dialog Boxes (Windows only)
  - What Is Dialog Control Language?
  - Defining and Laying Out a Dialog Box
  - Loading and Displaying a Dialog Box
  - Interacting with and Responding to a User
  - Exercise: Implementing a Dialog Box for the *drawplate* Function

Part III: AutoCAD VBA: Programming with VBA and ActiveX (Windows only)

- Chapter 24: Understanding the AutoCAD VBA Environment
  - What Makes Up an AutoCAD VBA Project?
  - What You'll Need to Start
  - Getting Started with the VBA Editor
  - Managing VBA Programs
  - Executing VBA Macros
  - Accessing the AutoCAD VBA Documentation
- Chapter 25: Understanding Visual Basic for Applications
  - Learning the Fundamentals of the VBA Language
  - Exploring Data Types

Comparing Values
Conditionalizing and Branching Statements
Repeating and Looping Expressions
Chapter 26: Interacting with the Application and Documents Objects
Working with the Application
Managing Documents
Working with System Variables
Querying and Setting Application and Document Preferences
Executing Commands
Exercise: Setting Up a Project
Chapter 27: Creating and Modifying Drawing Objects
Understanding the Basics of a Drawing-Based Object
Accessing Objects in a Drawing
Working with Model or Paper Space
Creating Graphical Objects
Getting an Object in the Drawing
Modifying Objects
Changing Object Properties
Exercise: Creating, Querying, and Modifying Objects
Chapter 28: Interacting with the User and Controlling the Current View
Interacting with the User
Selecting Objects
Performing Geometric Calculations
Changing the Current View

Exercise: Getting Input from the User to Draw the Plate
Chapter 29: Annotating Objects
Working with Text
Dimensioning Objects
Creating and Modifying Geometric Tolerances
Adding Leaders
Organizing Data with Tables
Creating Fields
Exercise: Adding a Label to the Plate
Chapter 30: Working with Blocks and External References
Managing Block Definitions
Inserting and Working with Block References
Managing External References
Listing File Dependencies
Exercise: Creating and Querying Blocks
Chapter 31: Outputting Drawings
Creating and Managing Layouts
Displaying Model Space Objects with Viewports
Controlling the Output of a Layout
Plotting and Previewing a Layout
Exporting and Importing File Formats
Exercise: Adding a Layout to Create a Check Plot
Chapter 32: Storing and Retrieving Custom Data
Extending Object Information
Creating and Modifying a Custom Dictionary
Storing Information in the Windows Registry

- Exercise: Storing Custom Values for the Room Labels Program

Chapter 33: Modifying the Application and Working with Events

- Manipulating the AutoCAD User Interface
- Using External Custom Programs
- Working with Events
- Exercise: Extending the User Interface and Using Events

Chapter 34: Creating and Displaying User Forms

- Adding and Designing a User Form
- Placing and Arranging Controls on a User Form
- Changing the Appearance of a User Form or Control
- Defining the Behavior of a User Form or Control
- Displaying and Loading a User Form
- Exercise: Implementing a User Form for the ***DrawPlate*** Project

Chapter 35: Communicating with Other Applications

- Referencing a Programming Library
- Creating and Getting an Instance of an Object
- Accessing a Drawing File from outside of AutoCAD
- Working with Microsoft Windows
- Reading and Writing Text Files
- Parsing Content in an XML File
- Working with Microsoft Office Applications
- Exercise: Reading and Writing Data

Chapter 36: Handling Errors and Deploying VBA Projects

- Catching and Identifying Errors

Debugging a VBA Project
Deploying a VBA Project
Exercise: Deploying the DrawPlate VBA Project
End User License Agreement

List of Illustrations

Chapter 1: Establishing the Foundation for Drawing Standards

Figure 1.1 Possible project numbering structure

Figure 1.2 Possible file-naming structure

Figure 1.3 Drawing Units dialog box. The Windows version of the dialog box appears on the top the Mac OS version appears on the bottom.

