

INDEX

SYMBOLS

- + (addition operator), 27
- && (AND operator), 38
- = (assignment operator), 19
- ... (closed range operator), 48
- / (division operator), 27
- == (equal to operator), 36
- > (greater than operator), 37
- < (less than operator), 37
- % (modulo operator), 30, 55, 105
- * (multiplication operator), 27
- ?? (nil coalescing operator), 65, 151, 185
- != (not equal to operator), 36
- ! (NOT operator), 38
- || (OR operator), 38
- | (pipe), 248
- (subtraction operator), 27

A

- addition operator (+), 27
- alpha (transparency setting), 286–287
- anchorPoint property, 208–209, 287
- AND operator (&&), 38
- app icon, adding to project, 125
- Apple ID (Apple account)
 - creating, 5
 - for running app on a device, 14
 - signing in to Xcode, 7
- applications. *See* apps
- application delegate, 174
 - managing app lifecycle, 177
 - shared property, 178
- apps, 3. *See also* BirthdayTracker; Hello World; Schoolhouse Skateboarder
 - creating, 5–9, 122–125, 205–206
 - lifecycle, 174, 177
- arc4random_uniform() function, 229

- arguments, 82
 - in a function call, 83
 - labels, 84, 88, 89
 - custom, 90
 - removing, 90–91
- arithmetic operators, 27–30
- arrays
 - accessing items, 69
 - adding items, 70
 - index, 67
 - Index out of range error, 69–70
 - initializing, 68
 - looping through, 50, 74–75
 - mutable and immutable, 68
 - properties, 73
 - removing items, 71–72
 - replacing items, 72
- artwork. *See* images
- asset catalogs, 125, 206–207, 214
- assignment operator (=), 19
- Attributes Inspector, 12, 127
- auto layout, 138–139

B

- behavior, of an object, 96
- bitmasks, 247–249
- BirthdayTracker (app), 121, 122
 - AddBirthdayViewController class, 144, 145
 - alphabetizing birthdays, 185–186
 - app icon, adding, 125
 - Birthday class, 142–144, 175–176
 - BirthdayTableViewController class, 127–129, 156–158
 - creating project, 122–125
 - displaying birthdays
 - connecting user input to display, 166–172
 - creating list of birthdays, 155–166
 - display name, adding, 126

- BirthdayTracker (app), *continued*
 - notifications
 - permissions for, 192–194
 - removing, 199
 - scheduling, 194–199
 - removing birthdays, 186–189
 - saving birthdays, 173–181
 - user input
 - Add button, 130–133
 - auto layout, 138–139
 - Cancel button, 139, 153–154
 - controllers, 127–130, 145–146
 - date picker, 137–138, 147–150, 152
 - input controls, 133, 146–147
 - Save button, 139, 150–151, 153
 - text fields, 136–137, 147–149, 151–152
 - user interface labels, 134–136
- body, of a function, 83
- Bool data type, 24
- Boolean
 - expressions, 36–40
 - values, 24
- break keyword, 105–106
- Bundle Identifier, 9
- bundles, 294

C

- Calendar class, 195–197
- calling a function, 83
- cases, of enums, 259–260, 280–281
- casting, 26. *See also* downcasting
- CGFloat data type, 210, 219
- CGPoint struct, 210
- CGRect struct, 210
- CGVector data type, 240
- classes, 95
 - accessing properties, 98–100
 - creating, 96
 - definition, writing, 96–97
 - inheritance, 108–110
 - initializers, 98, 100–103
 - instances, 96
 - methods, 96, 98, 103–106
 - naming, 96–97
 - objects, 95

- properties, 97, 219
- self keyword, 106–107
- superclasses and subclasses, 108–110
- class keyword, 96
- closed range operator (...), 48
- code blocks
 - nesting, 54–55
 - scope, 55–57
- collections, looping through, 50
- comments, 32–33
- comparison operators, 36–38
- compound assignment operators, 31–32
- compound Boolean expressions, 38–40
- conditional statements, 36, 40–45
- console. *See* debug area
- constants
 - declaring and creating, 20
 - naming, 22
 - when to use, 21
- coordinates, 11, 210
- Core Data framework, 174
 - adding to project, 123, 174
 - deleting managed objects, 188
 - entities and attributes, 174–176
 - fetching managed objects, 181–182
 - managed object context, 178
 - saving managed objects, 180
 - sortDescriptors property, 185–186
- count property
 - array, 73
 - dictionary, 78
- creating a new project, 6, 122–125, 205–206

D

- databases, 173–174. *See also* Core Data framework
- Data framework
- data types, 22
 - Bool, 24
 - casting, 26
 - CGFloat, 210, 219
 - CGVector, 240
 - custom class, 95
 - declaration of, 23

