Universität Stuttgart

Advanced Software Engineering:

Non-Functional Aspects in Software Engineering

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Seminar Introduction

Scientific Working

(partly based on slides by the SDQ research group at KIT)

Motivation (1)

Goals of writing a seminar

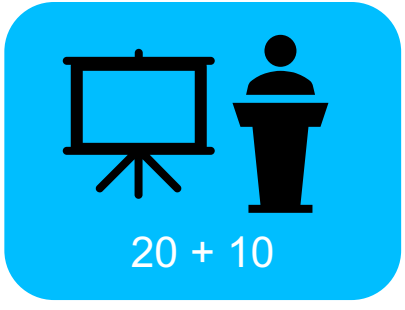
- Hands on interesting and recent research
- Practicing literature surveying
- Early creation of a seminar outline
- Finalizing a **scientific thesis**
  - approx. 15 to 20 pages
- Getting used to correct citations and style of writing
- Making a peer-review of other theses, Include review comments
- **Practicing presentations**, Improve your presentation skills (by collecting supervisor feedback)

Your supervisor is interested in your results!

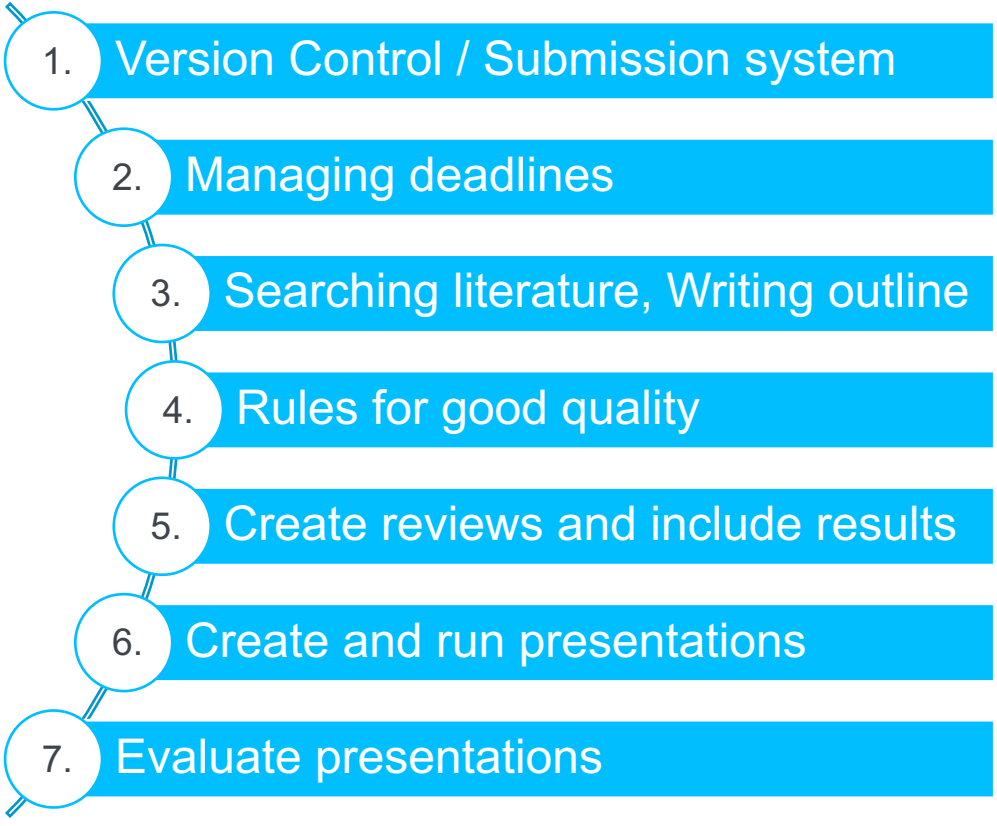
Motivation (2)

Goals of writing a seminar (cont.)

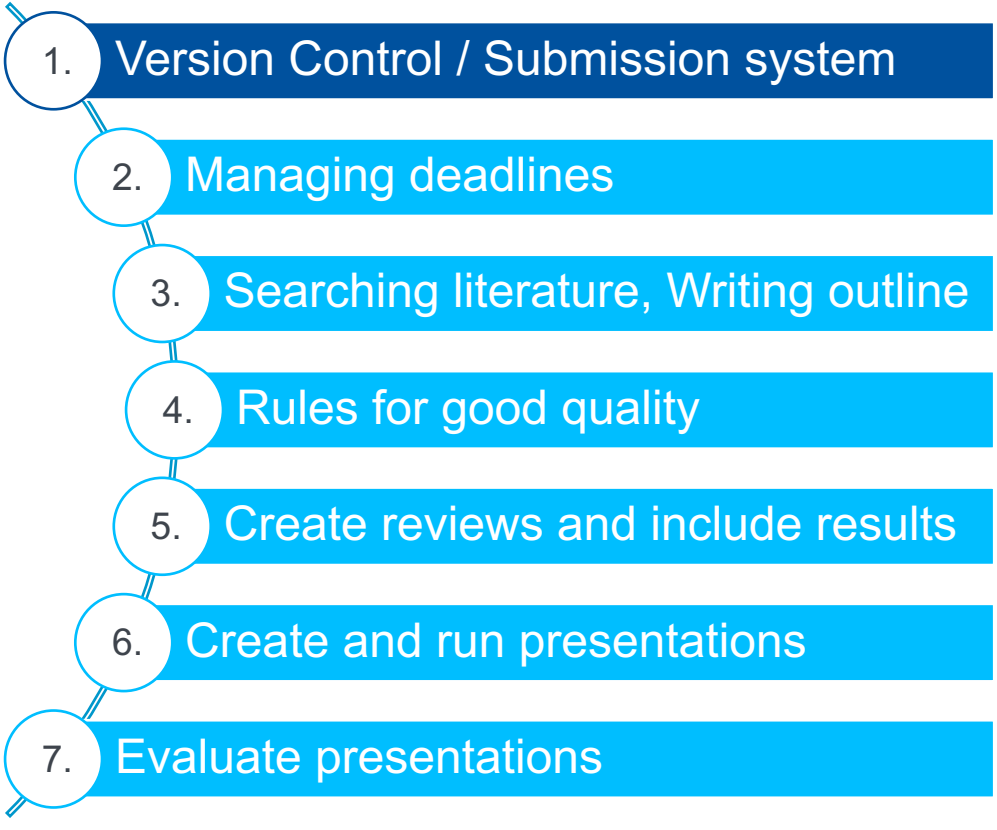
- Managing hard deadlines (as in real world)
- Executing a detailed schedule of small work packages
- Getting used to an iterative self-improvement
- Gaining complementary knowledge to other courses at our chair
- Block seminar at the end of the semester:
  use the time for high-quality results
- **Final presentation**:
  - 20min presentation
  - 10min discussion