Figure 1.4 Editing a plotter configuration file

Figure 1.5 Editing a plot style file. The Windows version of the dialog box appears on the top and the Mac OS version on the bottom.

Figure 1.6 Configuring drawing standards files

Figure 1.7 Enabling the plug-ins to use when validating drawing standards

Figure 1.8 Changing the notification and Check Standards settings

Figure 1.9 Access to CAD Standards notifications and settings is just a click away.

Figure 1.10 Standards violation found

Figure 1.11 The check for standards violations is complete.

Figure 1.12 Standards violation detected

Figure 1.13 Morethan one drawing can be checked for standards violations with the Batch Standards Checker.

Figure 1.14 Use this report to determine which files contain standards violations so they can be fixed.

Figure 1.15 Translating layers between CAD standards

Figure 1.16 Defining a new layer to use as part of the layer translation map

Figure 1.17 Changing the settings to use when translating layers

Chapter 2: Working with Nongraphical Objects

Figure 2.1 Possible layer-naming structure

Figure 2.2 Renaming nongraphical objects

Figure 2.3 Organizing objects with layers

Figure 2.4 Setting the color of a layer

Figure 2.5 Managing linetypes and scales

Figure 2.6 Controlling the display of lineweights

Figure 2.7 Changing layer settings affects the way you work with layers in the drawing window and user interface.

Figure 2.8 Unreconciled layer notification balloon

Figure 2.9 Creating dynamic filters based on layer names and properties

Figure 2.10 Saving layer states allows you to later restore the visibility and properties of the layers in a drawing.

Figure 2.11 The appearance of text can be controlled with text styles.

Figure 2.12 Creating and defining dimension styles

Figure 2.13 Updating the properties of a table style

Figure 2.14 Modifying a multileader style

Chapter 3: Building the Real World One Block at a Time

Figure 3.1 Defining a block

Figure 3.2 Block editing environment

Figure 3.3 Tools available for modifying the objects and behavior of a block definition

Figure 3.4 Inserting a block definition

Figure 3.5 Defining an attribute definition

Figure 3.6 You can edit attribute values after inserting a block reference.

Figure 3.7 Modifying a block's dynamic properties with grips (left: in the drawing window; right: in the Block Editor)

Figure 3.8 Defining a lookup table for a dynamic block

Figure 3.9 Defining a lookup table for a dynamic block

Chapter 4: Manipulating the Drawing Environment

Figure 4.1 Setting the properties for the new shortcut

Figure 4.2 Switching workspaces

Figure 4.3 Setting application preferences

Figure 4.4 Elements of the drawing window

Figure 4.5 Customizing the input search options for the Command prompt

Figure 4.6 Accessing recently used commands and coordinate values

Figure 4.7 Controlling the behavior and appearance of dynamic input

Figure 4.8 Command suggestion list based on typed characters

Figure 4.9 AutoCorrect entry in the command suggestion list

Chapter 5: Customizing the AutoCAD User Interface for Windows

Figure 5.1 The CUI Editor lets you create and modify user-interface elements.

Figure 5.2 Command-line history of the input you previously entered

Figure 5.3 Defining the properties of a command

Figure 5.12 Tooltip for the custom Wheelchair Note command

Figure 5.4 The properties of the completed command

Figure 5.5 Creating a custom image

Figure 5.6 Example custom image

Figure 5.7 Managing images in the loaded CUIx files

Figure 5.8 Accessing the customization options for the Quick Access toolbar

Figure 5.9 Adding a command to the QAT

Figure 5.10 Accessing the controls that can be placed on the QAT

Figure 5.11 Results of the customization to the QAT

Figure 5.13 The results of using the Wheelchair Note command

Figure 5.14 Command and control organization using the ribbon

Figure 5.15 Structure of the Home 2D - Draw panel

Figure 5.16 Structure for the new My Tools panel

Figure 5.17 The completed My Tools panel

Figure 5.18 Favorites tab with the My Tools panel

Figure 5.19 Customizing the current workspace

Figure 5.20 Adding the ribbon tab to the current workspace

Figure 5.21 Controlling the order of the ribbon tab with the workspace

Figure 5.22 The Favorites tab displayed on the ribbon

Figure 5.23 The custom Edit Text tab displayed when the multiline text object was selected

