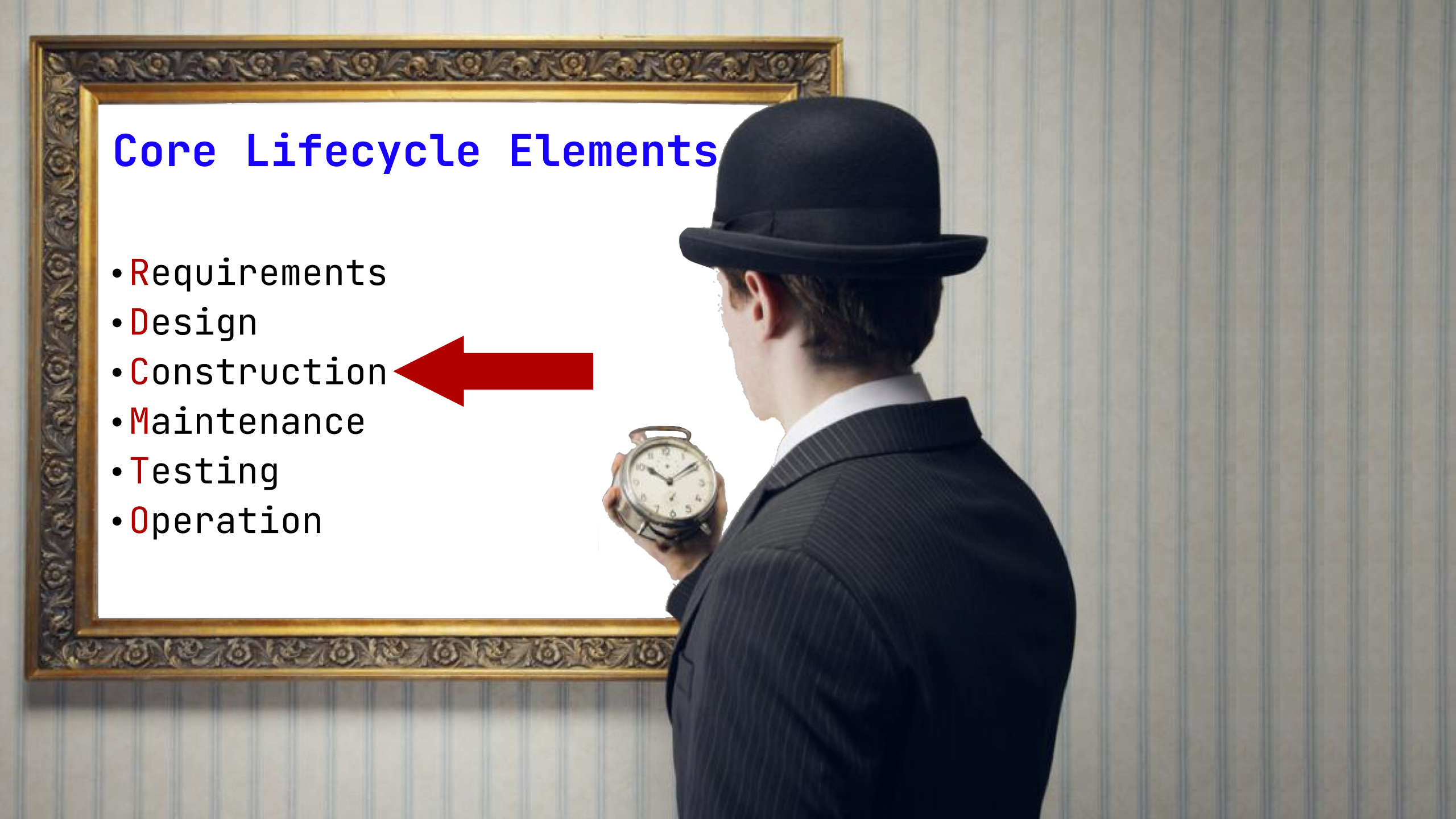
Modelling in Maintenance

Software Systems — Design — L2T4

Dr. Vadim Zaytsev aka @grammarware, 2020

UNIVERSITY OF TWENTE. | Formal Methods & Tools


Core Lifecycle Elements
•Requirements
•Design
•Construction
•Maintenance
•Testing
•Operation

What's Maintenance?

