

INDEX

Symbols

- + (addition), 26
- += (addition in place), 122
- * (arbitrary arguments), 146
- ** (arbitrary keyword arguments), 148
- { } (braces)
 - dictionaries, 92
 - sets, 104
- @ (decorator), 221, 424
- / (division), 26
- == (equality), 72, 74
- ** (exponent), 26
- > (greater than), 75
- >= (greater than or equal to), 75
- # (hash mark), for comments, 29
- != (inequality), 74
- < (less than), 75
- <= (less than or equal to), 75
- [] (list), 34
- % (modulo), 116
- += (multiline strings), 115
- * (multiplication), 26
- \n (newline), 22
- >>> (Python prompt), 4
- (subtraction), 26
- \t (tab), 22
- _ (underscore)
 - in file and folder names, 10
 - in numbers, 28
 - in variable names, 17

A

- aliases, 151–152, 178–179
- alice.py*, 195–197
- Alien Invasion*. *See also* Pygame
 - aliens, 256–274
 - building fleet, 259–262
 - checking edges, 265

- collisions, with bullets, 267
- collisions, with ship, 270–273
- controlling fleet direction, 264–266
- creating an alien, 256–258
- dropping fleet, 265–266
- reaching bottom of screen, 273–274
- rebuilding fleet, 268–269
- bullets, 247–253, 266–270
 - collisions, with aliens, 267
 - deleting old, 250–251
 - firing, 249–250
 - larger, 268
 - limiting number of, 251–252
 - settings, 247
 - speeding up, 269
- classes
 - Alien, 257
 - AlienInvasion, 229
 - Bullet, 247–248
 - Button, 278–279
 - GameStats, 271
 - Scoreboard, 286–287
 - Settings, 232
 - Ship, 234–235
- ending the game, 274–275
- initializing dynamic settings, 283–285
- levels
 - modifying speed settings, 283–285
 - resetting the speed, 285
 - displaying, 294–296
- moving fleet, 263–266
- planning, 228
- Play button, 278–283
 - Button class, 278–279
 - deactivating, 282

Alien Invasion (continued)

Play button (*continued*)
 drawing, 279–280
 hiding mouse cursor, 282–283
 resetting game, 281–282
 starting game, 281
reviewing the project, 256
scoring, 286–298
 all hits, 290
 high score, 292–294
 increasing point values, 290–291
 level, 294–296
 number of ships, 296–299
 resetting, 289–290
 rounding and formatting, 291–292
 score attribute, 286
 updating, 289
settings, storing, 232–233
ship, 233–244
 adjusting speed, 242–243
 continuous movement, 239–242
 finding an image, 233–234
 limiting range, 243–244
amusement_park.py, 80–82
and keyword, 75
antialiasing, 279
API. *See* application programming interface
apostrophe.py, 24–25
append() method, 37–38
application programming interface (API), 355
API call, 355–357
GitHub API, 368
Hacker News API, 368–371
processing an API response, 357–362
rate limits, 362
requesting data, 356–357
visualizing results, 362–368
arguments, 131. *See also under* functions
as keyword, 151–152
assertions, 213, 217–218
attributes, 159. *See also under* classes

B

banned_users.py, 76–77
bicycles.py, 34–35
Boolean values, 77
Bootstrap, 433. *See also under* Django
braces ({}), 92
 dictionaries, 92
 sets, 104

break statement, 121
built-in functions, 467

C

calls (functions), 130, 132–135
car.py, 162–178
cars.py, 43–45, 72
cities.py, 121
classes
 attributes, 159
 accessing, 160
 default values, 163–164
 modifying, 164–166
 creating, 158–161
 importing, 173–179
 multiple classes, 175–176
 single classes, 174–175
 inheritance, 167–172
 attributes and methods, 169
 child classes, 167–170
 composition, 170
 __init__() method, 167–169
 instances as attributes, 170–172
 overriding methods, 170
 parent classes, 170
 subclasses, 168
 super() function, 168
 superclasses, 168
instances, 157
methods, 159
 calling, 160
 chaining, 185
 __init__() method, 159
modeling real-world objects, 172–173
multiple instances, 161
naming conventions, 158
objects, 157
style guidelines, 181

comma-separated value files. *See* CSV files
comment.py, 29
comments, 29–30
conditional tests, 72–77. *See also*
 if statements
confirmed_users.py, 124–125
constants, 28
continue statement, 122
counting.py, 117–118, 122–123
CSV files, 330–341
 `csv.reader()` function, 330–333
 error checking, 338–341
 file headers, 330–332