Figure 5.24 Structure of the Favorites pull-down menu in the CUI Editor

Figure 5.25 Favorites pull-down menu on the menu bar

Figure 5.26 Line Objects Menu in the drawing window

Figure 5.27 Structure of the Favorites toolbar in the CUI Editor and how it appears in the user interface

Figure 5.28 Rollover tooltip and Quick Properties panel displaying the properties for an arc

Figure 5.29 Controlling the appearance and behavior of the Quick Properties palette

Figure 5.30 Modifying the properties displayed on the rollover tooltip for a Hatch object

Figure 5.31 Controlling the display of tools on the status bar

Chapter 6: Customizing the AutoCAD User Interface for Mac

Figure 6.1 You create and modify user-interface elements by using the Customize dialog box.

Figure 6.2 Command-line history of the input you previously entered

Figure 6.3 The properties of the completed command

Figure 6.4 Wheelchair command with the custom icon

Figure 6.5 Structure of the Favorites pull-down menu in the Customize dialog box

Figure 6.6 Favorites pull-down menu on the menu bar

Figure 6.7 The results of using the Wheelchair Note command

Figure 6.8 Structure of the Open Shapes tool group

Figure 6.9 Structure for the new Favorites toolset and the My Tools tool group

Figure 6.10 Completed Favorites toolset and My Tools tool group

Figure 6.11 Controlling the display of tools on the status bar

Chapter 7: Creating Tools and Tool Palettes

Figure 7.1 Tool palettes in the Tool Palettes window

Figure 7.2 Components of the Tool Palettes window

Figure 7.3 Controlling the image size and style for tools

Figure 7.4 Adding a new tool based on a line object from the drawing area

Figure 7.5 New Line tool on a custom tool palette

Figure 7.6 A flyout offers additional related geometric tools.

Figure 7.7 Changing the properties of a tool

Figure 7.8 Controlling which tools are displayed on the flyout

Figure 7.9 Revised tool and flyout

Figure 7.10 Searching for named objects and support files

Figure 7.11 Creating and managing tool-palette groups

Chapter 8: Automating Repetitive Tasks

Figure 8.1 Action Recorder panel on the ribbon

Figure 8.2 The Action Tree shows recently recorded actions.

Figure 8.3 Recorded actions and values used to create a new layer named Hardware with the color blue

Figure 8.4 Saving recorded actions to an action macro

Chapter 9: Defining Shapes, Linetypes, and Hatch Patterns

Figure 9.1 Determining which value to use for vector angles (left) or octants (right)

Figure 9.2 BAT shape inserted into the drawing (top) along with a polyline with the Batting linetype assigned (bottom)

Figure 9.3 sBreakdown of the BAT shape

Figure 9.4 Inserted DMOND shape (left) and a breakdown of its shape definition (right)