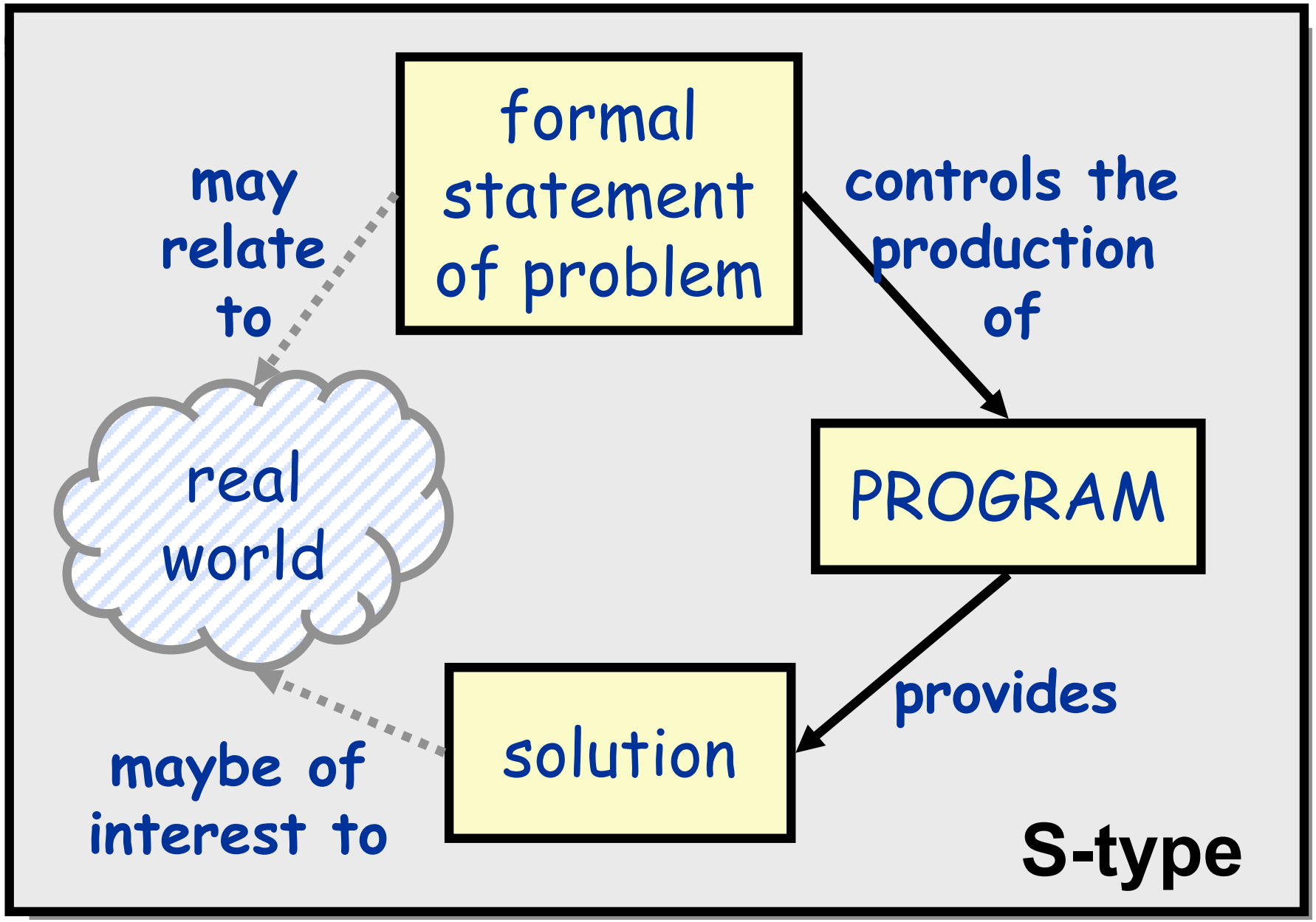
- Modification of a software product
  - after delivery
    - to correct faults
    - to improve performance or other attributes, or
    - to adapt the product to a modified environment

IEEE 1219, 1993

Software System Types: S

- S-type programs
  - “specifiable”
  - problem formally defined by a spec
  - automated acceptance possible
  - such software does not evolve

M.M.Lehman, Programs, Life Cycles and Laws of Software Evolution, IEEE 68(9), 1980.