D

data analysis, 301
databases. *See under* Django
data visualization, 301. *See also*
 Matplotlib; Plotly
datetime module, 333–335
death_valley_highs_lows.py, 339–341
decorators, 221–223, 423–425
default values
 class attributes, 163–164
 function parameters, 134–135
definition (functions), 130
def keyword, 130
del statement
 with dictionaries, 96
 with lists, 38–40
dice_visual_d6d10.py, 326–327
dice_visual.py, 324–326
dictionaries
 defining, 92
 empty, 94
 formatting larger, 96–97
 `KeyError`, 98
 key-value pairs, 92
 adding, 93–94
 removing, 96
 looping through
 keys, 101–102
 keys in order, 102–103
 key-value pairs, 99–101
 values, 103–104
 methods
 `get()`, 97–98
 `items()`, 99–101

`keys()`, 101–103
 `values()`, 103–104

nesting
 dictionaries in dictionaries, 110–111
 dictionaries in lists, 105–108
 lists in dictionaries, 108–109
ordering in, 94, 102–103
sorting a list of, 370
values
 accessing, 92–93, 97–98
 modifying, 94–96

die.py, 320
die_visual.py, 320–321
dimensions.py, 66–67
div (HTML), 437
division_calculator.py, 192–195
Django. *See also* Git; Learning Log project
 accounts app, 415–423
 creating app, 415–416
 logging out, 419–420
 login page, 416–419
 registration page, 420–423
 admin site, 381–386
 associating data with a user, 425–430
Bootstrap, 434–445
 card, 443
 collapsible navigation, 437
 container, 440
 django-bootstrap5 app, 434
 documentation, 444
 HTML headers, 435–436
 jumbotron, 440–441
 list groups, 443
 navigation bar, 436–439
 styling forms, 441–442

commands
 `createsuperuser`, 382
 `flush`, 427
 `makemigrations`, 381, 385, 426
 `migrate`, 377
 `runserver`, 377–378, 383, 392
 `shell`, 386
 `startapp`, 379, 415
 `startproject`, 376
 creating new projects, 376

Django (*continued*)

- databases
 - cascading delete, 384
 - creating, 376
 - foreign keys, 384, 425
 - many-to-one relationships, 384
 - migrating, 377, 381, 385, 426
 - non-nullable field, 427
- Postgres, 447
 - queries, 398, 428
 - querysets, 386–387, 395, 398, 426–428
 - resetting, 427
- SQLite, 377
- deployment, 445–461, 493–501
 - committing the project, 453
 - configuration files, 447–450
 - creating Platform.sh project, 453–455
 - creating superuser, 456–457
 - custom error pages, 459–460
 - deleting projects, 461
 - free trial limits, 446
 - gunicorn, 447
 - ignoring files, 452–453
 - installing Platform.sh CLI, 446, 497–500
 - installing platform shconfig, 446
 - other deployment approaches, 500
- Platform.sh, 445
- Postgres database, 447, 450–451
- psycopg2, 447
- pushing a project, 455
- pushing changes, 458, 460
- requirements.txt, 446
- securing project, 457–460
- settings, 451
- SSH sessions, 456–457
- troubleshooting, 494–501
- using Git, 451
 - viewing project, 456
- development server, 377–378, 383, 392

documentation

- model fields, 380
- queries, 388
- templates, 400

forms, 404–423, 429–430

- csrf_token, 407
- GET and POST requests, 406
- ModelForm, 404, 408
- processing forms, 405–406, 409–410, 412–413, 421–422, 429–430
- save() method, 405–406, 409–410, 430
- templates, 407, 410–411, 413, 417, 419, 422
- validation, 404–406
- wIDGETS, 408

