Thesis Defense

Computer Science Master's Program

"A Comparative Evaluation of Feedback Strategies for Enhancing Student Software Test Suite Writing Outcomes"

By **Ashton Alonge**

Abstract:

Software testing is a fundamental component of computer science education, forming the basis for students' ability to ensure program correctness and reliability. Despite its importance, many students struggle to design test cases that effectively expose faults and achieve meaningful test coverage. Traditional instructional approaches often emphasize code coverage metrics such as line or branch coverage, but these metrics may not adequately capture the quality of student tests. Mutation analysis, which measures how well tests detect small, artificial faults (mutants) introduced into the program, offers a potentially richer measure of test effectiveness. However, little is known about how feedback based on mutation coverage affects student learning compared to more conventional coverage-based feedback.

This thesis investigates how different forms of automated feedback impact students' underlying ability to construct effective test suites. Specifically, it examines whether exposure to mutation-based feedback or branch coverage feedback better improves students' conceptual understanding and independent application of software testing principles. In other words, rather than asking which feedback produces stronger test suites during training, this study asks which feedback better helps students learn to become stronger testers.

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Time: 9:00 AM – 11:00 AM
Location: 14-238b
Committee: Dr. Kazerouni, Dr. Klingenberg, and Dr. Clements