Overview


1. Version Control / Submission system
2. Managing deadlines
3. Searching literature, Writing outline
4. Rules for good quality
5. Create reviews and include results
6. Create and run presentations
7. Evaluate presentations
• Structure, content, style, spelling
• Correct citations to avoid plagiarism
• Technical issues

Overview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Version Control

GIT – Quasi-Standard in Software Development

- GIT:
  - Tracks file versions which can be restored, compared, etc.
  - Widely adopted in academic and industrial practice
- Instead of sending files via mail:
  - Files are held on a (remote) server
  - Progress between versions recognizable
  - GUI and shell integration for good usability
- Easy to learn and use
  - “learning by doing” – try it
  - Cheat Sheet: https://www.atlassian.com/git/tutorials/atlassian-git-cheatsheet

Submission System

- EasyChair
  - Real conference submission system
  - Widely used by many conferences
  - Allows submissions to be revised
  - Keeps track of revisions
  - Provides peer-review process

- Visit https://easychair.org/conferences/?conf=sqaseminarws2021 and create an account
  - The account can later be used for real conferences

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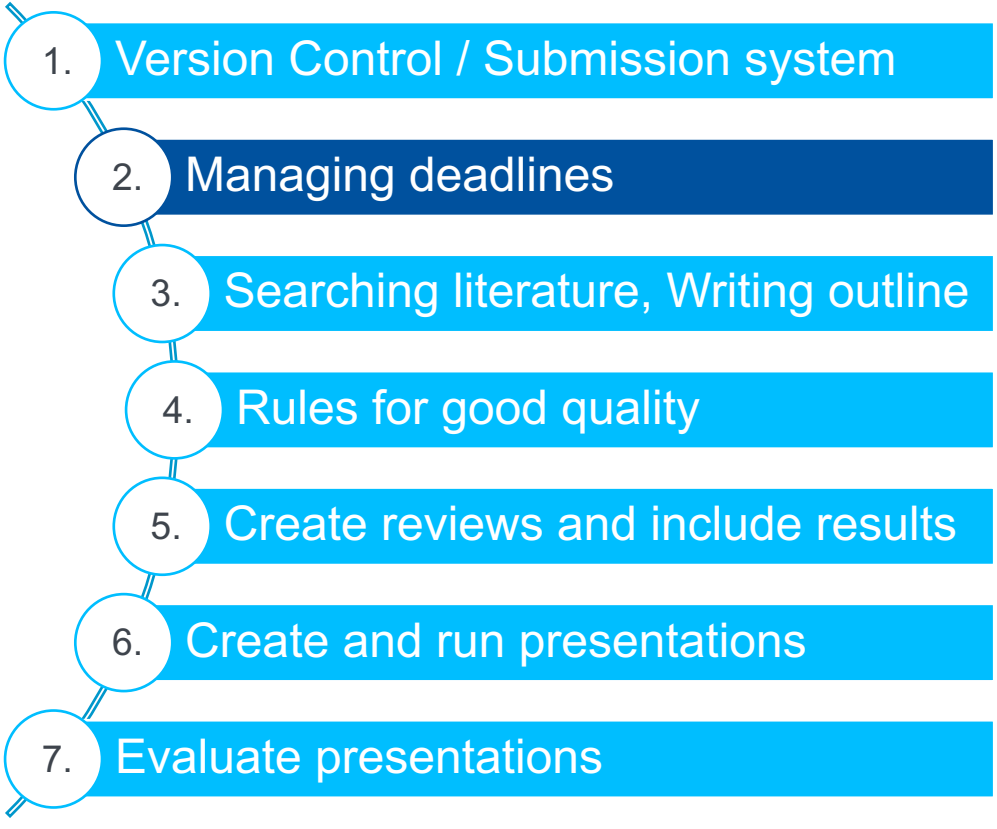
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Managing Deadlines (1)

The “real world”

- **Project life: Determined by externally defined (+usually tight) deadlines and milestones**

- **Deadlines: “carrot and stick” ("Zuckerbrot und Peitsche”)**
  - Missing deadlines: contract penalties
  - Long term effect: Loss of reputation and follow-up contracts
  - Sticking to deadlines by finishing things early: Relax, continuous work load, confidence

Managing Deadlines (2)

- Even for small projects (seminar theses):
  define small work packages & break-down overall task into smaller ones
  - **Rough Schedule** defined externally in the deadlines of the seminar
  - **Refined Schedule**
    - Outline
    - Chapters, Figures
    - Survey Literature
    - Revision Effort
    - Buffer
    - **Should be defined internally**

Managing Deadlines (3)

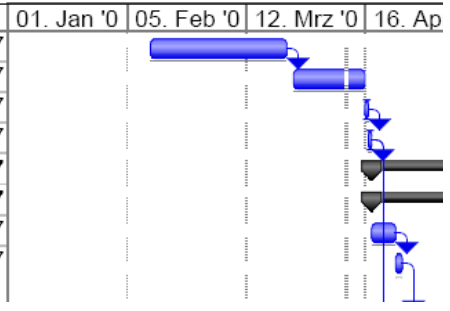
- Reasons in “real world”
  - Projects become foreseeable
  - Upcoming milestones are small and manageable
  - Less deadlines missed
  - “Early motivation to get started"
  - No overlooking of efforts like “Revision"

Managing Deadlines (4)

