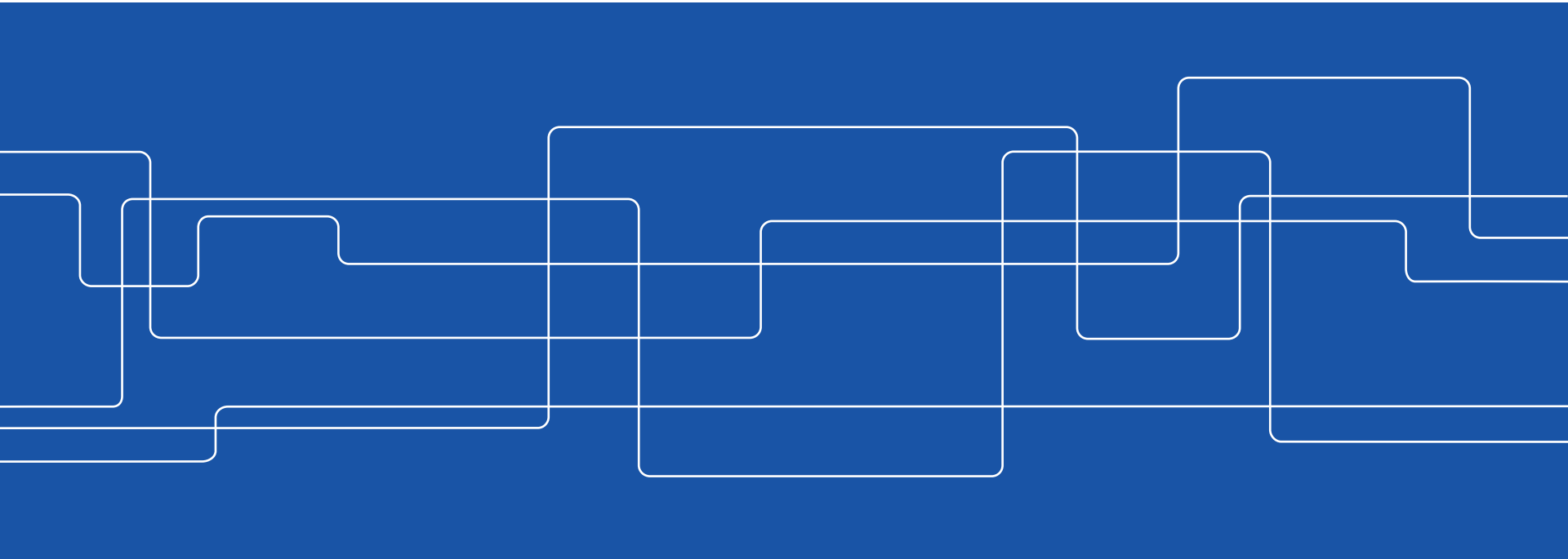




# Kandidatexjobb (kexjobb), DA150x

Pawel Herman

Jörg Conradt





# Outline

1. Aim (mål)
2. Mandatory components (obligatoriska delar)
3. Implementation, project execution (genomförande)
4. The report (rapporten)



# Aim (mål)

## What is kandidatexjobb?

- Independent work (självständigt arbete)
  - Your own responsibility, define yourselves what you should work on  
(*under eget ansvar*)
  - Not individual (in pairs) and not without supervision  
(*inte individuellt eller utan handledning*)
  - You plan and conduct your research study independently  
(*självständigt planera och utföra en undersökning*)



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  - You produce research/academic results (*det akademiska resultatet*)
  - Develop skills, acquire knowledge that you need (*skaffa de kunskaper som behövs, tillämpa färdigheter*)

# Aim (mål)

## What is kandidatexjobb?

- Independent work (självständigt arbete)

