Index

& (ampersand), shortcut key designator, 58
- (hyphen), menu item separator, 58
? (question mark), help button, 50, 107–109
.config files, 19–20, 411–413
.manifest files, 62
.resx files, 363–366

A
Action controls, 238–240
Activate method, 40
Activated event, 40
Active Documents, 598
Active forms, 40
ActiveForm method, 40–41
ActiveMdiChild property, 78–79
Adapters, 29
ADO.NET. See data sets.
al.exe tool, 381
Alignment, text strings, 180–182, 184
Alignment property, 184
AllowSelection property, 230–231
AllowSomePages property, 230–231
Alpha values, 124
Alpha-RBG, 124
Ambient properties, 259–261
Ampersand (&), shortcut key designator, 58
Anchoring controls, 13–14, 68–69, 597
Animation, 157–160
Antialiasing
print preview, 218
shapes, 144–145
text strings, 184–186
UseAntiAlias property, 218
appbase (application base), 560–562
appdomain (application domain), 561
Application base (appbase), 560–562
Application domain (appdomain), 561
Application download, 557–559
Application locality, 410–413
Application settings. See also multithreading
user interfaces; resources; user interface.
application locality, 410–413
assembly locality, 410–413
choosing a mechanism, 432–433
compile-time, 406–409
configuration (.config) files, 19–20, 411–413
domain locality, 410–413
dynamic properties, 20–21, 414–416. See also data binding.
environment, 406–409
isolated storage, 21, 426–430
localities, 410–413
machine locality, 410–413
partial trust, 430
permissions, 411
Registry, 416–421
roaming user locality, 410–413, 419
scope, 426–430
special folders, 21, 422–424
Store Admin tool, 429–430
stores, 426–430
streams, 424–430
types of, 410–413
Application settings (continued)
user locality, 410–413
versioned data paths, 430–432
Application wizards, MFC, 595–596
Applications
calling, 388–389
command line arguments, 397–400
definition, 387–388
events, 392–393
lifetime, 388–389
marshaling by reference, 398
named kernel objects, 396
.NET Remoting, 397–400
single-instance, 395–397
UI thread exceptions, 393–395
UI threads, 389
Arranging controls, 13–16
Arrow keys, 570–571
Arrows, drawing, 137–138
Assemblies. See also Web deployment, partially trusted assemblies.
assembly linker tool, 381
assembly locality, 410–413
Assembly receiver, 560
Asynchronous callback, 528–529
Asynchronous event notification, 612–615
Asynchronous operations, 522–525
Asynchronous Web services, 541–545
Attributes, design-time integration, 306–307
Authenticode, 587–589
Automation, MFC, 598
AutoScale property, 66–67
AutoScaleBaseSize property, 66–67
Auto-scaling forms, 66–67
AutoScrollMargin property, 275
AutoScrollMinSize property, 275
AutoScrollPosition property, 275
AutoZoom property, 218

B
BackColor property, 259–261
Background images
previewing, 23
setting, 23
Batch initialization, design-time integration, 316–319
BeginPrint event, 220–221
Bezier curves, 144
Binary-type resources, 366–367
Binding managers, 477–482
Bitmap class, 150–151
Bitmaps, 150–151
Blend property, 131
Blending colors. See gradients.
Blocking operations, 526
Boolean values, controls, 240–241
Borders, forms, 49
Bottom property, 43
BringToFront method, 61
Brushing, 537
Brush class, 127–128
Brushes. See also color; drawing; pens.
creating pens from, 141–142
hatch patterns, 129–130
linear gradients, 129–132
path gradients, 132–135
samples, 127–128
solid, 128–129
texture, 129
tiling shapes, 129
Button control, 238–240, 644–645

C
Caching, 559–560
Calendar control, 650
Calling applications, 388–389
Cancel button, 93–97
CancelEventArgs, 41
Canceling
long running operations, 531–534
print jobs, 215
Captions, forms, 49
Cardinal splines, 143–144
CausesValidation property, 99
Cell ascent, 175
Cell descent, 175
CenterPoint property, 134
Check boxes, 645
CheckBox control, 645
Checked list boxes, 647
Checked property, 58
CheckedListBox control, 241–246, 647
Child columns, 450
Classes, grouping. See namespaces.

Click event, 238–240, 267

Client area, size, 45–46

ClientRect property, 46

Client-side command line arguments, 574–575

ClientSize property, 45–46

Clip property, 205–206

Clipping
forms, 38
images, 151–154
regions, 122, 205–206
text strings, 179–180

Closed event, 41

Closing event, 41

Closing forms, 41–42

Code serialization. See serialization.

Color
alpha values, 124
Alpha-RBG, 124
blending, 131–132
drawing shapes. See pens.
filling shapes. See brushes.
focus points, 131
format translation, 126
gradients, 129–135
known, 124–126
linear gradients, 129–132
mapping, 155–156
named, 124–126
opacity, 123–124
path gradients, 132–135
printing, 227
recoloring images, 155–156
system, 125–126, 129
transitions, 131–132
transparency, 124

Color structure, 123

ColorDialog component, 89

ColorTranslator method, 126

COM (Component Object Model)
control hosting, MFC, 598
controls, 63–65
drag and drop controls, 283
ComboBox control, 241–246, 647–648
Command builder, 444

Command line
arguments, 397–400, 573–576
setting the PATH environment variable, 4
Command objects, 454–455

Command routing, MFC, 602

Command text, 438

Command unification, MFC, 602

Committing data set changes, 443–445

Common dialogs. See dialogs.

Communication
with shared data, 534–535
via message passing, 537–541
via method parameters, 535–537
via Web services, 571–572

Compile-time application settings, 406–409

Component Object Model (COM). See COM
(Component Object Model).

