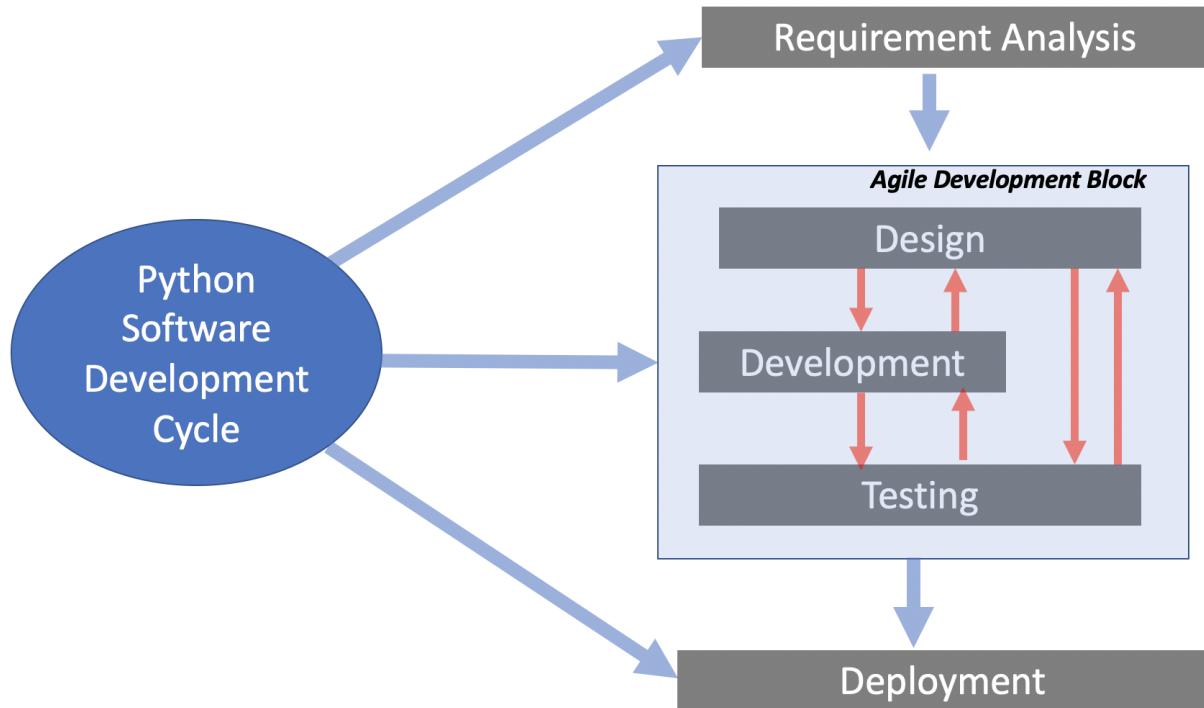


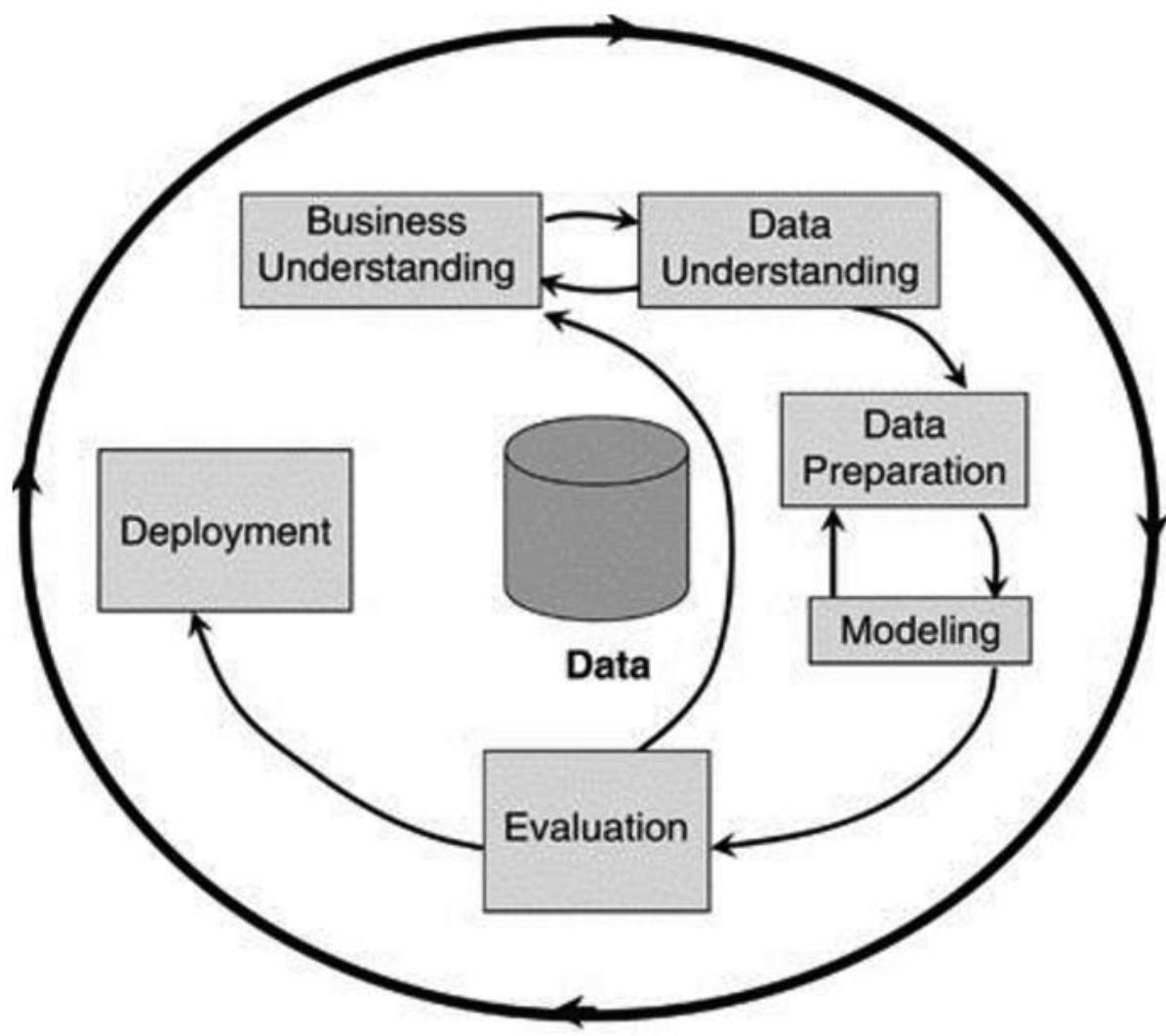
Chapter 1: Optimal Python Development Life Cycle

```
[1] import this
    this

↳ The Zen of Python, by Tim Peters

Beautiful is better than ugly.
Explicit is better than implicit.
Simple is better than complex.
Complex is better than complicated.
Flat is better than nested.
Sparse is better than dense.
Readability counts.
Special cases aren't special enough to break the rules.
Although practicality beats purity.
Errors should never pass silently.
Unless explicitly silenced.
In the face of ambiguity, refuse the temptation to guess.
There should be one-- and preferably only one --obvious way to do it.
Although that way may not be obvious at first unless you're Dutch.
Now is better than never.
Although never is often better than *right* now.
If the implementation is hard to explain, it's a bad idea.
If the implementation is easy to explain, it may be a good idea.
Namespaces are one honking great idea -- let's do more of those!
<module 'this' from '/usr/lib/python3.6>this.py'>
```





```
# A simple example to demonstrate the comments.  
print("This is Chapter 1")
```

⇨ This is Chapter 1



```
"""
This is a comment
written in
more than just one line
"""
print("Chapter 2 will be about Python Modules")
```

↳ Chapter 2 will be about Python Modules

```
[5] def double(n):
    '''Takes in a number n, returns the double of its value'''
    return n**2
```

```
[6] print(double.__doc__)
```

↳ Takes in a number n, returns the double of its value

```
[8] help(double)
```

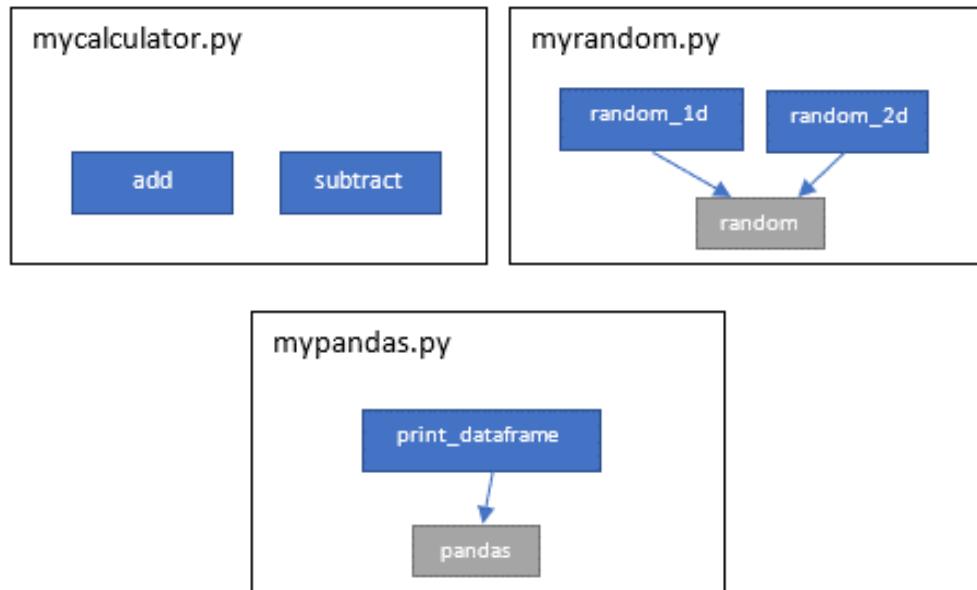
↳ Help on function double in module __main__:

```
double(n)
Takes in a number n, returns the double of its value
```

```
▶ class ComplexNumber:  
    """  
        This is a class for mathematical operations on complex numbers.  
  
    Attributes:  
        real (int): The real part of complex number.  
        imag (int): The imaginary part of complex number.  
    """  
  
    def __init__(self, real, imag):  
        """  
            The constructor for ComplexNumber class.  
  
        Parameters:  
            real (int): The real part of complex number.  
            imag (int): The imaginary part of complex number.  
        """  
  
    def add(self, num):  
        """  
            The function to add two Complex Numbers.  
  
        Parameters:  
            num (ComplexNumber): The complex number to be added.  
  
        Returns:  
            ComplexNumber: A complex number which contains the sum.  
        """  
  
        re = self.real + num.real  
        im = self.imag + num.imag  
  
        return ComplexNumber(re, im)
```

