Softwarepraktikum: An Extension for NuSMV

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AG Discrete Biomathematics

- ▶ Prof. Dr. Heike Siebert
- ▶ Dr. Hannes Klarner
- ▶ Adam Streck
- ▶ Kirsten Thobe
- ▶ Firdevs Topcu-Alici

- ▶ mathematical modelling of gene regulation and signal transduction

# Design of Correct Software and Hardware

- ▶ its about money: Intel Pentium FDIV Bug, 1994
- ▶ its about safety: Therac 25 Radiation Overdosing, 1985-87

- ▶ usual practice: peer review and testing

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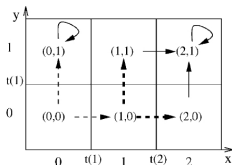- ▶ since the early nineties: symbolic model verification (SMV)
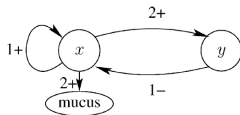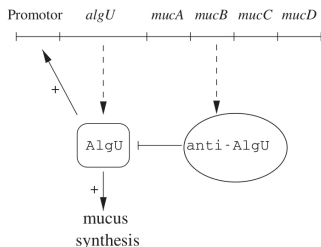
Model Checking
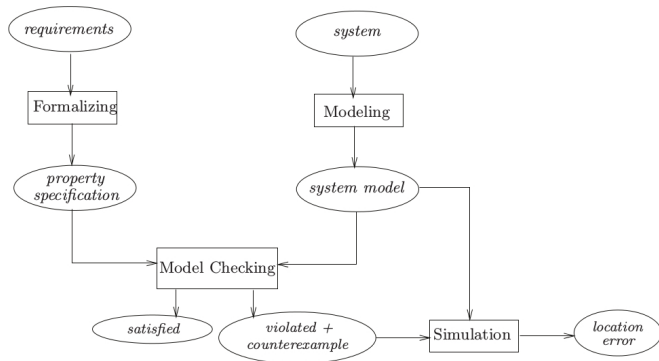
- system model = finite state machine
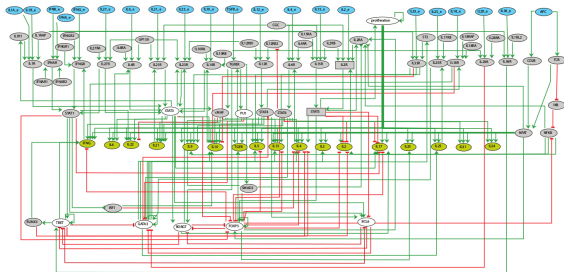- property specification = temporal logic

Systems Biology
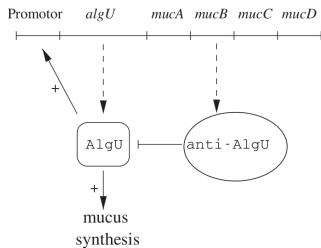
- Mutation or epigenetic phenomenon?

Systems Biology
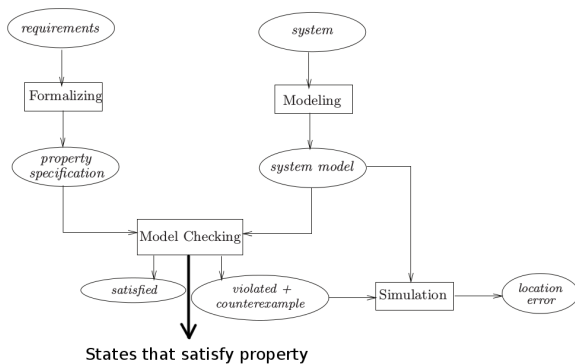

- qualitative gene regulation = finite state machine
- possibility of epigenetic phenomenon = temporal logic

NuSMV

- state explosion problem
- NuSMV developed since 1993
- Turing award for E. Clarke in 2007

NuSMV Extension

States that satisfy property

Project Plan

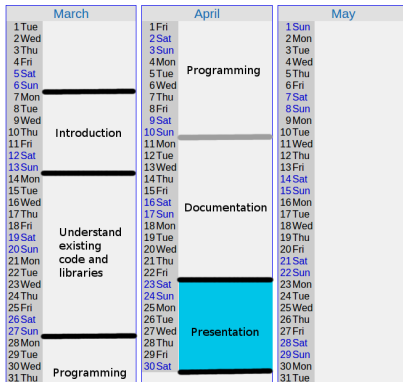- introduction to model checking, NuSMV, PyBoolNet

Project Plan

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- specification of plug-in

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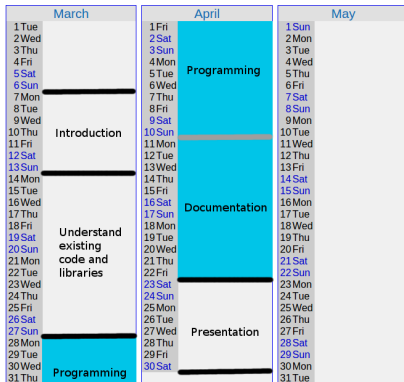
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Thanks!