Lab Course / “Praktikum”: Project Management and Software Development for Medical Applications

Introduction – SS2022

Conducted by: Ardit Ramadani, Lennart Bastian and Tianyu Song
Prof. Dr. Nassir Navab - CAMP

Munich, 25 April 2022
Work with clinicians on real-world medical applications

Improve your project management and presentations skills
Lecture Structure

- **4 lectures** by course tutors (**recommended to attend**)
  - Introduction (Administrative, Requirements, Grading) – **Mandatory**
  - Project Management & Presentation Tips
  - Unified Modeling Language (UML)
  - Introduction to Software Engineering - Documentation, Tests, Design Patterns & Integration Strategy

- **3 presentations** by students (**Mandatory**)
  - Requirements (5 mins)
  - Intermediate (7 minutes)
  - Final (incl. demo) (10 minutes)

- Minimum **10 hours per week** of project work during the semester
CoVid-19 related announcements

• Due to the CoVid-19 and subsequent government measures, short term changes might be necessary
  – Follow the announcement section on the website of the course
  – Check emails regularly

• As of today (25 April 2022) we are planning
  – Purely virtual lectures and presentations conducted via TUM Zoom
  – Zoom details will be provided one day before the sessions via email
  – Presence might be required by supervisors depending on the Project
    • not guaranteed 100% online course
## Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Place</th>
<th>Topic</th>
<th>Conducted by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday, 25.04.2022</td>
<td>11:00 – 12:00</td>
<td>Zoom</td>
<td>Lecture 1: Introduction and Project Announcement</td>
<td>Course tutors</td>
</tr>
<tr>
<td>Tuesday, 26.04.2022</td>
<td>09:00 – 12:00</td>
<td>Zoom</td>
<td>Lecture 2: Presentation Tips and Project Management</td>
<td>Course tutors</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Lecture 3: UML</td>
<td></td>
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<tr>
<td>Thursday, 28.04.2022</td>
<td>23:59 CEST</td>
<td>Email</td>
<td>Deadline to send project preferences</td>
<td>Seminar Participants</td>
</tr>
<tr>
<td>Monday, 09.05.2022</td>
<td>09:00 – 12:00</td>
<td>Zoom</td>
<td>Requirements Presentation</td>
<td>Seminar Participants</td>
</tr>
<tr>
<td>Tuesday, 10.05.2022</td>
<td>10:00 – 12:00</td>
<td>Zoom</td>
<td>Lecture 4: Documentation, Tests, Design Patterns &amp; Integration Strategy</td>
<td>Course tutors</td>
</tr>
<tr>
<td>Monday, 13.06.2022</td>
<td>09:00 – 12:00</td>
<td>Zoom</td>
<td>Intermediate Presentations Part I</td>
<td>Seminar Participants</td>
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<tr>
<td>Tuesday, 14.06.2022</td>
<td>09:00 – 12:00</td>
<td>Zoom</td>
<td>Intermediate Presentations Part II</td>
<td>Seminar Participants</td>
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<tr>
<td>Monday, 18.07.2022</td>
<td>09:00 – 12:00</td>
<td>Zoom</td>
<td>Final Presentations Part I</td>
<td>Seminar Participants</td>
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<tr>
<td>Tuesday, 19.07.2022</td>
<td>09:00 – 12:00</td>
<td>Zoom</td>
<td>Final Presentations Part II</td>
<td>Seminar Participants</td>
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</tbody>
</table>
Timeline

Project Start

L1: Introduction and Project Announcement

L2: Presentation Tips and Project Management

L3: UML

L4: Documentation, Tests, Design Patterns & Integration Strategy

Deadline to send project preferences

Requirements Presentation

Intermediate Presentations Part I

Intermediate Presentations Part II

Final Presentations Part I

Final Presentations Part II

Project End

25 April 2022   Slide 6
Projects will be on Software Development in Medical Applications

- Involves “Medical Application” and “Software Development”
- In collaboration with Hospital or Industry or Research Institute
- In the previous years, example projects were based on:
  - Image Analysis (Registration, Segmentation, Quantification)
  - Graphical User Interface design
  - Mobile App Development
  - Robotics
  - Machine Learning, Deep Learning
  - Computer Vision
  - Image Reconstruction
  - Simulations and Modeling
  - Augmented Reality
  - Computer Graphics
## Project proposals