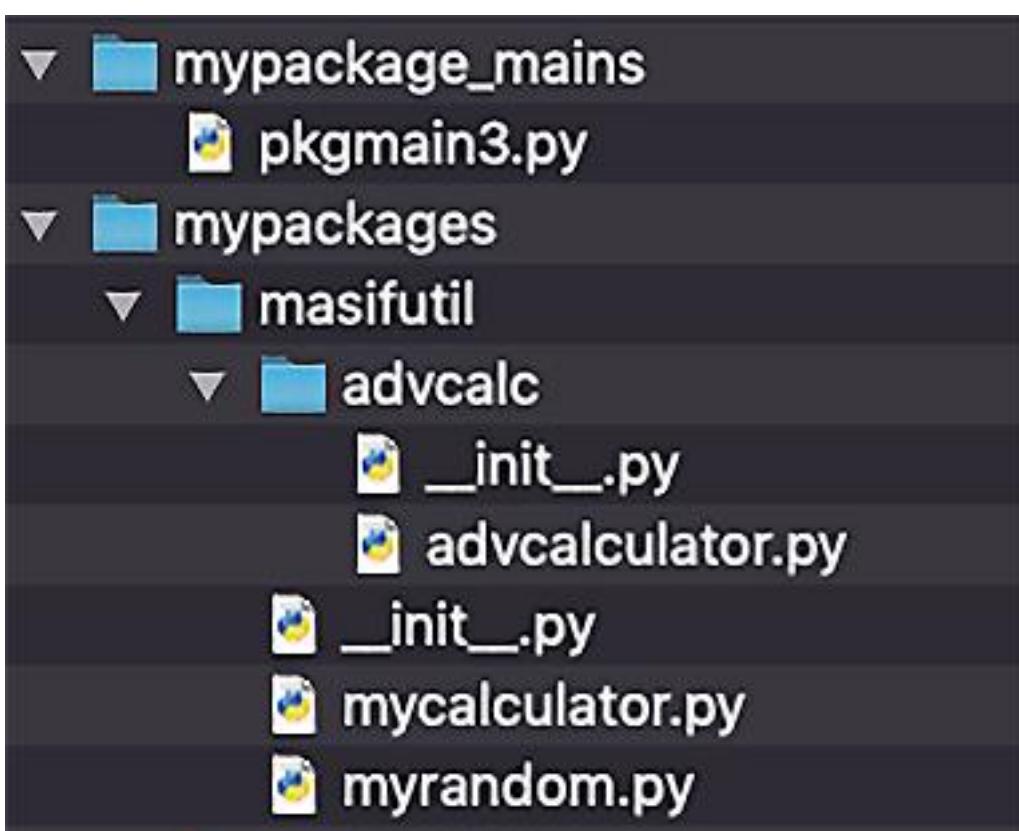
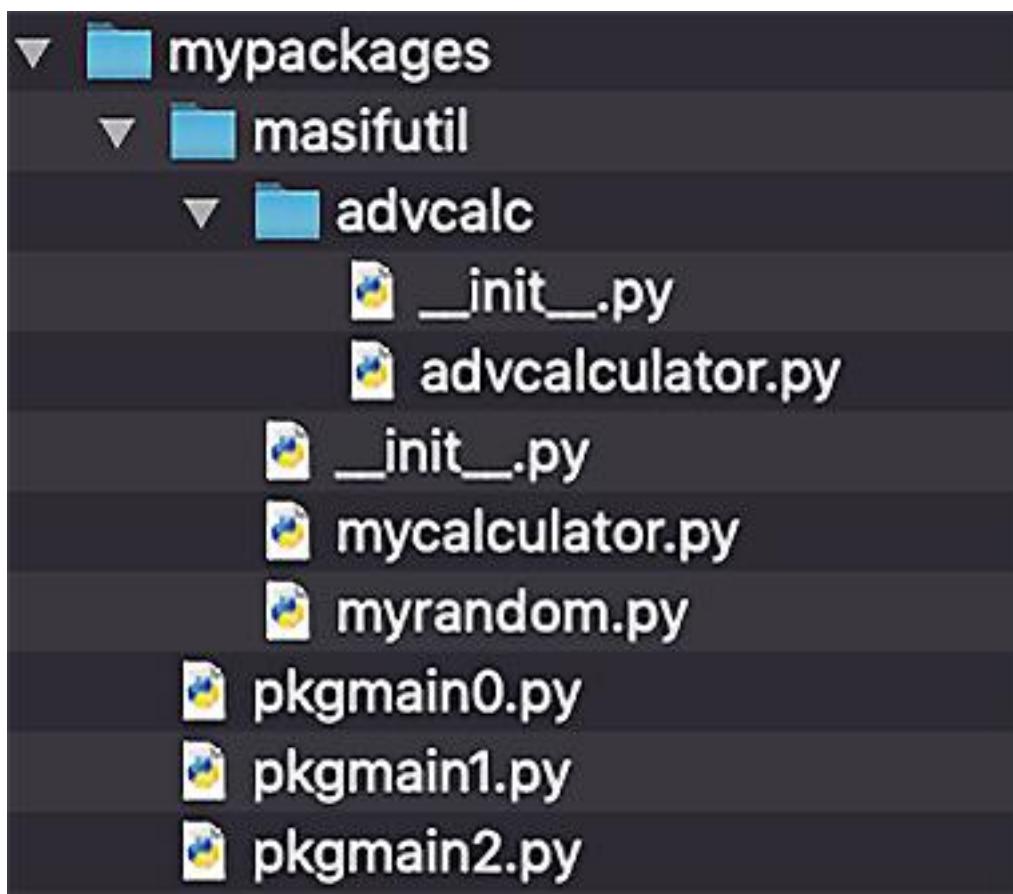
Chapter 2: Using Modularization to Handle Complex Projects

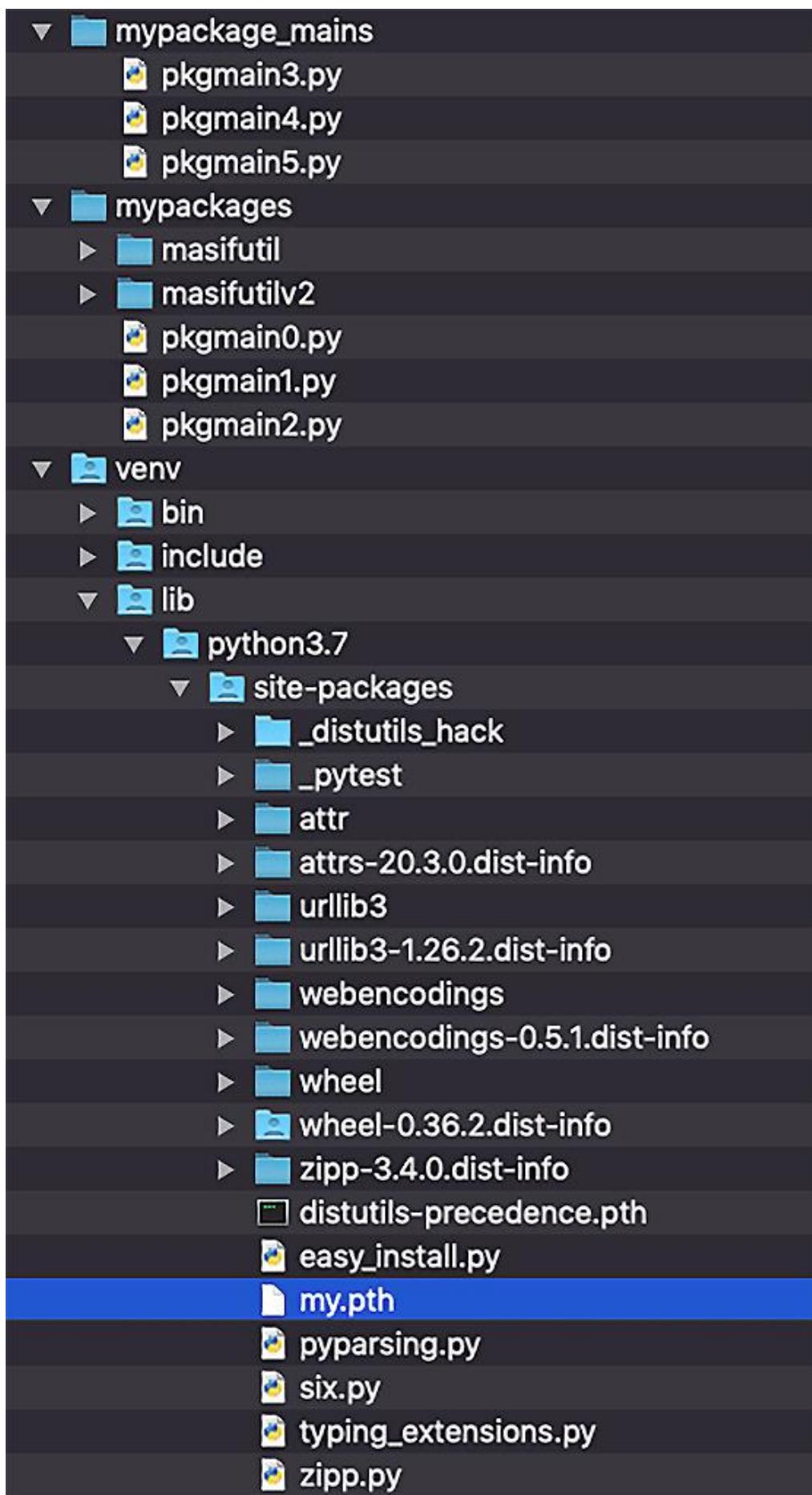
Module Name	__name__ =
main.py	__main__
myrandom.py	myrandom
mycalculator.py	mycalculator



```
brics = pandas.DataFrame(dict)
print(brics)  pandas.util._tester
f test(extra_args) pandas.util._tester
f tseries (pandas)
f timedelta_range(start, end, period...) pandas.core.indexes.timedeltas
f to_datetime(arg, errors, dayfirst, ye... pandas.core.tools.datetimes
f to_numeric(arg, errors, downcast) pandas.core.tools.numeric
f to_pickle(obj, filepath_or_buffer, compression, ...) pandas.io.pickle
f to_timedelta(arg, unit, errors) pandas.core.tools.timedeltas
v _tslib pandas
f read_sql_table(table_name, con, schema, index_col, ...) pandas.io.sql
f read_table pandas.io.parsers

Press ^ to choose the selected (or first) suggestion and insert a dot afterwards Next Tip 
```





pypa / sampleproject

<> Code Issues 7 Pull requests 3 Actions Security Insights

main 1 branch 0 tags Go to file Add file Code

gliptak Remove Python 3.5 and add 3.9 (#132) ... ✓ 90d44ab on Jan 8 178 commits

.github/workflows Don't fail when releasing an existing version (#126) 14 months ago

data add data_files example 8 years ago

src/sample Removed blank lines 14 months ago

tests 26 added simple module and test module 14 months ago

.gitignore have the tests we're including actually run and pass 6 years ago

.travis.yml Remove Python 3.5 and add 3.9 (#132) 7 months ago

LICENSE.txt Add a LICENSE.txt file 6 years ago

MANIFEST.in Remove Python 3.5 and add 3.9 (#132) 7 months ago

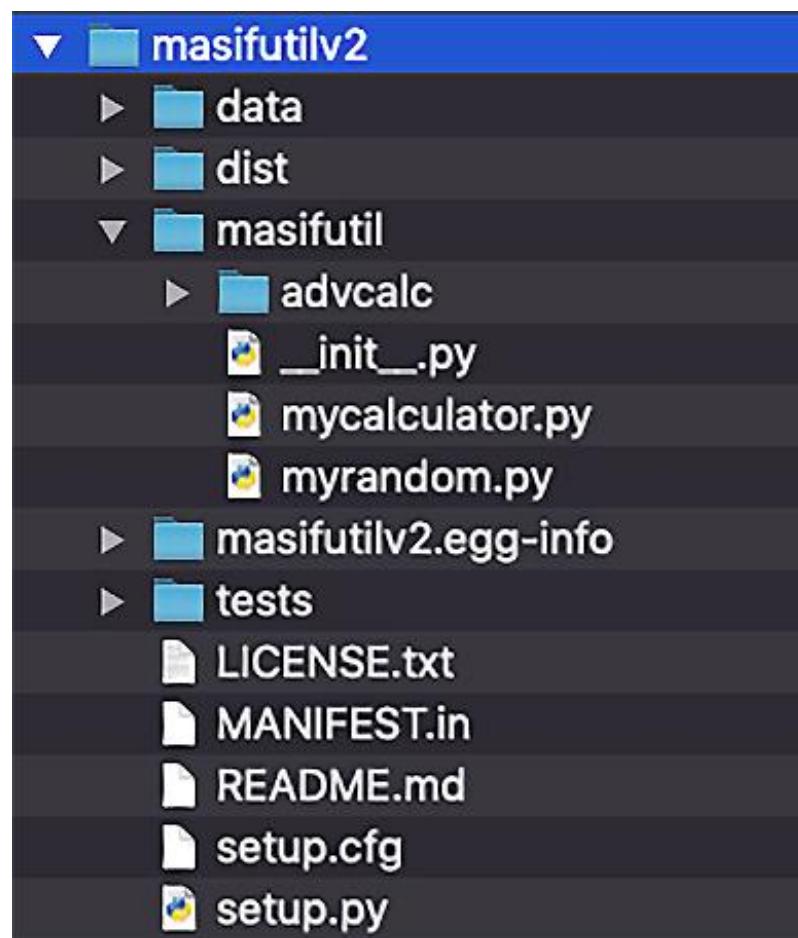
README.md 119 updated python logo (removed some other code from my own fo... 14 months ago

