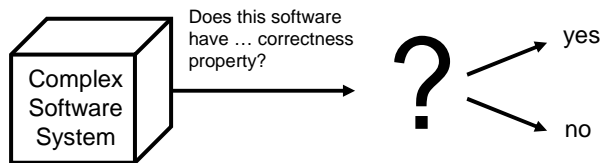


Lecture 1: Introduction, UML and OO basics

Overview

- **Research area: software engineering**
 - Software model checking
 - Analysis of application security
- **In a nutshell:**

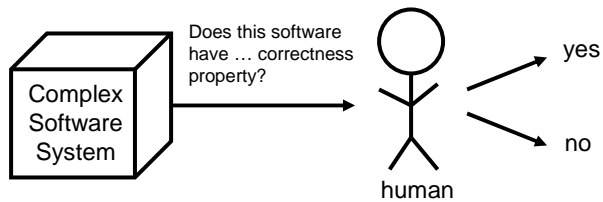


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Overview

- **Research area: software engineering**
 - Software model checking
 - Analysis of application security
- **In a nutshell:**



Very expensive, error-prone

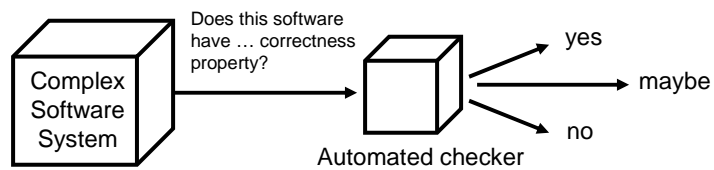
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Lecture 1: Introduction, UML and OO basics

Overview

- **Research area: software engineering**
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- **In a nutshell:**



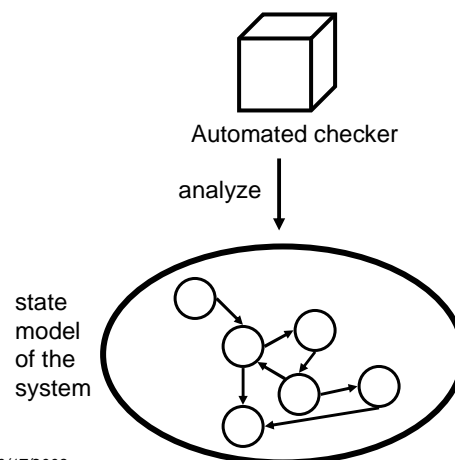
- Cannot always be fully automated
- Potential for inconclusive results

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Challenges in model checking

- **High complexity of the analysis**
- **Have to trade-off precision for complexity**



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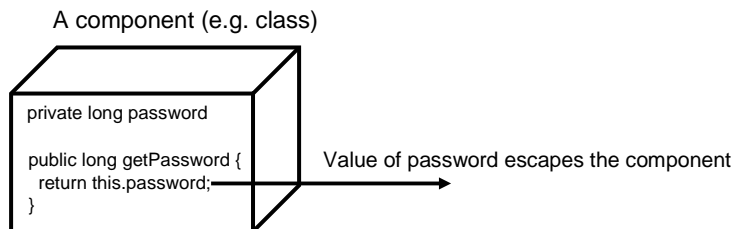
Analysis of application security

- **Distributed programs consist of a number of components**
 - Components reside on different machines
 - A machine can be compromised
 - A machine may not be trusted
- **Distributed software has to be designed in a way to protect other components if one is compromised**

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Analysis of visibility and modifiability of information in a component



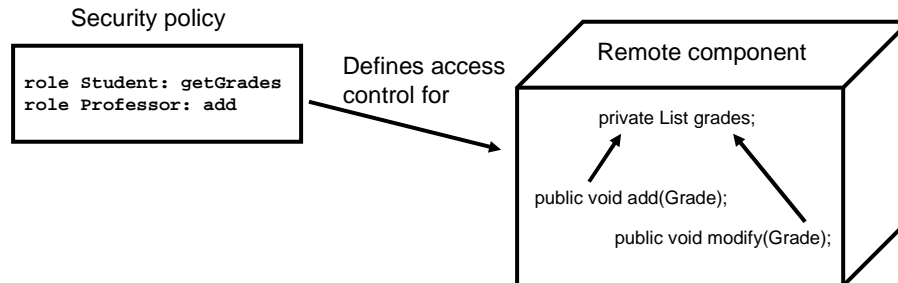
- **Compute escape information for Java classes**
 - Fields values of (or references to) which can be obtained by other classes
- **Compute mutability information**
 - Whether values of fields may be modified via public method calls

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Analysis of access control policies



- **Compute dependency information for methods and fields of a class**
 - Check if methods assigned to different roles access the same fields in similar ways
 - Allow specifying access control policies in terms of fields

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Other

- **Automated tools for protection of intellectual property on software**
 - Obfuscation
 - Watermarking
 - Tamper-proofing
- **Combining testing and static analysis**
- **Parallel implementations of analysis algorithms**

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