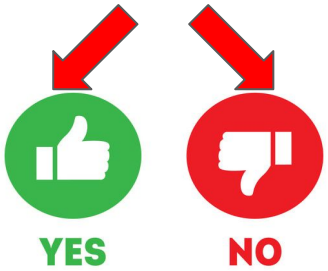
(Recent) Advances in Model Checking

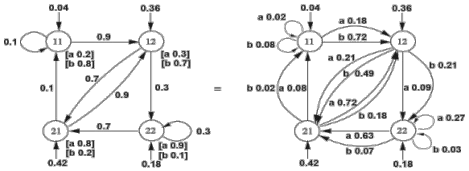
seminar pre-course meeting

Maximilian Weininger ● Stefanie Mohr ● Jan Kretinsky

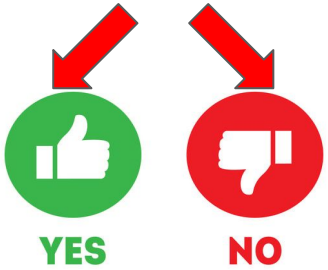
Context



Context



Model Checker



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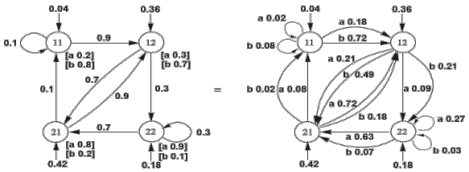
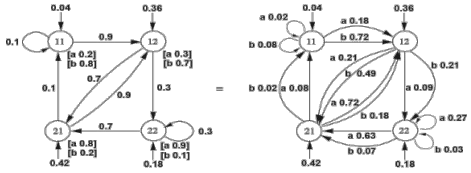


$\mathsf{A}(\psi \vee \varphi)$
$\mathcal{K} \models \mathsf{A}\neg(\neg\psi \wedge \neg\varphi)$
$\mathcal{K} \models \mathsf{A}\neg(\neg(\mathcal{A}_\exists(\{\}, 1, 1, \neg\psi) \wedge \mathcal{A}_\exists(Q, \varphi_\mathcal{I}, \varphi_\mathcal{R}, \varphi_\mathcal{F})))$
$\mathcal{K} \models \mathsf{A}\neg\mathcal{A}_\exists(Q, \varphi_\mathcal{I}, \varphi_\mathcal{R}, \neg\psi \wedge \varphi_\mathcal{F})$
$\mathcal{K} \models \mathsf{A}\mathcal{A}_\forall(Q, \varphi_\mathcal{I}, \varphi_\mathcal{R}, \psi \vee \neg\varphi_\mathcal{F})$
$\mathcal{K}_\times \models \varphi_\mathcal{I} \rightarrow \mathsf{A}(\psi \vee \neg\varphi_\mathcal{F})$
$\mathcal{K}_\times \models p \rightarrow \mathsf{A}(\neg a \vee \neg\mathsf{GF}(p \wedge b))$
$\mathcal{K}_\times \models p \rightarrow \mathsf{A}(\neg a \vee \mathsf{FG}\neg(p \wedge b))$
$\mathcal{K}_\times \models p \rightarrow (\neg a \vee \mathsf{AFG}\neg(p \wedge b))$
$[\![\mathsf{AFG}\neg(p \wedge b)]\!]_{\mathcal{K}_\times} = \mathcal{S} \setminus [\![\mathsf{EGF}(p \wedge b)]\!]_{\mathcal{K}_\times} = \{\}$
$\mathcal{K}_\times \models p \rightarrow \neg a$
$[\![(p \rightarrow \neg a)]\!]_{\mathcal{K}_\times} = \{SQ0, SQ1\}$

Model Checker

YES NO

Context



$\mathsf{A}(\psi \vee \varphi)$
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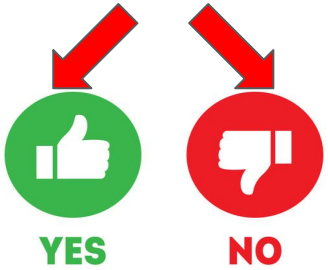
- Quantitative (e.g. probabilistic), more agents, several competing properties,...
- Well-established industrial method & recent research

Model Checker

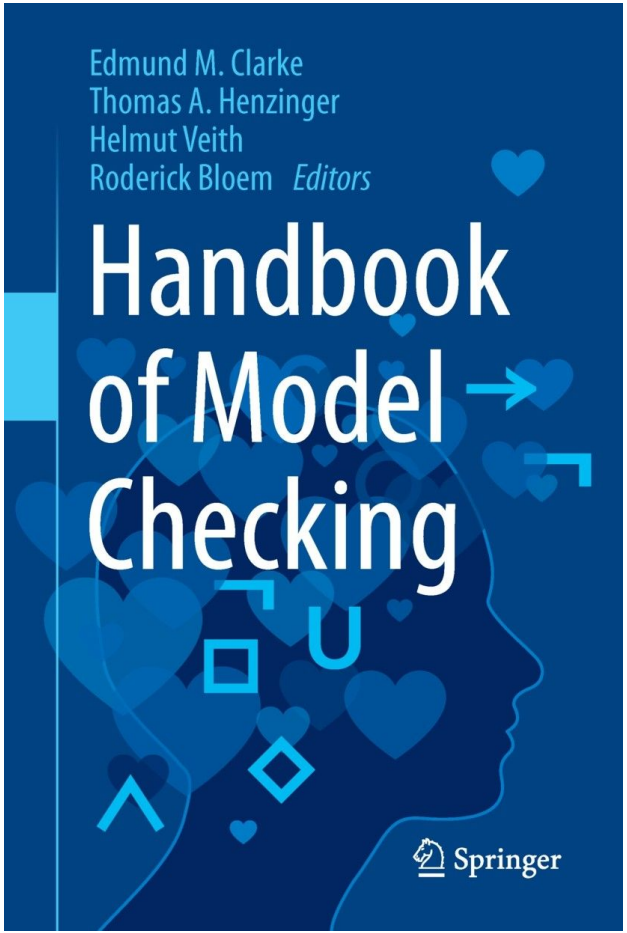


Topic

Chapters of the book

“Handbook of Model Checking”