Steve Easterbrook, http://www.cs.toronto.edu/~sme/CSC444F/slides/L20-SoftwareMaintenance.pdf

Software System Types: P

- P-type programs
  - “problem-solving”
  - problem models a real-world task
    - imperfectly
  - qualitative acceptance
  - they can evolve continuously

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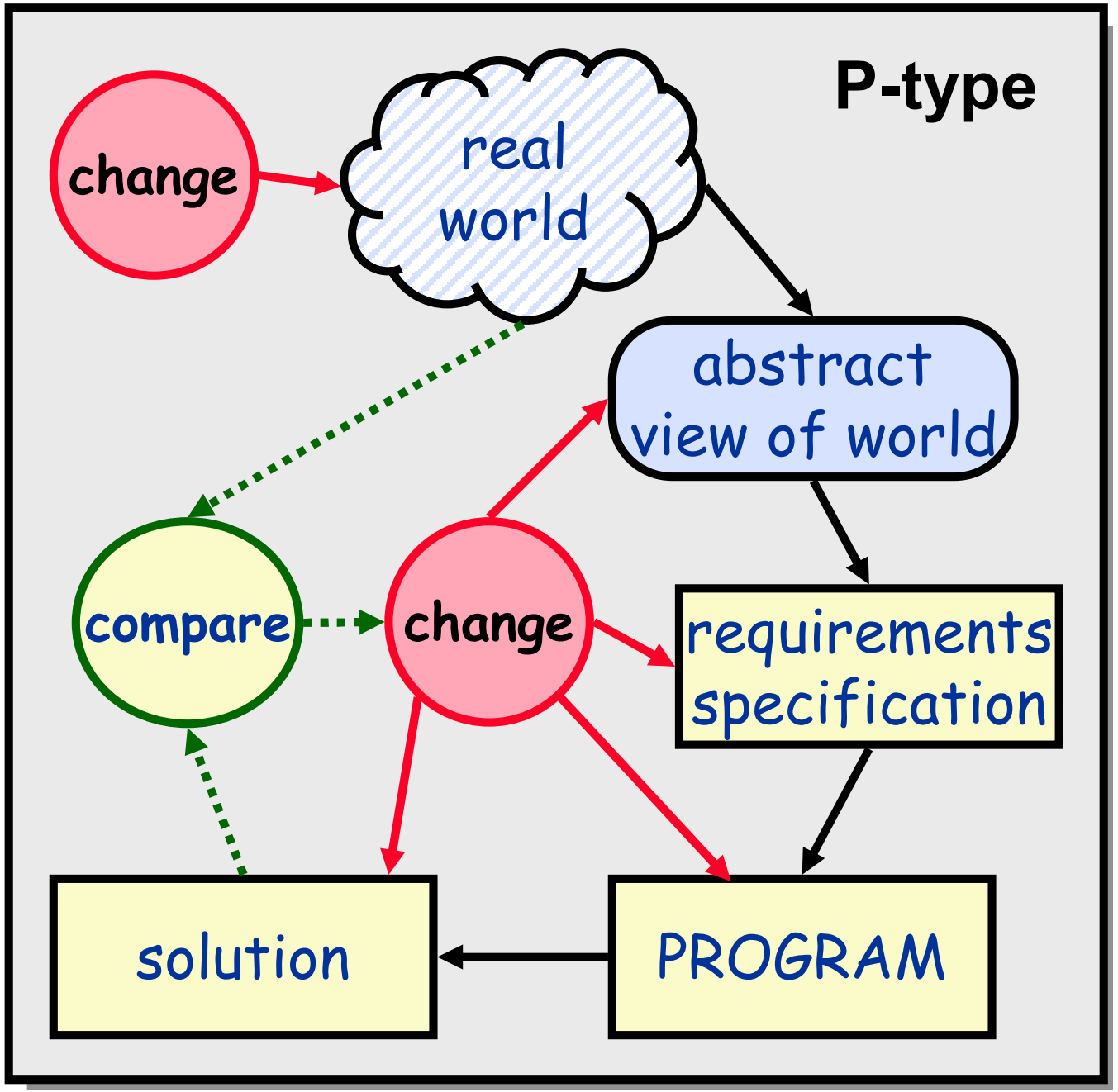