- Double, 24
- downcasting, 113–114
- Float, 24
- Int, 24
- String, 24–25
- TimeInterval, 232, 272
- type inference, 25–26
- UInt32, 247
- Date
 - class, 144
 - data type, 159
- DateComponents class, 195–197
- date formatter, 159
- date picker
 - adding, 137–138
 - getting date from, 152
 - setting a maximum date, 149–150
- debug area, 10
 - displaying output, 83
 - opening, 19, 48
- decimal numbers, 24
- definition, writing for a class, 96–97
- degrees, of rotation, 255
- delegation, 166–168
 - delegate, creating, 170–171
 - protocols
 - adopting, 168–170
 - creating, 168
- device orientation, 124, 211–213
- devices, running apps on, 14–16
- dictionaries, 75
 - accessing values, 76–77
 - adding items, 77
 - initializing, 75–76
 - looping through, 78–79
 - mutable and immutable, 75
 - optionals, 76
 - properties, 78
 - removing items, 77
 - replacing items, 77–78
- dismissing view controller, 153–154
- division operator (/), 27
- dot notation, 98, 104
- do-try-catch blocks, handling errors
 - with, 180
- Double data type, 24
- downcasting, 113–114

E

- else if statements, 41–43. *See also* if statements
- else statements, 41. *See also* if statements
- enums (enumerations), 259–260, 280–281
- equal to operator (==), 36
- errors
 - fixing with Xcode, 99–100
 - handling with do-try-catch blocks, 180
 - Index out of range error, 69–70
 - playground, 21
- exhaustive switch statements, 105

F

- Float data type, 24
- fonts
 - in SpriteKit, 270
 - in storyboard, 12
- for-in loops
 - arrays, 50, 74–75
 - collections, 50
 - dictionaries, 78–79
 - ranges, 48–49
- formatting strings, 273–274
- frames, 210
- func keyword, 82
- functions, 81
 - argument labels, 84, 88, 89–91
 - arguments, 82
 - body, 83
 - calling, 83
 - input parameters, 82, 84–88
 - naming, 82
 - return values, 91–93
 - void, 82

G

- game engine. *See* SpriteKit
- game loop update(·) method, 231–233
- GameScene class, 208
- gesture recognizers, 234–235
- greater than operator (>), 37
- graphics. *See* images

H

- Hello World (app)
 - adding a label, 10–12
 - creating and naming, 6–9
 - running in simulator, 12–13
 - running on a device, 14–16
 - stopping, 13

I

- IBAction, 150
- IBOutlet
 - connecting to storyboard, 147–149
 - setting up, 146–147
- if-let statements, 62–64
- if statements, 40–43
- images
 - adding to project, 206–207
 - finding, 204
 - sizing for devices, 213–214
 - suffixes, 214
- implicitly unwrapped optionals, 64
- index, 67. *See also* arrays
- IndexPath struct, 165–166
- inheritance, in a class, 108–110
- initializers, for classes, 98
 - calling with input parameters, 102–103
 - creating
 - with input parameters, 101–102
 - without input parameters, 100–101
 - default, 100
- init keyword, 100–102
- input parameters, of a function, 82, 84–88
- installing Xcode, 4–5
- instances, of a class, 96
- Int data type, 24
- integers, 23, 24
- iOS, 4
- iPhone simulator. *See* simulator
- isEmpty property
 - array, 73
 - dictionary, 78
- is keyword, 110
- iteration, 49

K

- keys, 75. *See also* dictionaries

L

- labels
 - adding to storyboard, 10–11
 - positioning, 134–136
 - in SpriteKit, 268–272, 273–274
- landscape vs. portrait, device
 - orientation, 124, 211–213
- less than operator (<), 37
- let keyword, 20
- local notifications. *See* notifications
- logical operators, 38–40
- long-press gestures, 234
- loops, 47
 - for-in loops. *See* for-in loops
 - nesting, 54–55
 - while loops, 50–53

M

- managed object context, 178
- MARK: keyword, for marking file sections, 170
- methods, 96
 - calling, 104
 - creating, 103
 - helper methods, 104–106
 - initializers, 98
 - selectors, 235
- mobile apps, 4
- modal view controller, 132
- modulo operator (%), 30, 55, 105
- modulus. *See* modulo operator
- multiplication operator (*), 27

N

- naming
 - classes, 96–97
 - constants and variables, 22
 - functions, 82
- navigation controller, 129
 - accessing in code, 171–172
 - adding buttons, 130–133, 139
 - adding a title, 130
- Navigator pane, 9–10, 124
- nesting code blocks, 54–55