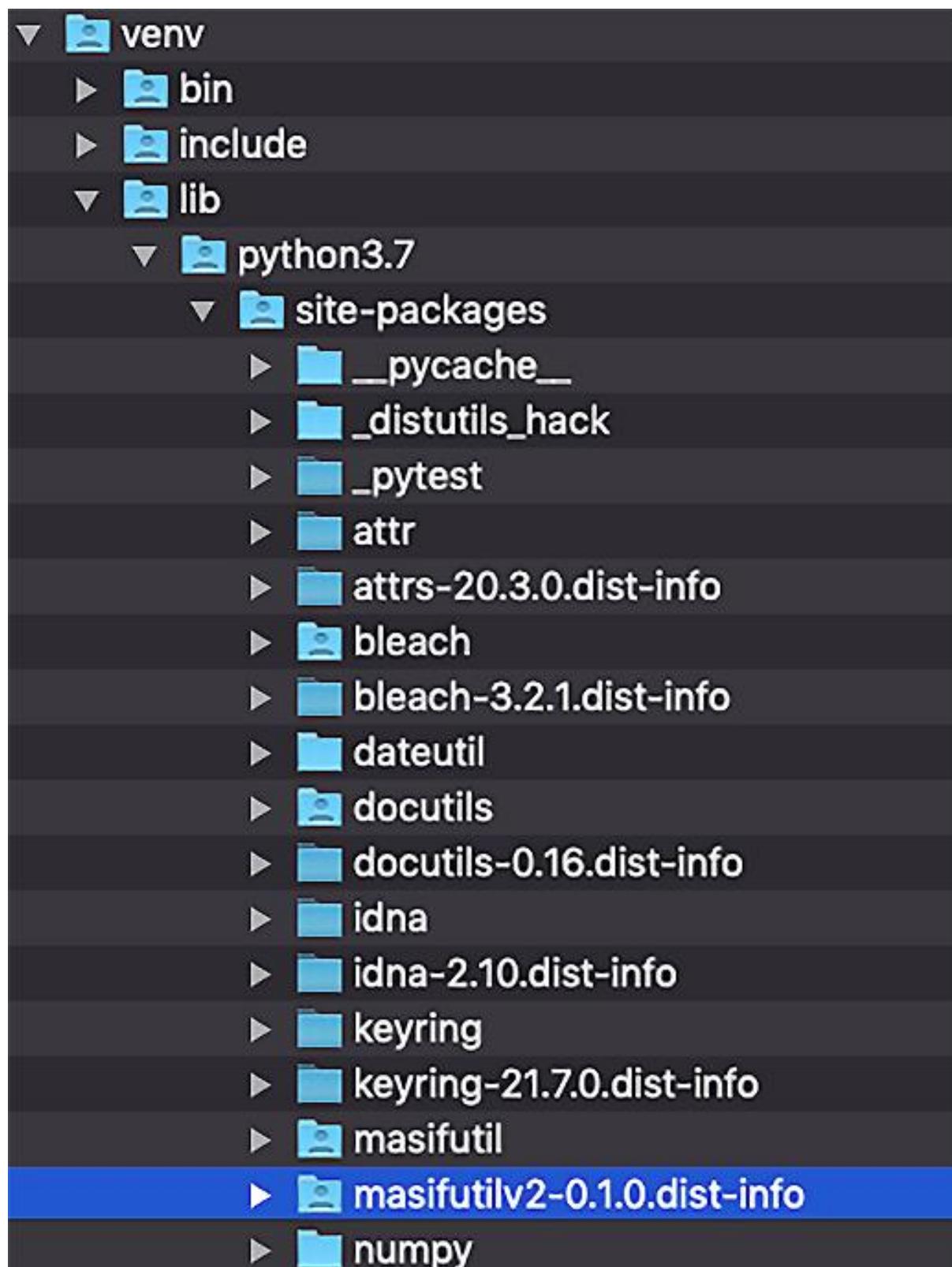
pyproject.toml Implement PEP 518 and opt into PEP 517 builds 2 years ago

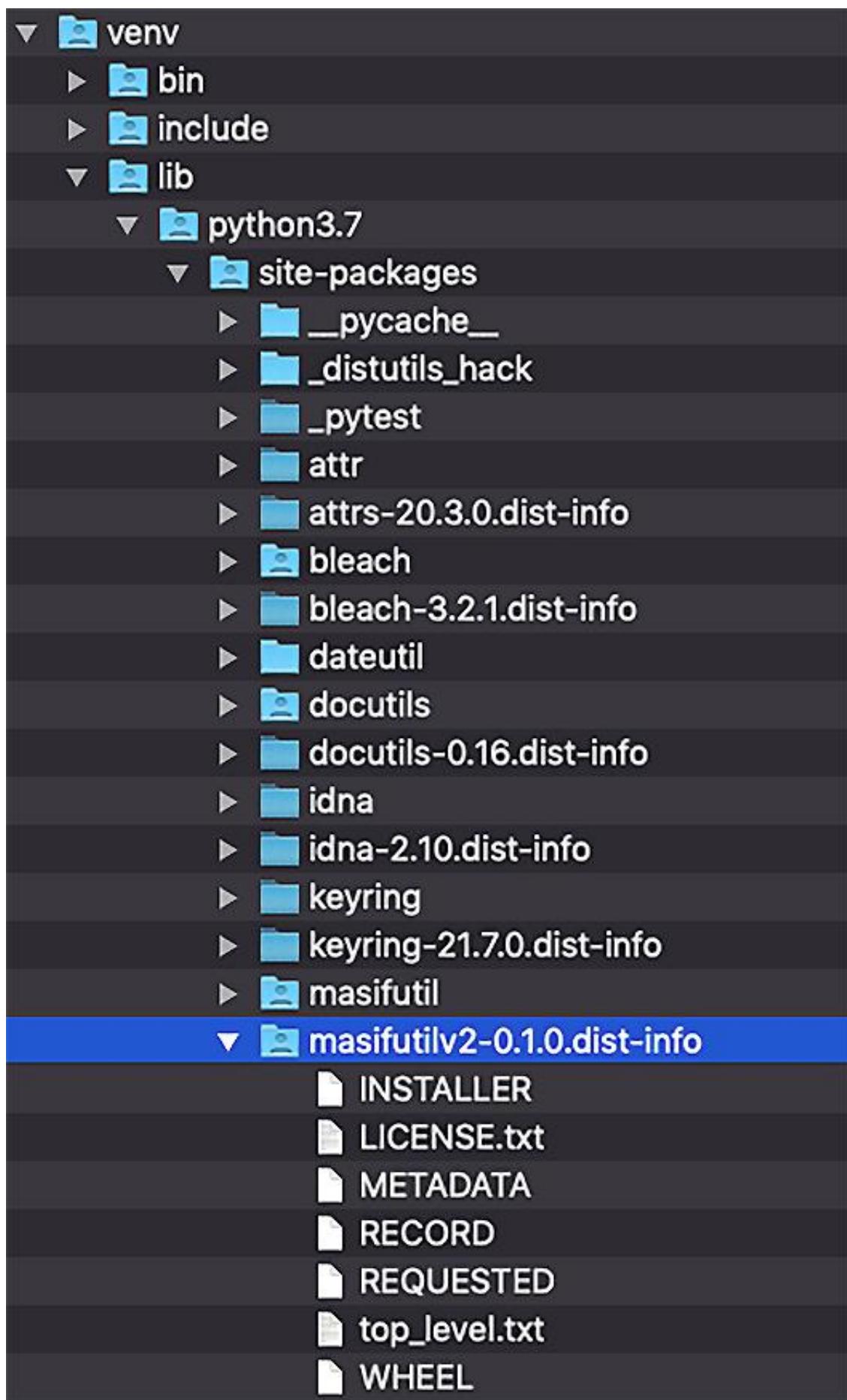
setup.cfg Drop support for EOL Python 2 15 months ago

setup.py Remove Python 3.5 and add 3.9 (#132) 7 months ago

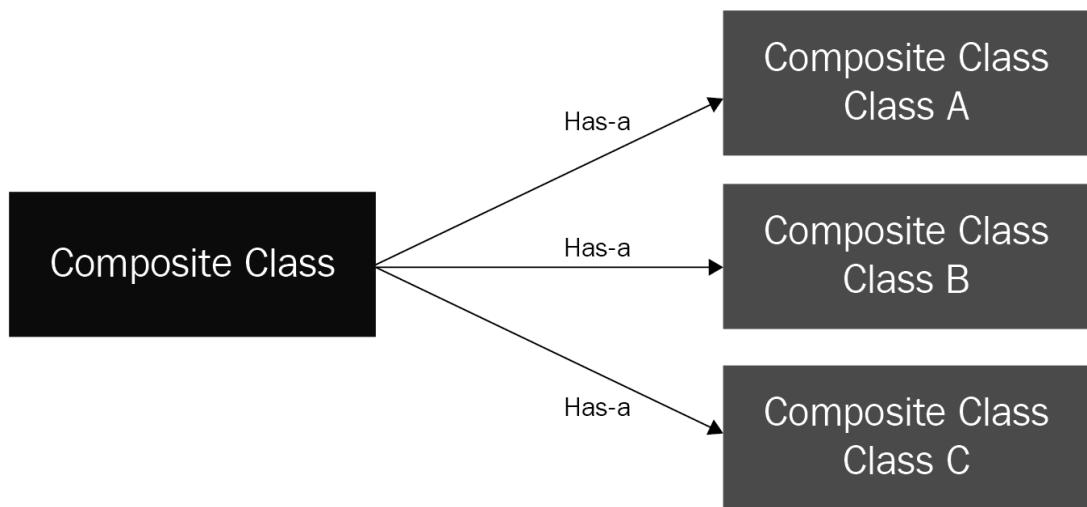
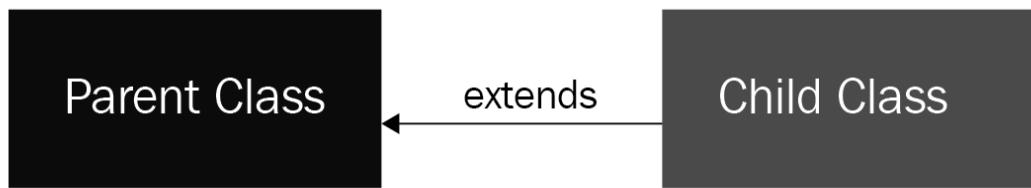
tox.ini Remove Python 3.5 and add 3.9 (#132) 7 months ago



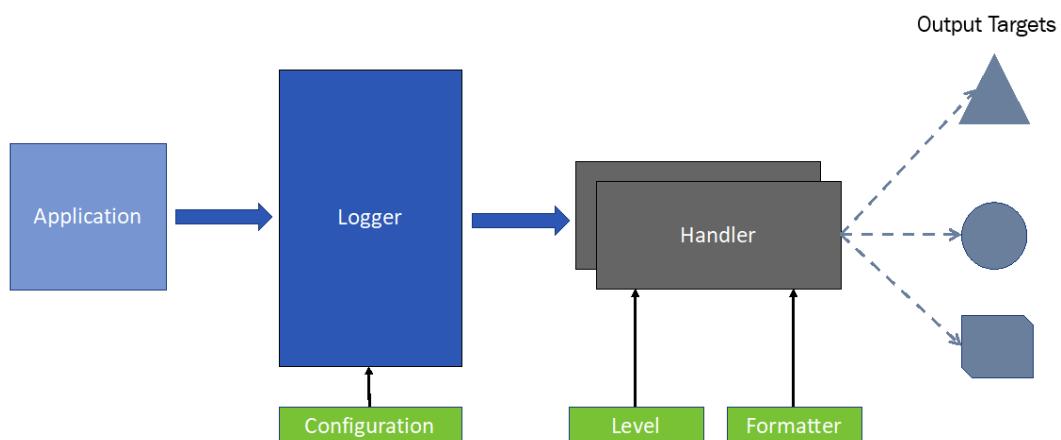
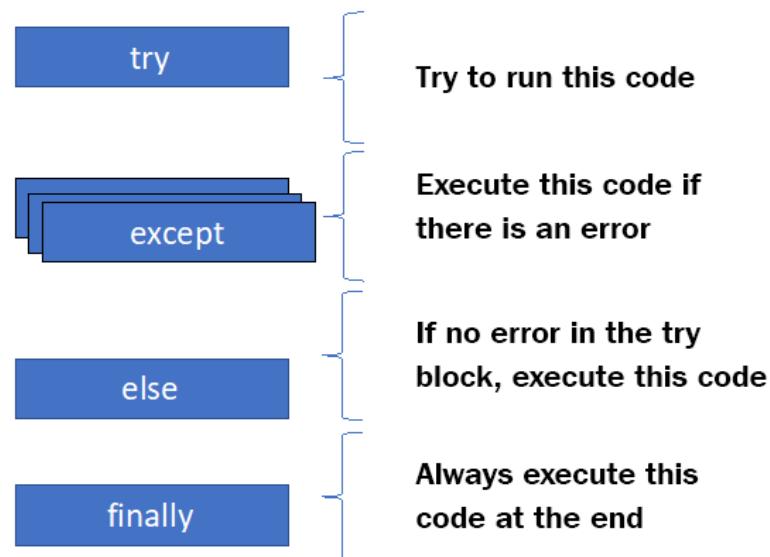




