POLITECNICO
MILANO 1863

Software Engineering 2

Brief description of the course organization

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Instructors

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  - Exercises: Livia Lestingi (livia.lestingi@polimi.it)

Note

The three classes proceed in parallel
No substantial differences!

Course objectives

- Overview of the principles and techniques of software engineering
- Compared to basic SE courses, SE2 focuses on development of complex systems (large-scale projects)
- **Topics:**
  - Software lifecycles, standards, project management and metrics
  - Specification languages: UML, Alloy
  - Requirements analysis
  - Software architecture and implementation platforms
  - Validation and verification

Logistics

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- **Schedule**
  - Wednesday 8.15-10.15
  - Thursday 8.15-10.15
- Full course schedule: see webpage on WeBeep
- **Recording** policy
  - Lectures will be recorded — NO live streaming
  - Made available through WeBeep

Books and other material

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- http://webeep.polimi.it/: slides, material, exams info, schedule variations, news, forum
- Suggested textbooks
  - Ravi Sethi, Software Engineering: Basic Principles and Best Practices (English Edition), Editore: Cambridge University Press, Ed: 2022, ISBN: 1316511944
  - Hans van Vliet, Software Engineering: Principles and Practice, 3rd Edition, Editore: Wiley, Anno edizione: 2008, ISBN: 978-0-470-03146-9
  - Carlo Ghezzi, Mehdi Jarayeri, Dino Mandrioli, Fundamentals of Software Engineering, Editore: Prentice-Hall, Ed: 2002, ISBN: 0133056996
  - Len Bass, Paul Clements, and Rick Kazman, Software Architecture in Practice, Editore: Pearson Education, Limited, Ed: 2021, ISBN: 9780136886099 https://ebookcentral.proquest.com/lib/polimi/detail.action?docID=7116234
    - The book has been purchased by our library. It can be accessed by three contemporary users. Access can take place from Polimi network or by following the instructions available here https://www.biblio.polimi.it/en/services/how-to/access-to-an-electronic-resource
  - Christoph Fehling, Frank Leymann, Ralph Retter, Walter Schupeck, Peter Arbitter, Cloud Computing Patterns : Fundamentals to Design, Build, and Manage Cloud Applications, Editore: Springer, Ed: 2014, ISBN: 9783709115671 http://search.ebscohost.com/login.aspx?direct=true&scope=site&db=nlebk&db=nlabk&AN=705269
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  - Martin Kleppmann, Designing Data-Intensive Applications : The Big Ideas Behind Reliable, Scalable, and Maintainable Systems, Editore: O'Reilly Media, Incorporated, Ed: 2017, ISBN: 9781449373320 https://ebookcentral.proquest.com/lib/polimi/detail.action?docID=4825244
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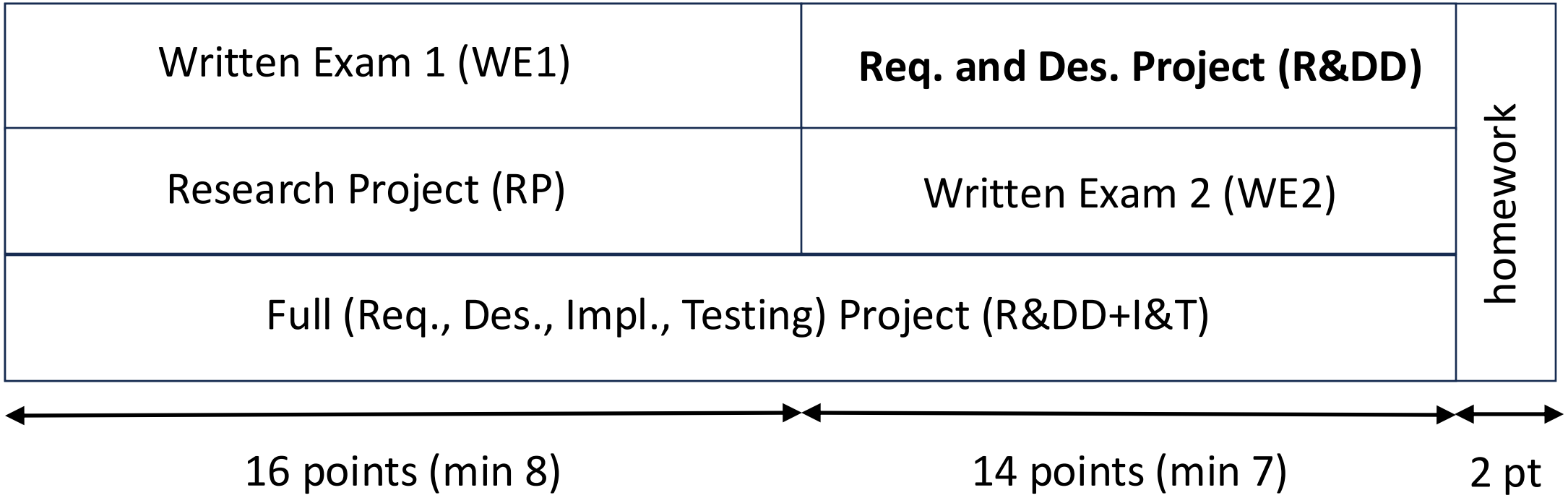
Assessment: rules

- 2 parts + homework (optional)
- How do I compose parts?