Components
changing behavior at design time, 304–306.
See also design-time integration.
definition, 633
finalizer methods, 299–300
garbage collection, 297–300
resource management, 297–300
sample, 293–297
uses for, 289
vs. controls, 633

Components, custom, 292–293

Components, standard. See also Color-Dialog component; ContextMenu component; FontDialog component; OpenFileDialog component; PageSetupDialog component; PrintDialog component; PrintPreviewDialog component; SaveFileDialog component.

toolbars, 238–240, 641

ContextMenu, 238–240, 641

error notification, 25–26, 101–102, 290, 642

ErrorProvider, 25–26, 101–102, 290, 642

FolderPathDialog, 89

HelpProvider, 114–116, 642

image lists, 247–249, 290, 640–641

ImageList, 247–249, 290, 640–641

main menus, 56, 641

MainMenu, 56, 641

menus, 290

notification tray, 290, 638–639

NotifyIcon component, 290, 638–639

standard dialogs, 290, 634–638
table of, 631–633

Timer, 291–292, 639–640

ToolTip, 105, 109–111, 642

user information, 290

CompoundArray property, 139
Configuration (.config) files, 19–20, 411–413, 563
Connection objects, 453–454
Connection strings, 438
Connections, 29
ControlBox property, 49
Constraints, data set data, 447–448, 459–460
Constructors, forms, 38
Container controls, 74–75
Containers, design-time integration, 300–302
Containers for controls, 246–247
Context, applications, 390–392
Context menus, 58–59, 352–355, 641
ContextMenu component, 238–240, 641
ContextMenu property, 58
Control libraries, creating, 16–17
Control points, 144
ControlBox property, 89–91
ControlPaint class, 252–253
Controls. See also forms; entries for specific controls.
adding to the Toolbox, 17–18
ambient properties, 259–261
anchoring, 13–14
arranging, 13–16
binding to data. See data binding.
categories, 237–238
changing behavior. See design-time integration.
custom, 18
custom layout, 76–77
data type values, 240–241
definition, 237, 633
docking, 15
drawing, 18
extending, 275–276
focus, and data validation, 102–104
getting a list of, 104
inheritance, 259–261
resizing, 73
reusing, 16–18. See also controls, owner-draw; controls, user.
scrolling, 272–275
splitting, 15
text labels, 643
user, 16, 277–279. See also controls, owner-draw.
vs. components, 633
Controls, child
adding to forms, 59–60
anchoring, 68–69
COM (Component Object Model), 63–65
container controls, 74–75
custom layout, 76–77
docking, 69–73
form auto-scaling, 66–67
grouping, 74–75
removing, 60–61
separator bars. See splitting.
splitting, 73–74
tabbing between, 61
themes, 61–63
Z-order, 60–61, 71–73
Controls, custom
adding to the Toolbox, 256–257
deriving from existing controls, 277–278
deriving from the Control class, 254–255
Designer and, 259
events, 263–265
functionality, 262–263
input, keyboard, 267–271
input, mouse, 265–267
kinds of, 254–255
message queue, 271–272
rendering, 257–259
testing, 256–257
Windows message handling, 271–272
Controls, drag and drop
COM (Component Object Model), 283
data validation, 286–287
drop source, 283–285
drop target, 279–282
keypress, detecting, 285–286
multiple effects, 285–287
Controls, owner-draw. See also controls, user.
definition, 249
drawing disabled text, 253–254
examples, 249–251
reusing existing controls, 252–253
sizing controls, 251–252
themes, 254
Controls, standard
action, 238–240
Boolean values, 240–241
Button, 644–645
categories, 237–238
CheckBox, 645
CheckedListBox, 647
ComboBox, 647–648
containers for, 246–247
data type values, 240–241
DataGrid, 649
date values, 240–241
DateTimePicker, 650–651
definition, 237
DomainUpDown, 652
graphical values, 240–241
GroupBox, 657
grouping, 246–247
HScrollBar, 651–652
Label, 643
LinkLabel, 643–644
ListBox, 646
lists, images, 247–249
lists, text, 241–246
ListView, 648
MonthCalendar, 650
numeric values, 240–241
NumericUpDown, 652–653
Panel, 657
PictureBox, 646
PrintPreviewControl, 654
Progressbar, 653–654
RadioButton, 645
RichTextBox, 654
Splitter, 655
StatusBar, 656
string values, 240–241
TabControl, 657–658
TextBox, 644
ToolBar, 655–656
TrackBar, 653
TreeView, 648–649
value, 240–241
VScrollBar, 651–652
Controls collection, 247
Coordinate conversions, 193
CreateGraphics method, 118–119
CreateMeasurementGraphics method, 232–233
Cross-bitness, MFC, 600
Cross-language, MFC, 600
Cross-platform, MFC, 600
Culture information, 373–375
Culture-neutral, 377
Culture-specific, 377
Current property, 483
CurrentUICulture property, 375
Cursor class, 164–166
Cursor property, 259–261
Cursors, drawing, 143–144
data type values, 240–241
definition, 237
data views, 492–494
definition, 469
filtering, 493–494
master-detail relations, 494–497
required properties, 489–492
sorting, 492–493
data source, 468–471
MFC (Microsoft Foundation Classes), 600
overview, 29–30
property managers, 477–482
suspending, 486
type conversion, 506–511
type descriptors, 505–506
Data binding, complex
data views, 492–494
definition, 469
filtering, 493–494
master-detail relations, 494–497
required properties, 489–492
sorting, 492–493
Data binding, data sources. See also data
sets.
custom hierarchies, 513–516
custom item, 504–505
to data sets, 476–477
definition, 470
to items, 471–474
Data binding, simple (continued)
list data sources, 512–516
to lists, 475
Data columns, 436
Data commands, 436