Gantt-Charts

- If you loose the big picture easily maybe **Gantt-Charts can help**

Nr.	Vorgangsname	Dauer	Anfang
1	Literatursuche und Einarbeitung	30 Tage	Mo 12.02.07
2	Proposal schreiben und Vortragsfolien erstellen	15 Tage	Mo 26.03.07
3	Proposal Vortrag	1 Tag	Mo 16.04.07
4	Anmeldung der Diplomarbeit	1 Tag	Di 17.04.07
5	**Empirische Verhaltensanalyse der Datenbank**	**55 Tage**	**Mi 18.04.07**
6	**Vorbereitung**	**37 Tage**	**Mi 18.04.07**
7	Formulierung der Hypothesen und Experimentdesign	5 Tage	Mi 18.04.07
8	Installation des DBMS und zusätzlich erforderlicher Software	2 Tage	Mi 25.04.07



- **Tool support** (not mandatory...)
  - GanttProject (Java, O/S) http://ganttproject.biz/
  - Office Timeline Online: https://online.officetimeline.com/
  - http://en.wikipedia.org/wiki/List_of_project_management_software

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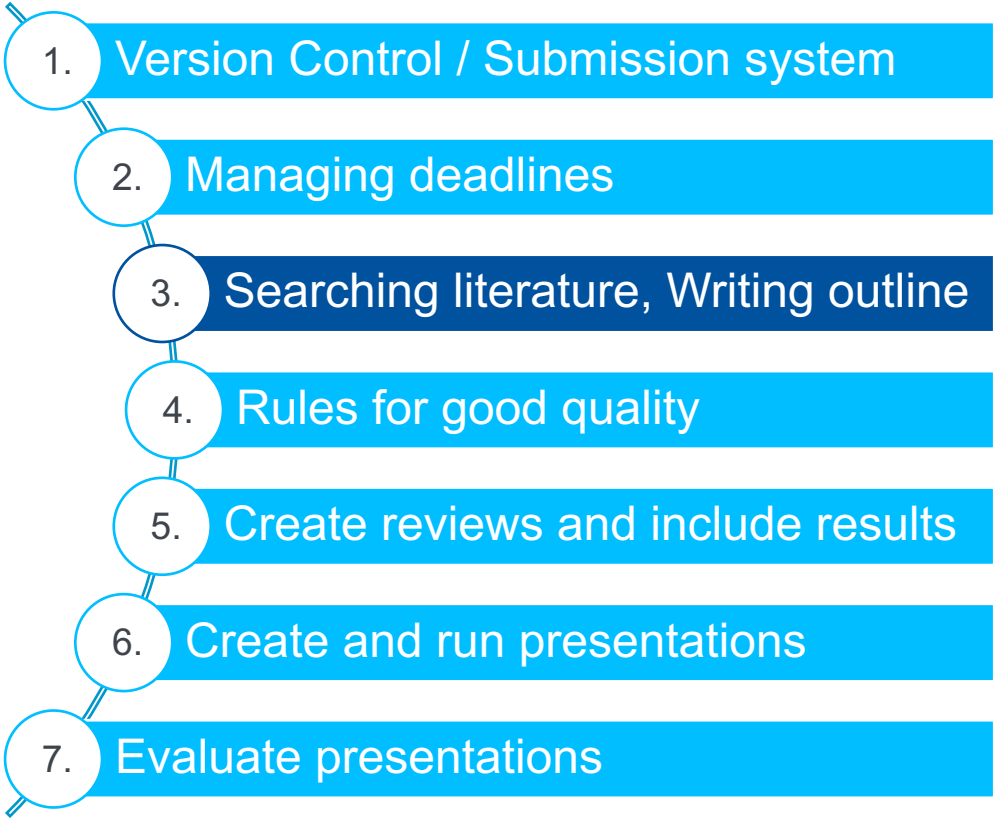
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Literature Survey (1)

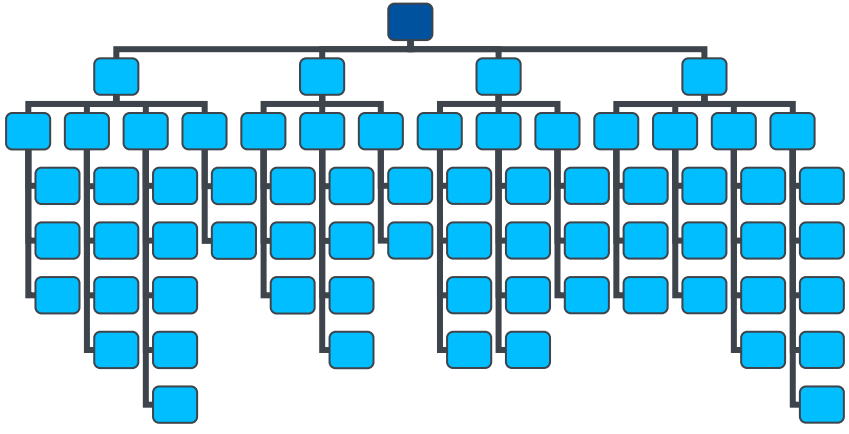
- To get you started, we provide initial literature references
  - This list is non-final
  - Get you started with the topic, **Keywords**
  - Authors, Conference, Workshop, Proceedings
  - **Important**: follow incoming and outgoing references (see next slides)
- **No depth or broad search, no Structured Literature Review (SLR):**
  - **FIRST** read the material you have
  - **THEN** continue by following references

Literature Survey (2)