Chapter 3: Advanced Object-Oriented Python Programming



Chapter 4: Python Libraries for Advanced Programming



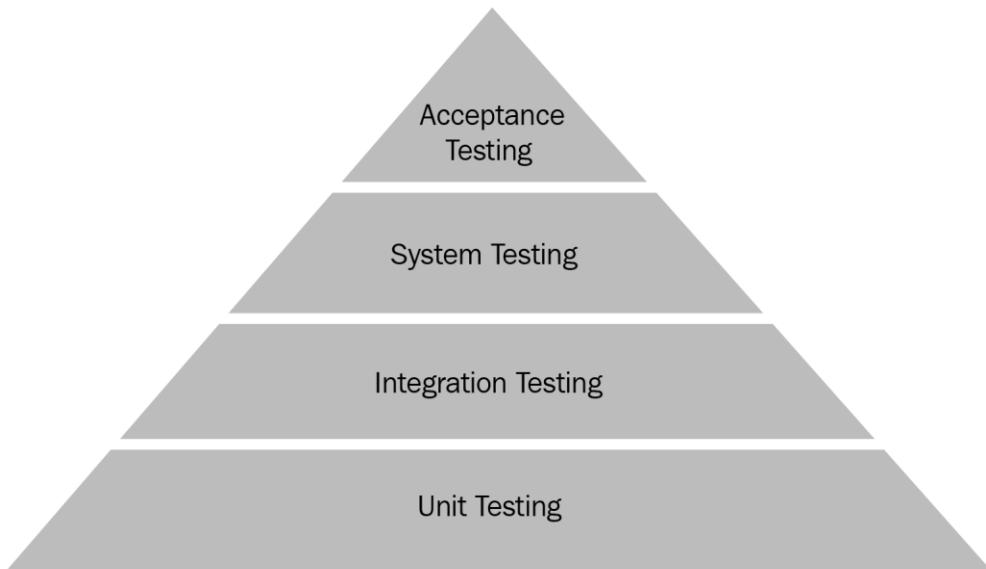
A vertical hierarchy diagram showing the levels of Python logging:

```
graph TD; NOTSET[0: NOTSET] --> DEBUG[10: DEBUG] --> INFO[20: INFO] --> WARNING[30: WARNING] --> ERROR[40: ERROR] --> CRITICAL[50: CRITICAL]
```

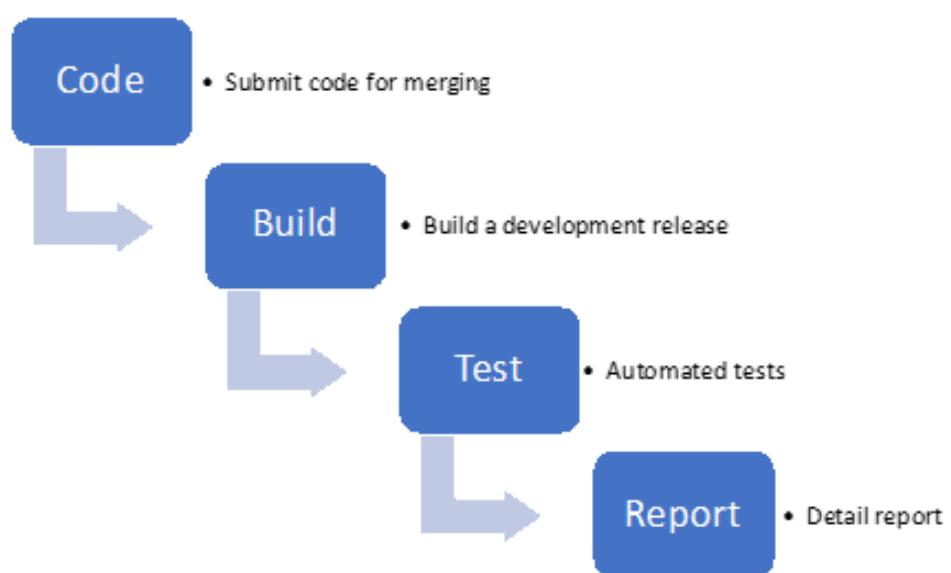
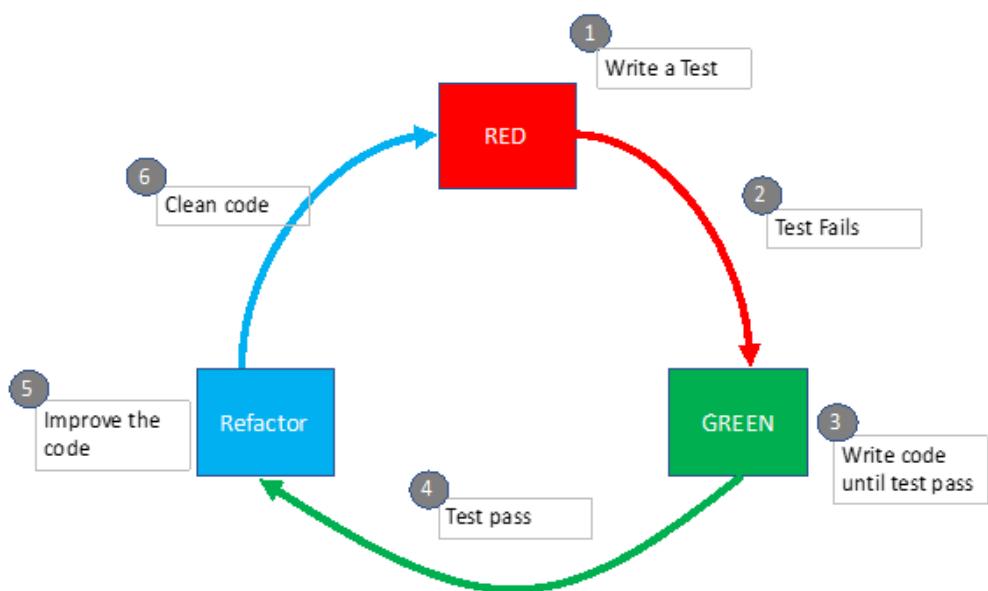
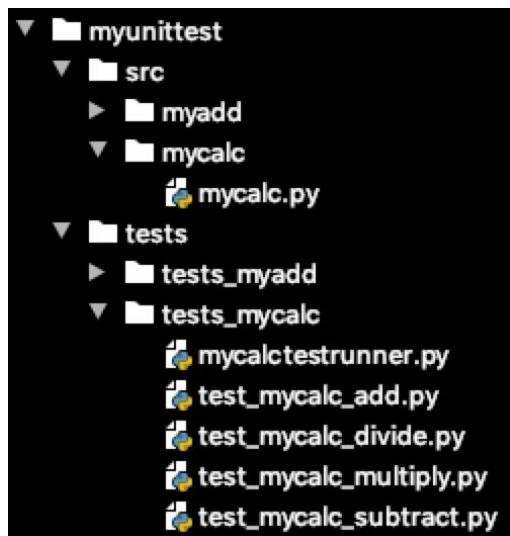
The levels are ordered from highest to lowest severity. An upward arrow indicates the progression from NOTSET to CRITICAL.

50	CRITICAL	Provides info about the highest level of issues, to a level where the application can no longer execute properly
40	ERROR	Provides info about a serious issue or problem and is an indication that an application feature cannot work properly
30	WARNING	Provides info about some unexpected event or indication of a possible problem
20	INFO	Provides less detail, intended for tracking application behavior
10	DEBUG	Provides detailed information, intended for troubleshooting and bug fixing
0	NOTSET	No logging set

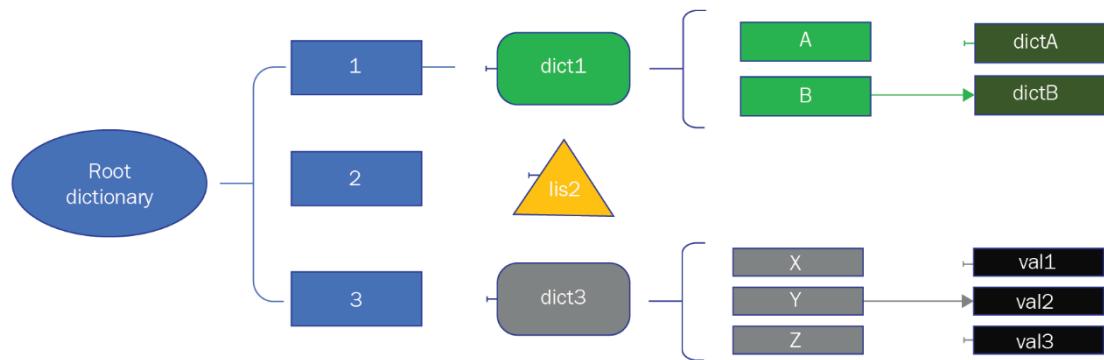
Chapter 5: Testing and Automation with Python



Method name	Evaluating condition
assertEqual (x, y)	Check if x is equal to y
assertTrue (x)	Check if x is Boolean true
assertFalse (x)	Check if x is Boolean false
assertNotEqual (x)	Check if x is not equal to y
assertIn (a, c)	Check if a is in collection c
assertNotIn (a, c)	Check if a is not in collection c
assertIs (x, y)	Check if x is y
assertIsNot (x, y)	Check if x is not y
assertIsNone (x)	Check if x is none



Chapter 6: Advanced Tips and Tricks in Python

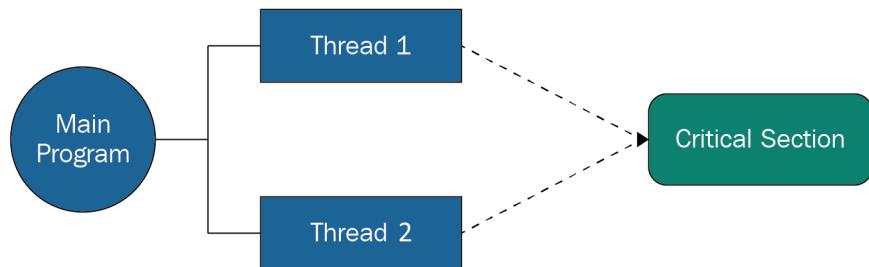
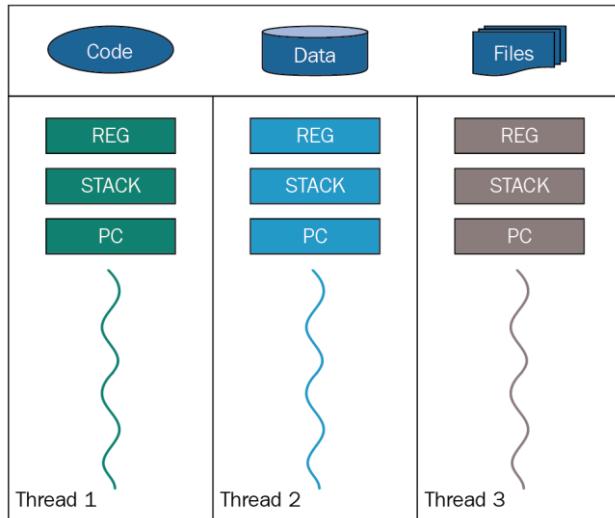


	day	temp	condition
0	Monday	40	Sunny
1	Tuesday	33	Cloudy
2	Wednesday	42	Sunny
3	Thursday	31	Rain
4	Friday	41	Sunny
5	Saturday	40	Cloudy
6	Sunday	30	Rain