### Summer Semester 2020

<table>
<thead>
<tr>
<th>Source</th>
<th>Number of projects</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academia</td>
<td>21</td>
<td>91%</td>
</tr>
<tr>
<td>Industry</td>
<td>2</td>
<td>9%</td>
</tr>
</tbody>
</table>

*Tab. Project proposal's source*

23 total projects
1 company from industry participated

### Winter Semester 2020/2021

<table>
<thead>
<tr>
<th>Source</th>
<th>Number of projects</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academia</td>
<td>17</td>
<td>80%</td>
</tr>
<tr>
<td>Industry</td>
<td>4</td>
<td>20%</td>
</tr>
</tbody>
</table>

*Tab. Project proposal's source*

21 total projects
3 companies from industry participated

### Summer Semester 2021

<table>
<thead>
<tr>
<th>Source</th>
<th>Number of projects</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academia</td>
<td>17</td>
<td>63%</td>
</tr>
<tr>
<td>Industry</td>
<td>10</td>
<td>37%</td>
</tr>
</tbody>
</table>

*Tab. Project proposal's source*

27 total projects
5 companies from industry participated

### Winter Semester 2021/2022

<table>
<thead>
<tr>
<th>Source</th>
<th>Number of projects</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academia</td>
<td>20</td>
<td>59%</td>
</tr>
<tr>
<td>Industry</td>
<td>14</td>
<td>41%</td>
</tr>
</tbody>
</table>

*Tab. Project proposal's source*

34 total projects
8 companies from industry participated
You are a Project Manager as well as a Software Developer

- Make and follow your project **plan**
  - Gather requirements
  - Set goals and tasks
  - Derive milestones
  - Make Gantt chart (project time plan)

- **Design** and **implement** the software
  - Design patterns, use case and class diagram
  - Programming in higher level languages (C/C++, Python, Java, Matlab etc.)
  - Development tools like IDEs, version control (GIT) etc.

- Present your work to the **course tutors and supervisors**
  - 3 presentations: Requirements, Intermediate, Final (with demo)
Project Assignment

• Project proposals will be announced in the web-site of the course **Today**
  – Send us your application with 3 **preferred projects** and **motivation** until **THURSDAY, 28.04.2022, 23:59 CEST**
  – Find application form under **Downloads** > “**Student project application template**”

• We will try to assign students one project from their preferences
  – Mixture of “FCFS” and maximization of first choices
  – There is no guarantee that you will get one of your preferences
  – **FAQ**
    • my first preference is unassigned, and I am assigned to my second/third preference
      – because we try to maximize the number of supervisors included in the course as well
    • Is it possible to change the project to another one that is not assigned
      – **NO**

• **Students must discuss the projects with their assigned supervisors as soon as possible**
  – After the projects have been assigned
### Summer Semester 2020

<table>
<thead>
<tr>
<th>Choice</th>
<th>Number of students</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st choice assigned</td>
<td>10 students</td>
<td>56%</td>
</tr>
<tr>
<td>2nd choice assigned</td>
<td>6 students</td>
<td>33%</td>
</tr>
<tr>
<td>3rd choice assigned</td>
<td>2 students</td>
<td>10%</td>
</tr>
<tr>
<td>no submission</td>
<td>0 student</td>
<td>0%</td>
</tr>
</tbody>
</table>