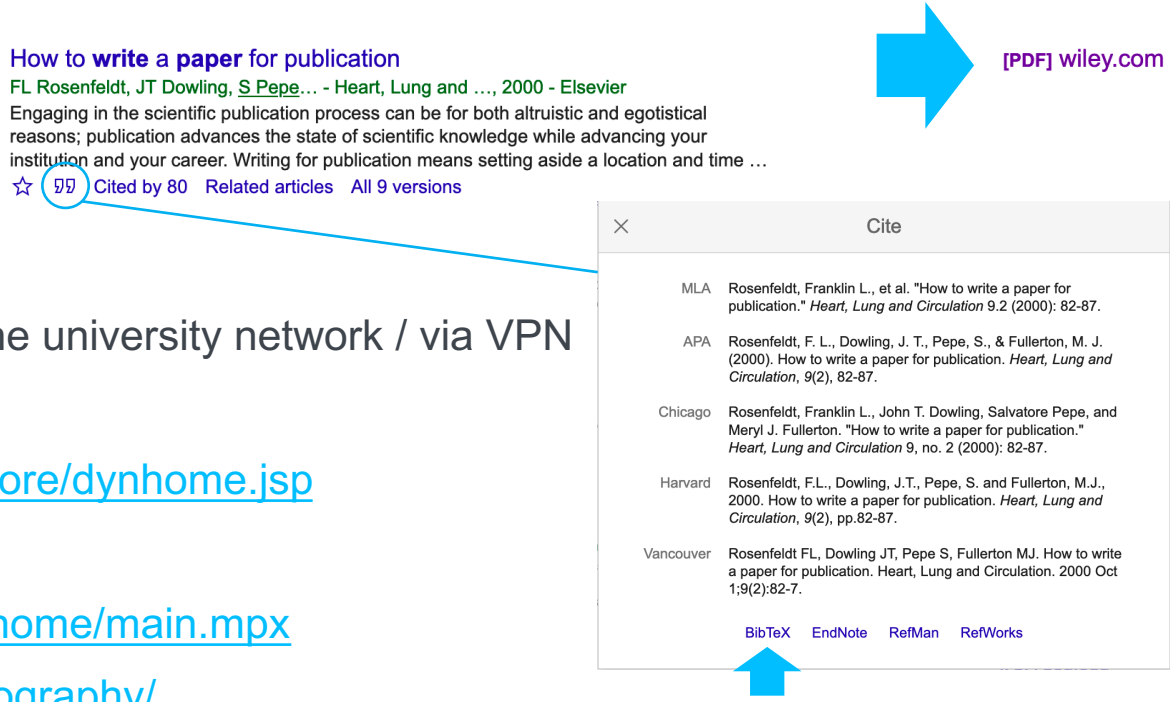
- Read literature **efficiently**
  - **FIRST** read abstract, introduction, conclusions, then look at figures
  - **THEN** decide whether it is worth reading the article
  - **Goal-driven** reading:
    - Approach a text using concrete questions
    - Try to answer the questions while reading
  - **Be aware** while reading:
    - Question statements made in the text
    - Do not believe immediately all statements in a text even if it has been published at well-known conferences or journals

Literature Survey (3)

- How to find more literature?
  - Use references at the end of an article
    - Follow only references which seem to be promising given their context in the original paper
    - Do not follow all references



Literature Survey (4)

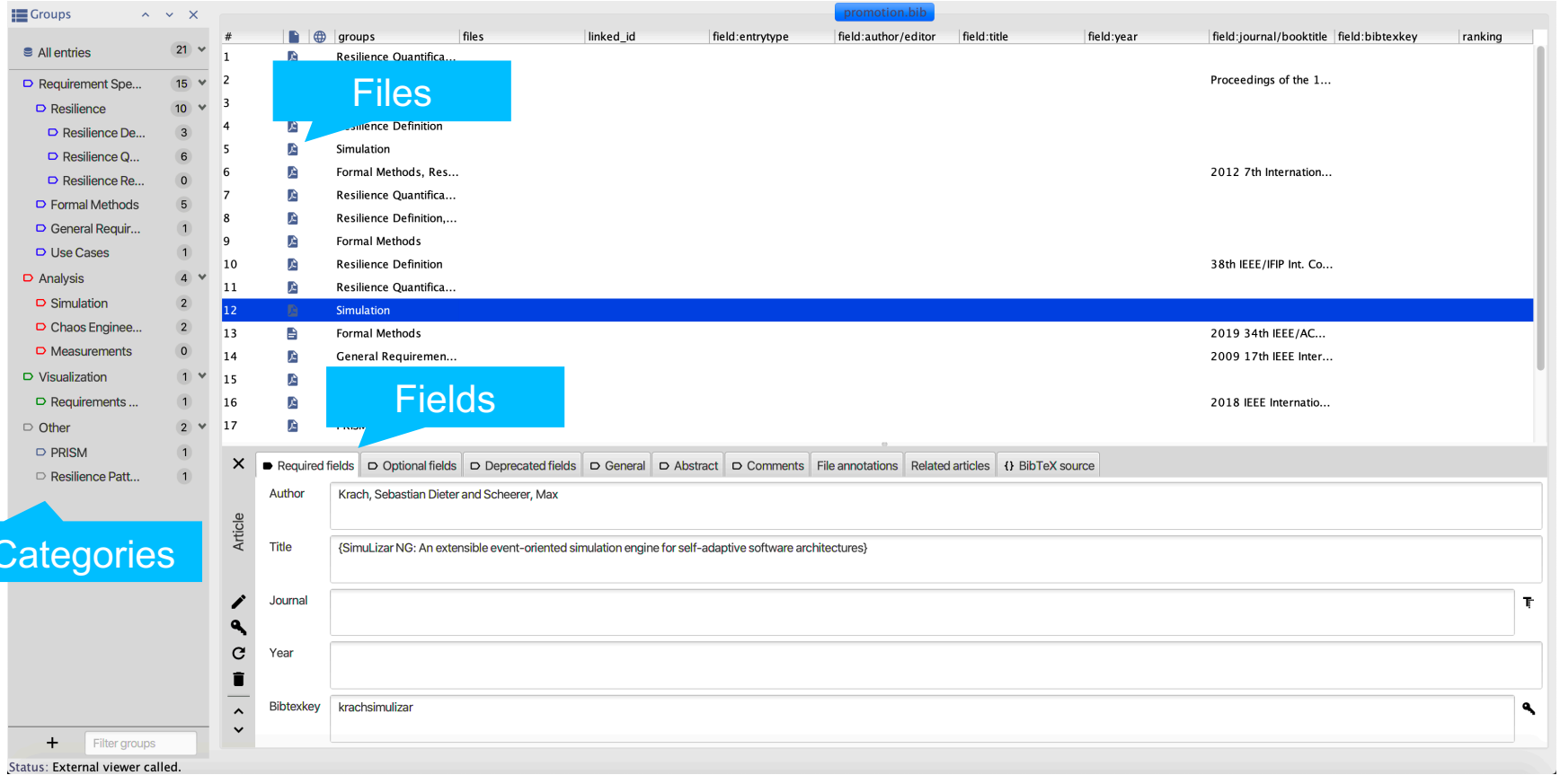


- Many **articles** available from the university network / via VPN
  - **http://scholar.google.com**
  - http://ieeexplore.ieee.org/Xplore/dynhome.jsp
  - http://portal.acm.org/dl.cfm
  - http://www.springerlink.com/home/main.mpx
  - http://liinwww.ira.uka.de/bibliography/
  - https://dblp.org/
    - Search for similar publications of the same authors

