

Presenting your work (report/talk)

Guidelines

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Motivation and background

- The report and talk are **important** parts of a student project
→ People **judge** your work based on your report/talk
- Experience at IFOR:
quality of report/talk often worse than the work itself
- Possible reasons:
 - Little (or no) theory/practice during studies
 - Importance and time requirement are underestimated
 - Lacking enthusiasm?

Goals of this tutorial

- Create awareness for importance of your report/talk
- Provide **guidelines** for your report/talk
- Avoid common mistakes
- **Improve the quality** of your report/talk
- Indicate assessment criteria



Outline

- 1 Project Management
- 2 Reflect on your work: W⁵
- 3 Report
- 4 Talk

Project management cycle¹



Analysis: Gather all information, structure it, consider all possibilities

Diagnosis: Be critical with information, set priorities, what are the best possibilities?

Goal: Formulate the precise goal

Approach: Practical aspects/external factors (e.g. timeline, budget), planning, implementation

Results: Collect results

Evaluation: Look back, reflect on/synthesize/interpret results

Feedback: Look forward, make suggestions/recommendations

¹Taken from [Shephard 2006]

Time schedule²



- Identify/define activities (and dependencies)
What? How long?
- Identify/define **milestones**
What? Until when?
- Plan activities on a **timeline**
Don't forget buffer time

Remarks:

- Plan **enough** time for writing the report!
- Discuss time schedule with supervisors
- Time schedule is **dynamic** (but deadlines are not)

²Partly from [Deiningner et al 1996]

Reflect on your work: W⁵



Before starting, answer the following questions:

- **Why** do you care about the problem? - Motivation
- **What problem** do you address? - Problem statement
- **How** do you solve it? - Method
- **What** are the **results**? - Results
- **What** are the **implications**? - Conclusion

Adapted from [Koopman 1997]

Purpose of the report

- Scientific documentation of your work
 - (The only!) **permanent** record
 - Future reference (for you, supervisor, other students)
- Self-contained, detailed, precise
- State your contribution
- Give your view of subject



Target audience

- People with experience/education in the field (not your supervisor), industry partners
- Assume...
 - ... basic knowledge of your/related studies (MATH, INFK, MTEC), but
 - ... no “specialized” knowledge (of the subject)
 - Self-contained, level of detail
- Write with the reader in mind³



³[Gopen and Swan 1990]

Procedure for writing a report⁴

1st draft: Point-form outline, definitions, figures/tables

- Inner logic and smooth flow (“roter Faden”), self-contained

Discuss with supervisor(s)

2nd draft: Sentence form (keep writing, leave gaps if stuck)

- Focus on logic rather than nice sentences

3rd draft: Flow

- Link paragraphs (guide the reader)



⁴Adapted from [Shephard 2006]

Procedure for writing a report⁴ (2)

4th draft: Style

- Keep it simple (succinct sentences), avoid informal expressions

————— Hand in to supervisor(s) —————

5th draft: Corrections

6th draft: Layout

- Put report aside for ≥ 1 day, final check

————— Hand in final version —————



⁴Adapted from [Shephard 2006]

Intermediate report

- Why?
 - Avoid last-minute writing
 - Formalize ideas/concepts
 - Check structure and style
- What?
 - 1st draft: whole thesis
 - 4th draft: completed tasks (e.g., problem description, model, etc.)
- From intermediate to final report:
 1. Start with 1st draft from scratch
 2. Insert contents from intermediate report



Formal elements of a report

Guidelines⁵

Title page

Abstract

(Acknowledgements)

Table of contents

Introduction

*Chapters appropriate to
describe the research*

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(Appendix)



⁵Subsequent guidelines partly from
[Deinger et al 1996, Koopman 1997, Shephard 2006, Spector 1994]

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- Choose an adequate title for your work
 - You may change the given title
 - Meaningful, specific, “short”

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Spring Semester 2011

Title of my work

Master Thesis

by

<name>, D-MATH

Professor:

Prof. <name>

Supervisors:

Dr. <name>

<name>

Institute for Operations Research

ETH Zurich

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- Summarizes whole report in 100-250 words
 - 3 sentences Introduction (incl. Goal)
 - 3 sentences Method
 - 3 sentences Results
 - 1 sentence Conclusion
- Best written at the end

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- Optional
- Who contributed to the success?
 - “Technically”
 - “Morally”
 - Industry partners

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- Meaningful, “catchy”, specific titles, e.g., “Primal-dual subgradient algorithm” instead of “Algorithm”

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- Background, context
- Problem or purpose, relevance
- Critical analysis of other's work
- Aim, what's new?
- Approach

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Standard structure:

- (Mathematical statement of the problem)
- Model(s)
- Method(s)
- Case study/results and discussion

Chapters/sections:

- Every 1-3 page(s)
- (Short overview)

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Formulas:

- Explain meaning in words

Proofs:

- Explain key ideas/intuition in words
- Illustration

Algorithms:

- Pseudo code
- Referenced and explained in body of the text

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Tables, Figures:

- Can be very helpful!
- Concise caption (e.g., giving main finding)
- Referenced and explained in body of the text, e.g., for figures with results:
 - What relationship is **depicted**?
 - What is the **major finding**?
 - Possible explanation/**interpretation**
- Related to subject
- No visual effects without meaning

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Figures (cont.):

- Label the axes, indicate values and units
- Clearly distinguishable curves
- Legend
- Font size

Colors:

- Used to clarify, not because “it looks nice”

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Results and discussion:

- Discuss and interpret results

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Conclusion:

- Point out your contribution
 - Significance, added value, big picture
 - e.g., approach, findings, model, applications

Outlook:

- Open questions
- Possible refinements/improvements

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- Cite **all** the work you've used
 - Basics, secondary contents: cite only, e.g.,
"An introduction to convex optimization is given in [...]."
"The proof ... can be found in [...]."
 - Fundamental results: cite and summarize, e.g.
"Following [...] we define ..."
- Each reference must be cited in the body of the text (and vice versa)
- **Complete** and **accurate** information
 - Webpages with access date

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(**Appendix**)

- Additional (non-central) material
- No source code
- CD/DVD with report, source code, etc.

Scientific writing

A few more remarks

- Write **precisely**, to the point
- Describe everything relevant, but as **briefly** as possible
- Clearly distinguish (proven) facts from your own interpretation/conclusions, i.e.,
 - **Justify** your statements (no unfounded claims)
 - Cite references
- Be **consistent**, e.g.,
 - Introduce/define (new) terms before using them
 - Don't use synonyms for "defined" terms
 - Don't repeat yourself
- Make a spell check
- Usage of \LaTeX is strongly recommended



L^AT_EX

- For an **introduction** to L^AT_EX see e.g. T.Oetiker et al, *The Not So Short Introduction to L^AT_EX*,
<http://tobi.oetiker.ch/lshort/lshort.pdf>⁵.
- L^AT_EX with Windows:
 - **MiKTeX**, an implementation of T_EX for Windows
<http://www.miktex.org/>.
 - **Editor**: e.g. TeXnicCenter (<http://www.texniccenter.org/>),
LEd (<http://www.latexeditor.org/>), Texmaker
(<http://www.xmlmath.net/texmaker/>).
 - For more information on setting up L^AT_EX for Windows see e.g. J.
Schlosser, *LATEX - a complete setup for Windows*,
<http://schlosser.info/latexsystem-en.html>.

⁵All web pages checked on 21.3.2011.

Summary: Report

- Reserve a sufficient amount of **time**
- Use the **6-draft** procedure
- Write for the **reader**
- Be **precise** and **self-contained**

What is a good academic talk?

Characteristics:

- Awaken interest in the audience for your topic
- State clearly your contribution
- Prepare well-structured and appealing slides

In this tutorial:

Provide guidelines for good academic talks



framework?

