CMPT 479 - D200 Spec.Topics/Computing Systems

Instructor(s): Nick Sumner

SFU Burnaby

Calendar Objective/Description:
Spec. Topics/Computing Systems

Instructor's Objectives:
How can we create software that is maintainable, reliable, and secure? How can we treat software systems as subjects for analysis? How can we automate challenging tasks like finding vulnerabilities or even programming itself? This course examines both classic and cutting edge answers to these software engineering questions. This course will explore modern aspects of software engineering including design, reliability, performance, and security. Beyond manual design and programming issues, students will gain experience with techniques for automating aspects of software engineering and treating programs themselves as data that can be analyzed, transformed, or automatically generated.

The material will be hands-on, with several small projects in a variety of programming languages throughout the semester. Students are expected to learn core techniques used in program analysis and to ultimately apply them. Students will also be expected to complete a term project in a direction of their choice based on material from the course. The term project will involve building a tool that automates some useful analysis/task within software engineering. Introductory projects will involve programming in C++. Term projects can be done using a language of student preference. Students should have completed CMPT 300 before enrolling. CMPT 379 is recommended but not required.

Prerequisites:
see go.sfu.ca

Topics:
- Classic design and architecture
- Performance analysis
- Static and dynamic program analysis
- Software security (offense and defense)
- Automated debugging & defect investigation
- Automated program synthesis
- Automated test generation
- Concurrency and parallelism

Grading:
Assignments: 50% Exams: 25% Term Project: 25% Grading criteria are subject to change.

Reference Books:
Working Effectively with Legacy Code, Feathers, Michael, Prentice Hall, 9780131177055
Engineering a Compiler, Cooper, Keith, Torczon, Linda, Elsevier Science & Technology Books, 9780120884780
Academic Honesty Statement:
Academic honesty plays a key role in our efforts to maintain a high standard of academic excellence and integrity. Students are advised that ALL acts of intellectual dishonesty will be handled in accordance with the SFU Academic Honesty and Student Conduct Policies (http://www.sfu.ca/policies/gazette/student.html).