Course Number: CS 378
Course Title: Modern Web Applications
Semester: Fall 2016

Class timing: Tuesday, Thursday 5.30-7.00pm
Location: JGB 2.218

Instructor: Dr. Devdatta Kulkarni
Email: devdatta@cs.utexas.edu
Office: 4.812
Office Hours: Thursday 7.15pm-8.30 pm, GDC 6.202

Teaching Assistant: Eddy Hudson
Office: TBD
Office Hours: TBD

Course objectives:

Learn concepts, tools, and techniques in designing and building modern web applications, and their deployment to public clouds. Get hands-on experience with tools and frameworks related to modern web application development and public cloud computing platforms.

Expected outcome for students:

-Learn about Hypertext transfer protocol (HTTP), Servlets, Session management, unit testing, functional testing, Representational State Transfer (REST), XML/JSON, Databases, JDBC, Object Relational Mapping, Spring framework, logging, authentication, authorization, Javascript, JQuery
-Understand different cloud computing paradigms, such as infrastructure-as-a-service (IaaS) and platform-as-a-service (PaaS).
-Get hands-on experience with using public cloud platforms
-Gain introduction to OpenStack

Course details:

Modern Web applications are those that are accessible over the Internet. The focus of this course is on learning concepts, tools, and techniques in designing and building such applications, and their deployment to public clouds. The fundamental concepts that we will study include, basic protocols (hypertext transfer protocol and representational state

transfer protocol), application architecture (internal and external) principled application development through unit and functional testing, persistence support through relational databases, handling inputs and outputs, authentication and authorization mechanisms, integration with other web applications and systems, designing user interfaces, and deployment of such applications to public clouds so that they are publicly accessible. Learning of these concepts is complemented by rigorous study and practice of modern tools and frameworks that are essential for building such applications. These include, application container (Tomcat), web frameworks (Servlets, Spring, RESTEasy), Object-relational mapping (Hibernate), dependency injection, unit testing (Junit, Mockito), user interface building using JavaScript and JQuery.

Once a web application is designed and implemented, additional concerns need to be addressed. These include, where to host the application, how to scale it, how to secure it, how to ensure it is available with the required uptime guarantees, and so on. This is where the paradigm of cloud computing comes into picture. Cloud computing is essentially a way to harness resources such as compute, storage, networking, as and when needed by an application. In the second part of this course we will learn about this area. We will cover concepts such as, infrastructure-as-a-service, platform-as-a-service, and the OpenStack platform. We may also briefly cover the topic of Linux containers(Docker).

This is a programming intensive course. Most of the assignments will be in Java. Students are expected to be comfortable with Java. Parts of some of the assignments might be in JavaScript and Python.

Prerequisites:

- Required:
  - Principles of Computer Systems (CS 439)
  - Programming knowledge and experience in Java/C#
    - (Java: CS 312, CS 314)

- Additional (not required but will be good to have):
  - Knowledge of relational databases (MySQL) (CS 347, CS 327E)
  - Distributed Computing (CS 371D)

Reference Books:

The topics to be covered in this class are varied and there is no single book that covers all of them. So I plan to provide regular class notes to

fill this gap. In the previous iterations of this class we used two books listed below. You may use these as reference books. The topics that are not covered in these books but which we will cover are: unit and functional testing, XML and JSON parsing, relational databases and SQL, Hibernate ORM framework, deploying web applications to public clouds.

1) Professional Java for Web Applications - Paper back
   - Author: Nicholas S. Williams
   - ISBN-13: 978-1118656464
   - ISBN-10: 1118656466

2) RESTful Java with JAX-RS 2.0, 2nd Edition, Designing and Developing Distributed Web Services
   - Author: Bill Burke
   - ISBN-13: 978-1449361341
   - ISBN-10: 144936134X
   - Edition: Second Edition

In addition to these class notes will be made available.

Grading:

- Midterm (13%)
- Final (15%)
- Six (6) programming assignments (72%)
  - To be done individually
  - Due by midnight on the due date
- Each late day will reduce 5% of received points

> 95%: A
90 - 95: A-
85 - 90: B+
80 - 85: B
75 - 80: B-
70 - 75: C+
65 - 70: C
60 - 65: C-
55 - 60: D+
50 - 55: D
45 - 50: D-
< 45: F

Academic dishonesty policy:
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http://www.cs.utexas.edu/undergraduate-program/code-conduct/

This is a hands-on course in which most of the learning will happen as part of programming assignments. As such, I encourage everyone to discuss the problems and assignments with each other. Your final submission though must reflect your own thought and design. Copying or sharing of code will result in a failure grade. More importantly, by doing so you will miss out on learning all the exciting topics to be taught in this class. So please refrain from cheating.

Students with disabilities:

Students with disabilities may request appropriate academic accommodations from the Division of Diversity and Community Engagement, Services for Students with Disabilities, 512-471-6259. Additional information available at:
http://ddce.utexas.edu/disability/

Accommodations for religious holidays:

By UT Austin policy, you must notify me of your pending absence at least fourteen days prior to the date of observance of a religious holy day. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence.

Campus Safety:
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http://www.utexas.edu/safety/
http://besafe.utexas.edu