HTML

- anchor tag (<a>), 393
- <body> element, 437
- comments, 437
- <div> elements, 437
- <main> element, 440
- margins, 440
- padding, 440
- <p> elements, 391
- elements, 438

HTTP 404 error, 428–429, 459–460

INSTALLED_APPS, 380

installing, 375–376

localhost, 378

logging out, 419–420

@login_required decorator, 423–424

login template, 417

mapping URLs, 388–390, 397–398

migrating the database, 426–427

models, 379

- activating, 380–381
- defining, 379, 384
- foreign keys, 384, 425
- registering with admin, 382–383, 385–386
- __str__() method, 380, 384

projects (vs. apps), 379

redirect() function, 405–406

release cycle, 376

restricting access to data, 427–430

- settings
- `ALLOWED_HOSTS`, 451
 - `DEBUG`, 457–458
 - `INSTALLED_APPS`, 380–381, 415–416, 434
 - `LOGIN_REDIRECT_URL`, 417–418
 - `LOGIN_URL`, 424
 - `LOGOUT_REDIRECT_URL`, 420
 - `SECRET_KEY`, 451
- shell, 386–387, 426–427
- starting an app, 379
- styling. *See* Django: Bootstrap
- superusers, 382, 456–457
- templates
- block tags, 393
 - child template, 393–394
 - context dictionary, 395
 - filters, 399
 - forms in, 407
 - indentation in, 393
 - inheritance, 392–394
 - `linebreaks`, 399
 - links in, 392–393, 399
 - loops in, 395–397
 - parent template, 392–393
 - template tags, 393
 - timestamps in, 398–399
 - user object, 418
 - writing, 390–392
- URLs. *See* Django: mapping URLs
- `UserCreationForm`, 421–422
- user ID values, 426
- versions, 376
- view functions, 388, 390
- virtual environments, 374–375
- docstrings, 130, 153, 181
- `dog.py`, 158–162
- dot notation, 150, 160
- E**
- earthquakes. *See* mapping earthquakes
- `electric_car.py`, 167–173
- module, 177–179
- encoding argument, 195–196
- `enumerate()` function, 331
- `eq_explore_data.py`, 343–347
- equality operator (`==`), 72, 74
- `eq_world_map.py`, 347–352
- `even_numbers.py`, 58
- `even_or_odd.py`, 117
- exceptions, 183, 192–199
- deciding which errors to report, 199
 - `else` block, 194–195
 - failing silently, 198–199
 - `FileNotFoundException` error, 195–196
 - handling exceptions, 192–196
 - preventing crashes, 193–195
 - `try-except` blocks, 193
 - `ZeroDivisionError`, 192–195
- exponents (**), 26
- F**
- `favorite_languages.py`, 96–97, 100–104, 109
- `file_reader.py`, 184–187
- files
- encoding argument, 195–196
 - `FileNotFoundException` error, 195–196
 - file paths, 186
 - absolute, 186
 - `exists()` method, 203–204
 - `pathlib` module, 184
 - Path objects, 184–186, 330
 - relative, 186
 - from strings, 198
 - on Windows, 186
 - `read_text()` method, 185, 195–196
 - `splitlines()` method, 186–187
 - `write_text()` method, 190–191
- `first_numbers.py`, 57
- fixtures, 221–223
- flags, 120–121
- floats, 26–28
- `foods.py`, 63–64
- for loops, 49–56, 99–104. *See also* dictionaries; lists
- `formatted_name.py`, 137–139
- f-strings
- format specifiers, 291–292
 - using variables in, 20–21
- `full_name.py`, 21
- functions, 129–155
- arguments
 - arbitrary, 146–149
 - default values, 134–135
 - errors, 136
 - keyword, 133–134

functions (*continued*)
arguments (*continued*)
 lists as, 142–145
 optional, 138–139
 positional, 131–133
body, 130
built-in, 467
calling functions, 130, 132–135
defining, 130
importing, 149–153
 aliases, 151–152
 entire modules, 150–151
 specific functions, 151
modifying a list in a function,
 142–145
modules, 149–153
parameters, 131
return values, 137–141
style guidelines, 153

