IT 4403 ADVANCED MOBILE AND WEB APPLICATIONS STUDY GUIDE
MODULE 5: RESTFUL WEB SERVICES AND APIS
Prepared by Jack G. Zheng, Fall 2020

OVERVIEW AND LEARNING OUTCOMES

Web services have significantly advanced distributed web applications, and RESTful web services have expanded the impact to a wide range and level of web applications because of its simplicity and flexibility. After completing this module, you will be able to:

1. Describe the principles of service oriented and resource oriented architectures
2. Explain REST basic principles
3. Describe features of RESTful web services
4. Test RESTful web APIs using client testing tools
5. Consume public RESTful web APIs using JavaScript

This module is related to course level learning outcomes 3 and 5.

TASK LIST

1. Finish required readings.
2. Review the lecture notes and some examples given by the instructor. Try it yourself to rewrite the examples compare your code to the examples provided.
3. Research and discuss:
   a. Compare the solution of providing data through services and direct database access? Refer to the additional readings (3c) and this discussion: http://stackoverflow.com/questions/2142070/why-should-a-developer-use-web-services-instead-of-direct-connections-to-a-db
4. Lab 4: no submission; practice until you feel comfortable and confident to begin the project/assignment. Reference answers will be posted at the end of the week.

LEARNING MATERIALS

1. Required readings
   a. Learn REST: A Tutorial: http://rest.elkstein.org
   b. RESTful Web Services Tutorial: http://www.drdobbs.com/web-development/restful-web-services-a-tutorial/240169069
   c. REST principles – a video tutorial: http://www.restapitutorial.com/lessons/whatisrest.html
   d. RESTful API using JSON (just watch it): https://www.youtube.com/watch?v=7YcW25PHnAA
   e. Test a RESTful API: http://www.guru99.com/testing-rest-api-manually.html
2. Lecture notes with examples
   a. Lecture notes: restful.pdf
   b. Code examples of using Web APIs.
3. lab4 restful.pdf
4. Additional resources and readings
   a. Further understanding of REST and RESTful services
      i. http://www.infoq.com/articles/rest-introduction - discussion of its key principles
      ii. http://www.ibm.com/developerworks/webservices/library/ws-restful/
      iii. Resource-Oriented Architecture: The Rest of REST: http://www.infoq.com/articles/roa-rest-of-rest
      iv. Microservices: http://www.forbes.com/sites/jasonbloomberg/2015/02/09/service-oriented-architecture-enabler-of-the-digital-world/
      v. Comparison between REST and SOAP http://www.prescod.net/rest/rest_vs_soap_overview/

b. Consuming web APIs using PHP
    i. http://rest.elkstein.org/2008/02/using-rest-in-php.html (we can also use HTML form to do "post")
    ii. This video shows creating a mashup by chaining two web APIs (the example APIs return JSON but it works similarly with XML): https://www.youtube.com/watch?v=RTjd1nwvlj4

c. Database access via services (data services)
    i. http://www.agiledata.org/essays/implementationStrategies.html
    ii. http://www.agile-code.com/blog/direct-sql-access-vs-web-service/

d. A Comparison of Service-oriented, Resource-oriented, and Object-oriented Architecture Styles
    i. http://research.microsoft.com/pubs/117710/3-arch-styles.pdf
    ii. https://www.researchgate.net/publication/221211522_Roots_of_the_RESTSOAP_Debate