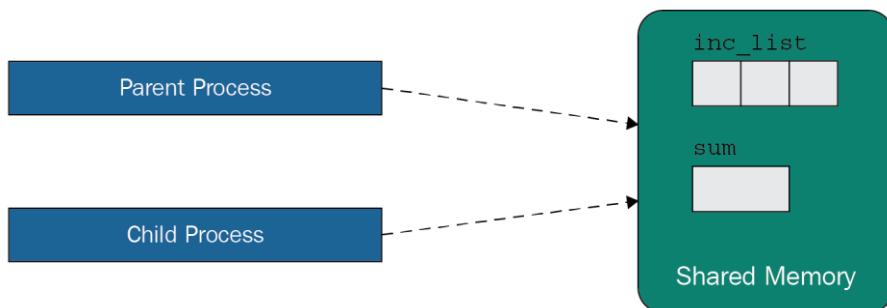
	temp	condition
day		
Monday	40	Sunny
Tuesday	33	Cloudy
Wednesday	42	Sunny
Thursday	31	Rain
Friday	41	Sunny
Saturday	40	Cloudy
Sunday	30	Rain

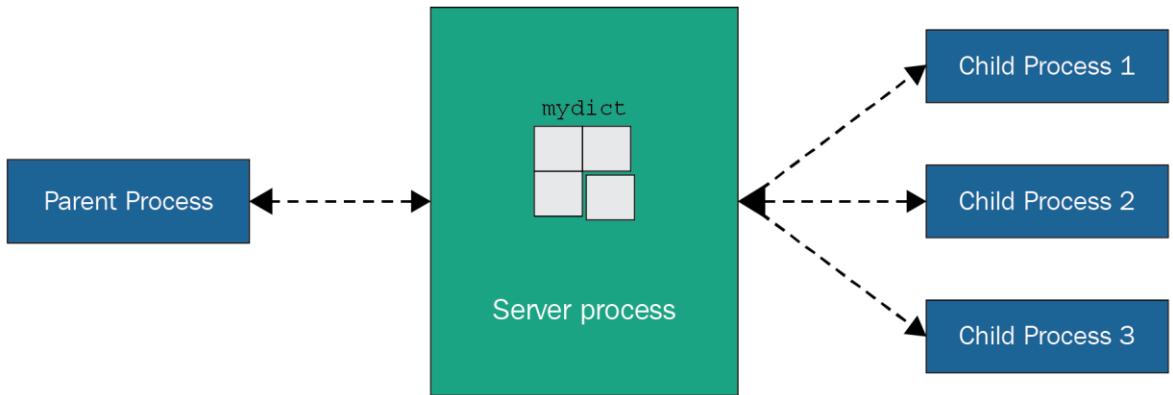
	day	temp	condition
MON	Monday	40	Sunny
TUE	Tuesday	33	Cloudy
WED	Wednesday	42	Sunny
THU	Thursday	31	Rain
FRI	Friday	41	Sunny
SAT	Saturday	40	Cloudy
SUN	Sunday	30	Rain

Chapter 7: Multiprocessing, Multithreading, and Asynchronous Programming

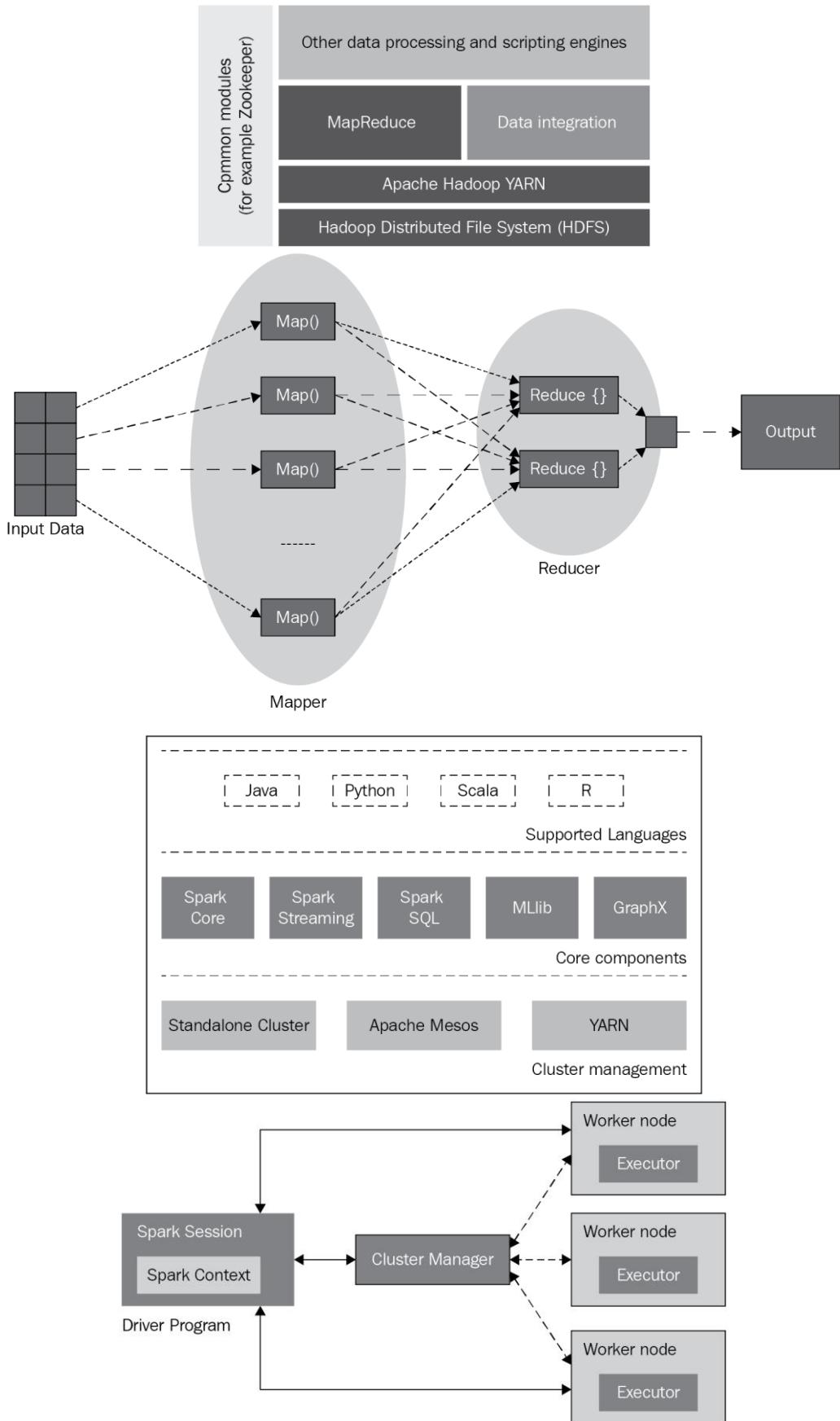


Using the Pool object	Using the Process object
Only active processes stay in memory	All created processes stay in memory
Works better for large datasets and for repetitive tasks	Works better for small datasets
Processes block on I/O operation until I/O resource is granted	Processes are not blocked on the I/O operation





Chapter 8: Scaling out Python Using Clusters



Welcome to

```
Using Python version 3.7.0 (v3.7.0:1bf9cc5093, Jun 26 2018 23:26:24)
Spark context Web UI available at http://192.168.1.110:4040
Spark context available as 'sc' (master = local[*], app id = local-1628712798632).
SparkSession available as 'spark'.
>>>
```

```
+-----+-----+
|firstname|salary|
+-----+-----+
|      James| 40000|
|     Kamal| 41000|
|    Robert| 35000|
| Sophia| 47000|
|     John| 65000|
+-----+-----+
+-----+-----+-----+-----+-----+-----+
|firstname|middlename|lastname| department|gender|salary|Pay Level|
+-----+-----+-----+-----+-----+-----+
|      James|           | Bylsma|          HR|   Male| 40000|      11|
|     Kamal|     Rahim|        |          HR|   Male| 41000|      11|
|    Robert|           | Zaine|     Finance|   Male| 35000|      10|
| Sophia|     Anne| Richer|     Finance|Female| 47000|      11|
|     John|     Will| Brown|Engineering|Female| 65000|      12|
+-----+-----+-----+-----+-----+-----+
```

Name	State	IPv4	Image
vm1	Running	192.168.64.2	Ubuntu 20.04 LTS
vm2	Running	192.168.64.3	Ubuntu 20.04 LTS
vm3	Running	192.168.64.4	Ubuntu 20.04 LTS

Node Name	Role	Web UI
192.168.64.2	Master (Spark://192.168.64.2:7077)	http://192.168.64.2:8080/
192.168.64.3	Worker	http://192.168.64.3:8081/
192.168.64.4	Worker	http://192.168.64.4:8081/

Apache Spark 3.1.1 Spark Master at spark://192.168.64.2:7077

URL: spark://192.168.64.2:7077

Alive Workers: 2

Cores in use: 2 Total, 0 Used

Memory in use: 2.0 GiB Total, 0.0 B Used

Resources in use:

Applications: 0 Running, 0 Completed

Drivers: 0 Running, 0 Completed

Status: ALIVE

Workers (2)

Worker Id	Address	State	Cores	Memory	Resources
worker-20210529145544-192.168.64.3-43027	192.168.64.3:43027	ALIVE	1 (0 Used)	1024.0 MiB (0.0 B Used)	
worker-20210529150201-192.168.64.4-34453	192.168.64.4:34453	ALIVE	1 (0 Used)	1024.0 MiB (0.0 B Used)	

Running Applications (0)

Completed Applications (0)



Spark Worker at 192.168.64.3:43027

ID: worker-20210529145544-192.168.64.3-43027

Master URL: spark://192.168.64.2:7077

Cores: 1 (0 Used)

Memory: 1024.0 MiB (0.0 B Used)

Resources:

[Back to Master](#)

Running Executors (0)

ExecutorID	State	Cores	Memory	Resources	Job Details	Logs

Finished Executors (13)



Spark Master at spark://192.168.64.2:7077

URL: spark://192.168.64.2:7077

Alive Workers: 2

Cores in use: 2 Total, 2 Used

Memory in use: 2.0 GiB Total, 2.0 GiB Used

Resources in use:

Applications: 1 Running, 0 Completed

Drivers: 0 Running, 0 Completed

Status: ALIVE

Workers (2)

Worker Id	Address	State	Cores	Memory	Resources
worker-20210529145544-192.168.64.3-43027	192.168.64.3:43027	ALIVE	1 (1 Used)	1024.0 MiB (1024.0 MiB Used)	
worker-20210529150201-192.168.64.4-34453	192.168.64.4:34453	ALIVE	1 (1 Used)	1024.0 MiB (1024.0 MiB Used)	

Running Applications (1)

Application ID	Name	Cores	Memory per Executor	Resources Per Executor	Submitted Time	User	State	Duration
app-20210529191451-0000 (kill)	Pi calculator app	2	1024.0 MiB		2021/05/29 19:14:51	muasif	RUNNING	9 s



Application: Pi calculator app

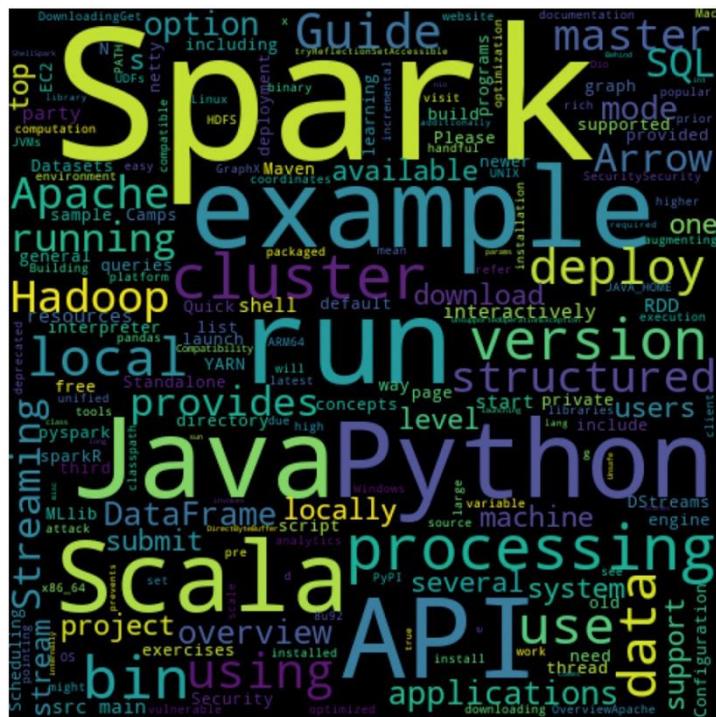
ID: app-20210529191451-0000
Name: Pi claculator app
User: mwasif
Cores: Unlimited (2 granted)
Executor Limit: Unlimited (2 granted)
Executor Memory: 1024.0 MiB
Executor Resources:
Submit Date: 2021/05/29 19:14:51
State: FINISHED

