Index

A
ActionListener 283
actionPerformed 281
adapter 284
addActionListener 282
addMouseListener 285
animation 175, 354
anisotropic mapping mode 15
anonymous class 283
arc 345
area2 (for polygon) 43
area2 (for triangle) 40
AWT 2
concave polygon 41
contains (Java method) 47
continuous interval 14
coordinate system 33
coordinate system (changing) 78
counter-clockwise 39, 75, 191
cropping 271
cross product 37
cube 148, 302
curve fitting 120
curved surface 232
cvDefPoly class 24
cylinder 199

B
back-face culling 220
background color 6
Bézier curve 120
beams 323
BorderLayout 202
Bresenham’s algorithm for circles 103
Bresenham’s algorithm for lines 92
B-spline curve fitting 130

camera 140
canvas 3
ccw (for polygon) 42
circle 102
circumcenter 344
circumscribed circle 59
client rectangle 4
Cohen-Sutherland line clipping 107
color 225
complex numbers 265
dashed line 29, 342
data files for 3D objects 190
determinant 35
device coordinates 5, 8
distance between point and line 50
distance2 56
dodecahedron 306
dot product 34
double buffering 175, 354
double-step line-drawing 97
Dragon curve 255
drawArc 345
drawLine 2
drawOval 102

circle 102
circumcenter 344
circumscribed circle 59
client rectangle 4
Cohen-Sutherland line clipping 107
color 225
complex numbers 265
dashed line 29, 342
data files for 3D objects 190
determinant 35
device coordinates 5, 8
distance between point and line 50
distance2 56
dodecahedron 306
dot product 34
double buffering 175, 354
double-step line-drawing 97
Dragon curve 255
drawArc 345
drawLine 2
drawOval 102

camera 140
canvas 3
ccw (for polygon) 42
circle 102
circumcenter 344
circumscribed circle 59
client rectangle 4
Cohen-Sutherland line clipping 107
color 225
complex numbers 265
dashed line 29, 342
data files for 3D objects 190
determinant 35
device coordinates 5, 8
distance between point and line 50
distance2 56
dodecahedron 306
dot product 34
double buffering 175, 354
double-step line-drawing 97
Dragon curve 255
drawArc 345
drawLine 2
drawOval 102

E
Euler’s theorem 302
event listener 282
Export HP-GL command 209
expression evaluator 327
eye coordinates 146
eye position 140
INDEX

F
Faces (in 3D data files) 232
File menu 209, 232
files for 3D objects 190
fillet 60
fillPolygon 221, 354
fillRect 7
foreground color 6
fractal 249
frame 5
function of two variables 244, 326

G
ggetSize 5
globe model 215, 312
grammar 258

H
Hewlett-Packard Graphics Language 207
hexahedron 302
hidden-face elimination 219
hidden-line elimination 177
Hilbert curve 255
holes in faces 192
hollow cylinder 199
hollow prism 199
horizon 140
Horner’s rule 129
HP-GL 207

I
icosahedron 306
image size 148
inner class 282
inner product 34
input file for 3D objects 190
inscribed circle 60
insidePolygon 47
insideTriangle 44
interpolation for z 235
interpolation for z 277
inverse matrix 73
isotropic mapping mode 18

J
JDK 2
Julia 274

K
Koch 250

L
Lindenmayer 254
line clipping 107
line drawing 92
line through two points 36
linear combination of vectors 33
linear transformation 65
lines of latitude 312
lines of longitude 313
listener 281
logical coordinates 8
Logo 251
L-systems 254

M
Mandelbrot 249, 264
matrix 64
matrix product 64
menu 231
mouse 21
mouse button 75
MouseListener 283
MouseAdapter 284

N
nonconvex solid 225
normal vector 220

O
Obj3D class 160
octahedron 302, 305
orientation 38
orthographic projection 146, 220
INDEX

P
painter’s algorithm 226
panel 202
parsing 336
perpendicular bisector 344
perspective transformation 141, 146
pixel 5
plane through three points 36
platonic solid 301
point in polygon 45
point in triangle 44
point on line 47
Point2D 25
Point3D 83
polygon 21, 41
polygon clipping 113
Polygon3D class 162
printer output via HP-GL 208
prism 199
projection of point on line 51

Q
quicksort 231

R
recursive descent parsing 335
reflection 69
reflex vertex 41
regular polyhedron 301
right-handed coordinate system 33
Rokne 97
Rotate3D 84
rotation 66, 74
rotation (3D) 79
rotation about arbitrary axis 80
rotation matrix (3D) 81
rotation matrix 66
rounding-off errors 13
rubber banding 271

S
scaling 69
screen coordinates 147, 220
semi-sphere 216
setColor 221
setXORMode 106
shearing 70
shift vector 72
Sierpinski 255
silhouette 245
smooth curve 128
snowflake 253
sorting triangles 227, 231
sphere 312, 363
spherical coordinates 142
spiral of beams 323
staircase 217
string grammar 253
superpixel 135
sutherland-hodgman polygon clipping 113

tetrahedron 302
thickness of line 7
tolerances 181
Tools2D class 54
torus 217, 319, 364
transformation matrix 65
translation 71
tree (fractal) 258
tree of Pythagoras 60
Triangle 53
triangulate 53
turtle graphics 251

U
unit vector 33

V
vector 32
Vector 32
Vector (in Java) 32
Vector (in Java) 33
INDEX

vector product 37
viewing matrix 143
viewpoint 143
viewing transformation 141
viewpoint menu commands 231
visible lines 178

W
WindowAdapter 284
windowClosing 283
WindowListener 283
wire-frame model 148

world coordinates 141
Wu 97
Wyvill 97

X
XOR paint mode 106

Y
y-axis, direction 8

Z
Z-buffer algorithm 234
zooming 271