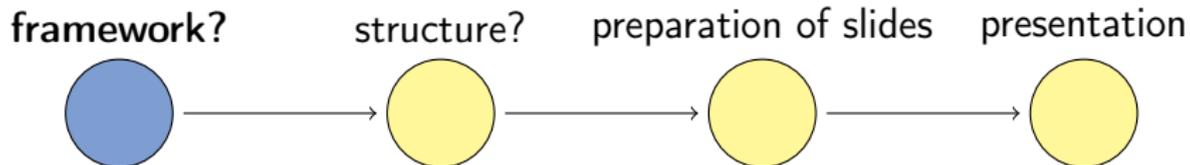
structure?

preparation of slides

presentation



Framework requirements



- What is the purpose of the talk?
- Who is in the audience?
- What are the time restrictions?
- What media can you use?

What is the purpose of your final IFOR-talk?

What we expect:

- Introduce audience to the topic
- Give an idea (overview) of your work
- Awaken interest in the audience for your work
- State clearly your contribution

Who is in the audience?

Talk at IFOR

- IFOR staff,
other IFOR students

- What is their knowledge?
- What are their interests?
- What do they want to hear from you?

Other talks

- Industry partners, others



What are the time restrictions?

Prepare a presentation lasting no longer than the following limits:

- Final presentations:
 - ▶ Master Thesis: 30 minutes
 - ▶ Semester Thesis: 20 minutes
 - ▶ Bachelor Thesis: 20 minutes
- All other talks: ask your supervisors

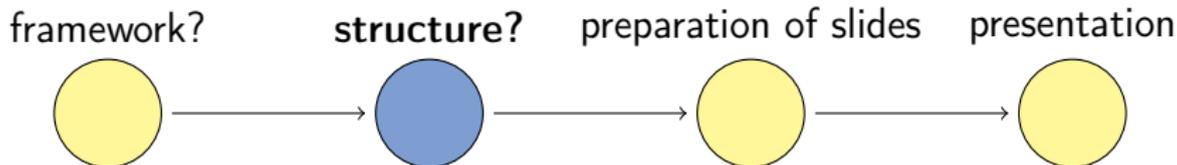
- Discussion format, where questions and comments are allowed at any time
- Discussion may take longer than the given limits
- At most one slide per minute

What media can you use?

- Beamer and laptop:
 - ▶ Expected form of your final presentation
 - ▶ \LaTeX and beamer:⁶
http://en.wikipedia.org/wiki/Beamer_%28LaTeX%29
 - ▶ Beamer and laptop are available at IFOR
- Overhead projector
 - ▶ Useful if you need a lot of notation
- Blackboard
 - ▶ Be careful with your handwriting!
 - ▶ Time consuming!

⁶Web page checked on 23.3.2011.

How do you structure your talk?



- What is the structure of your talk?
- How do you get the attention of the audience?
- What should people remember from your talk?

What is the structure of your talk?

- Apply the W^5 rule:
 - ▶ What problem do you address?
 - ▶ Why is this problem interesting?
 - ▶ Which methods do you apply?
 - ▶ What are your results and contributions?
 - ▶ What are the effects of your results?
- Divide your talk into 3 or 4 sections (plus summary and outlook)

A good structure is the cornerstone of every excellent talk!

How do you get the attention of the audience?

Most important time of your talk: first two minutes!

- Why? Everybody is curious about your talk!
- Awaken people's interest
- Motivate people to stay concentrated, e.g.:
 - ▶ Start with a Mickey Mouse example
 - ▶ Illustrate the relevance of your problem
 - ▶ Show your main result and discuss its importance
 - ▶ Present impressive numerical results

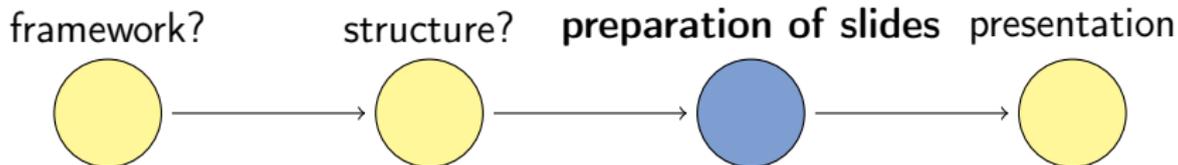
What should people remember from your talk?