G

GeoJSON files, 342–347, 350–351
GET requests, 406. *See* Django: forms
getting help
 Discord, 480
 official Python documentation,
 479–480
 online resources, xxxv, 478
 r/learnpython, 480
 rubber duck debugging, 478
 searching online, 479
 Slack, 481
 Stack Overflow, 479
 three main questions, 477–478
Git, 356, 451–453, 483–492. *See also*
 Django: deployment
abandoning changes, 488–489
adding files, 486
branches, 486
checking out previous commits,
 489–491
commits, 486–488
configuring, 452, 484
deleting a repository, 491–492
.gitignore, 484
HEAD, 490
ignoring files, 484
initializing a repository, 485

installing, 484
log, 487
repositories, 356
status, 485–486
GitHub, 356
greeter.py, 114–115, 130–131
greet_users.py, 142

H

Hacker News API, 368–371
hash mark (#), for comments, 29
hello_git.py, 484–491
hello_world.py, 10–12, 15–19
hidden files, 448, 485
hn_article.py, 368–369
hn_submissions.py, 369–371

I

IDE (integrated development
environment), 469–470
if statements
 and keyword, 75
 Boolean expressions, 77
 checking for
 equality (==), 72
 inequality (!=), 74
 item in list, 76
 item not in list, 76
 list not empty, 86–87
 elif statement, 80–83
 else statement, 79–80
 if statements and lists, 85–88
 ignoring case, 73–74
 numerical comparisons, 74–76
 or keyword, 76
 simple, 78
 style guidelines, 89
 testing multiple conditions, 82–83
immutable, 65
`import *`, 152, 177
`import this`, 30–31
indentation errors, 53–56
index errors, 46–47
inheritance, 167–173. *See also*
 under classes
`input()` function, 114–116
 numerical input, 115–116
 writing prompts, 114–115

`insert()` method, 38
`itemgetter()` function, 370
`items()` method, 99–101

J

JSON files
 GeoJSON files, 342–347, 350–351
 JSON data format, 201
 `json.dumps()` function, 201–204, 343–344, 368
 `json.loads()` function, 201–204, 343–344

K

`keys()` method, 101–103
key-value pairs, 92. *See also* dictionaries
keyword arguments, 133–134
keywords, 466

L

language_survey.py, 219
Learning Log project, 373
 files, 392
 `404.html`, 459
 `500.html`, 459
 `accounts/urls.py`, 416, 420
 `accounts/views.py`, 421–422
 `admin.py`, 382–383
 `base.html`, 392–393, 396, 418–419, 422, 435–440
 `edit_entry.html`, 413
 `forms.py`, 404, 408–409
 `.gitignore`, 452–453
 `index.html`, 390–394, 440–441
 `learning_logs/urls.py`, 389–390, 394–395, 397–398, 405, 409, 412
 `learning_logs/views.py`, 390, 395, 398, 405–406, 409–410, 412–413, 423–425, 428–430
 `ll_project/urls.py`, 388–389, 416
 `login.html`, 417, 441–442
 `models.py`, 379–380, 384
 `new_entry.html`, 410
 `new_topic.html`, 407
 `.platform.app.yaml`, 448–450

