COMP 7890: Software Testing and Quality Assurance (Fall 2013)

Course info

Instructor: Hadi Hemmati
Class time/location: Tue/Thu 2:30pm-4:00pm, E2- 461 EITC
Office hours: Tue/Thu 11:00pm-12:00pm, or by appointment
Course webpage: http://cs.umanitoba.ca/~hemmati/courses/comp7890/fall2013/

Prerequisite

Exposure to software engineering and basic testing concepts through COMP 3350 or equivalent software engineering courses/experience.

Overview

The growing complexity and size of software systems, along with the increasing role of software in everyday life, makes software quality assurance an essential part of the software engineering process. Among different software quality assurance techniques, software testing is one of the most practical approaches. This course provides an overview of the fundamental concepts and techniques as well as state-of-the-art approaches in software quality assurance, with an emphasis on software testing.

Grading scheme

This is a seminar-style course, where several research papers and book chapters, covering the course topics, will be presented and discussed by the students and/or the instructor. Half of the course covers the fundamental topics in software testing and QA. Each topic will be covered by some book chapters and/or survey papers. Some students will be responsible for presenting each topic, as a lecture. Other students must read the material beforehand and submit two intellectual questions about the readings, per lecture. The students and the presenters will discuss about the pre-submitted questions in the class.

The second half of the class covers state-of-the-arts in software testing and QA by several research papers. Each research paper will be presented by one student, but read beforehand by all students. Again each student submits two questions per paper. The questions will be discussed after each presentation.

In addition, students will form research teams to work on concrete research ideas, as their final project. Students first need to write a proposal to get early feedbacks. The final projects will be both presented in class and reported as research articles. The reports will be evaluated in a peer-review style by the students and the instructor.

Grading will be based on the following components:

1. Participating in the class and active discussions based on submitted questions: 20%
2. Presentations: 30%
   a. Basic concepts: 10%
   b. Advanced concepts: 10%
   c. Project results: 10%
3. Project proposal: 5%
4. Final project report: 30%
5. Peer review reports of other groups’ projects: 15%
Deliverables, missing classes, and late policies

Deliverables of this course are:

- Presentations
  - After finalizing the presentations’ schedule by the second session of the class, no change or cancelation is accepted. The students will miss the points for their presentation in case of missing, expect in unusual circumstances”.
- Submitted questions per reading
- Final project’s proposal and final report
- Peer reviews

* Examples of unusual circumstances are medical reasons with doctor’s note. The instructor, depending on the case, will handle these situations.

IMPORTANT: Students are allowed 2 grace days to use at their own discretion over the semester for missing classes (the missed sessions can not be one of the presentation days for the student), late delivery of the final project proposal/report, and the peer reviews. For example, students can miss one session of the class and submit one of their peer review reports a day after the deadline, without loosing any mark. After using both grace days, each missing session will reduce 10 points (out of 100) from the student’s total mark.

If the students do not use the grace days they will get bonus points, 5 points per unused grace day.

IMPORTANT: Missing a class on the student’s presentation day means both missing the presentation mark and the 10 points from the total mark.

Readings

There is no single textbook that covers all the material of this course. However, books number one and two from the following list will cover most of the topics for the first half of the class. The second half of the class will be covered by research papers, which will be available to students through the course website. Books 1, 3, 4, 5, and 6 are available in hardcopies at the University of Manitoba’s Engineering Library (in course reserve under their title). Book 2 is available as electronic-book in the library. All research papers are accessible through the library.

Reference books

List of topics

This schedule is tentative and subject to change. Please check the course website on a regular basis for updated information.

Week 1
- Introduction to COMP7890 and its logistics
Week 2
- Introduction to software testing & QA
- Control and data flow analysis
Week 3
- White-box (structural) testing
- Black-box (functional) testing
Week 4
- Combinatorial testing
- Model-based testing
Week 5
- Object-oriented testing
- Fault-based testing
Week 6
- Test execution, System testing, and Regression testing
- Inspection, Code review, and Test driven development
Week 7
- Program analysis
- Symbolic execution and testing
Week 8-12
- Research paper presentations (the list of the research papers will be available in the course website)
Week 13 and 14
- Project Presentations

Academic Dishonesty

The acts of academic dishonesty are serious offenses. Students must be familiar with the university policies in this regard: (http://umanitoba.ca/faculties/science/undergrad/resources/webdisciplinedocuments.html).