Software Engineering using Formal Methods

Lecture Notes by Thomas Schulz
Last Update: February 9, 2012 - 15:43

TECHNISCHE
UNIVERSITÄT
DARMSTADT

Contents

Disclaimer II

Course Introduction III

1 Modeling & Model Checking with PROMELA & SPIN 1

1.1 PROMELA Introduction . . . 1
1.2 Verifying with SPIN . . . 2
1.3 Modeling Concurrency . . . 3
1.4 Introduction to PROMELA/SPIN . . . 4
1.5 Modeling Distribution . . . 5
1.6 Propositional Logic & Temporal Logic (1) . . . 6
1.7 Temporal Logic (2) . . . 7
1.8 Channels & Linear Temporal Logic . . . 8
1.9 Temporal Model Checking with SPIN . . . 9

2 Modeling & Verification with JML & KEY 10

2.1 First-Order Logic (Syntax and Semantics) . . . 10
2.2 First-Order Logic – Calculus . . . 11
2.3 JML (1) . . . 12
2.4 JML (2) . . . 13
2.5 Dynamic Logic 1 . . . 14
2.6 Dynamic Logic Calculus . . . 15
2.7 Proof-Obligations . . . 16
2.8 Loop Invariants . . . 17

Disclaimer

Course Introduction

1 Modeling & Model Checking with PROMELA & SPIN

1.1 PROMELA Introduction

1.2 Verifying with SPIN

1.3 Modeling Concurrency

1.4 Introduction to PROMELA/SPIN

1.5 Modeling Distribution

1.6 Propositional Logic & Temporal Logic (1)

1.7 Temporal Logic (2)

1.8 Channels & Linear Temporal Logic

1.9 Temporal Model Checking with SPIN

2 Modeling & Verification with JML & KeY

2.1 First-Order Logic (Syntax and Semantics)

2.2 First-Order Logic – Calculus

2.3 JML (1)

2.4 JML (2)

2.5 Dynamic Logic 1

2.6 Dynamic Logic Calculus

2.7 Proof-Obligations

2.8 Loop Invariants