`register.html`, 422
`requirements.txt`, 446–447
`routes.yaml`, 450
`services.yaml`, 450
`settings.py`, 380–381, 415–418, 420, 424, 434, 451, 457–460
`topic.html`, 398–399, 443–444
`topics.html`, 395–396, 442–443

ongoing development, 460

pages, 391
 edit entry, 412–414
 home page, 388–394
 login page, 416–419
 new entry, 408–411
 new topic, 404–408
 registration, 420–423
 topic, 397–400
 topics, 394–397

writing a specification (spec), 374

`len()` function, 44–45

library, 184

Linux

 Python
 checking installed version, 8
 setting up, 8–12, 465–466

terminals
 running programs from, 12
 starting Python session, 9

troubleshooting installation issues, 10

VS Code, installing, 9

lists, 33
 as arguments, 142–145
 comprehensions, 59–60
 copying, 63–64
 elements
 accessing, 34
 accessing last, 35
 adding with `append()`, 37–38
 adding with `insert()`, 38
 identifying unique, 104
 modifying, 36–37
 removing with `del`, 38–39
 removing with `pop()`, 39–40
 removing with `remove()`, 40–41
 empty, 37–38
 `enumerate()` function, 331

lists (*continued*)

- errors
 - indentation, 53–56
 - index, 46
- for loops, 49–56
 - nested, 108–109, 261–262
- indexes, 34–35
 - negative index, 35
 - zero index, 34–35
- len() function, 44–45
- naming, 33–34
- nesting
 - dictionaries in lists, 105–108
 - lists in dictionaries, 108–109
- numerical lists, 56–60
 - max() function, 59
 - min() function, 59
 - range() function, 58–59
 - sum() function, 59
- removing all occurrences of a value, 125
- slices, 61–62
- sorting
 - reverse() method, 44
 - sorted() function, 43–44
 - sort() method, 43
- square brackets, 34

M

macOS

- .DS_Store files, ignoring, 453
- Homebrew package manager, 499
- Python
 - checking installed version, 7
 - setting up, 7–12, 464–465
- terminals
 - running programs from, 12
 - starting Python session, 7
- troubleshooting installation issues, 10
- VS Code, installing, 8

magicians.py, 49–56

magic_number.py, 74

making_pizzas.py, 150–152

mapping earthquakes, 342–352. *See also* Plotly

downloading data, 343, 352

GeoJSON files, 342–347, 350–351

latitude-longitude ordering, 345

location data, 346–347

magnitudes, 346

world map, 347–348

Matplotlib

axes

set_aspect() method, 313–314

removing, 317

ax objects, 303

colormaps, 310–311

fig objects, 303

figsize argument, 318

formatting plots

alpha argument, 337–338

built-in styles, 306

custom colors, 310

labels, 303–304

line thickness, 303–304

plot size, 318

shading, 337–338

tick labels, 309–310

gallery, 302

installing, 302

plot() method, 303–306

pyplot module, 302–303

savefig() method, 311

saving plots, 311

scatter() method, 306–311

simple line graph, 302–306

subplots() function, 303

methods, 20

helper methods, 237

modules, 149–152, 173–179. *See also*

classes: importing; functions: importing

modulo operator (%), 116–117

motorcycles.py, 36–41

mountain_poll.py, 125–126

mpl_squares.py, 302–306

my_car.py, 174–175

my_cars.py, 176–179

my_electric_car.py, 176

N

name errors, 17–18
name_function.py, 211–217
name.py, 20
names.py, 211–212
nesting. *See* dictionaries: nesting; lists:
 for loops
newline (\n), 21–22
next() function, 330–331
None, 98, 140
number_reader.py, 202
numbers, 26–28
 arithmetic, 26
 constants, 28
 exponents, 26
 floats, 26–27
 formatting, 291–292
 integers, 26
 mixing integers and floats, 27–28
 order of operations, 26
 round() function, 291–292
 underscores in, 28
number_writer.py, 201

O

object-oriented programming
 (OOP), 157. *See also* classes
or keyword, 76. *See also* if statements