- nil coalescing operator (??), 65, 151, 185
- nil value, 60
- not equal to operator (!=), 36
- notifications, 191
 - changing settings, 194
 - removing, 199
 - requesting authorization, 192–194
 - scheduling, 194–199
 - trigger, 195–196
- NOT operator (!), 38
- NSKeyedUnarchiver, 294

O

- Objective-C, 4
- Object Library, 10
- objects, 95–96
- opening a project, 13
- operands, 27
- operators
 - arithmetic, 27–30
 - comparison, 36–38
 - compound assignment, 31–32
 - logical, 38–40
 - modulo (%), 30, 55, 105
 - order of operations, 30–31
- optionals, 59, 60
 - declaring, 60
 - dictionary values, 76
 - if-let statements, 62–64
 - nil coalescing operator (??), 65, 151
 - optional binding, 62–64
 - unwrapping
 - forced, 61–62
 - implicit, 64
- order of operations, 30–31
- OR operator (||), 38

P

- pan gestures, 234
- parameters, of a function, 82, 84–88
- parentheses
 - after function names, 83
 - for order of operations, 30–31, 39

- particle emitters, 291–297
- physics bodies, 240
 - applying forces to, 250–251
 - applying to sprite, 244–245, 263
 - properties, 242–244, 253–254
 - shapes, 241–242
- physics categories, 247
- physics engine. *See* SpriteKit physics engine
- pinch gestures, 234
- pipe (|), 248
- playground
 - debug area, 19–21
 - opening, 17–18
 - results sidebar, 18–19
- PNG (Portable Network Graphics) files, 207
- portrait vs. landscape, device orientation, 124, 211–213
- positioning
 - sprites, 210, 220–221, 226–227, 263
 - storyboard elements, 134–136
- prepare(for:sender:) method, 171–172
- print(:) function, 19, 82
- projects. *See also individual projects*
 - creating, 6–9, 122–125, 205–206
 - opening, 13
 - running on device, 14–16
 - running in simulator, 12–13
 - saving, 13
- properties
 - of arrays, 73
 - of classes, 96–97
 - accessing, 98–100
 - default values, 97
 - of dictionaries, 78
- protocol, for delegation, 167, 168–170

R

- radians, of rotation, 255
- random numbers, 229
- ranges, looping through, 48–49
- raw values, of enums, 259–260
- rectangles, for frames, 210
- refactoring code, 182
- reference types, 115–116

- repeat-while loops, 52–53
- return keyword, 91
- return values, 91–93
- rotating device, in simulator, 213
- running an app
 - in simulator, 12–13
 - on a device, 14–16

S

- saving
 - birthdays, in BirthdayTracker, 173–181
 - managed objects, in database, 180
 - projects, 13
- scene
 - in SpriteKit, 205, 208
 - in a storyboard, 10
- Schoolhouse Skateboarder (app), 203
 - anchorPoint, setting for scene, 208–209
 - bricks
 - adding, 224–225
 - animating, 226–230
 - leaving gaps, 229–230
 - physics bodies for, 245–246
 - contacts and collisions, 246–250
 - creating the project, 205–206
 - ending the game, 254–255
 - game loop, 231–233
 - game state, 280–281
 - gems
 - collecting, 267–268
 - removing, 264–265
 - spawning, 262–264
 - updating, 265–267
 - gravity, simulating, 235–238, 240
 - images
 - displaying background, 207–211
 - downloading, 204, 206
 - filling the screen, 215
 - menus (MenuLayer class), 282
 - displaying, 286–288
 - message label, 283–285
 - removing, 288–289
 - score label, 285–286

- orientation, setting, 211–213
- platforms, adding multilevel, 258–262
- scores
 - displaying with labels, 268–272
 - for collecting gems, 275–276
 - high scores, 276
 - updating, 272–275
- skater
 - checking rotation of, 255
 - jumping, 234–238, 250–251
 - physics body for, 244–245
 - resetting, 220–221
- Skater class
 - creating, 218
 - instantiating, 219
- sounds
 - adding to project, 289–290
 - downloading, 204, 206
 - playing, 290
- sparks, 291–297
- speeding up the game, 257–258
- starting the game, 251–254
- scope, 55–57, 103–104
- SDK (Software Development Kit), 4
- segues, 132, 171–172
- selectors, 235
- self keyword, 106–107
- simulator (iPhone simulator)
 - rotating device, 213
 - running app on, 12–13
- Size Inspector, 11, 127
- SKAction object, 284–285, 295
- SKEmitterNode, 294–295
- SKLabelNode class, 269–273
- SKPhysicsWorld class, 240
- .sks (SpriteKit scene) files, 206, 291, 294
- SKScene class, 208, 240
- SKSpriteNode class
 - creating, 210, 218, 225
 - subclassing, 218, 282
- Software Development Kit (SDK), 4
- sound effects
 - adding to project, 289–290
 - finding, 204
 - playing, in SpriteKit, 290