Figure 9.5 Dash Dot Dash linetype assigned to a polyline

Figure 9.6 Plot Line linetype assigned to a polyline

Figure 9.7 Same object with different linetype scale factors

Figure 9.8 Breakdown of the AR-B816 hatch pattern

Figure 9.9 sDiamonds hatch pattern used to fill a rectangle

Figure 9.10 Diamonds hatch pattern in the Hatch Pattern gallery

Figure 9.11 Pattern button on the Hatch visor

Figure 9.12 Available hatch patterns in the hatch library

Chapter 10: Using, Loading, and Managing Custom Files

Figure 10.1 Loading a custom program

Figure 10.2 Internet search results on AutoLISP files

Chapter 11: Quick Start for New AutoLISP Programmers

Figure 11.1 Result of using AutoLISP expressions with the circle command

Figure 11.2 Drawing concentric circles with AutoLISP

Figure 11.3 Converting a rectangle to a revision cloud

Figure 11.4 Loading the acp_qs.lsp file

Chapter 12: Understanding AutoLISP

Figure 12.1 Structure of an AutoLISP expression

Figure 12.2 Result of the drawplate custom function

Chapter 13: Calculating and Working with Values

Figure 13.1 Multiline text object created from multiple string values

Figure 13.2 Loading the LSP files

Figure 13.3 Results of the custom `drawplate` function

Chapter 14: Working with Lists

Figure 14.1 Completed plate

Chapter 15: Requesting Input and Using Conditional and Looping Expressions

Figure 15.1 Window drawn based on user input

Figure 15.2 Rubber-band line effect used when specifying a point from a base point

Figure 15.3 The rubber-band effect used when specifying the opposite corner with the `getcorner` function

Figure 15.4 Message displayed with the alert function

Figure 15.5 Custom message displayed with the acet-ui-message function

Figure 15.6 Message displayed in the status bar with the grtext function

Figure 15.7 Drawing individual vectors with the grdraw function

Figure 15.8 Drawing multiple vectors with the grvecs function

Figure 15.9 Custom animated progress message

Figure 15.10 Completed plate

Chapter 16: Creating and Modifying Graphical Objects

Figure 16.1 Circle and line objects created with the `entmake` function

Figure 16.2 Plan view of a #12-24 machine screw, slotted round head

Figure 16.3 Basics of a callout balloon

Figure 16.4 RoomNum block reference inserted with AutoLISP

Figure 16.5 The completed plate created using the updated utility functions

Figure 16.6 Office furniture layout

Figure 16.7 Bill of materials generated from the office furniture layout

Chapter 17: Creating and Modifying Nongraphical Objects

Figure 17.1 RoomLabel block definition

Figure 17.2 Plan view of the office building

Figure 17.3 Inserted RoomLabel block

Chapter 18: Working with the Operating System and External Files

Figure 18.1 File-navigation dialog box displayed with the `getfiled` function

Figure 18.2 BOM content in Excel

Chapter 19: Catching and Handling Errors

Figure 19.1 Troubleshooting and debugging loading problems

Figure 19.2 Troubleshooting and debugging execution problems

Figure 19.3 Rolling back changes made with commands and the `entmake` function

Figure 19.4 Wrapping functions with undo groupings to create a single undo action

Chapter 20: Authoring, Managing, and Loading AutoLISP Programs

Figure 20.1 Loading a custom program

Figure 20.2 Loading a custom program

Figure 20.3 Adding a LSP file to the Startup Suite

Figure 20.4 This security warning informs you of a LSP file being loaded from an untrusted location.

Figure 20.5 Custom help for a custom function

Chapter 21: Using the Visual LISP Editor (Windows only)

Figure 21.1 The Visual LISP Editor with a new LSP file open in an editor window

Figure 21.2 Searching for defined functions and variables

Figure 21.3 Color syntax allows you to quickly identify functions, argument values, and problems in a program.

Figure 21.4 Setting element colors to be used in the editor window

Figure 21.5 Specifying the settings to format code in the editor window

Figure 21.6 Use the Console window to execute AutoLISP statements.

Figure 21.7 The Build Output window indicates the type of error encountered during checking.