- If no PDF directly available, contact your supervisors or the authors directly ☺
- **Save BibTeX entries together with the papers! (use JabRef, Docear etc.)**

Literature Survey (5)

JabRef



Literature Survey (6)

- **Books** and scientific journals
  - “More intense“ and strict review process
  - Ask supervisor (maybe book is available at special locations)
  - Amazon and others offer (partial) full-text search
  - Read sample chapters (look at publisher or author websites)

- **Websites, online tutorials, etc.**
  - commonly considered as weaker references

Outline (1)

- **Contents:**
  - **Headlines** for all sections and subsections, **Keywords** for all content of the seminar thesis
  - List of **references** (!) plus their association to sections (reference the articles from their linked sections)
  - Abstract or introduction
- **Number of entries per outline level**
  - Subsections serve classification purposes, not for highlighting
  - Each outline level should have **≥2 entries**
  - **Example:**

1. Foundations,
1.1 My special foundations,
2. My contribution

1. Foundations,
1.1 Common foundations,
1.2 Special foundations

1. Foundations,
2. My contribution

- **Very common mistake ☹**

Outline (2)

- **Section names**
  - **No punctuation**, besides colon or hyphen
  - **Compactness and precision**. Short and wrong titles are more confusing then long and correct ones
  - **No multiline headings:** always avoidable
  - Try to **avoid abbreviations**
  - Try using **short headings** (in LaTeX `\section[short heading]{long heading}`)
- Readers should understand outline without reading content – should match abstract and introduction

Outline (3)

- **Structure**:
  - **Title page** (Topic, author, name of the seminar, name of the university group) – use provided template
  - **Abstract** (max. 10 lines)
  - **Introduction, Motivation**
  - **Contents**
  - **Conclusions** (plus critical reflection of the topic)
  - **References**

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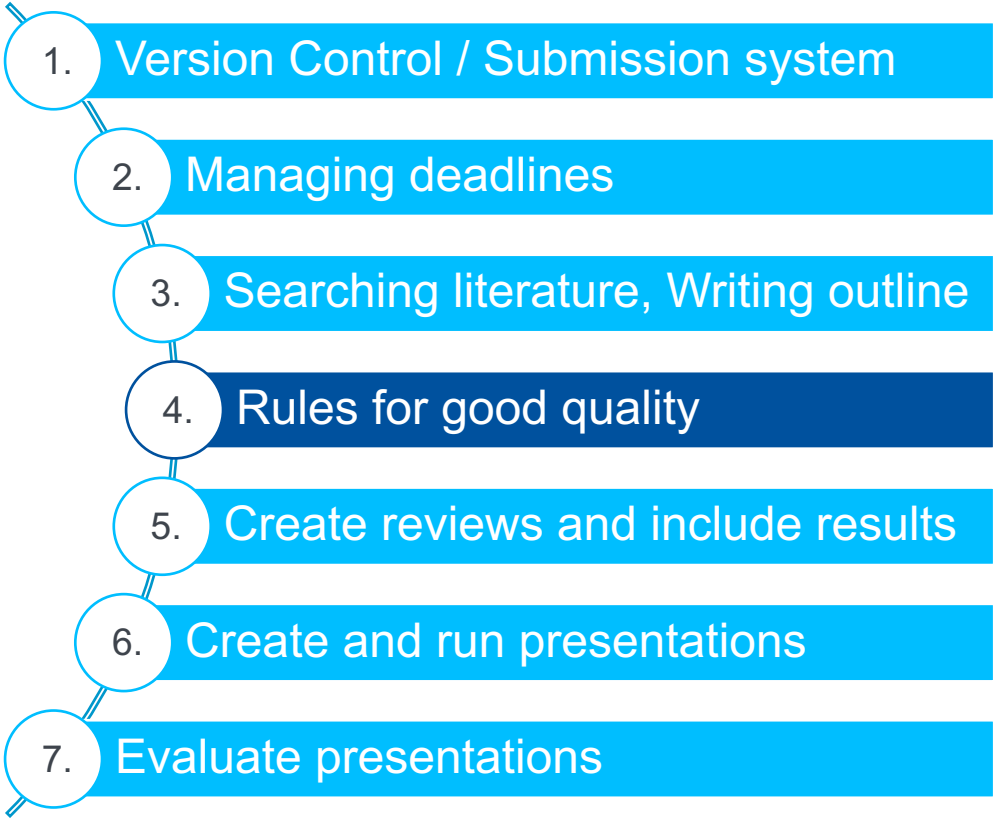
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Structure and contents

- Follow your **outline**
- Follow a central theme **from the viewpoint of your reader**
- Use logical arguments, from broad context to deep details

- Monitor whether you still comply to your central theme
- Seminar: no scientific break-through expected

Style (1)

- **Write as simple as possible**, precise and logical
- „Blurring“ sentences by the use of words like „maybe“, „in some (undefined) cases“, etc. is non-scientific
- **Short sentences**: Make one statement per sentence
  - Use „because“ to make logical dependencies between arguments/statements explicit
- **Define terminology**: if term is non-common
  but: do not get lost in terminology discussions

Style (2)