Data connections, 436
Data format notification, 101–102
Data grids. See also data binding.
control, 649
data exchange, 501–502
formatting, 499–501
overview, 497–499
table styles, 499–501
Data members, 468
Data rows, 436
Data sets. See also databases.
child columns, 450
command builder, 444
command objects, 454–455
command text, 438
committing changes, 443–445
connection objects, 453–454
connection strings, 438
constraining input data, 447–448, 459–460
creating data, 439
data adapter objects, 455–456
data validation, 447–448
definition, 436
deleted data, retrieving, 442
deleted rows, checking for, 441–442
deleting data, 440–442
Designer support, 453–456
expressions, 450–453, 461–462
multitable, 445–447
navigation, 450
parent columns, 450
populating, 436
relations, 448–450, 460–461
retrieving data, 436–439
tracking changes, 442–443
update error detection, 445
updating data, 440
Data sets, typed
adding to forms, 463–466
constraints, 459–460
creating, 456–459
definition, 456
expressions, 461–462
relations, 460–461
Data sources
custom hierarchies, 513–516
custom item, 504–505
for data binding, 468–471
item, 471
list, 471, 512–516
Data tables, 436
Data validation
constraints on data set data, 447–448, 459–460
and control focus, 102–104
data format notification, 101–102
data sets, 447–448
dialogs, 25, 98–104
drag and drop controls, 286–287
error messages, 107
ErrorProvider component, 25–26
extender properties, 105
free-form data entry, 98
information providers, 106
providing valid defaults, 103
regular expressions, 99–101
thorough validation, 102–104
Validating event, 25–26
Data versioning. See versioning.
Data views, 492–494
Databases, 29. See also data binding; data
sets; data sources.
DataGrid control, 241–246, 497–499, 649
DataRow methods, 450
DataSource property, 489–492
Date/time controls, 240–241, 650
DateTimePicker control, 240–241, 650–651
DDX/DDV, MFC, 599
Deactivate event, 40–41
Debugging
design-time integration, 302–304
Web deployment, 576–578
Declarative approach, design-time integra-
tion, 306–307
Delegates
definition, 7
description, 607–611
events, 612–615
Delete method, 441–442
DeleteCommand property, 444
Deleted data, retrieving, 442
Deleted rows, checking for, 441–442
Deleting data, 440–442
Deploying applications. See Web deploy-
ment.
Deserialization, 625–626
Design units, 168, 176
Designer
  adding controls to the Toolbox, 17–18
  anchoring controls, 13–14
  arranging controls, 13–16
  control libraries, creating, 16–17
  custom controls, 18, 259
  data set support, 453–456
  docking controls, 15
  drawing controls, 18
  event handling, 11–13
  initializing forms, 10–11
  Property Browser, 11–13
  resources, 369–373
  reusing controls, 16–18
  splitting controls, 15
  starting a project, 8
  user controls, 16
  viewing code, 8–9
DesignMode property, 304–306
Design-time integration. See also components.
  attributes, 306–307
  batch initialization, 316–319
  code serialization, 311–316
  containers, 300–302
  custom designers, 346–366
  debugging, 302–304
  declarative approach, 306–307
  expandable object converter, 332–334
  extender property providers, 319–324
  host form integration, 314–316
  hosts, 300–302
  programmatic approach, 306–307
  Property Browser integration, 307–311
  sites, 300–302
  type code serialization, 335–337
  type converters, 324–332, 335–337
Design-time-only properties, 350–352
DesktopBounds property, 46
DesktopLocation property, 44
Device units, 191
Dialog applications, MFC, 596
DialogResult property, 94
Dialogs
  built-in components, 89
  Cancel buttons, 93–97
  data exchange, 92–98
  data validation, 25, 98–104
default button, 95
Enter key, 95
ESC key, 95
modal vs. modeless, 91
modeless, 87
modeless form data, 97–98
OK buttons, 93–97
overview, 24–26
size grip, 90
standard, 88–89, 290
styles, 89–91
Dialogs, help features
  ? (question mark), help button, 107–109
  F1 key, 107–109
  help button, 50
  HTML help, 109–116
  indexes, 116
  MFC, 599
  pop-up help, 109–116
  searching, 116
  tables of contents, 116
  Tooltips, 105–107
  topic navigation, 114–116
  Digit substitution, 183–184
  DisplayMember property, 489–492
  Dock Padding property, 275
  Docking controls, 15, 69–73, 597
  Docking controls, MFC, 601–602
  Docking, MFC, 601
  DoDragDrop method, 283–285
  Domain locality, 410–413
  DomainUpDown control, 241–246, 652
  Double buffering, 209–211
  DoubleBuffer style, 209–210
  DoubleClick event, 267
dpi (dots per inch), 168
Drag and drop controls. See controls, drag and drop.
  DragDrop event, 279–282
  DragEnter event, 279–282
  DragLeave event, 279–282
  DragOver event, 279–282
  Drawlcon method, 163–164
  DrawlconUnstretched method, 163–164
  Drawing. See also brushes; color; pens. clipping regions, 122
custom controls, 18
  coordinate conversions, 193. See also transforms.
device units, 191
Drawing (continued)
double buffering, 209–211
flicker, 209–210
inset alignment, 140
joins at angles, 140–141
obtaining a graphics object, 118–119
optimizing, 207–211
overlapping, 149–150
overview, 26–29
page units, 190–193
pixels, and fonts, 167–168, 176
pixels, converting to page units, 193
redrawing objects, 119–120
releasing resources, 119
visibility, checking, 208–209
world coordinate conversions. See transforms.