Figure 21.8 Organizing LSP files into a project

Figure 21.9 Accessing files from the project window

Figure 21.10 Unformatted and formatted code

Figure 21.11 Breakpoint set in the editor window

Figure 21.12 Execution paused as a result of a breakpoint

Figure 21.13 Watching variable values with the Watch window

Figure 21.14 Viewing information about the recent error

Chapter 22: Working with ActiveX/COM Libraries (Windows only)

Figure 22.1 Hierarchy of the AutoCAD COM library

Chapter 23: Implementing Dialog Boxes (Windows only)

Figure 23.1 Alternative message box defined with DCL

Figure 23.2 Example dialog box titled Create Label Object

Figure 23.3 Grouping related tiles in the Create Label Object dialog box

Figure 23.4 Setting the alignment and sizes of tiles

Figure 23.5 New dialog box for the drawplate function

Chapter 24: Understanding the AutoCAD VBA Environment

Figure 24.1 The VBA Editor allows for the development of a VBA program

Figure 24.2 The Project Explorer lists loaded projects and components

Figure 24.3 Modify the properties of a component, UserForm, or control

Figure 24.4 Edit code statements stored in a code or class module.

Figure 24.5 Members of an object in a referenced library can be viewed in the Object Browser.

Figure 24.6 Changing the VBA environment settings

Figure 24.7 Managing loaded VBA programs

Figure 24.8 Executing a macro stored in a VBA project

Figure 24.9 Edit, debug, and execute macros from the Macros dialog box.

Figure 24.10 Custom dialog box used to draw a top or side view of a hex bolt

Figure 24.11 Views of the completed hex bolt

Chapter 26: Interacting with the Application and Documents Objects

Figure 26.1 Rectangle and text drawn using commands

Figure 26.2 Navigating the new project with the Project Explorer

Figure 26.3 Error message generated as a result of AutoCAD not being able to save the drawing

Figure 26.4 New drawing with a title block

Figure 26.5 Field values populated by drawing properties

Chapter 27: Creating and Modifying Drawing Objects

Figure 27.1 Drawing object hierarchy

Figure 27.2 Definition of a line

Figure 27.3 Definition of a circle

Figure 27.4 Definition of an arc

Figure 27.5 Offset polylines and lines

Figure 27.6 Polyline with three vertices

Figure 27.7 Message box containing the handle and object ID of an object

Figure 27.8 Rotated line object around a base point

Figure 27.9 New mounting plate

Chapter 28: Interacting with the User and Controlling the Current View

Figure 28.1 Rubber-band line effect used when specifying a point from a base point

Figure 28.2 The rubber-band effect used when specifying the opposite corner with the `GetCorner` function

Figure 28.3 Message displayed with the `MsgBox` function

Figure 28.4 Formula for calculating the distance between two points

Figure 28.5 Completed plates

Chapter 29: Annotating Objects

Figure 29.1 Basic note created with single-line text

Figure 29.2 Basic note created with an `MText` object

Figure 29.3 Numbered list in an `MText` object

Figure 29.4 Aligned and diametric dimensions showing the measurement values of two circles

Figure 29.5 Geometric tolerance object created with the `AddTolerance` function

Figure 29.6 Multileader with two leader lines

Figure 29.7 Legacy leader created with the `AddLeader` function

Figure 29.8 Empty BOM table

Chapter 30: Working with Blocks and External References

Figure 30.1 Block-definition-to-block-reference relationship

Figure 30.2 Xref attachment flow

Figure 30.3 `RoomLabel` block definition

Figure 30.4 Plan view of the office building

Figure 30.5 Inserted RoomLabel block

Figure 30.6 Bill of materials generated from the office furniture layout

Chapter 31: Outputting Drawings

Figure 31.1 New layout with a title block

Chapter 32: Storing and Retrieving Custom Data

Figure 32.1 Message box displaying the data values of Xdata that represent a dimension override

Figure 32.2 Plan view of the office building

Figure 32.3 Inserted RoomLabel block

Chapter 33: Modifying the Application and Working with Events

Figure 33.1 Visual reference of the objects that make up a pull-down menu

Figure 33.2 ACP pull-down menu

Figure 33.3 Visual reference of the objects that make up a toolbar

Figure 33.4 New ACP toolbar

Figure 33.5 Selecting an object and event to add

Figure 33.6 Custom user interface elements added by loading `acp.cuix`

Figure 33.7 Layers created as a result of the `BeginCommand` event and the use of the `hatch` and `dimlinear` commands

Chapter 34: Creating and Displaying User Forms

Figure 34.1 Default `UserForm` displayed in the UserForm editor window

Figure 34.2 Controls that can be added to a user form are displayed in the Toolbox window.