- sparks, adding with particle emitters, 291–297
- spawning, in games, 225
- SpriteKit, 204
 - animating via actions, 284–285, 295
 - debug information, 223
 - game loop update(·) method, 231–233
 - didMove(to:) method, 208, 210, 234, 253
 - filling the screen, 215
 - nodes, 223
 - getting by name, 273
 - name property of, 271, 273
 - physics engine. *See* SpriteKit physics engine
 - physics engine
 - scene size, 215
 - SKAction, 284–285, 295
 - SKEmitterNode, 294–295
 - SKLabelNode, 269–273
 - .sks (SpriteKit scene) files, 206
 - SKScene class, 208
 - SKSpriteNode class, 210
 - subclassing, 218, 282
 - sound effects, 289–290
 - spawning, 225
 - sprites. *See* sprites
- SpriteKit physics engine, 239
 - applying forces, 250–251
 - categoryBitMask property, 248
 - collisionBitMask property, 248
 - contacts and collisions, 246–250, 267
 - contactTestBitMask property, 248–249
 - didBegin(·) method, 249–250, 267
 - gravity, 240
 - physics bodies, 240
 - applying to sprite, 244–245, 263
 - properties, 242–244, 253–254
 - shapes, 241–242
 - physics categories, 247
 - SKPhysicsBody class, 241–251
 - SKPhysicsContactDelegate protocol, 249–250
 - SKPhysicsWorld class, 240
 - speed, 240
 - vectors, 240, 250–251
- sprites, 204
 - adding, 210–211, 220, 222, 225, 263
 - animating, 226–229, 231–233, 284–285
 - children and parents, 211, 220
 - color, 286–287
 - displaying, 210, 220, 263
 - moving, 284–285
 - overlapping, 221
 - positioning, 210, 220–221, 226–227, 263
 - removing, 226–227, 252, 264–265, 288
 - zPosition property, 220–221, 225, 270, 283
- state, of an object, 95–96
- storyboard, 9, 126
 - adding a navigation controller, 129
 - adding view controllers, 127
 - auto layout, 138–139
 - elements
 - adding, 10
 - positioning, 11–12, 134–136
 - segues, 132
- String data type, 24
- strings, 24
 - concatenation, 25
 - embedded variables, 49
 - formatting, 273–274
- structs, 117–118
 - CGPoint, 210
 - IndexPath, 165–166
 - use in Schoolhouse Skateboarder, 247
- subclasses, 108–110, 218
- subtraction operator (-), 27
- superclasses, 108–110
- super keyword, 109
- Swift, 4
 - creating file, 142–143
 - playground. *See* playground
 - safe language, 59

swipe gestures, 234
switch keyword, 44
switch statements, 44–45, 105

T

table view, 155
 cells
 adding, 158–159
 displaying, 164–166
 data source, 162
 IndexPath struct, 165
 reloadData() method, 169
 rows, 162–163
 deleting, 187–188
 editing, 187
 sections, 162–163
table view controller, adding to
 storyboard, 127
tap gestures, 234–235
targets, for selectors, 235
text alignment
 in SpriteKit, 269, 271, 283, 286
 in storyboard, 12
text fields
 adding, 136
 reading text from, 151–152
textures, for physics bodies,
 241–242, 244–245
TimeInterval data type, 231–233, 272
transparency setting (alpha),
 286–287
typecasting, 110–113
type inference, 25

U

UIDatePicker class, 146, 149. *See also*
 date picker
UInt32 data type, 247
UITableViewController class, 156–157.
 See also table view
 controller
UIViewController class, 145–146. *See*
 also view controller
unsigned integers, 247
unwrapping optionals, 61–64
user interface elements, 10

User Notifications framework. *See*
 notifications.

Utilities pane, 10, 124–125

V

value types, 115–116
variables, 18
 changing value of, 20
 declaring and creating, 19
 naming, 22
var keyword, 19
vectors, 240
vertical pipe (|), 248
view controller, 10, 122
 dismissing, 153–154
 file, 124
 in SpriteKit, 215
 storyboard, 11
 UIViewController class, 145
viewDidLoad() method, 145
 used for setup, 149, 162, 215
viewWillAppear(·) method, 146, 181
void functions, 82

W

while loops, 50–53, 228

X

.xcassets files, 207
Xcode
 autocomplete, 85
 creating a new project, 6,
 122–125, 205–206
 installing, 4–5
 opening, 5
 playground, 17
 signing in, 7
x-coordinates, 11, 210

Y

y-coordinates, 11, 210

Z

zPosition property, of sprites,
 220–221, 225, 270, 283