Drawing, images
animation, 157–160
bitmaps, 150–151
clipping, 151–154
cursors, 164–166
flipping, 154–155
on the fly, 160–162
icons, 163–164
mapping colors, 155–156
metafiles, 150–151
panning, 151–154
raster graphics, 150–151
recoloring, 155–156
rotating, 154–155
scaling, 151–154
skewing, 151–154
transparency, 156–157
vector graphics, 150–151

Drawing, lines
arrows, 137–138
dashes, 138–139
inset alignment, 140
joins at angles, 140–141
line caps, 137–138
parallel lines, 139

Drawing, shapes
antialiasing, 144–145
Bezier curves, 144
cardinal splines, 143–144
control points, 144
curves, 143–144
figures, 146
fill modes, 149–150

Drawing, text strings. See also fonts.
alignment, 180–182, 184
along paths, 186–187
antialiasing, 184–186
clipping to fit, 179–180
digit substitution, 183–184
disabled text, 253–254
formatting, 178–180
glyphs, 179
hotkey prefixes, 182–183
tab stops, 180–182
trimming, 180
wrapping, 178–179, 190

DrillItem event, 251
DrawLine method, 137–138
Drop source, 283–285
Drop target, 279–282
Dynamic properties, 20–21, 414–416. See also data binding.

E
Editing properties, 337–346
Em height, 176
Embedding resources, 22–24
Em-units, 168
EnableVisualStyles method, 62
EndPrint event, 220–221
Enter key, 95
Enumerations, grouping. See namespaces.
Environment application settings, 406–409
Error detection, data set updates, 445
Error messages, data validation, 107
Error notification, standard component for,
25–26, 101–102, 290, 642
ErrorProvider component, 25–26, 101–102, 290, 642
ESC key, 95
Event handling
default events, 13
Designer, 11–13
in Property Browser, 11–13
Events
applications, 392–393
asynchronous notification, 612–615
custom controls, 263–265
definition, 6–7
delegation, 612–615
polling, 614
Expandable object converter, 332–334
Expanding properties, 332–334
Expression property, 450–453
Expressions
data sets, 450–453, 461–462
data validation, 99–101
Extender properties, 105
Extender property providers, 319–324
Extending controls, 275–276

F
F1 key, 107–109
Figures, drawing. See drawing, images; drawing, shapes.
Files
adding to projects. See manifests; resources.
embedding in assemblies. See manifests; resources.
reading and writing, 572–573
Fill modes, 149–150
Filtering, data binding, 493–494
Finalizer methods, 299–300
FlatStyle property, 62–63
Flatten method, 203–204
Flattening paths, 203–204
Flicker, 209–210
Flipping images, 154–155
Focus points, color, 131
FolderBrowserDialog component, 89
Font class, 168–169
Font families, 167, 171–172
Font property, 259–261
Font size, changing
in forms, 66–67
scaling, 196
Font styles, 167
FontDialog component, 89
FontFamily class, 171–172
Fonts. See also drawing, text.
cell ascent, 175
cell descent, 175
characteristics, 172–175
creating, 169–170, 171–172
definition, 167
design units, 168, 176
dpi (dots per inch), 168
dm height, 176
dm-units, 168
getting properties of, 172–175
height, 175–177
leading, 175
line spacing, 176
measuring, 167–168, 173
monospace, 173
pixels, 167–168, 176
points, 168
typefaces, 167
ForeColor property, 259–261
Form icon, 50
Format event, 487–489
FormatFlags property, 179
Formatters
serialization, 622–624
Formatting text strings, 178–180
FormBorderStyle property, 49, 89–91
Forms. See also controls.
activation/deactivation, tracking, 40–41
active, 40
clipping, 38
closing, 41–42
constructors, 38
definition, 1
font size, changing, 66–67
within forms, 75
hiding, See visibility.
inactive, 40
initializing, 10–11, 38–39
lifetime, 38–42
main, 1–2
modal, 4, 35–36
modeless, 3, 35–36
owned, 36–38
owner, 36–38
pausing, 41
rectangular, 46
relative coordinates, converting, 46–47
restarting, 41
reusing, 82–85
scaling. See resizing, forms.
Forms (continued)
serializing visible properties, 42
showing, 35–38
showing in the taskbar, 50
starting as hidden, 39–40
stopping, 41
subforms, 75
visual inheritance, 82–85
Forms, adornments
?q (question mark) button, 50
borders, 49
caption, 49
t form icon, 50
help button, 50
maximize/minimize buttons, 49
non-client area, 49–50
size grip, 50
system menu control box, 49
Forms, location
basic location properties, 43
initial location, 42
moving regions, 54
moving whole forms, 43
Point structure, 44
PointF (floating point) structure, 44
relative to the desktop, 43–44
screen coordinates, 43–44
stacking windows, 48–49
topmost windows, 48–49
Z-order, 48–49
Forms, menus. See also menus.
enabling/disabling items, 58
keyboard shortcuts, 58
labeling items, 58
separating items, 58
switching, 55–56
Forms, visibility
regions, 52–54
starting as hidden, 39–40, 41
transparency, 50–55
FromPage property, 232–233

G
GAC (Global Assembly Cache), 560–562
Garbage collection, 297–300
Genghis library, MFC, 604–605
GetAllControls method, 104
GetChanges method, 443
GetChildRows method, 450
GetFrameCount method, 157–160
GetFullPath method, 111
GetHeight method, 175–177
GetManifestResourceNames method, 360
GetManifestResourceStream method, 361
GetParentRows method, 450
GetProperties method, 505–506
GetRealPageBounds method, 223–224
GetTabStops method, 181–182
GIF animation, 157–160
Global Assembly Cache (GAC), 560–562
Global namespaces, 3
Glyphs, drawing, 179
Gradients, 129–135
Graphical value controls, 240–241
Graphics
drawing. See drawing.
objects, obtaining, 118–119
objects, redrawing, 119–120
printing, 233–234
settings, saving and restoring, 145–146
Graphics class. See dialogs.
GraphicsFromImage method, 161
GraphicsPath class, 146–150
Group boxes, 75, 246–247, 657
GroupBox control, 75, 246–247, 657
Grouping
child controls, 74–75
classes. See namespaces.
controls, 74–75, 246–247
enumerations. See namespaces.
resources, 366
structures. See namespaces.
w eldows. See MDI (Multiple Document Interface).