▼ Executor Summary (2)

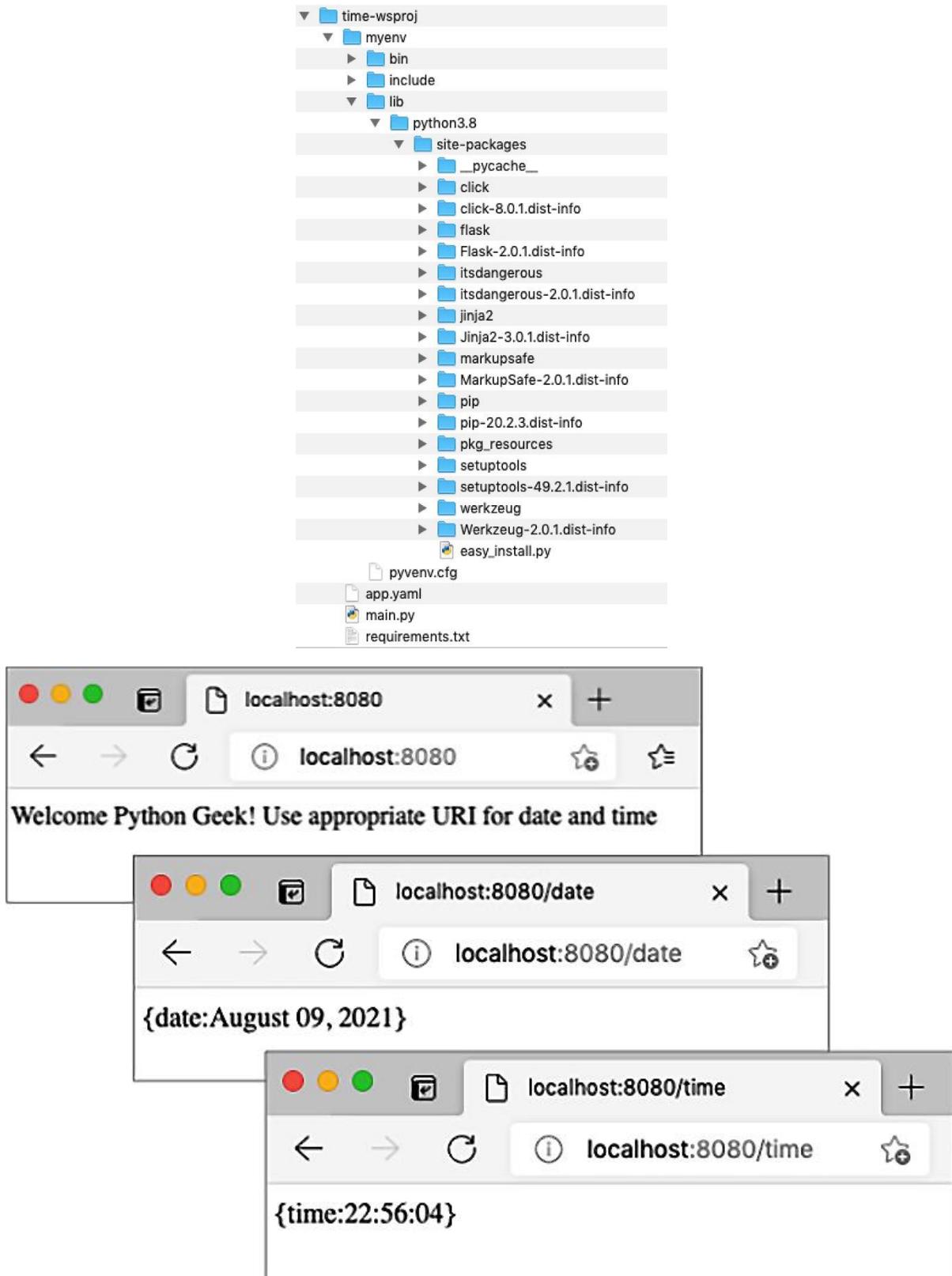
ExecutorID	Worker	Cores	Memory	Resources	State	Logs
------------	--------	-------	--------	-----------	-------	------

▼ Removed Executors (2)

ExecutorID	Worker	Cores	Memory	Resources	State	Logs
1	worker-20210529150201-192.168.64.4-34453	1	1024		KILLED	stdout stderr
0	worker-20210529145544-192.168.64.3-43027	1	1024		KILLED	stdout stderr



Chapter 9: Python Programming for the Cloud



Google Cloud Platform time-wsproj

App Engine

- Dashboard
- Services
- Versions
- Instances
- Task queues
- Cron jobs
- Release Notes

Get started

Resources

Language: Python
Environment: Standard

Read App Engine Python Standard Environment Documentation

Visit [Github](#) for Python Standard Environment code samples.

Deploy with Google Cloud SDK

[DOWNLOAD THE CLOUD SDK](#)

Initialise your SDK
\$ gcloud init

Deploy to App Engine
\$ gcloud app deploy

CLOUD SHELL

```
Terminal (time-wsproj) x + 
masif_72@cloudshell:~ (time-wsproj)$ gcloud app versions list
SERVICE VERSION ID TRAFFIC_SPLIT LAST_DEPLOYED SERVING_STATUS
default 20210611t191125 1.00 2021-06-11T15:12:34+00:00 SERVING
masif_72@cloudshell:~ (time-wsproj)$ gcloud projects describe time-wsproj
createTime: '2021-06-05T12:03:31.039Z'
lifecycleState: ACTIVE
name: time-wsproj
projectId: time-wsproj
projectNumber: '539807460484'
masif_72@cloudshell:~ (time-wsproj)$
```

Google Cloud Platform time-wsproj

App Engine

- Dashboard
- Services
- Versions
- Instances
- Task queues
- Cron jobs
- Release Notes

Dashboard

Version
20210611t191125 (100%)

time-wsproj.uc.r.appspot.com
Region: us-central

Summary

1 hour 6h 12h 1 day 2d 4d 7d 14d 30d RESET ZOOM

Summary

Count/sec

Version 20210611t191125 in service default

Yesterday

- 19:12 Completed: Create App Engine ... masif.72@gmail.com created ...
- 19:11 Create App Engine version masif.72@gmail.com created ...

No older events found.

CLOUD SHELL

Editor

File Edit Selection View Go Run Terminal Help

EXPLORER: MASIF_72

- app.yaml
- main.py
- README-cloudshell.txt
- requirements.txt

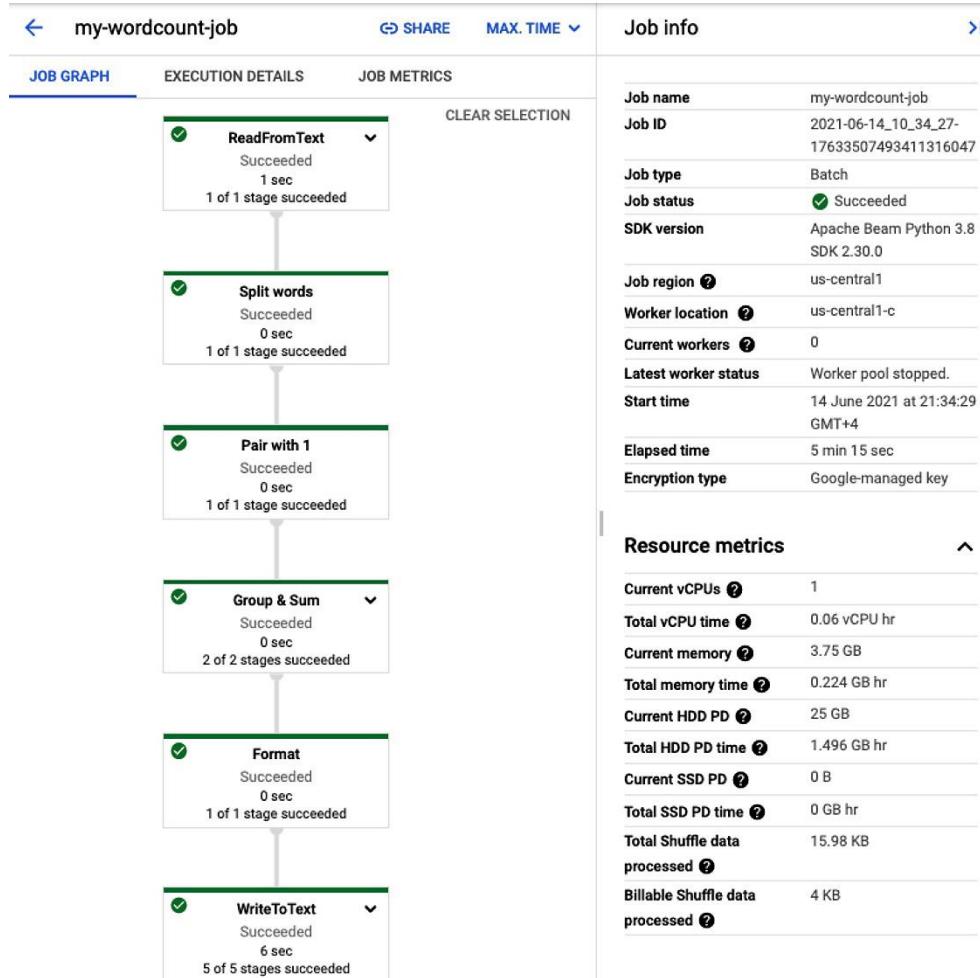
```
main.py x
1
2 from flask import Flask
3 from datetime import date, datetime
4
5
6 # If 'entrypoint' is not defined in app.yaml, App Engine will look for an app
7 # called 'app' in file 'main.py'. This is the case in our yaml file
8 app = Flask(__name__)
9
10
11 @app.route('/')
12 def welcome():
13     return 'Welcome Python Geek! Use appropriate URI for date and time'
14
15
16 @app.route('/date')
17 def today():
18     today = date.today()
```

