Teaching Formal Methods in an ‘Otherwise Completely Ordinary’ Undergraduate Software Engineering Course: That’s Well Possible.

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Terminology: Formal Methods

D. Bjørner, K. Havelund (2014): A method is called formal method if and only if its techniques and tools can be explained in mathematics. [1]

D. Gries (1996): “More liberally, any informal use of theoretical ideas in the development process can be viewed as an application of formal methods.” [2]

Opinion

Starting 2015 (the latest), every B.Sc. in C.S. should learn ‘FM core’; e.g. in the Software Engineering course.

None

Research Questions

• RQ1: Is it possible (for teachers) to comprehensively cover the concept of Formal Methods in an undergraduate Software Engineering course?
• RQ2: Is it (cf. RQ1) possible (for students) – or do we necessarily overstrain students?

Observations on SWE Textbooks: ‘Extrapolate’

NEW: Didactic Approach

add: semi-formal language

add: formal semantics & analysis, interpretation of analysis results

NEW: Software Engineering with ‘FM core’ – Course Content

add: model, structural & behavioural modelling (still: fully formal [syntax & semantics])

add: testing, program verification

NEW: Evaluation & Conclusion

• RQ1: Yes, possible.
• RQ2: Yes, possible.

References

[6] Mandilis, D. Advertising formal methods and explaining their teaching. Yes, but... In: Dean and Boute (4), pp. 219–224