



Software Engineering Seminar (WiSe 2016/17)

# Semantics based Automated Program Repair

## Description

Automated program repair is a relatively new research field that is currently explored by many research groups using different strategies. One very interesting and promising method uses semantic information to repair a fault, i.e. it analyzes the behavior of the given program. The methodology behind this repair approach is that a repair candidate (a patch) is synthesized by using semantic information that is provided by, for example, symbolic execution and constraint solving. A state-of-the-art semantics based repair tool is ANGELIX [1] which is the successor of SEMFIX [2]. A main goal of ANGELIX is to scale to larger, real-world programs to be able to compete with other repair strategies like, for example, search-based automated repair.

The student is to examine the current state of automated program repair with special focus on semantics based methods.

## References

- [1] Sergey Mehtaev, Jooyong Yi, and Abhik Roychoudhury. Angelix: Scalable multiline program patch synthesis via symbolic analysis. In *Proceedings of the 38th International Conference on Software Engineering, ICSE '16*, pages 691–701, New York, NY, USA, 2016. ACM.
- [2] Hoang Duong Thien Nguyen, Dawei Qi, Abhik Roychoudhury, and Satish Chandra. Semfix: Program repair via semantic analysis. In *Proceedings of the 2013 International Conference on Software Engineering, ICSE '13*, pages 772–781, Piscataway, NJ, USA, 2013. IEEE Press.

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