

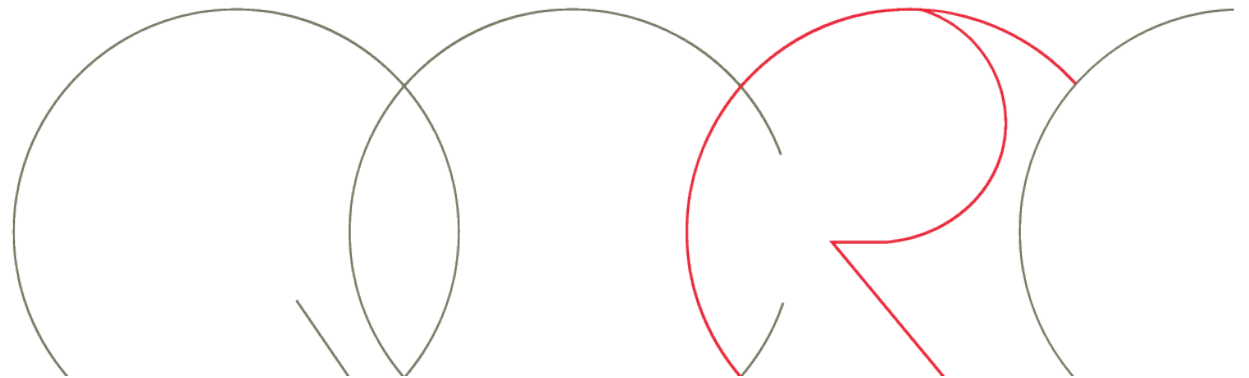


معهد قطر لبحوث الحوسبة
Qatar Computing Research Institute

Member of Qatar Foundation عضو في المؤسسة قطر

Rapid Prototyping (RP) with Python

Omar Alrawi



Agenda

- Purpose of Hackathon
- Using Python for rapid prototyping
 - Running a server
 - Templating
 - Data manipulation with JSON
 - Persisting data
 - Using 3rd party APIs

A Hackathon ...

- ... is to demonstrate your idea!
- ... IS NOT to
 - Create a startup
 - Full featured
 - Bug free
 - Scalable
 - Optimal
 - ...
- Decide on your idea, find bare minimum features needed to **DEMO** your idea, start programming!!!

Python for RP

- We will be using:
 - BottlePy (python webserver)
 - Bootstrap (template framework, twitter)
 - JSON, for data manipulation (ujson)
 - Database, NoSQL (MongoDB, UnQLite, etc.)
 - Use 3rd party API (Google API, table fusion, graph, etc)

Prerequisites

- Build essentials, for compiling packages
 - `sudo apt-get install linux-headers-$(uname -r) build-essential`
- Python-pip, package manager for python
 - `Sudo apt-get install python-pip`
- Database server, Mongodb-server
 - `Sudo apt-get install mongodb-server`
- Other packages: bottlepy, bootstrap, ujson, google api client library, pymongo
 - `Sudo pip install bottlepy ujson google-api-python-client pymongo`

Using BottlePy

- Test the installation
 - \$python
 - >>> import bottle
 - No errors means we are gold!
- Build a small program (Hello CMU)
 - Call it server.py
- Run the code
 - Python server.py
- Go to <http://localhost:8080/>

<http://bottlepy.org/docs/dev/index.html>

```
from bottle import route, run
@route('/')
def index():
    return 'Hello CMUQ!'
run(host='localhost',port=8080)
```

Get Bootstrap

- Go to <http://getbootstrap.com/getting-started/>
- Download starter template or any of the available templates
- Integrate bootstrap template with bottlepy
 - fix the template to remove local references and use CDN or download the resources locally (css/js/etc)
 - modify template to include variables that we can dynamically populate
- bottle looks for templates in the following list:
 - bottle.TEMPLATE_PATH
 - by default you have ./ and ./views
- Tip: do not get stuck on perfection, Hackathon is to demonstrate your idea

Using JSON

- JSON is awesome!
- Use it to:
 - Transport Data
 - Store Data
 - Represent Data
- Integrates well with Python data structures (lists/dictionaries)
- JSON libraries
 - simplejson, json, ujson, etc.

JSON example

```
>>> import ujson
>>> json_string='{"a":[1,2,3],"b":[4,5,6]}'
>>> json_struct=ujson.loads(json_string)
>>> print json_struct
{u'a': [1, 2, 3], u'b': [4, 5, 6]}
>>> json_struct['a']
[1, 2, 3]
>>> json_struct['b']
[4, 5, 6]
>>> json_string==ujson.dumps(json_struct)
True
>>>
```

Persisting Data

- How do we store data after our program exits?
- Use a database, NoSQL database in our example
- NoSQL is document based database that allows us to store records with different keys
- We will use MongoDB
- Good to use:
 - Lots of inserts, reads, and updates
 - Non-relational data, although you can use aggregation feature
 - JSON format (FTW!),

MongoDB

```
>>> import pymongo
>>> client = pymongo.MongoClient("localhost", 27017)
>>> db = client.test
>>> db.name
u'test'
>>> db.test_collection.save(json_struct)
>>> db.test_collection.find_one()
```

Putting All Together

- Find some dataset using google tables
- Import data as JSON
- Save data in MongoDB\
- Use google charts, maps, or any of their APIs to:
 - Visualize the data
 - Augment it with other data
 - etc

What's next?

- Prepare a build environment for the hackathon
- Make sure you have necessary libraries:
 - Build essentials
 - Package managers
 - Data store
- Become fluent and comfortable with the technologies you are planning to use



معهد قطر لبحوث الحوسبة
Qatar Computing Research Institute

Member of Qatar Foundation عضو مؤسسة قطر

ص.ب. 5825
برج التورنيڊو، الطابق 10
الخليج الغربي، الدوحة - قطر
هاتف +974 4454 0629
فاكس +974 4454 0630

P.O.Box 5825
Tornado Tower, 10th Floor
West Bay, Doha - Qatar
Tel +974 4454 0629
Fax +974 4454 0630

www.qcri.qa

may the odds be ever in your favor...