P

pandas, 320
parameters, 131
parrot.py, 114, 118–121
pass statement, 198–199
paths. *See* files: file paths
PEP 8, 68–69
person.py, 139–140
pets.py, 125, 132–136
pip, 210–211
 installing Django, 374–376
 installing Matplotlib, 302
 installing Plotly, 320
 installing Pygame, 228
 installing pytest, 211
 installing Requests, 357
Linux, installing pip, 465–466
 updating, 210

pi_string.py, 187–189
pizza.py, 146–148
Platform.sh. *See* Django: deployment
players.py, 61–62
Plotly, 302, 319. *See also* mapping
 earthquakes; rolling dice
chart types, 322
customizing plots, 323, 325–326, 364
documentation, 368
fig.show() method, 322
fig.write_html() method, 327
formatting plots
 axis labels, 323
 color scales, 349–350
 hover text, 350–351, 365–366
 links in charts, 366–367
 marker colors, 349–350, 367
 tick marks, 325–326
 titles, 323
 tooltips, 365–366
 update_layout() method,
 325–326, 364
 update_traces() method, 367
gallery, 320
histograms, 322
installing, 320
plotly.express module, 322,
 347, 368
px alias, 322
px.bar() function, 322–323, 363–367
saving figures, 327
scatter_geo() function, 347–352
pop() method, 39–40
positional arguments, 131–133. *See also*
 functions: arguments
POST requests, 406. *See also*
 Django: forms
printing_models.py, 143–145
Project Gutenberg, 196–197
prompts, 114–115
.py file extension, 15–16
Pygame. *See also* *Alien Invasion*
 background colors, 231–232
 clock.tick() method, 230–231
 collisions, 266–267, 270–271,
 289–290
 creating an empty window, 229–230
 cursor, hiding, 282–283

- Pygame (*continued*)
- displaying text, 278–280
 - ending games, 274–275
 - event loops, 229–230
 - frame rates, 230–231
 - fullscreen mode, 245
 - groups
 - adding elements, 249–250
 - defining, 248–249
 - drawing all elements in, 249–250, 257–258
 - emptying, 268–269
 - looping through, 249–251
 - removing elements from, 250–251
 - updating all elements in, 248–249
 - images, 234–236
 - installing, 228
 - levels, 283–285
 - Play button, 278–283
 - `print()` calls in, 251
 - quitting, 244–245
 - rect objects, 234–235
 - creating from scratch, 247–248
 - `get_rect()` method, 234–235
 - positioning, 234–235, 238–243, 247–248, 256–262, 278, 286–298
 - `size` attribute, 261
 - responding to input, 230
 - events, 230
 - keypresses, 238–242
 - mouse clicks, 281–283
 - screen coordinates, 235
 - surfaces, 230
 - testing games, 268
- pytest. *See* testing code
- Python
- `>>>` prompt, 4
 - built-in functions, 467
 - checking installed version, 466
 - installing
 - on Linux, 465–466
 - on macOS, 7–11, 464–465
 - on Windows, 5–6, 463–464
 - interpreter, 15–16
 - keywords, 466
 - Python Enhancement Proposal (PEP), 68
 - standard library, 179–180
 - terminal sessions, 4
 - on Linux, 9
 - on macOS, 7–8
 - on Windows, 6
 - versions, 4
 - why use Python, xxxvi
- python_repos.py*, 357–362
- python_repos_visual.py*, 362–367
- Q**
- quit values, 118
- R**
- random_walk.py*, 312–313
- random walks, 312–318
 - `choice()` function, 313
 - coloring points, 315–316
 - `fill_walk()` method, 312–313
 - generating multiple walks, 314–315
 - plotting, 313–314
 - `RandomWalk` class, 312–313
 - starting and ending points, 316–317
- `range()` function, 58–59
- `read_text()` method, 185, 195–196
- refactoring, 204–206, 237–238, 260, 269–270
- remember_me.py*, 202–206
- `removeprefix()` method, 24
- `removesuffix()` method, 25
- Requests package, installing, 357
- return values, 137–141
- rollercoaster.py*, 116
- rolling dice, 319–327. *See also* Plotly
 - analyzing results, 321–322
 - `Die` class, 320
 - different-size dice, 326–327
 - `randint()` function, 320
 - rolling two dice, 324–326
- rubber duck debugging, 478
- `rstrip()` method, 22–23
- rw_visual.py*, 313–318