One person - one chapter - one supervisor

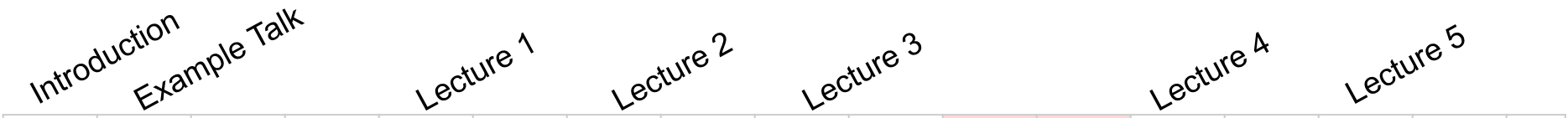


https://link.springer.com/content/pdf/10.1007/978-3-319-10575-8.pdf

Schedule

- First meeting (~15.10.): introduction and scheduling
- Second meeting (TBD): example talk
- Lectures (TBD): (bi-)weekly all over the semester

In between: at least two meetings with your supervisor



Grading

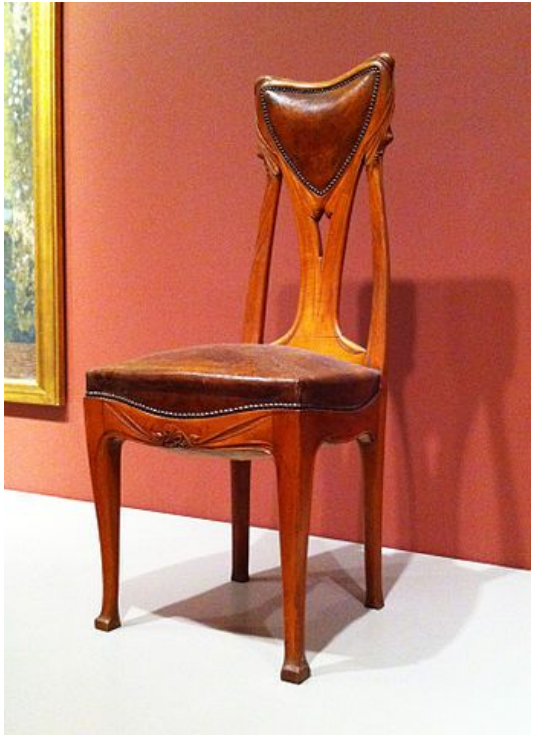
In the first meeting, you will receive the exact criteria which we use to grade.

We expect you to attend all lectures, including the ones **after** your talk (not attending will result in failing the seminar)

Your final grade will be determined from

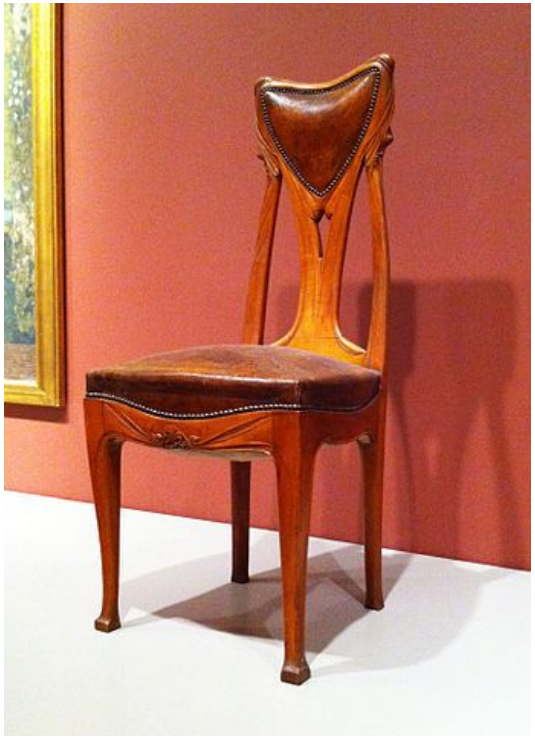
- written work (40%): extended abstract, 2-4 pages
- presentation (40%): talk of 25-30 min
- discussions (20%): participation, questions for the other talks, **chairing**

Chairing?



https://en.wikipedia.org/wiki/File:Side_Chair,_1900,_Hector_Guimard.jpg

Chairing?



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- Introducing speaker
- Timing of the talk
- Leading discussion

- Extended Abstracts ⟹ 2 Questions

Schedule

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- Abstracts: Sent out to all participants one week before the talk
- Lectures (TBD): (bi-)weekly all over the semester (be chair once)

In between: at least two meetings with your supervisor

Next steps

- If you want to participate
  - Until Monday, 01.08.22, send a mail to

    mohr@in.tum.de AND maxi.weininger@tum.de

    to be preferred in the matching system

  - Prefer us in the matching until tomorrow, 27.07.22