

Service-Oriented Architecture (2)

Hui Chen ^a

^aCUNY Brooklyn College, Brooklyn, NY, USA

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Outline

- 1 Service-Oriented Architecture
- 2 SOA: Demo
 - Using RESTful Services
 - Testing REST API using cURL
 - Demo App: Design and Implementation
- 3 References

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Outline

- ▶ Service-Oriented Architectures (SOA)
 - ▶ Architectural style (high-level design)
- ▶ Implementing SOA
 - ▶ Using RESTful Web Services
- ▶ SOA history lesson
- ▶ Demo (Part 2)

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Using RESTful Services

1. Identify RESTful Services and REST API
2. Familiarize with REST API
3. Access REST API (design REST client)

Familiarize with REST API

1. What? For instance, [Github API](#), [StackExchange API](#), [Discourse API](#),
...
2. Documentation?
3. How to access?
 - ▶ API keys?
 - ▶ end point?
 - ▶ protocols? (http vs. https)
4. Data format (JSON or XML)?
5. Test API?
 - ▶ Using tools like cURL

Testing REST API using cURL

- ▶ without and without `-i` option
- ▶ setting extra Headers: `-H` option
- ▶ setting HTTP methods (get or post?)
- ▶ passing data to server
- ▶ ...

Reference

[cURL manual](#)

Example: Retrieving Github Repos for a User

Using BDD and Red-Green-Refactoring, design and implement an Android app – *assume the requirements (user stories, scenarios, and story boards) are accepted*

- ▶ Acceptance Tests
 - ▶ documenting requirements
 - ▶ via espresso tests
 - ▶ run on Android
- ▶ Unit Tests
 - ▶ documenting design specifications
 - ▶ via Unit tests
 - ▶ run locally
 - ▶ what if we use Android API?
 - ▶ Mock the API (e.g., [Robolectric](#))

Project Setup for Robolectric

“Running tests on an Android emulator or device is slow! ... That’s no way to do TDD. ...Robolectric is a framework that brings fast and reliable unit tests to Android. Tests run inside the JVM on your workstation in seconds.” – <http://robolectric.org/>

Add the dependencies to the app’s build.gradle (i.e., the module’s build.gradle)

```
1 dependencies {
2     // ...
3     testImplementation 'junit:junit:4.13.2'
4     testImplementation 'org.robolectric:robolectric:4.6'
5     // ...
6 }
```

RED – Write Tests

Design tests, serving as design specifications

```
1 package edu.cuny.bc.cisc3171.githubapp;
2
3 import org.junit.Assert;
4 import org.junit.Test;
5 import org.junit.runner.RunWith;
6 import org.robolectric.RobolectricTestRunner;
7 import java.io.IOException;
8 import edu.cuny.bc.cisc3171.githubapp.Github.GithubClient;
9
10 @RunWith(RobolectricTestRunner.class)
11 public class GithubResponsePageTest {
12     @Test
13     public void test_GithubClient_getRepoList() throws IOException
14     {
15         GithubClient client = new GithubClient("YOUR_GH_TOKEN");
16         Assert.assertNotNull("getting null", client.getPageRepoList()
17     );
18 }
```

GREEN – Writing Code

Write the simplest possible code that lets the test pass – Aim for “always have working code”

```
1 public class GithubClient {
2     private String ghToken;
3
4     public GithubClient(String ghToken) { // ... }
5
6     public List<String> getPageRepoList() throws IOException { //
7     ... }
```

Refactor – Making Improvement

Clean up the code you have just written – Aim for nice, clean structure, naming ...

- ▶ GithubClient → GithubResponsePage
- ▶ ...

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“Engineering Software as a Service” by Armando Fox and David Patterson
(2nd Edition)

“Essentials of Software Engineering” by Frank Tsui, Orlando Karam, and
Barbara Bernal(4th Edition)