OUTLINE

- Flask
- date
- datetime
- app
- welcome
- today
- time

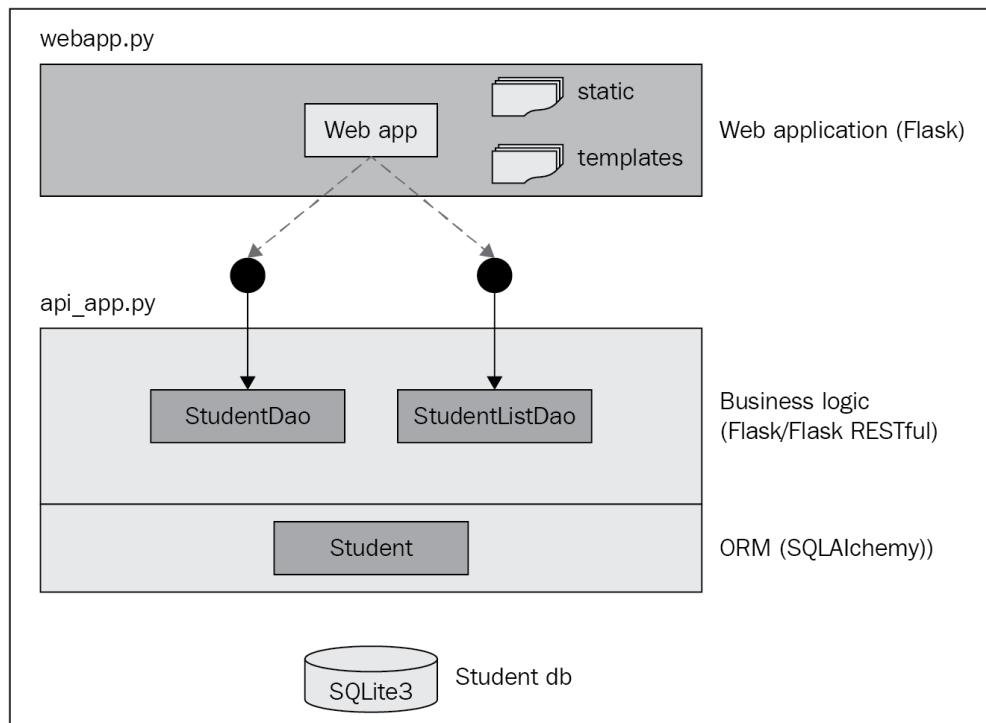
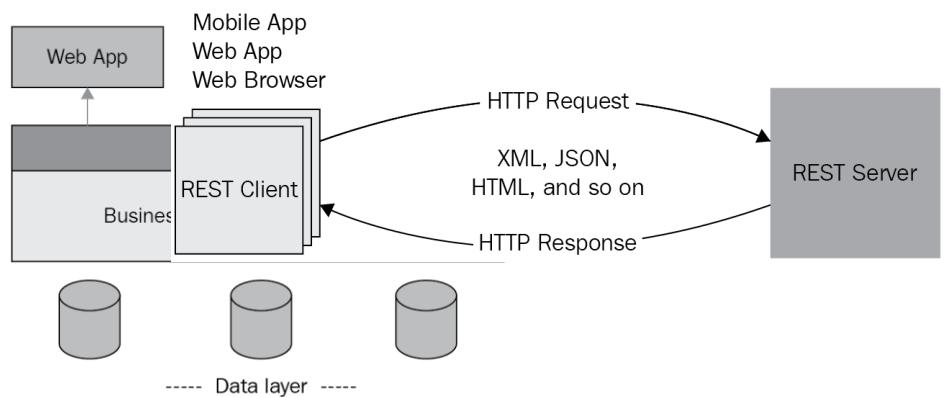


Jobs								
CREATE JOB FROM TEMPLATE			CREATE JOB FROM SQL			ENABLE SORTING		
Running	Filter	Filter jobs						
Name	Type	End time	Elapsed time	Start time	Status	SDK version	ID	Region
my-wordcount-job	Batch	14 Jun 2021, 21:39:43	5 min 14 sec	14 Jun 2021, 21:34:29	Succeeded	2.30.0	2021-06-14_10_34_27-17633507493411316047	us-central1
my-wordcount-job	Batch	14 Jun 2021, 21:30:54	5 min 3 sec	14 Jun 2021, 21:25:51	Succeeded	2.30.0	2021-06-14_10_25_49-9276325152354335464	us-central1
my-wordcount-job	Batch	14 Jun 2021, 13:56:34	4 min 43 sec	14 Jun 2021, 13:51:51	Failed	2.30.0	2021-06-14_02_51_50-7355109158749375121	us-central1



Chapter 10: Using Python for Web Development and REST API

Error Code	Name	Description
400	Bad Request	This error indicates either the URL or the request contents are incorrect.
401	Unauthorized	This error appears when the username or password is not provided or not correctly provided with the request.
403	Forbidden	This error shows that a user is trying to access a resource that is not allowed for that user.
404	Not Found	This error is returned when we are trying to access a resource that is not available. This is usually for the wrong URL.
500	Internal Server Error	This error indicates that the request is correct but that something happened on the server side.



Students



Add a Student

First name

Last name

Grade

Submit

Students

No	Name	Grade	Actions
1	John Lee	10	<button>Update</button> <button>Delete</button>
2	Brian Miles	7	<button>Update</button> <button>Delete</button>

Students



Update Student

First name

John

Last name

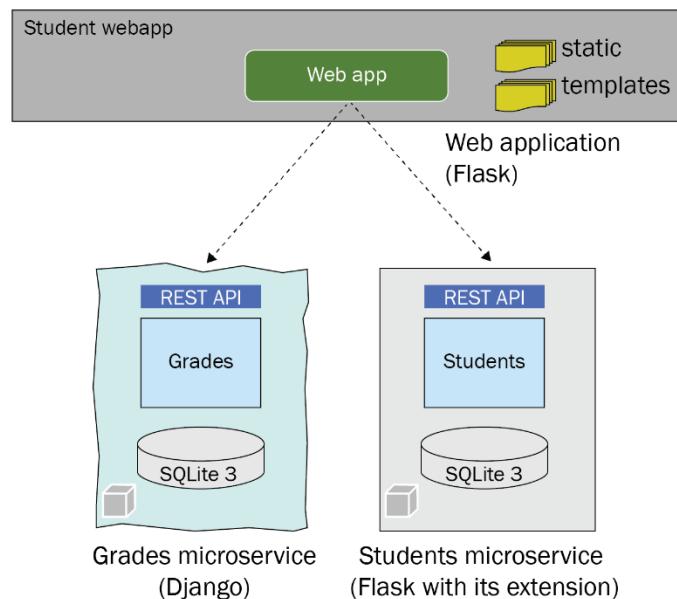
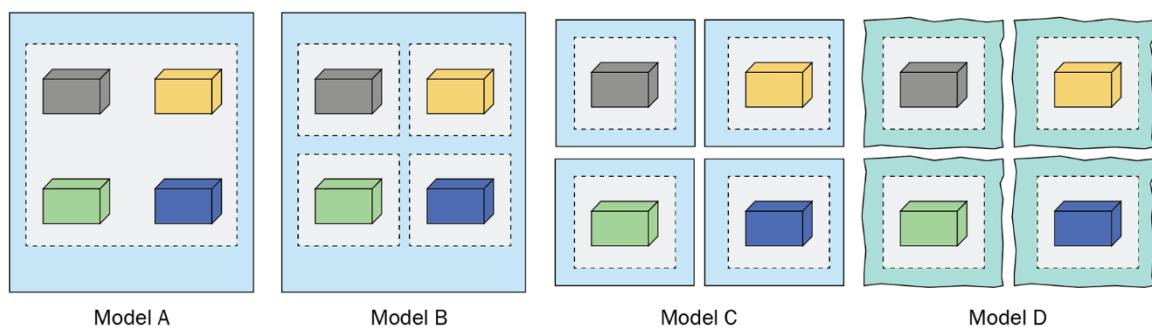
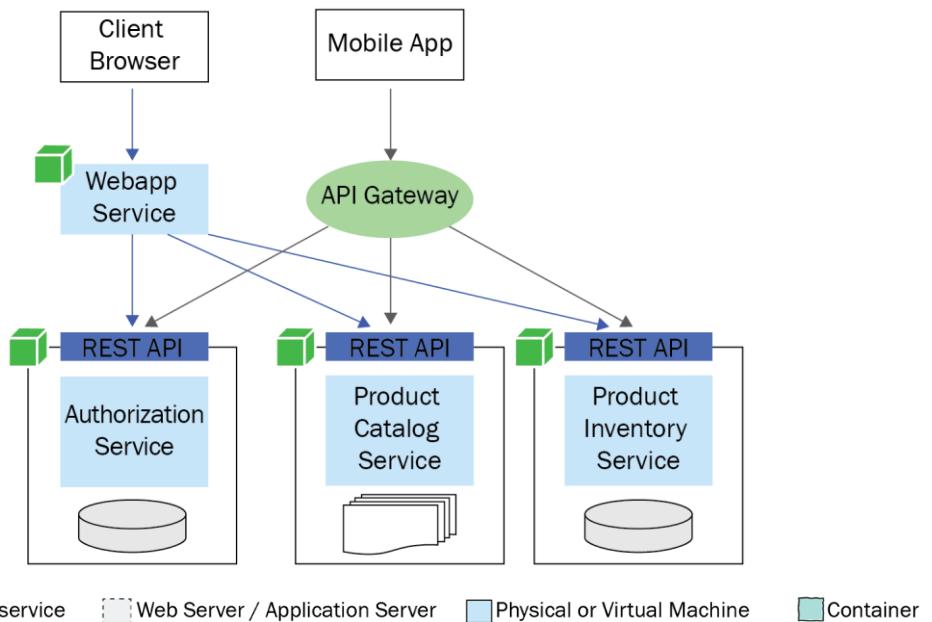
Lee

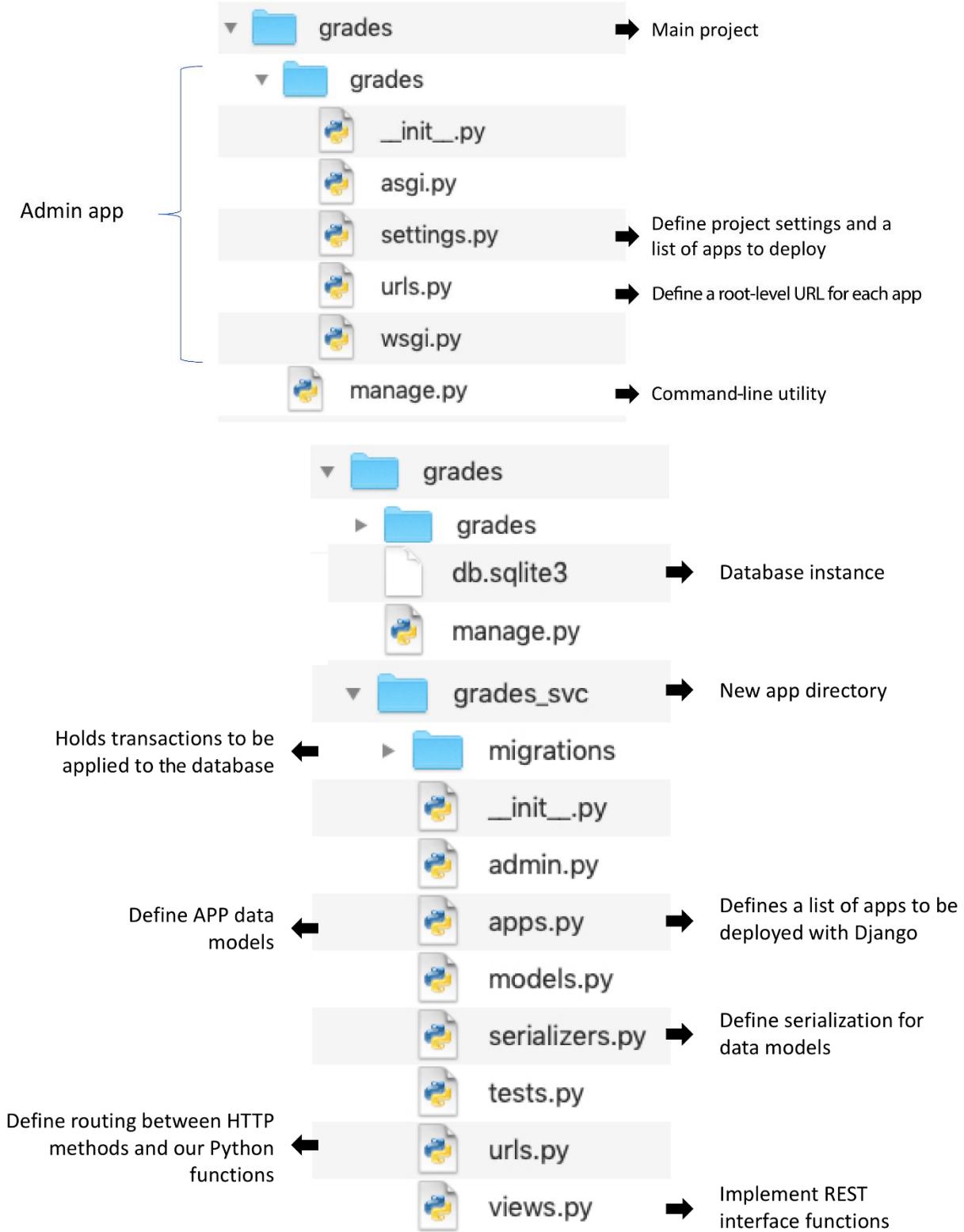
Grade

10

Update

Chapter 11: Using Python for Microservices Development





Students



Add a Student

First name

Last Name

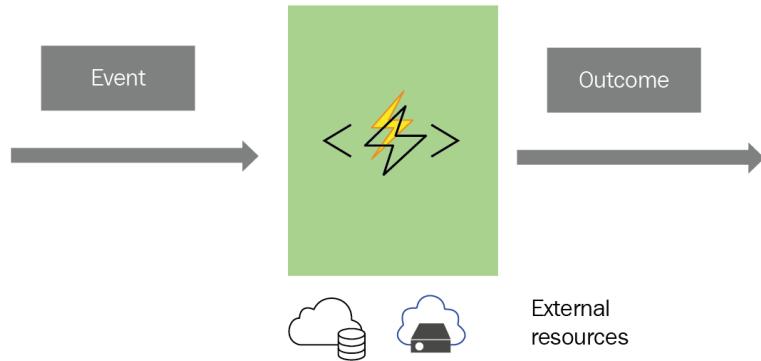
Grade

Submit

Students

No	Name	Grade	Building	Teacher	Actions
1	John Lee	10	Building #10	Miss Hannah	Update Delete
2	Brian Miles	7	NA	Miss Fey	Update Delete

Chapter 12: Building Serverless Functions Using Python



(...) Cloud Functions | [Copy function](#)

Configuration — [Code](#)

Basics

Function name * ?

