Formal Methods: Course overview

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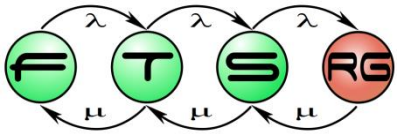

Lecturers

- Course coordinator:
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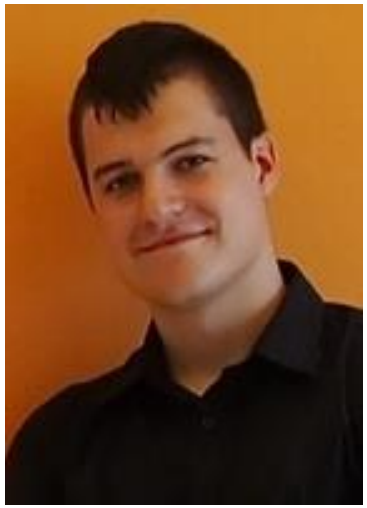
- Lecturers:
  - Vince Molnár <molnarv@mit.bme.hu>
  - Ákos Hajdu <hajdua@mit.bme.hu>



Motivations for the course

- Increasing costs of design faults in computer based systems and software
  - Important to prove that the design of the critical system components is correct
- Formal methods offer:
  - Mathematically precise requirement specifications and design models
  - Verification methods to prove that requirements are satisfied by the design model
  - Evaluation methods to derive properties of the design (like performance, safety, dependability)

Knowledge to be obtained

- Participants of the course will be able to
  - Construct formal models and specifications on the basis of informal descriptions
  - Apply formal verification and evaluation techniques
  - Understand the advantages and disadvantages of various modelling formalisms and verification techniques
  - Apply tools that support the application of formal methods

Assessment

- During the semester:
  - 2 successful midterm exams
    - 6th week (13th March 18:15) and 14th week (15th May, 18:15)
  - Successful homework
  - Final result: calculated from the results of the two midterm exams (35%-35%) and the result of the homework (30%)
- The homework
  - Modelling of a small-scale IT system + Verification of its required properties
  - Assigned on the 4th week of the semester
  - Deadline: 28. 04. 2018. (Saturday), 23:59:00
- In the examination period: -

Recaps

- Both midterm exams can be repeated
  - One opportunity for each exam
    - 9th week (29th March 18:15) and 15th week (23th May 10:15)
- The homework can be submitted during the repetition period
  - Extended deadline: 23. 05. 2018. (Wednesday), 23:59:00
  - The late submission will result in 20% decrease of the score
  - The submission of the homework cannot be replaced by a repeated midterm exam

Synopsis

- Basic formal models and their semantics
- Formalization of requirements: Temporal logics
- Formal verification using model checking
- Modelling state-dependent dynamic behavior: Statecharts
- Modelling and analysis of concurrent systems: The Petri-net formalism
- Modelling data-dependent behavior: Colored Petri-nets
- Modelling and evaluation of extra-functional properties: Stochastic Petri-nets

Important information

- Web page of the course:

  https://inf.mit.bme.hu/en/content/formal-methods

- Expected content
  - Course material (slides)
  - News and announcements
  - Homework assignment
  - Results of midterm exams