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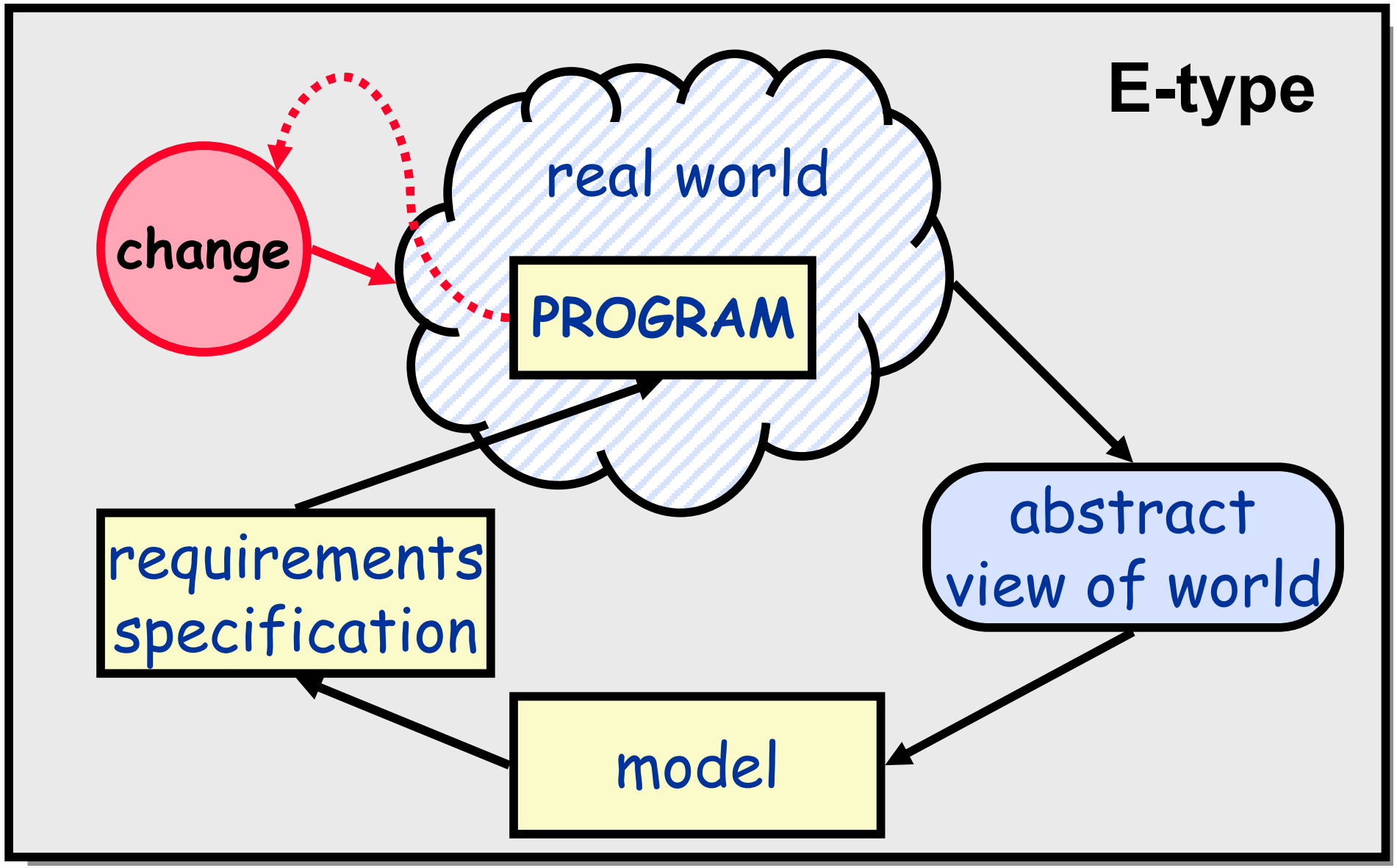
Software System Types: E

- E-type programs
  - “embedded”
  - solution is a part of the world
  - acceptance is subjective
  - they are inherently evolutionary

M.M.Lehman, Programs, Life Cycles and Laws of Software Evolution, IEEE 68(9), 1980.