S

scatter_squares.py, 306–311
sets, 103–104
sitka_highs_lows.py, 336–338
sitka_highs.py, 330–336
`sleep()` function, 272
slices, 61–64
`sorted()` function, 43–44, 102–103
`sort()` method, 43
`splitlines()` method, 186–187
`split()` method, 196–197
SQLite database, 376–377
square_numbers.py, 58–59
squares.py, 59–60
Stack Overflow, 479
storing data, 201–204. *See also* JSON files
 saving and reading data, 202–204
strings, 19–25
 changing case, 20
 f-strings, 20–21, 291–292
 methods
 `lower()`, 20
 `lstrip()`, 22–23
 `removeprefix()`, 23–24
 `removesuffix()`, 25
 `rstrip()`, 22–23
 `split()`, 196–197
 `splitlines()`, 186–187
 `strip()`, 22–23
 `title()`, 20
 `upper()`, 20
 multiline, 115
 newlines in, 21–22
 single and double quotes, 19, 24–25
 tabs in, 21–22
 variables in, 20–21
 whitespace in, 21–23
`strip()` method, 22–23
`strptime()` method, 333–335
style guidelines, 68–69
 blank lines, 69
 CamelCase, 181
 classes, 181
 dictionaries, 96–97
 functions, 153
 if statements, 89
 indentation, 68

line length, 69

PEP 8, 68

survey.py, 218

syntax errors, 24

 avoiding with strings, 24–25

syntax highlighting, 16

T

tab (`\t`), 21–22

templates. *See under* Django

testing code, 209–223

 assertions, 213, 217–218

 failing tests, 214–216

 full coverage, 212

 naming tests, 213

 passing tests, 212–214

 pytest, 209–223

 fixtures, 221–223

 installing, 210–211

 running tests, 213–214

test cases, 212

testing classes, 217–223

testing functions, 211–217

unit tests, 212

test_name_function.py, 212–217

test_survey.py, 220–223

text editors and IDEs. *See also* VS Code

 Emacs and Vim, 475

 Geany, 474

 IDLE, 474

 Jupyter Notebooks, 475

 PyCharm, 475

 Sublime Text, 474

third-party package, 210

toppings.py, 74, 82–83

tracebacks, 10, 17–18, 192, 195–196

try-except blocks. *See* exceptions

tuples, 65–67

 defining, 65

 for loop, 66–67

 writing over, 67

type errors, 66

U

underscore (`_`)

 in file and folder names, 10

 in numbers, 28

 in variable names, 17

unit tests, 212
user_profile.py, 148–149

V

`values()` method, 103–104
variables, 16–19, 28
 constants, 28
 as labels, 18–19
 multiple assignment, 28
 name errors, 17–18
 naming conventions, 17
 values, 16
`venv` module, 374–375
version control. *See* Git
virtual environments, 374–375
voting.py, 78–80
VS Code, 4–5
 configuring, 470–473
 features, 469–470
 installing
 on Linux, 9
 on macOS, 8
 on Windows, 6
 Python extension, 9–10
 opening files with Python, 185
 Python extension, 9
running files, 10
shortcuts, 473–474
tabs and spaces, 471

W

weather data, 330–341. *See also* CSV
 files; Matplotlib
while loops, 117–126
 active flag, 120–121
 break statement, 121
 continue statement, 122
 infinite loops, 122–123
 moving items between lists, 124
 quit values, 118
 removing all items from list, 125
whitespace, 21–23. *See also* strings
Windows
 file paths, 186
Python
 setting up, 5–6, 9–12, 463–464
 troubleshooting installation, 10
terminals
 running programs from, 12
 starting Python session, 6
VS Code, installing, 6
word_count.py, 197–199
write_message.py, 190–191
`write_text()` method, 190–191

Z

Zen of Python, 30–31
`ZeroDivisionError`, 192–195