

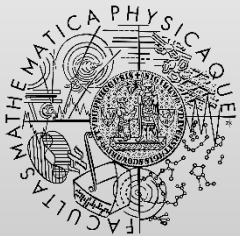
Homework 3: Static Analysis

<http://d3s.mff.cuni.cz>

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Distributed and
Dependable
Systems



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Task 1

- Design and implement a static analysis that finds whether the values of all object fields and local variables (of an integer type) stay in a given range
 - Value of any variable cannot exceed the upper bound and cannot fall below the lower bound
 - The range will be defined by the user as a configuration parameter of the analysis
 - For the purpose of this homework, it can be explicitly defined using constants in the procedure `main`
 - Consider only fields and variables declared in application classes
 - You can ignore those declared in libraries
 - Hint: note that you can have multiple elements of a bit-vector associated with every local variable (e.g., each bit representing one predicate about the variable)
- Implementation: use the WALA library (or LLVM)

Task 2

- Create some example programs to
 - Demonstrate your static analysis
 - Test its design and implementation

Task 3

- Test various configurations of your analysis
 - For example, different numbers of bits dedicated to each variable or field
- Document your solution (analysis design, etc)
- Discuss precision-performance trade-offs
 - All you identify during experiments

Organization

- Deadline: **25.5.2025**
- Submission
 - E-mail: **parizek@d3s.mff.cuni.cz**