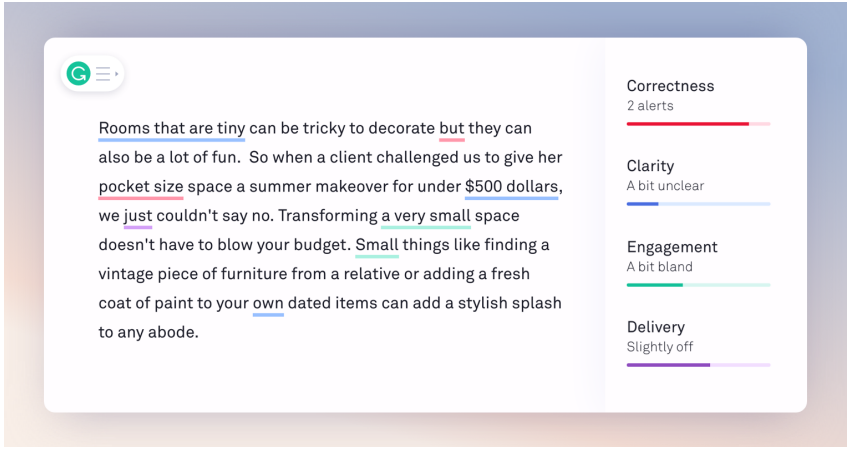
- **Stick to well-defined (technical) terms**: Repetitions in scientific work are common
  - Reason: when you use synonyms the reader tries to see whether there are intentional differences you wanted to point out
  - Not valid for non-technical terms. Try to avoid repetitions here as usual!

Formatting

- **Thesis**:
  - Use our LaTeX-Template (ILIAS)

- **Slides**:
  - PowerPoint or compatible program
  - Use our templates (ILIAS)

Grammar, Spelling (1)



- Dictionary: http://dict.leo.org
- Spell check
  - available in TeXnicCenter
  - Grammarly: https://www.grammarly.com
  - …
- Use US English
- Proof-read your text with a little delay
- **Supervisors are not spell checkers!**
- **Too many spelling mistakes lead to penalty points**
- Assign someone to proof-read your text (but not revise or write your text ☺)
- Use a style guide like http://en.wikipedia.org/wiki/Elements_of_style

Grammar, Spelling (2)

- **Footnotes**

  Before using a footnote, check the following conditions

  - No important text in footnotes
    - **If a footnote is important,** include it in the main text for better readability
    - **Otherwise** avoid the footnote
  - **Never cite literature using footnotes**

Footnotes should be an exception

Citation: Original text

- Book(=**Source**)

Field	Data
Author	Hans Meier
Title	“Best recipes for heart and soul”
Publisher	Schmiermann-Verlag
Address	Klein-Wurzdorf
Edition	2nd
Year (of 2nd Edition)	1998

- Section on page 4 of the book:

> Especially suited for this are parrots. Therefore, I advise in order to kill two birds with one stone, you should have good stones at hand.
>
> *4*

Citation: Correct

In the main text

- Hans Meier coined funny statements like “to kill two birds with one stone you should have good stones at hand” [Mei98, S. 4]. 

In list of references

- [Mei98] Hans Meier, “Best recipes for heart and soul", 2nd edition, Schmiermann-Verlag, Klein-Wurzdorf, 1998

Citation: Wrong

Wrong citation in the main text

> Hans Meier coined funny statements like “to kill two birds with one stone you should have good stones at hand”. 

Problems:

- Where does the statement come from?
  - No way of checking correctness
  - Where and when was the statement made? What was its context?

Citation: Context & Shortening

- **Give context** of information taken from a partial sentence.
  - Better: “to kill two [parrots] birds with one stone you should have good stones at hand" [Mei98, S. 4]

- **To shorten** original text use []
  - He argues “[..] you should have good stones at hand" [Mei98, S. 4].

Citations: Use

- Use a reference actively in your text.
  Having a reference in the list of references only is **not** allowed.
- Translations
  - Translating existing work into English is still a citation
  - Especially, it is not own and original work
  - Non citing such work is considered as cheating attempt

Citation: Summarizing foreign ideas

- Summarizing foreign ideas with own words
  - Used source must be **cited**
  - Citation of the source **close to the summarized idea**
    - Clearly recognize who had the original idea
    - Clearly identifiable own and foreign ideas

- Same is true for shortened citations

Citation: Completeness

In BibTeX (Entry from DBLP):

```
@proceedings{2004trust,
    editor     = {Ralf H. Reussner and Judith A. Stafford and Clemens A. Szyperski},
    title      = {Architecting Systems with Trustworthy Components, International
                  Seminar, Dagstuhl Castle, Germany, December 12-17, 2004. Revised
                  Selected Papers},
    booktitle  = {Architecting Systems with Trustworthy Components},
    publisher  = {Springer},
    series     = {Lecture Notes in Computer Science},
    volume     = {3938},
    year       = {2006},
    isbn       = {3-540-35800-5},
}
```

Citation: Exaggeration

- Not common to include non-referenced work in literature list
- **Do not use LaTeX `\nocite{*}`**

- Foundations:
  Include in introduction of a matching section, i.e., „The following foundations introduce XML [1,2,3]“

Citation: Plagiarism

- “[the] use or close imitation of the language and thoughts of another author and the representation of them as one's own original work.”
  (Source: http://en.wikipedia.org/wiki/Plagiarism)
- Is considered to be a **crime** in some countries

- **Consequences** of plagiarism
  - **Denial of „Seminarschein“**
  - Seminar counts as „not passed“
  - Might have more consequences

- **Always mark your sources**
  - “Proper citing avoids plagiarism issues"
  - Mark your sources clearly
  - **In case of doubt:** Ask your supervisor!