*Tab. Percentage of assigned projects based on student's preferences*

### Winter Semester 2020/2021

<table>
<thead>
<tr>
<th>Choice</th>
<th>Number of students</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st choice assigned</td>
<td>10 students</td>
<td>50%</td>
</tr>
<tr>
<td>2nd choice assigned</td>
<td>7 students</td>
<td>35%</td>
</tr>
<tr>
<td>3rd choice assigned</td>
<td>2 students</td>
<td>10%</td>
</tr>
<tr>
<td>no submission</td>
<td>1 student</td>
<td>5%</td>
</tr>
</tbody>
</table>

*Tab. Percentage of assigned projects based on student's preferences*

### Summer Semester 2021

<table>
<thead>
<tr>
<th>Choice</th>
<th>Number of students</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st choice assigned</td>
<td>7 students</td>
<td>40%</td>
</tr>
<tr>
<td>2nd choice assigned</td>
<td>4 students</td>
<td>22%</td>
</tr>
<tr>
<td>3rd choice assigned</td>
<td>6 students</td>
<td>27%</td>
</tr>
<tr>
<td>no submission</td>
<td>2 student</td>
<td>11%</td>
</tr>
</tbody>
</table>

*Tab. Percentage of assigned projects based on student's preferences*

### Winter Semester 2021/2022

<table>
<thead>
<tr>
<th>Choice</th>
<th>Number of students</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st choice assigned</td>
<td>18 students</td>
<td>69%</td>
</tr>
<tr>
<td>2nd choice assigned</td>
<td>5 students</td>
<td>19%</td>
</tr>
<tr>
<td>3rd choice assigned</td>
<td>2 students</td>
<td>8%</td>
</tr>
<tr>
<td>no submission</td>
<td>1 student</td>
<td>4%</td>
</tr>
</tbody>
</table>

*Tab. Percentage of assigned projects based on student's preferences*
Grading

- **This course has 10 ECTS**
  - Equivalent to **10 – 14 hours per week for 3 – 4 months**

- **Project Supervisor** will grade based on performance (weight: 50%)
  - Requirement coverage
  - Implementation on time
  - Completion of the project goals
  - Regular communication

- **Course Tutors** will grade based on presentations (weight: 50%)
  - Fundamental requirements met (citations, correctness, formatting)
  - Presentation skills (get the message across)
  - Slides (proper layout of text and visual information, consistency)
  - Content (for example: introduction, software design, tasks, project management)
  - Time Management (presentation time management and project time management)
  - Course attendance
Grading (continued)

• Attendance to all presentations is mandatory (even if you are not presenting)
  – Every unexcused absence: – 0.3 on tutor grading
  – **Excuses**: Illness, funeral, civic duties, reasons beyond your influence (accident, earthquake...), work meeting that cannot be moved
  – **No Excuse**: overslept, holidays, don’t want to join
  – In any case, inform us in time and get a certificate

• Good conduct
  – Complete all assignments
  – Presentation dates cannot be moved – you get a slot, you take it
  – Follow the presentation rules
  – Upload your presentation slides at link provided latest by the deadline given
    • No upload: 5.0 on slides evaluation
  – Convince us that you want a good grade: layout and content matter!
  – Presenting with camera is mandatory
Presentation times

- Requirement presentation – **5 minutes**
- Intermediate presentation – **7 minutes**
- Final presentation – **10 minutes**
- Exceeding the time will be penalized
  - All times are including presentation time and demos (when applicable)
  - We will interrupt your presentation at **30s overtime**
  - You need to present for at least **30s less** than the time indicated
    - if you are faster, we will wait until time is over
Etiquette

• Always be polite
  – To your fellow students
  – To your supervisors
• Send polite e-mails
  – Properly motivate your request
  – Write full sentences
  – Be patient for an answer
  – Teaching is not our only duty
• Do not send emails at 01:00 AM on a weekend
  – Contact your supervisors and tutors during working hours
• If you want a favorable answer, be polite
Please follow the course webpage or write to us if you have specific questions

• Website

• Course tutors

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  Lennart Bastian
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  Tianyu Song
  tianyu.song@tum.de
Thank you