

## Software Reversing Lab 2 – State Machines

You are asked to see what mutation testing can do for developers in practice. In addition, it is important to know and understand that mutation testing has a relationship with test coverage. In a first phase, read the following 3 papers:

1. René Just, Darioush Jalali, Laura Inozemtseva, Michael D. Ernst, Reid Holmes, Gordon Fraser: Are mutants a valid substitute for real faults in software testing? SIGSOFT FSE 2014: 654-665
2. Laura Inozemtseva, Reid Holmes: Coverage is not strongly correlated with test suite effectiveness. ICSE 2014: 435-445
3. James H. Andrews, Lionel C. Briand, Yvan Labiche: Is mutation an appropriate tool for testing experiments? ICSE 2005: 402-411

Subsequently, work with PITest (<http://www.pitest.org>). You might also want to have a look at this useful PIT tutorial <https://bitbucket.org/hascode/pitest-tutorial>

Your assignment is to use PIT on a piece of your own code *and* at least 3 open source projects (your are absolutely free to choose, but keep in mind that somewhat larger projects will likely yield more interesting/diverse results, which might make it easier to talk about the results).

More specifically, you should compare the code coverage (line/branch) with mutation score and interpret the similarity/difference of the score per project. How do your observations relate to the work of Inozemtseva?

You have to create a video in which you use e.g. slides +voice over to show and explain what you did. We are expecting at least the following, but feel free to be creative and highlight other things as well!

- Which projects you selected and why
- Which potential issues you came across when determining the code coverage and/or the mutation score
- The results (i.e., code coverage versus mutation score per project)
- A comparison of your observations with the work of Inozemtseva

Your video will be evaluated on the following criteria:

- Clarity of presentation
- Quality of observations
- Quality of argumentation (e.g., how can the observations be explained)
- Quality of the argumentation when comparing with Inozemtseva

You can get extra credit when you highlight other interesting insights that you've generated while performing this study.