Figure 34.3 Common controls employed in user forms

Figure 34.4 View and change the property values in the Properties window.

Figure 34.5 Selecting an object and event to add

Figure 34.6 New `UserForm` in the editor window

Figure 34.7 New user form running in the AutoCAD drawing environment

Figure 34.8 Completed Draw Plate user form

Figure 34.9 The label control added to the user form

Figure 34.10 Completed Draw Plate user form in the AutoCAD drawing environment

Figure 34.11 Completed plates

Chapter 35: Communicating with Other Applications

Figure 35.1 Check the Libraries drop-down list in the Object Browser and use the appname listed there.

Figure 35.2 Information from an externally opened drawing file

Figure 35.3 BOM content in Excel

Chapter 36: Handling Errors and Deploying VBA Projects

Figure 36.1 The layer wasn't found in the drawing.

Figure 36.2 Custom message containing information about a recent error

Figure 36.3 Outputting debug information to the Immediate window

Figure 36.4 Suspend the execution of a program with breakpoints for debugging.

Figure 36.5 Viewing local variables with the Locals window

Figure 36.6 Watching variables and statements with the Watches window

Figure 36.7 Adding a watch with the Add Watch dialog box

Figure 36.8 This security warning informs you that a DVB file is being loaded from an untrusted location.

Figure 36.9 Breakpoint set in the code editor window

Figure 36.10 Current watches added to the Watches window

List of Tables

Chapter 1: Establishing the Foundation for Drawing Standards

Table 1.1 System variables

Table 1.2 AutoCAD releases and drawing file formats

Chapter 2: Working with Nongraphical Objects

Table 2.1 System variables used to set default property values

Chapter 3: Building the Real World One Block at a Time

Table 3.1 Block properties available for use in an attribute-extraction template

Chapter 4: Manipulating the Drawing Environment

Table 4.1 AutoCAD command-line switches

Table 4.2 Commonly used command aliases

Chapter 5: Customizing the AutoCAD User Interface for Windows

Table 5.1 Meaning of macro components

Table 5.2 Special characters that can be used in macros

Table 5.3 Customizable shortcut menus

Table 5.4 Aliases and alias naming conventions for shortcut menus

Table 5.5 Special names used to identify types of block reference objects

Chapter 6: Customizing the AutoCAD User Interface for Mac

Table 6.1 Macro components used in the circle example

Table 6.2 Special characters that can be used in macros

Chapter 8: Automating Repetitive Tasks

Table 8.1 Command-line equivalent commands (Windows and Mac OS)

Table 8.2 Command-line equivalent commands (Windows only)

Chapter 9: Defining Shapes, Linetypes, and Hatch Patterns

Table 9.1 Components of a shape header line

Table 9.2 Shape specification line codes

Table 9.3 Codes and values for a BAT shape

Table 9.4 Values of the Center linetype

Table 9.5 Text string and shape object values

Table 9.6 Pattern-definition line values

Table 9.7 Values of the AR-B816 hatch pattern

Chapter 12: Understanding AutoLISP

Table 12.1 AutoLISP expressions

Table 12.2 Special characters that can prefix a command name

Table 12.3 AutoLISP expressions used to define the `drawplate` function

Chapter 13: Calculating and Working with Values

Table 13.1 AutoLISP advanced math functions

Table 13.2 AutoLISP functions for converting numeric values to strings

Table 13.3 AutoLISP functions for converting strings to numeric values