- Focus on a few key messages
- It is better to explain a few things well than many things poorly

A good mathematical talk...

- allows everybody to get the main ideas, ...
- but includes also some mathematical depth for experts.

The preparation of the slides



- Titles are the first thing people read
- How much is too much?
- There are helpful font variations
- How can you successfully use visualizations?
- Orientation? Where are we?
- Questions: your chance to score!

Titles are the first thing people read

- Put a self-explanatory title on each slide
- Titles on consecutive slides should tell a story all by themselves
- Use a verb to make a statement
- Questions create curiosity in the audience

How much is too much?

- Do not put too much on a slide
- Bullet list - no full sentences
- No unnecessary notation or formulas
- Math is much harder to parse than text

Too little is better than too much!

There are helpful font variations

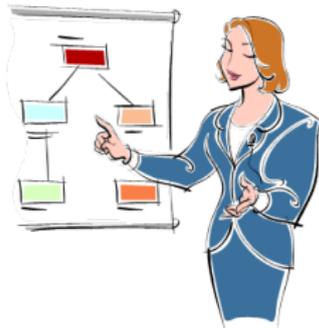
- **Highlight** important statements

... but there are also some bad things:

- Font size should be readable
- **Colors are good**, but they should have a reason.
Maximize contrast.

How can you successfully use visualizations?

- Visualizations help an audience enormously
- Figures, photos, films, flowcharts,...
- Explain what is shown on each figure
- Visualizations must support the message



Orientation? Where are we?

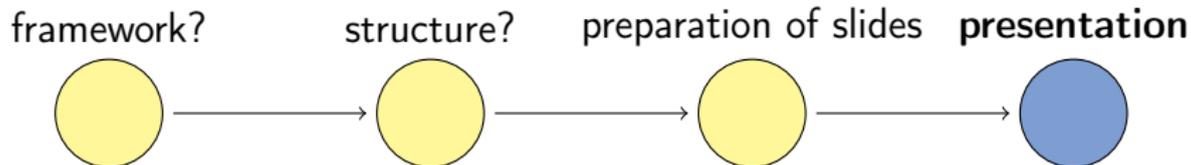
- Number the slides
- Show outline when changing section
- Graphics can be used as outline

Questions: your chance to score!

Prepare expected questions!

- Think of possible questions from the audience
- Add an appendix part with handy information for questions
 - ▶ Appendix should not count to the total number of slides
 - ▶ \LaTeX hint: `\addtocounter{framenum}{-1}`

The presentation



- Test your presentation
- You and your presentation style
- Behavior during the talk
- Recall who you are talking to

Test your presentation

A way to prepare your talk:

- A good start - you are on your way!
- Memorize key formulations
- Practice it... and improve

Focus lies on:

- Is my time management fine?
- Logical flow and completeness
- Learn to speak freely

Get feedback from your supervisors!

You and your presentation style

- Bring your individuality, use your fantasy
- Keep speech simple
- Do not speak too quickly
- Be consistent



Behavior during the talk

- Look at the audience (one by one)
- Voice: loud (not too much) and clear
- Body: natural but controlled gestures
- Using a pointer? Handle it correctly



Recall who you are talking to

Consider the audience as a collection of individuals!

Law (Ignorant Audience⁷)

Someone important in the audience always knows less than you have assumed everyone knows, even if you take the Ignorant Audience Law into account.

- Explain everything that you have on the slides
- You may explain things that are not on a slide
- Summary at the end: repeat the main message of the talk

⁷Adapted from [Tantau 2004]

Summary: Talk

- Adjust your talk to the audience
- Motivate people to stay concentrated
- Focus on key messages
- Think of possible questions
- Practice your talk
- Get feedback from your supervisors

Overall summary

- The report and talk are **essential** parts of your work
- Think about **W⁵** before starting to compose
- Remember: it's **your** work
→ Freedom, responsibility
- *Make things as simple as possible, but not simpler.*
Albert Einstein

Law

Every rule can be broken, but no rule may be ignored.

References

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