Título: **Understanding the effectiveness of Exception Handling Testing in Long-Lived Java Libraries**

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Local: **Bloco 952 - Sala de Seminários**

Resumo:

Modern programming languages (e.g., Java and C#) provide features to separate the error-handling code from the regular one, seeking to enhance software comprehensibility and maintainability. Nevertheless, the way exception handling (EH) code is structured in such languages may lead to multiples, different, and complex control flows, affecting the software testability. Test criterion defines what constitutes an adequate software test. The test adequacy

measurement is used as an indicator of its efficacy. On the one hand, previous studies have investigated several perspectives concerning test criteria and adequacy measurement. On the other hand, prior studies have reported that EH code is typically neglected, not well tested, and its misuse can lead to reliability degradation and catastrophic failures. However, little is known about the relationship between testing practices and EH testing effectiveness. In this exploratory study, we (i) measured the adequacy degree of EH testing concerning the code coverage (instruction, branch, and method) criteria; and (ii) evaluated the effectiveness of the EH testing by measuring its capability to detect artificially injected faults using 7 existing EH mutation operators. Our study was performed using unit-test cases suites of 27 long-lived Java libraries from the open source ecosystem. Our results, although not conclusively, show that EH testing instruction and branch coverages are lower with statistical significance than the overall instruction and branch coverages. However, its effectiveness is, in general, high reaching more than 70% in most cases.

Banca:

- Prof. Dr. Lincoln Souza Rocha(MDCC/UFC - Orientador)
- Profª. Drª. Carla Ilane Moreira Bezerra (UFC/Quixadá)
- Prof. Dr. Paulo Henrique Mendes Maia (UECE)
- Prof. Dr. Matheus Henrique Esteves Paixão (Unifor)
- Prof. Dr. João Bosco Ferreira Filho (MDCC/UFC)