Assessment: constraints

- Exam is passed if
  - You get the minimum for each building block
  - Total is ≥ 18
- Total ≥ 31 (before rounding) = 30L

- **Important note**
  - R&DD, I&T, RP, homework will be assigned **only during this winter session**

R&DD Project

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- Goals
  - Put into practice most of the approaches and principles presented in class
  - Produce high-quality requirements and design documentation
- R&DD is a **group activity**
  - Students will autonomously form groups
  - 3 students at most, 1 student (singleton) is also ok (but not encouraged!)
  - Each student can have a specific role (to be declared during the exam)
  - But all must have broader knowledge, that is, they must be aware of what the other teammates have done (see later)
- Some exercise sessions are dedicated to introducing and discussing the project development
- Ad-hoc meetings can be scheduled as required by the groups

Implementation and Testing (I&T)

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- Only for **groups of two or three** students **who have taken R&DD**
  - These must be the same groups as for R&DD!
  - You can choose to continue with I&T after completing R&DD
- Goals
  - Achieve a **running prototype** implementation offering some of the functionality of the project
  - **Test** your prototype possibly using some of the automation tools that will be presented in class
  - **Evaluate** through **acceptance testing** the prototype implemented by another group

R&DD and I&T evaluation

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- We will assess
  - Quality of the produced artifacts
  - Ability to justify and soundness of design decisions
  - Ability to explain rationales
  - Ability to coordinate with the other group members
  - Ability to meet the deadlines
  - Presentation

R&DD and I&T — Important dates

- Project assignment: 11/10/2024
- Group registration: 25/10/2024

- RASD submission deadline: 22/12/2024
- DD submission deadline: 7/01/2025
- I&T deliverable deadline: 2/02/2025
- Acceptance testing deliverable deadline: 9/02/2025
- Final project presentations (to be scheduled)

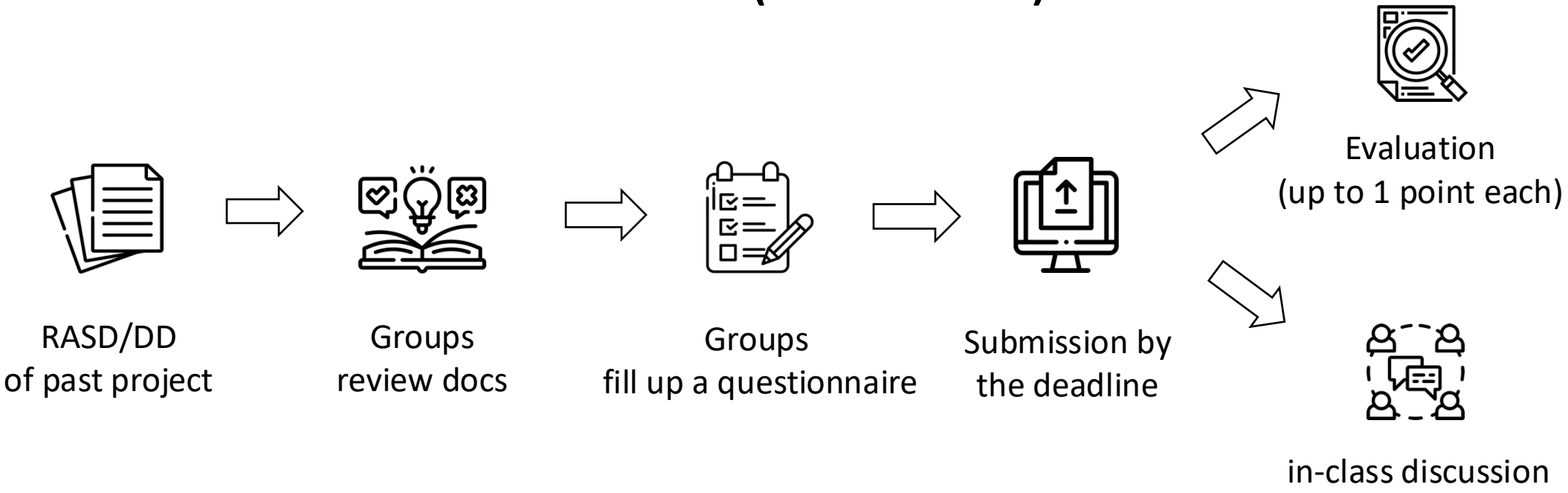
R&DD and I&T — Notes

- **You can submit before the deadlines, if you want/need!**

- When you submit a deliverable, you can also submit a new, improved/updated version of the previous deliverables
  - make sure to document what changes you applied

Homework on RASD and DD

Process overview for each homework (RASD and DD)



Homework on RASD and DD

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- During the semester we will provide you with (anonymized) past projects (RASD and DD)
  - Tentative schedule: RASD in mid-October / DD in the first part of November
- You review the documentation and **fill out a questionnaire** in which you explain what errors you found
  - One questionnaire for the RASD, one for the DD
- Then we will **discuss** it during an exercise session
  - The goal of the exercise is to understand how to/not to create a RASD and DD
- Answering each questionnaire with reasonable answers is worth 1 point
  - Hence, 2 points can be earned through questionnaires (one for requirements, one for design)
- The questionnaires will be administered **only once**, during the semester
  - If you do not fill them out during the semester, you miss 2 of the total 32 possible points
- **Important note**: the homework gives you the chance to reflect on how to develop a R&D documentation… it is very useful even if you take WE2!

Research Project (RP)

- Goals
  - Get involved into research teams of the DeepSE (software engineering) group
  - Contribute to the development of novel techniques/tools for research purposes
- RPs will be agreed with your instructors: we will schedule a dedicated meeting for this around mid-October
- They must be completed by September 2025 at the latest

- **M.Sc. theses are available**, possibly (not only) as continuation of RP

WE1 and WE2

- **Written Exams** (WE) focus on all topics presented in the course
  - Duration: 1h30m each
- **WE1**: 3 exercises on all course topics
- **WE2**: mimics the writing of R&DD
  - Given a short description of an application, identify requirements, define architecture
  - **Note**: scoring well in WE2 requires a good level of experience in writing R&D documents!
- WE1 and WE2 are “open book”
  - You can use your notes and books