Technical Issues (1)

- **LaTeX and BibTeX:**
  - **Learning** LaTeX
    - Books in library, tutorials online
  - **Figures** in LaTeX:
    - use vector graphics only, i.e., Visio or Inkscape figures
  - **Tools** under Windows:
    - MikTeX: https://miktex.org/
    - TeXnicCenter: https://www.texniccenter.org/

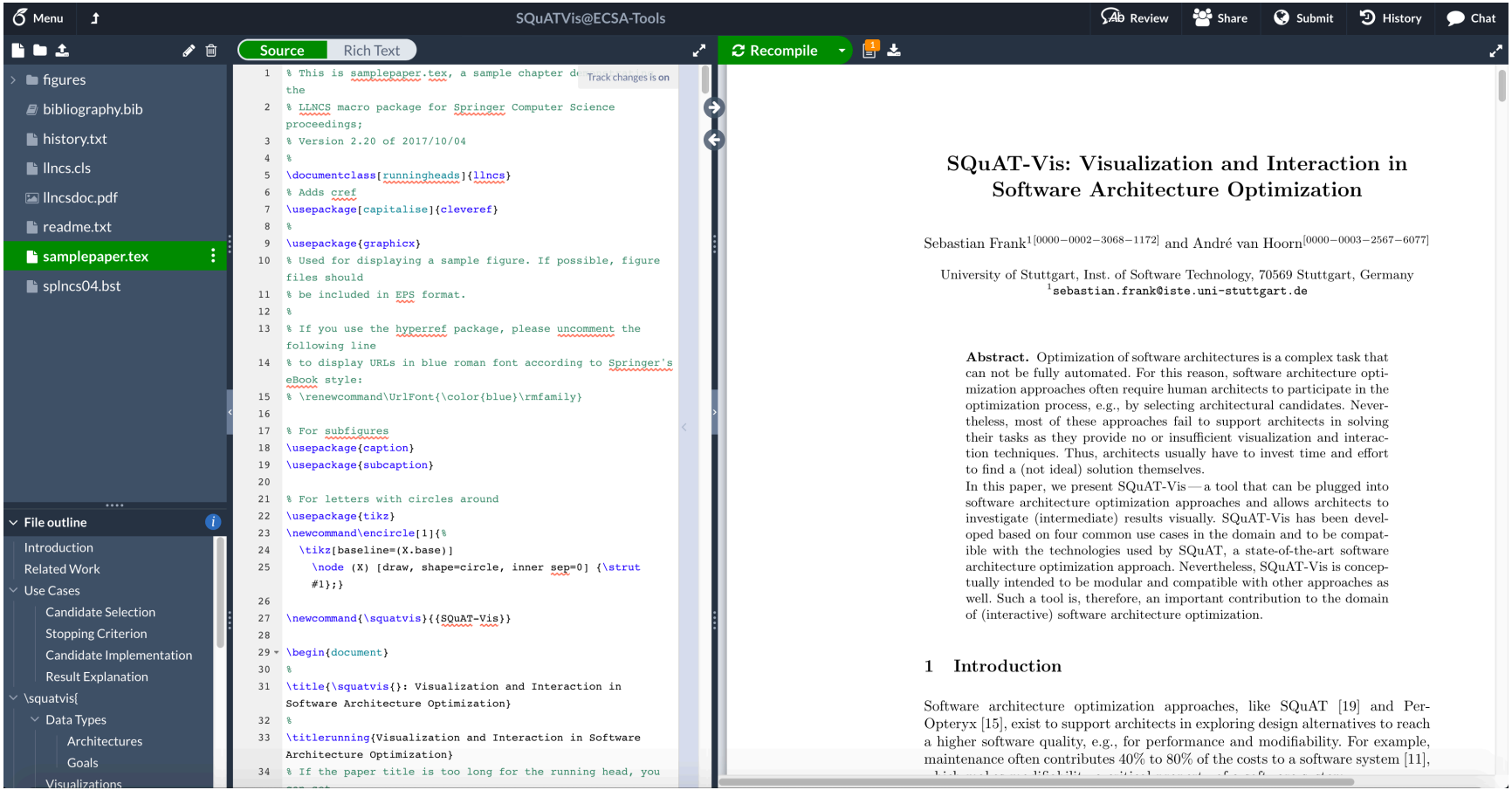
Technical Issues (2)

- **LaTeX and BibTeX:**
  - More **Tools**:
    - Overleaf: https://www.overleaf.com
      - Collaborative, online LaTeX editor
    - … (search online)
  - **References**:
    - JabRef: https://www.jabref.org/
      - management of BibTeX entries and corresponding PDFs (Java, open-source)
  - **Slides**:
    - PowerPoint: https://www.office.com
    - or similar office product, use PDF export in case of doubt

Technical Issues (3)

Overleaf

Can be synced with **Git**, GitHub, Dropbox



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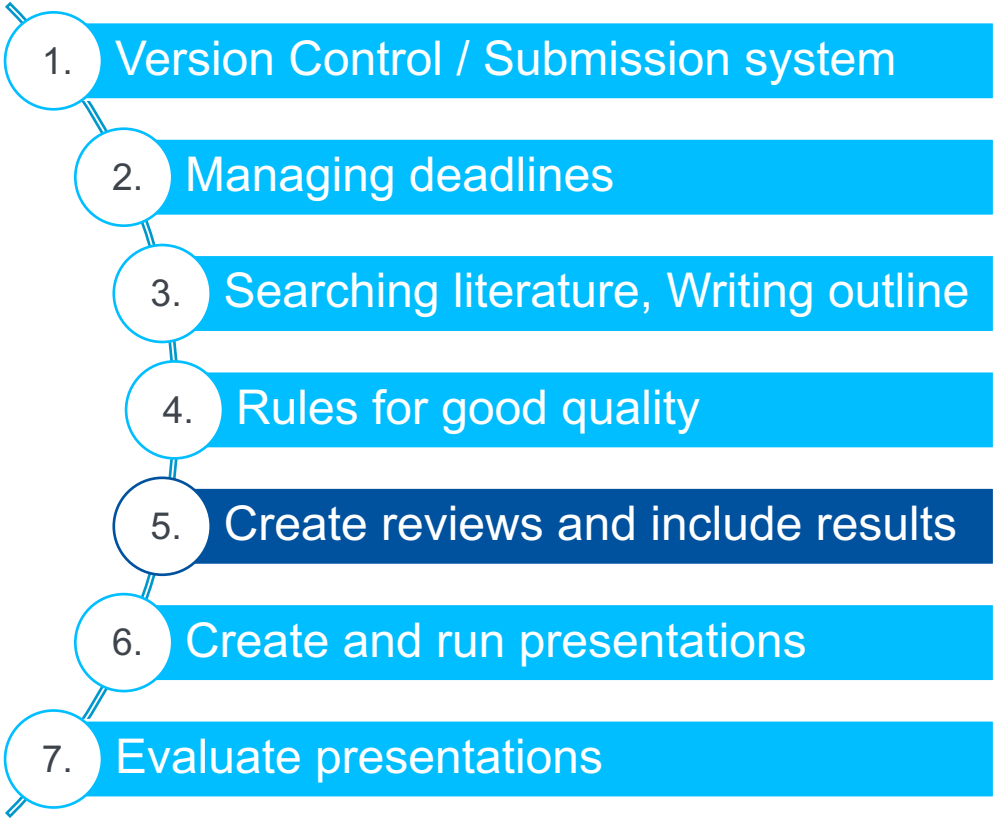
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Writing reviews (1)