Region ?

Trigger

HTTP

Trigger type ▾

URL ▾

Authentication

Allow unauthenticated invocations
Check this if you are creating a public API or website.

Require authentication
Manage authorised users with Cloud IAM.

Require HTTPS ?

SAVE CANCEL

RUNTIME, BUILD AND CONNECTIONS SETTINGS



RUNTIME

BUILD

CONNECTIONS

Memory allocated *

128 MiB

Timeout *

60

seconds



Runtime service account

Runtime service account

App Engine default service account

Auto-scaling

Maximum number of instances

1

Runtime environment variables

+ ADD VARIABLE

NEXT

CANCEL

(...) Cloud Functions

Edit function

Configuration — 2 Code

Runtime

Python 3.8

Source code

Inline Editor



main.py



requirements.txt



Entry point

today_datetime

```
1  from datetime import date, datetime
2
3  def today_datetime(request):
4
5      request_json = request.get_json()
6
7      if request.args and 'requester' in request.args:
8          requester_name = request.args.get('requester')
9
10     elif request_json and 'requester' in request_json:
11         requester_name = request_json['requester']
12
13     else:
14         requester_name = f'anonymous'
15
16     today = date.today()
17     now = datetime.now()
18
19     resp = f'{date: {today.strftime("%B %d, %Y")}} + \
20           | | time: {now.strftime("%H:%M:%S")}) + \
21           | | return f'Hello ' + requester_name + '! Here is today date and time:\n' + resp
```

PREVIOUS

DEPLOY

CANCEL

Cloud Functions Functions [CREATE FUNCTION](#) [REFRESH](#)

Filter Filter functions

	Name	Region	Trigger	Memory allocated	Actions
<input type="checkbox"/>	handle_storage_delete	us-central1	Bucket: ch12-cfunc-testing	256 MiB	
<input type="checkbox"/>	handle_storage_upload	us-central1	Bucket: ch12-cfunc-testing	256 MiB	
<input type="checkbox"/>	my-datetime	us-east1	HTTP	128 MiB	

Copy function
 Test function
 View logs

 Delete

Cloud Functions [Function details](#) [EDIT](#) [DELETE](#) [COPY](#)

my-datetime Version 3, deployed at 10 Jul 2021, 10:04:03 ...

METRICS DETAILS SOURCE VARIABLES TRIGGER PERMISSIONS LOGS TESTING

Triggering event

```

1 {"requester": "John"}
2
  
```

[TEST THE FUNCTION](#) Testing in the Cloud Console has a 60-second timeout. Note that this is different from the limit set in the function configuration.

Output Complete

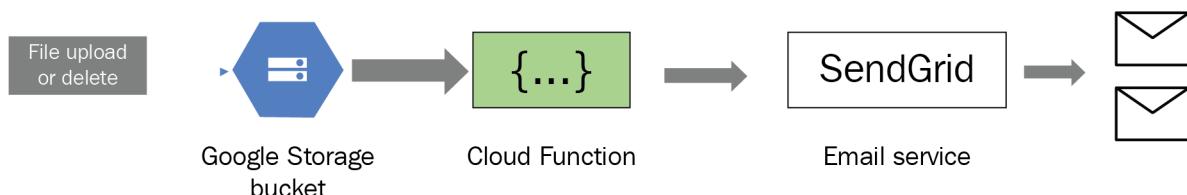
```

$ Hello John! Here is today date and time:
{date:July 10, 2021, time: 07:24:52}
  
```

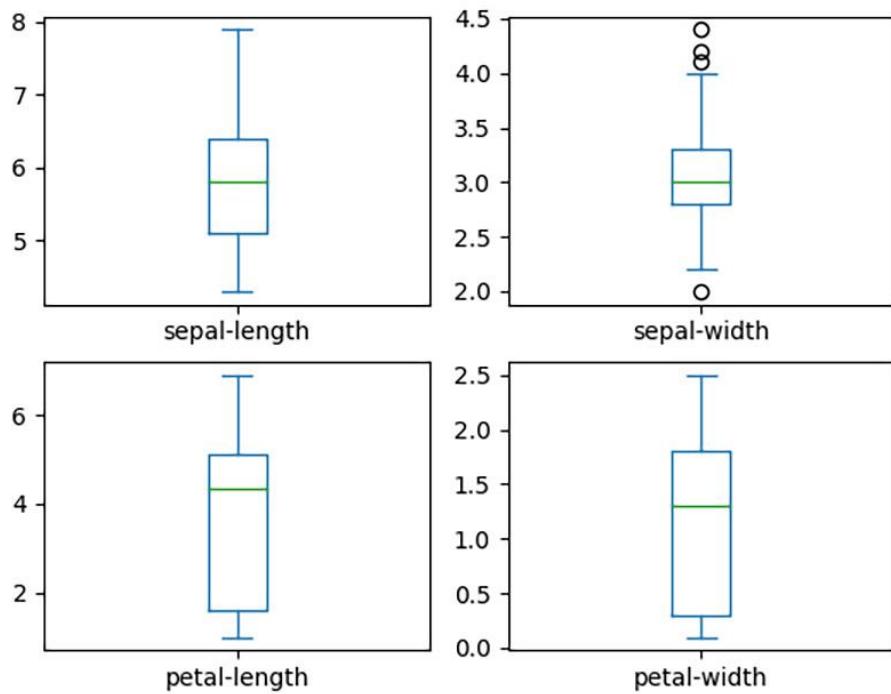
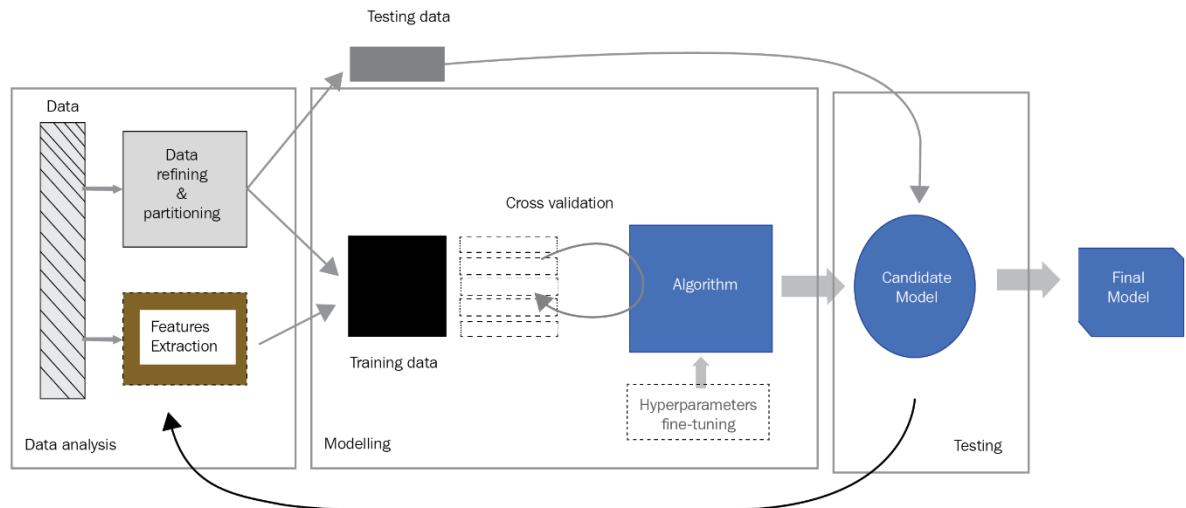
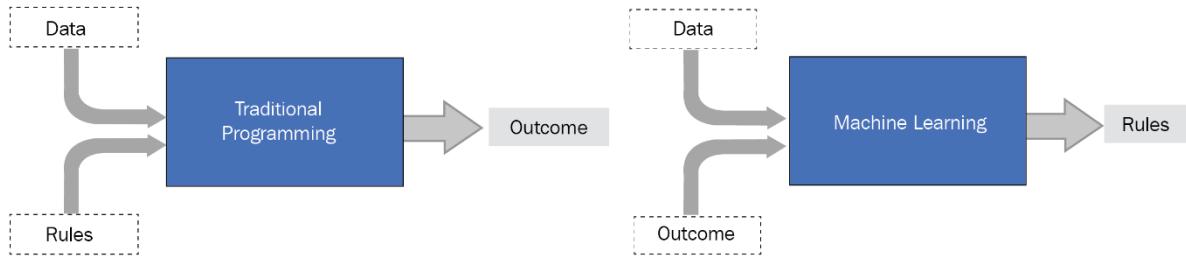
Logs [View all logs](#)

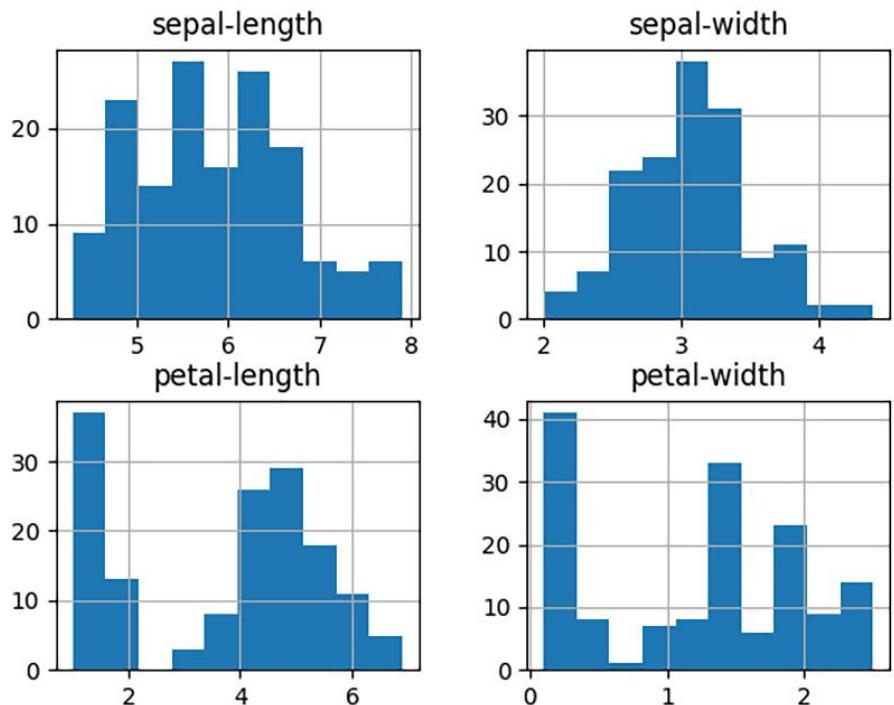
```

Loading... Scanned up to 03/02/2021, 03:59. Scanned 911 B.
▶ [λ] 2021-07-10T07:24:51.717822528Z my-datetime ke0djohswsq2 Function execution started
▶ [λ] 2021-07-10T07:24:52.033451420Z my-datetime ke0djohswsq2 Function execution took 316 ms, finished with status code: 200
  
```



Chapter 13: Python and Machine Learning





Chapter 14: Using Python for Network Automation

No images...