H
HasErrors property, 445
Hatch patterns, 129–130
HatchBrush class, 129–130
Height
fonts, 175–177
forms, 43
Height property, 43
Help. See dialogs, help features.
HelpButton property, 50, 89–91, 107
HelpProvider component, 114–116, 642
HelpRequested event, 107–108
Hide method, 41
Host form integration, design-time integration, 314–316
HostingForm property, 314–315
Hosts, design-time integration, 300–302
Hotkey prefixes, drawing, 182–183
HScrollBar control, 240–241, 651–652
HTML help, 109–116
Hyphen (-), menu item separator, 58

I
i18n, 373. See also internationalization.
Icon class, 163–164
Icon property, 50
Icons, drawing, 163–164
IDE integration, MFC, 596
Identity matrix, 195
IDeserializationCallback, 625–626
IDisposable interface, 119
ildasm.dex tool, 359
Image lists, 247–249, 290, 640–641
ImageAnimator class, 159–160
ImageList component, 247–249, 290, 640–641
Images, drawing. See drawing, images.
Inactive forms, 40
Indexes, 116
Infinite regions, 205
Information providers, 106
Inheritance, controls, 259–261
InitializeComponent function, 38–39
Initializing
batch initialization, design-time integration, 316–319
forms, 10–11, 38–39
properties, 312
Input, keyboard, 267–271
Input, mouse, 265–267
InsertCommand property, 444
Instance descriptors, 335–337
Internationalization, 373. See also localization.
Invalidate method, 120–121
ISerializable interface, 626–628
IsMdiChild property, 78–79
IsMdiContainer property, 77–79
Isolated storage, 21, 426–430

K
Keyboard
input from, 267–271
input language, 384–385
Keyboard shortcuts
drawing hotkey prefixes, 182–183
menu items, 58
KeyDown event, 267
KeyPress, detecting, 285–286
KeyPressEventArgs object, 268–271
KeyPress event, 267
KeyPressEventArgs object, 268–271
KeyUp event, 267
Known colors, 124–126
KnownColor enumeration, 124–126

L
I10n, 373. See also localization.
Label control, 240–241, 643
Labels on controls, 643
Leading, 175
Left property, 43
Lifetime
applications, 388–389
forms, 38–42
Line spacing, 176
LineAlignment property, 184
Linear gradients, 129–132
LinearGradientBrush, 131–132
LineJoin property, 140–141
Lines, drawing. See drawing, lines.
LinkLabel control, 240–241, 643–644
List boxes, 646, 647, 652–653
List views, 241–246, 648
ListBox control, 241–246, 646
Lists
adding tags to, 245–246
creating, 241–244
images, controls for, 247–249
selecting from, 244–245
text, controls for, 241–246
List/text combination boxes, 647–648
ListView control, 241–249, 648
Load event, 39
Loading manifest resources, 360–361
Localities, application settings, 410–413
Localization
assembly linker tool, 381
culture information, 373–375
culture-neutral, 377
Localization (continued)
culture-specific, 377
definition, 373
at the forms level, 377–380
keyboard input language, 384–385
main assemblies, 376
no-compile deployment, 380
for nondevelopers, 380–382
probing, 375–377
resolving duplicate names, 382–384
satellite assemblies, 376
Windows Resource Localization Editor, 380–382
Location property, 43
LocationChanged event, 43
Look and feel. See application settings; user interface.

M
Machine locality, 410–413
Main assemblies, 376
Main function, 2
Main menus, 54–58, 59, 641
MainMenu component, 56, 641
MakeEmpty method, 207
Manifest resources
definition, 358
loading, 360–361
namespaces, 361–362
naming, 359–360
Manifests, 358
Mapping colors, 155–156
MarginBounds property, 222, 226–228
Margins, printing, 222–226
Marshaling by reference, 398
Master-detail relations, 494–497
Matrix, 194
Matrix class, 194–195
MaximizeBox property, 49, 89–91
Maximize/minimize buttons, 49
MaximumPage property, 231
MaximumSize property, 47
MDI (Multiple Document Interface), 77–82
MDI applications, MFC, 596
MdiChildActivate event, 78–79
MdiList property, 78–79
MdiParent property, 77–79
MeasureString method, 173
Measuring fonts, 167–168, 173
Menu property, 55–56
MenuBar control, 238–240
MenuItem class, 56–57
Menus. See also forms, menus.
   context, 58–59, 352–355, 641
   main, 54–58, 59, 641
MDI (Multiple Document Interface), 79–82
   standard components, 290
MergeOrder property, 81
MergeType property, 81
Message passing model, 540–541
Message queue, 271–272
Metafile class, 151
Metafiles, 150–151
MFC (Microsoft Foundation Classes)
   Active Documents, 598
   anchoring, 597
   application wizards, 595–596
   automation, 598
   COM control hosting, 598
   command routing, 602
   command unification, 602
   cross-bitness, 600
   cross-language, 600
   cross-platform, 600
   data binding, 600
   DDX/DDV, 599
dialog applications, 596
docking, 597
document management, 601–602
   Document-View, 601
   Genghis library, 604–605
   help, 599
   history of, 591–594
   IDE integration, 596
   managed environment, 603
   MDI applications, 596
   migrating from, 603–604
   multi-SDI applications, 596
   OLE (Object Linking and Embedding), 598
   print preview, 598
   print setup, 598
   printing, 598
   SDI applications, 596
   shell management, 602
   source code, 603
   splitting, 597
   third-party support, 601
toolbars, 597–598
   user interface layout, 596–597
user interface updating, 602
vs. WinForms, 32, 594–603
Web deployment, 600–601
Win32 wrappers, 599
Microsoft Foundation Classes (MFC). See MFC (Microsoft Foundation Classes).
MinimizeBox property, 49, 89–91
MinimumPage property, 231
MinimumSize property, 47
MinMargins property, 228
Modal forms, 35–36
Modal property, 91
Modal vs. modeless dialogs, 91
Modeless
dialogs, 87
form data, 97–98
forms, 35–36
vs. modal dialogs, 91
Monospace fonts, 173
MonthCalendar control, 240–241, 650
Mouse
button status, 267
events, 265–267
MouseButtons property, 267
MouseDown event, 265–267
MouseEnter event, 267
MouseEventArgs argument, 266–267
MouseHover event, 267
MouseLeave event, 267
MouseMove event, 265–267
MousePosition property, 267
MouseUp event, 265–267
Move event, 43
Multiple Document Interface (MDI), 77–82
Multi-SDI applications, 400–406, 596
Multitable data sets, 445–447
Multithreading, 31
Multithreading user interfaces
asynchronous callback, 528–529
asynchronous operations, 522–525
asynchronous Web services, 541–545
blocking operations, 526
boxing, 537
canceling, 531–534
communication via message passing, 537–541
communication via method parameters, 535–537
communication with shared data, 534–535
message passing model, 540–541
nonblocking operations, 526
progress indicators, 520–522
race conditions, 534
reference types, 535–536
safety, 525–526
simplifying, 530–531
single-threaded applications, 522
synchronous callback, 525–528
threads, 522
value types, 535–536