- A fellow student submitted a seminar
- We expect **constructive and reasonable** feedback
- **Primary**:
  - Understandability, Outline, Correctness, and Completeness
- **Secondary**:
  - Correct Citations, Grammar & Spelling, Reasonable References, etc.

Writing reviews (2)

- We provide a **template** to ease your task
  - Summary of the paper
  - Positive aspects
  - General issues
  - Specific issues
  - Other issues

Dealing with reviews

There is a grain of truth in every review

- No need to accept all comments – however, provide reasons for not accepting something
  - We provide a **template** to ease your task
- **Reviews by your fellow students** give you feedback from people with comparable background
- Later you also get feedback by your supervisors
- **You gain experience** from multiple reviews
- **Trains you for later industrial and academic life**

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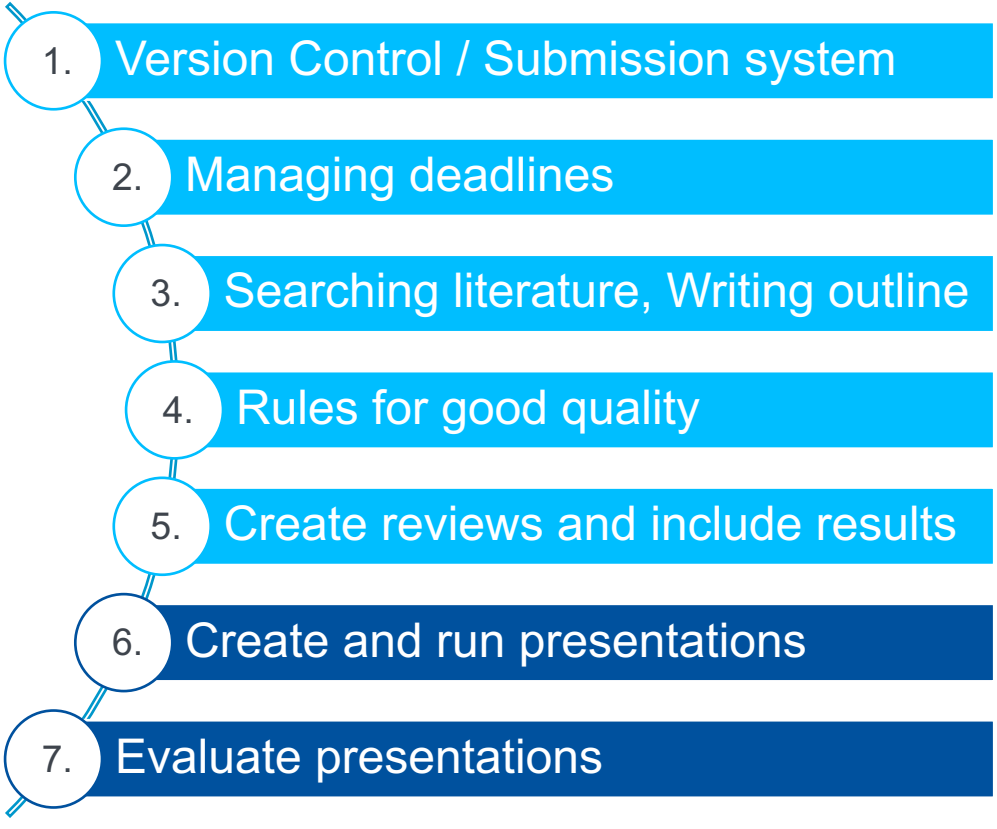
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Presentations (1)

- Seminar 10 slides, 2 minutes per slide, proven practice
- Do not assume you can do better/more

- **Contents**
  - Problem statement
  - (Outline: after title or motivation slide)
  - Content
  - Summary + Future Work: final slide
  - Slide with used references:
    - usually not shown in the presentation, but be prepared to show it
    - Preferably put references into footnotes

Presentations (2)

- **Slide design**
  - max. 5-7 bullet points per slide
  - No complete sentences
  - Figures instead of text
    - Replace text by self explaining figures
  - Check readability (font size, contrast)
  - Elements on each slide:
    - Name of presenter + title of talk (footnote)
    - Slide number & number of total slides
    - Maybe progress indicator
  - Use animations carefully
    - Do not play with animations, we know that you can find them in PowerPoint
    - A typical animation effect is simple „appear“

Presentations (3)

- **Format**
  - Use template
  - Font
    - Sans serif font
    - Fontsize: min. 18pt
  - Colors
    - red/green, blue/violet bad for color blind people
  - Vector graphics only
  - Include 1-2 slides as buffer, to compensate for timing issues

Serif
Sans Serif

Presentations (4)

- Important: Stick to your time limit
  - Check time while talking (presentation view)
  - Identify timing issues early and react on them
  - Timeout after 20 minutes
- Rehearsal:
  - Practice 1-2 times at home
  - Speak continuously, get a feeling for your timing
- Look at your audience:
  - Speak to everybody
  - And not only to your laptop screen or supervisor...

Presentations (5)

- When explaining figures
  - do not point on your laptop screen, but on the projection
  - But do not loose contact to your audience
- Be serious
  - no chewing gum
  - no cool slang
- Acoustics
  - Speak loud and clearly

Judge Presentations

- Requires concentrated listening
- Take notes!
- Jot down questions and ask later –
  only ask very important questions directly
- Get an overall picture and not just details
- If you get lost:
  note down the slide number and try to resync ☺

Questions?