

Advanced Software Engineering

- Introduction to Formal Methods
- Fall Semester 2009

BASIC INFORMATION

Instructor: JUNBEOM YOO
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Homepage: <http://dslab.konkuk.ac.kr>
Course Page: <http://dslab.konkuk.ac.kr/Class/2009/09ASE/09ASE.htm>
Class Hours: 09:00 ~ 12:00 (Friday, Room – not yet decided)

DESCRIPTION

This course introduces fundamental theories underlying formal methods. It practices several formal methods through 3 team projects. NuSCR formal specification, SMV model checking and UPPAAL specification and verification are those.

COURSE ORGANIZATION

This course is a lecture course in which topics are presented by the instructor. All assigned team projects should be completed and presented next class time.

COURSE OBJECTIVE

- Understand fundamental theories underlying formal methods.
- **Tem Project # 1**
 - Understand fundamental theory underlying NuSCR, formal requirements specification language.
 - Able to analyze, modeling and design a small system with NuSCR and its supporting tool NuSRS.
 - Understand the pros and cons of formal specifications.
- **Tem Project #2**
 - Understand fundamental theory underlying SMV, famous model checker.

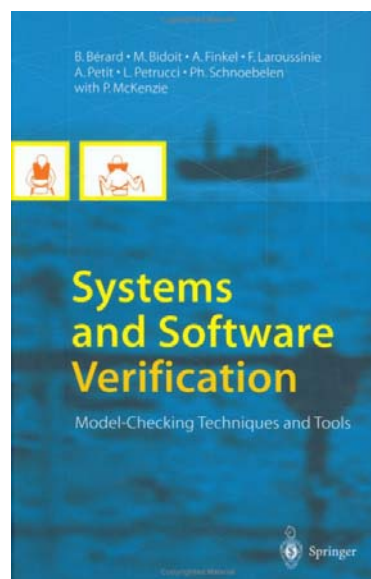
- Able to read, perceive and analyze the process and result of SMV verification.
- Able to specify and verify various useful properties using SMV.
- **Tem Project #3**
 - Understand fundamental theory underlying UPPAAL and timed automata.
 - Able to analyze, modeling, design and verify the small system you designed with timed automata and its supporting tool UPPAAL.
 - Able to specify and verify various useful properties using UPPAAL.
 - Compare the UPPAAL with the SMV from aspect of "time."

COURSE TOPICS

1. Introduction to Formal Methods (Theory)
2. Practices for Formal Methods
 - A. NuSCR
 - B. SMV
 - C. UPPAAL

TEXT

1. Required Text: "System and Software Verification" by B.Bérard, et. al., Springer



GRADING PLAN

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| 1. Attendance | 0% |
| 2. Mid-term Exam. | 20% |
| 3. Team Project | 50% |
| 4. Final Exam. | 30% |

TENTATIVE SCHEDULE

Week	Date	Lecture	Etc.
1	09.04	휴강 (RE'09 참가)	
2	09.11	Introduction to Formal Specification (Paper)	
3	09.18	Chapter 1. Automata	
4	09.25	Chapter 2. Temporal Logic	
5	10.02	휴강 (추석)	
6	10.09	Chapter 3. Model Checking Chapter 4. Symbolic Model Checking	
7	10.16	Chapter 5. Timed Automata Part I - Summary	
8	10.23	중간고사	
9	10.30	Chapter 6. Reachability Properties Chapter 7. Safety Properties Chapter 8. Liveness Properties Chapter 9. Deadlock-freeness Chapter 10. Fairness Properties	팀구성 (3명/1팀)
10	11.6	팀프로젝트 소개 - NuSCR - SMV - UPPAAL	
11	11.13	중간발표 : 팀프로젝트 #1	
12	11.20	중간발표 : 팀프로젝트 #2	
13	11.27	중간발표 : 팀프로젝트 #3	
14	12.04	휴강 (APSEC'09 참가)	
15	12.11	최종발표	
16	12.18	기말고사	