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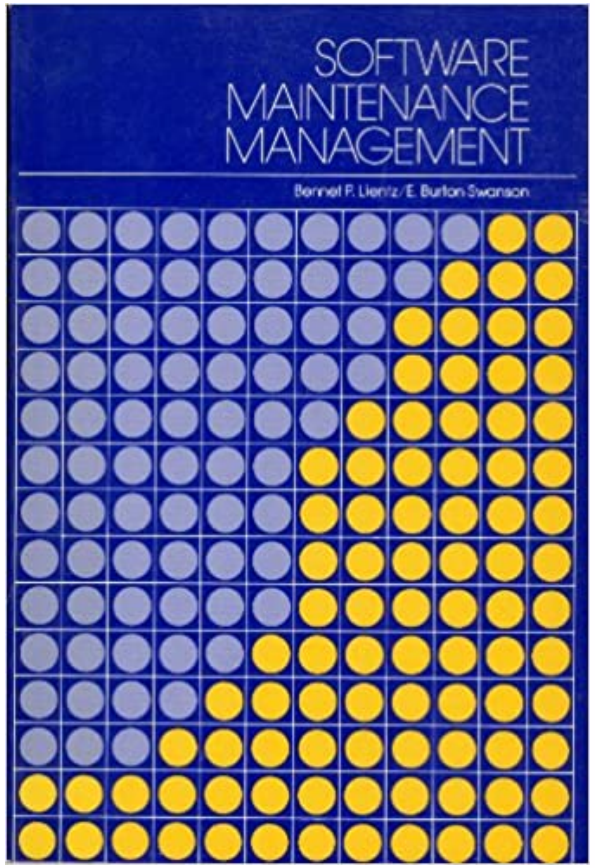
Maintenance Types

- Corrective
- Adaptive
- Perfective
- Preventive



B.P.Lientz, E.B.Swanson, Software Maintenance Management, A Study of the Maintenance of Computer Application Software in 487 Data Processing Organizations, 1980.

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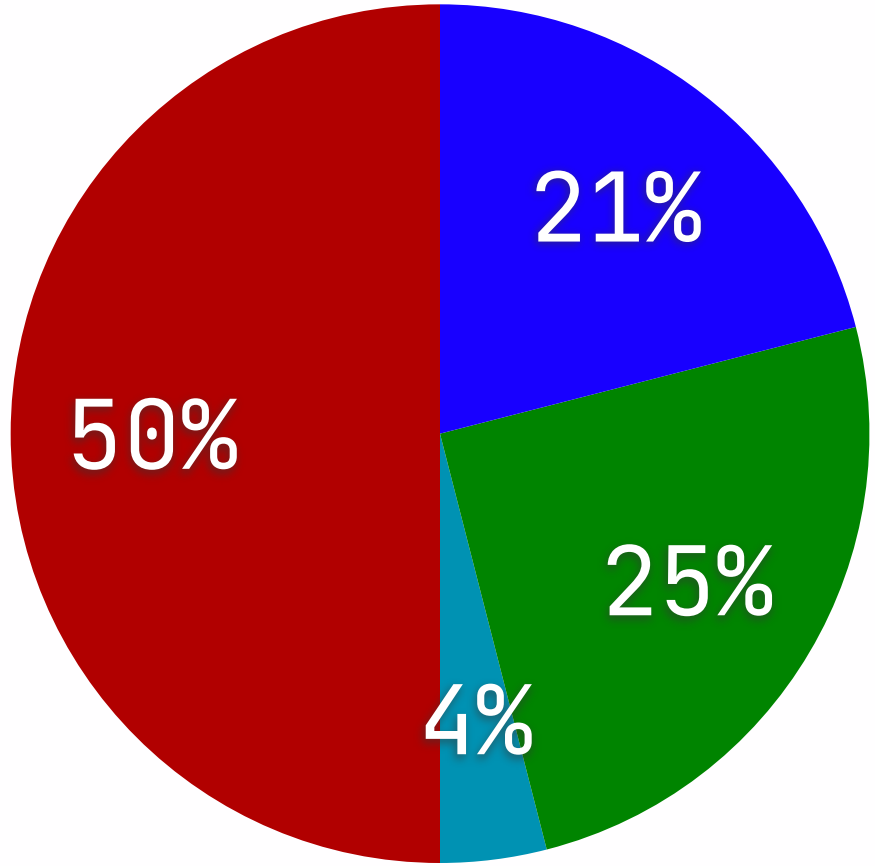