N
Named colors, 124–126
Named kernel objects, 396
Namespaces
default, getting, 23
global, 3
manifest resources, 361–362
purpose, 2
short notation, 3
using statement, 3
Naming manifest resources, 359–360
Navigation, data sets, 450
Nesting resources, 366
.NET Remoting, 397–400
No-compile deployment, 380
Nonblocking operations, 526
Non-client area, 49–50
Notification tray, 290, 638–639
NotifyIcon component, 290, 638–639
No-touch deployment (NTD). See Web deployment, no-touch.
NTD (no-touch deployment). See Web deployment; Web deployment, no-touch.
Numeric value controls, 240–241
NumericUpDown control, 240–241, 652–653

O
Object Linking and Embedding (OLE), MFC, 598
OK buttons, 93–97
OLE (Object Linking and Embedding), MFC, 598
OnPaint method, 273–274
Opacity, 123–124
Opacity property, 51–53
OpenFileDialog component, 89
Owned forms, 36–38
OwnedForms collection, 36–37
Owner forms, 36–38
Owner property, 36–37
Owner-draw controls. See controls, owner-draw.

Page settings, 226–228
Page units, 190–193
PageBounds property, 222
PageSize property, 191–192
PageSettings property, 226–228
Paint event, 119–122
Panel control, 75, 246–247, 657
Panning images, 151–154
Parallel lines, drawing, 139
Parent columns, 450
Parent property, 37–38
Parse event, 488–489
Partial trust, 430
Partially trusted assemblies. See Web deployment, partially trusted assemblies.
Partially trusted callers, 566–568
PATH environment variable, on the command line, 4
Path gradients, 132–135
PathGradientBrush class, 132–135
Pathnames, converting relative to full, 111
Paths (graphic)
drawing, 146–150
drawing text strings, 186–187
transforms, 202–204
Pausing forms, 41
Pen class, 135–136
Pens. See also brushes; color; drawing.
alignment, 140
arrows, 137–138
centered alignment, 140
compound, 139
creating from brushes, 141–142
dashes, 138–139
inset alignment, 140
joins at angles, 140–141
line caps, 137–138
parallel lines, 139
properties, 136–137
Permissions, 411. See also security.
Permissions, Web deployment
Authenticode, 587–589
awarding, 555–556
checking for, 554–555
deploying, 584–587
increasing, 578–584
intranet vs. Internet, 553
viewing, 552–553
Picture boxes, 240–241, 646
PictureBox control, 240–241, 646
Pixels, 167–168, 176
Pixels, converting to page units, 193
Point structure, 44
PointF (floating point) structure, 44
Points (unit of measure), 168
Polling events, 614
Populating data sets, 436
Pop-up help, 109–116
Position property, 479–482
Preferences, setting. See application settings.
Previewing, background images, 23
Previewing, printed output
corrupted display, 223
MFC (Microsoft Foundation Classes), 598
overview, 216–219
PreviewPrintController class, 216–217
print preview control, 654
PrintPreview control, 240–241
PrintPreviewControl, 654
PrintPreviewControl class, 217–218
PrintPreviewControl control, 654
PrintPreviewDialog component, 89
PreviewPrintController class, 216–217
Print button, 28
Print controllers, 215–219
Print documents, 213–215
Print events, 219–221
Print method, 214–215
Print preview. See previewing printed output.
Print setup, MFC, 598
PrintController class, 215
PrintController property, 215–216
PrintControllerWithStatusDialog class, 215–216
PrintDialog component, 89, 229–234
PrintDocument component, 28, 213–215
Printers
choosing, 228, 229–234
INDEX  677

resolution, 233
settings, 229–234
PrinterSettings class, 232–233
Printing
canceling, 215
color, 227
graphics, 233–234
margins, 222–226
MFC (Microsoft Foundation Classes), 598
overview, 26–29
page settings, 226–228
selected page ranges, 230–233
user preferences, 228
PrintPage event, 214–215, 220–221
PrintPreview control, 240–241
PrintPreviewControl class, 217–218
PrintPreviewControl control, 654
PrintPreviewDialog component, 89
PrintRange property, 232–233
Probing resources, 375–377
Programmatic approach, design-time integration, 306–307
Progress bars, 240–241, 520–522, 653–654
ProgressBar control, 240–241, 653–654
Projects, starting, 8
Properties.  See also entries for specific properties.
ambient, 259–261
code serialization, 311–316
of custom types, 332
default values, 311, 312
design-time-only, 350–352
displaying.  See Property Browser.
dynamic, 20–21
editing, 337–346
expanding, 332–334
exposing at design time.  See custom
designers; design-time integration.
extender, 105
extender property providers, 319–324
fonts, 172–175
forms, 42–43, 45–46
initializing, 312
pens, 136–137
required for data binding, 489–492
resetting defaults, 261, 310
type converters, 324–332, 335–337
Property Browser, 11–13, 307–311
Property managers, 477–482
Q
QueryPageSettings event, 226–228
Question mark (?), help button, 50, 107–109
R
Race conditions, 534
Radio buttons, 645
RadioButton control, 645
RadioCheck property, 58
Raster graphics, 150–151
Recoloring images, 155–156
Rectangle property, 46
RectangleF (floating point) property, 46
RectangleTheBounds property, 46
Rectangular forms, 46
Reference types, 535–536
Refresh method, 121
RegEx class, 99–101
Region class, 204–205
Region property, 53–54
Regions
clipping, 122, 205–206
combination operations, 206–207
constructing, 205
definition, 204
emptying, 207
infinite, 205
moving, 54
resizing, 54
visibility, 52–54
Registry, 416–421
Regular expressions.  See expressions.
Relations, data set tables, 448–450, 460–461
Remove method, 60–61, 440–442
RemoveRange method, 60–61
Rendering custom controls, 257–259
ResetClip method, 206
Resetting property defaults, 310
Resize event, 43
ResizeRedraw style, 211
Resizing.  See also scaling.
controls, 73
regions, 54
text boxes, 68–69
Resizing, forms
auto-scaling, 66–67
basic size properties, 43
client area, 45–46, 76–77
Resizing (continued)
proportionally, 76
regions, 54
restricting, 47–48
Size property, 45–46
SizeF (floating point) property, 45–46
by user, 68–69
whole forms, 43
Resizing forms
client area, 76–77
proportionally, 76
regions, 54
by user, 68–69
whole forms, 43
Resolution, printers, 233
Resource localization. See localization.
Resource management, 297–300
Resource manager
accessing resources, 368–369
ResourceManager class, 367–368
Resource resolution, 382–384
ResourceManager class, 367–368
Resources. See also application settings.
accessing, 368–369
associating with components, 369–373
binary type, 366–367
definition, 22
Designer, 369–373
embedding, 22–24
grouping, 366
issues, 372–373
nesting, 366
text-based type, 363–366
typing, 362–363
Restarting forms, 41
Restore method, 146
ResumeBinding method, 486
ResumeLayout method, 60, 76–77
Retrieving data, 436–439
Reusing
controls, 16–18, 252–253
forms, 82–85
Matrix objects, 201
Rich text boxes, 240–241, 654
RichTextBox control, 240–241, 654
Right property, 43
Roaming user locality, 410–413, 419
RootComponent property, 315
RotateAt method, 197–198
RotateFlipType enumeration, 154–155
Rotating images, 154–155, 197–198
RowFilter property, 493–494
Satellite assemblies, 376
Save method, 146
SaveFileDialog component, 89
Scaling. See also resizing.
AutoScale property, 66–67
AutoScaleBaseSize property, 66–67
auto-scaling forms, 66–67
controls, 251–252
fonts, 196
graphics objects, 195–196
images, 151–154
transforms, 195–196
Scope, application settings, 426–430
Scroll bars
AutoScrollMargin property, 275
AutoScrollMinSize property, 275
AutoScrollPosition property, 275
controls for, 240–241, 651–652
HScroll event, 275
HScrollBar control, 240–241, 651–652
SetScrollMinSize helper, 275
VScroll event, 275
VScrollBar control, 240–241, 651–652
Scrolling controls, 272–275
SDI applications, MFC, 596
Searching help topics, 116
Security. See also permissions.
Authenticode, 587–589
deployment, 32
Web deployment, code access, 552–556
SelectActiveFrame method, 159
SelectedItem property, 490–492
SelectedItems property, 490–492
SelectedValue property, 489–492
SendToBack method, 61
Serialization
data versioning, 628–629
deserialization, 625–626
design-time integration, 311–316
formatters, 622–624
IDeserializationCallback, 625–626
ISerializable interface, 626–628
skipping nonserialized fields, 625
streams, 619–622
visible form properties, 42
Server-side command line arguments, 575–576
SetBlendTriangular method, 131
SetClientSizeCore method, 76–77
SetClip method, 206
SetDigitSubstitution method, 183–184
SetScrollMinSize helper, 275
SetSigmaBellShape method, 131
SetTabStops method, 181–182
Settings, application. See application settings.
Shapes, drawing. See drawing, shapes.
Shearing, 200
Shell management, MFC, 602
Shift+Tab key, 570–571
Shortcut property, 58
Show method, 41
ShowDialog method, 24
ShowHelp property, 228
Showing forms. See forms, visibility.
Showing forms in the taskbar, 50
ShowInTaskbar property, 39–40, 50, 89–91
ShowPopup method, 109–110
Single-instance applications, 395–397
Single-threaded applications, 522
Sites, design-time integration, 300–302
Size grip, 50, 90
Size property, 43, 45–46, 175–177
SizeChanged event, 43
SizeF (floating point) property, 45–46
SizeGripStyle property, 50, 90–91
Sizing. See resizing; scaling.
Skewing images, 151–154
Smoothing modes, 144–145
SmoothingMode property, 144–145
SolidBrush class, 128–129
Sort property, 492–493
Sorting, data binding, 492–493
Source code, MFC, 603
Source code files. See assemblies.
Special folders, 21, 422–424
Splitter control, 655
Splitters, 15, 73–74, 597, 655
Stacking windows, 48–49
Standard controls. See controls, standard.
Standard dialogs, 634–638
StandardPrintController class, 215–216
Starting a project, 8
StartPage property, 218
StartPosition property, 42
Status bars, 240–241, 656
StatusBar control, 240–241, 656
Stopping forms, 41
StoreAdmin tool, 429–430
storeadm.exe tool, 429–430
Stores, 426–430
Streams, 424–430, 619–622
String values controls, 240–241
StringFormat class, 178–179
StringFormat constructor, 179
Structures, grouping. See namespaces.
Styles, dialogs, 89–91
Subforms, 75
Subpaths, 146
SurroundColors property, 135
SuspendBinding method, 486
SuspendLayout method, 60, 76–77
Sweeps, 143–144
Synchronous callback, 525–528
System menu control box, 49
SystemBrushes class, 129