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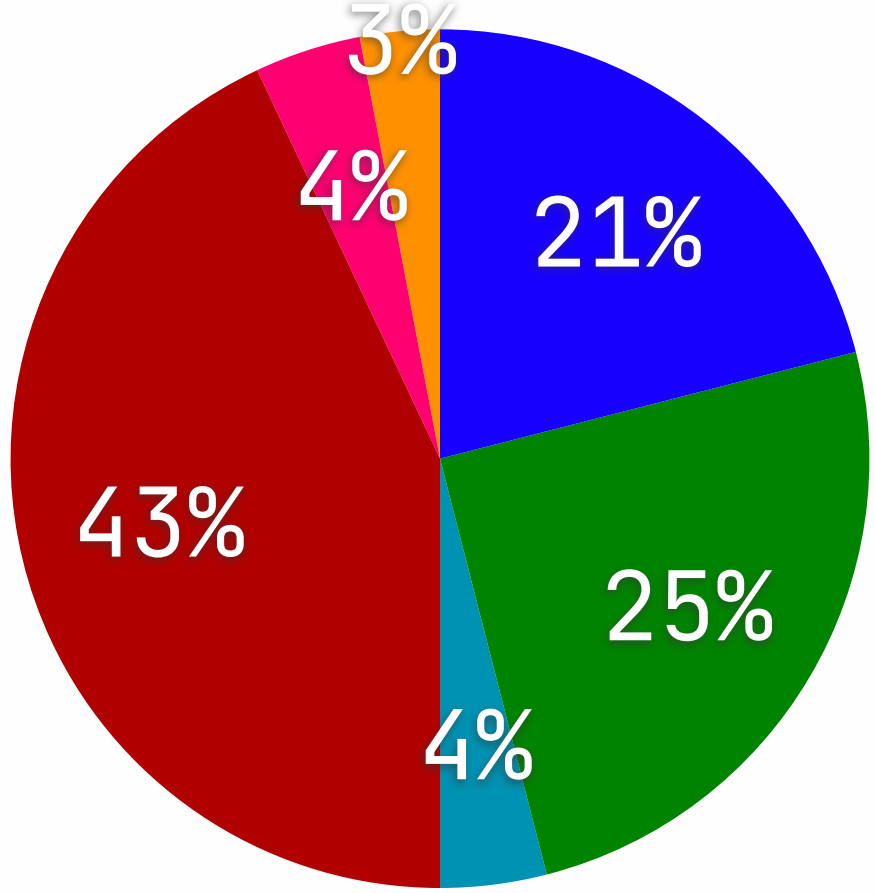
Maintenance Types

- Corrective
- Adaptive
- Perfective
  - user enhancement
  - efficiency
  - other
- Preventive



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There is Hope!

- Higher quality
  - less (c) maintenance
- Anticipating changes
  - less (a&p) maintenance
- Better tuning to user needs
  - less (p) maintenance
- Less code
  - less (*) maintenance

Conclusion

- Not all software systems evolve similarly
  - S, P, E
- Not all maintenance activities are the same
  - perfective / user-driven
  - adaptive / change-driven
  - corrective / bug-driven
  - preventive / future-driven

Topics/Slides Disclaimer

- Good ✅
  - watch before Q&A
  - embrace reality
  - try out at labs
  - ask for feedback
  - apply to project
  - dig deeper
  - recall from slides
- Bad ❌
  - slides over videos
  - assumptions
  - blanks
  - timing