T
Tab controls, 657–658
Tab key, 570–571
Tab stops, 180–182
Tabbing between controls, 61
TabControl, 75
TabControl control, 246–247, 657–658
TabIndex property, 61
Tables of contents, 116
TabPage control, 247–249
Tension, 143–144
Testing custom controls, 256–257
Text, drawing. See drawing, text.
Text boxes
  control for, 644, 654
  resizing, 68–69
Text property, 58
Text wrapping, 190
Text-based-type resources, 363–366
TextBox control, 644
Text/list-type combination boxes, 647–648
TextureBrush class, 129
Textures, drawing, 129
Themes
  controls, 61–63
  owner-draw controls, 254
Third-party support, MFC, 601
Thorough validation, 102–104
Threads, 522
Tiling shapes, 129
Time/date controls, 240–241, 650
Timer component, 291–292, 639–640
ToolBar control, 238–240, 655–656
ToolBarButton control, 247–249
Toolbars
  assigning images to buttons, 239–240
  control for, 655–656
  MFC (Microsoft Foundation Classes), 597–
  598
Toolbox, adding custom controls, 256–257
ToolTip component, 105, 109–111, 642
ToolTips, 105–107
Top property, 43
TopPage property, 232–233
Topmost windows, 48–49
ToString method, 241–242
Track bars, 240–241, 653
TrackBar control, 240–241, 653
Tracking changes, 442–443
Transform method, 202–203
TransformPoints method, 193
Transforms
  combining, 200–201
  definition, 193–194
  flattening paths, 203–204
  helpers, 201–202
  paths, 202–204
  rotation, 197–198
  scaling, 195–196
  shearing, 200
  translation, 198–200
  warping paths, 203–204
  widening paths, 203–204
Translations between colors. See gradients.
Translation, graphics objects, 198–200
Transparency, 50–55, 124, 156–157
TransparencyKey property, 52–53
Transparent color, 156–157
Tree views, 241–246, 648–649
TreeView control, 241–249, 648–649
Trimming property, 180
Trimming text strings, 180
Type code serialization, 335–337
Type conversion, 506–511
Type converters
  design-time integration, 324–332, 335–337
  properties, 324–332, 335–337
Type descriptors, 505–506
TypeConverter class, 325
Typed data sets. See data sets, typed.
TypeDescriptor class, 326, 505–506
Typefaces, 167
Typing resources, 362–363

U
UI thread exceptions, 393–395
UI threads, 389
UI type editors, 337–346
Update method, 121
UpdateCommand property, 444
Updating data sets, 440, 445
UseAntiAlias property, 218
User controls, 16, 277–279
User information, standard components, 290
User interface
  customizing. See application settings.
  layout, MFC, 596–597
  multithreading. See multithreading user interfaces.
  updating, MFC, 602
User locality, 410–413
Using statement, 3, 9

V
Validating event, 25–26
Validation. See data validation.
Value controls, 240–241
Value types, 535–536
ValueMember property, 489–492
Vector graphics, 150–151
Versioned data paths, 430–432
Versioning, 559–560, 628–629
Viewing code, 8–9
Visibility, checking, 208–209
Visible property, 39–40, 41
VisibleChanged event, 41
VisibleClipBounds property, 223
Visual inheritance, 82–85
VScroll event, 275
VScrollBar control, 240–241, 651–652

W
Warp method, 203–204
Warping paths, 203–204
Web deployment
code access security, 552–556
control creation, 548–549
control events, exposing, 550–552
control interaction, 549–550
hosting controls, Internet Explorer, 547–552
MFC (Microsoft Foundation Classes), 600–601
no-touch, 32
overview, 31–33
security, 32
Web deployment, no-touch
application base (appbase), 560–562
application domain (apppdomain), 561
application download, 557–559
arrow keys, 570–571
assembly receiver, 560
caching, 559–560
client-side command line arguments, 574–575
custom user input, 570–571
definition, 565
deployment, 584–587
definition, 565
files, reading and writing, 572–573
form-jacking, 570–571
GAC (Global Assembly Cache), 560–562
partially trusted callers, 566–568
procedure, 556–557
related files, 560–565
resources, 563–565
server-side command line arguments, 575–576
settings, 568–569
Shift+Tab key, 570–571
Tab key, 570–571
Win32 wrappers, MFC, 599
Windows, grouping. See MDI (Multiple Document Interface).
Windows message handling, 271–272
Windows Resource Localization Editor, 380–382
WindowState property, 47–48
WrapMode property, 134
Zoom property, 218
Z-order
controls, 60–61, 71–73
forms, 48–49