Kursmålen

- Your own responsibility, define yourselves what you should work on (*under eget ansvar*)
- Not individual (in pairs) and not without supervision (*inte individuellt eller utan handledning*)
- You plan and conduct your research study independently (*självständigt planera och utföra en undersökning*)
- You produce research/academic results (*det akademiska resultatet*)
- Develop skills, acquire knowledge that you need (*skaffa de kunskaper som behövs, tillämpa färdigheter*)
- Critically discuss your own as well as your peers' work – scientific results (*kritiskt diskutera egna och andras vetenskapliga resultat*)
- Present your work in writing and orally (*presentera arbetet, muntligt och skriftligt, med krav på struktur och innehåll*)



# Aim (mål)

## What is kandidatexjobb?

- Independent work (*självständigt arbete*)
- Scientific nature and setup of your work (*vetenskapligt upplagd studie*)
  - Focus on the report (*fokus på rapporten*)
  - Clear problem formulation, research question (*tydlig frågeställning*)
  - Programming, implementation is only a tool, not the objective (*bara ett verktyg på vägen*)
  - The need for a literature study, related work, state of the art (*litteratursökning nödvändig*)
  - Advised NOT to seek a project at a company (*rekommenderas att INTE leta arbete hos företag*)



# Aim (mål)

What is kandidatexjobb?

- Independent work (*självständigt arbete*)
- Scientific nature and setup of your work (*vetenskapligt upplagd studie*)
- Fixed deadlines (*fast slutdatum*)



# Mandatory tasks (obligatoriska delar)

- Project plan (*projektplan*)
  - written specification with a clear problem statement and a workplan/schedule
- Report (*rapport*)
  - must fulfill the requirements for a scientific/academic report
- Popular science description (*populärvetenskaplig text*)
  - should inform general (non-academic) audience about your research and the area
- Presentation (*presentation*)
  - must fulfill the requirements for a presentation at a scientific conference
- Peer review (*kritisk granskning*)
  - both in writing and oral during the conference





# Formulating a research question (frågeställning)

- Tricky part
  - Needs a discussion with the supervisor but your autonomous choice
  - Should be built on previous work (usually reported in the literature)
  - Relevant to the field, providing scope for new knowledge, generalisable  
(NOT necessarily a solution, rather an *answer to an interesting question*)



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  - Needs a discussion with the supervisor but your autonomous choice
  - Should be built on previous work (usually reported in the literature)
  - Relevant to the field, providing scope for new knowledge, generalisable (not necessarily a solution, rather an answer to an interesting question)
- Good examples available in the past reports – concrete questions
  - What is the effect of ..... on the performance of .....?
  - How does .... compare with ..... in terms of .....?
  - ...etc....



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  - Should be built on previous work (usually reported in the literature)
  - Relevant to the field, providing scope for new knowledge, generalisable (not necessarily a solution, rather an answer to an interesting question)
- Good examples available in the past reports
- Bad examples
  - Open-ended questions with no scope for a conclusive answer
    - Is it possible to.../ Can one....? etc. – **NOT recommended!**
  - Questions that invite unfocused, purely exploratory studies
    - How can one ...? – **NOT recommended!**



# Formulating a research question (frågeställning)

- Tricky part
  - Needs a discussion with the supervisor but your autonomous choice
  - Should be built on previous work (usually reported in the literature)
  - Relevant to the field, providing scope for new knowledge, generalisable (not necessarily a solution, rather an answer to an interesting question)
- Good examples available in the past reports
- Bad examples
- Process helping you to arrive at a suitable research question
  - Discussion with a supervisor and an iterative re-formulation
  - Attend a lecture/seminar on problem formulation, project planning
  - Reading relevant literature, reflecting on what is interesting, what the gaps in knowledge are and where you can contribute



# Report (rapporten)

## Structure (*struktur*)

1. **Introduction** – a wider context, basic background, brief overview of the state of the art, motivation, Scope, Aims, Research question/Problem Statement
2. **Background**
3. **Methods**
4. **Results**
5. **Discussion**
6. **Conclusions**



# Report (rapporten)

## Structure (*struktur*)

1. **Introduction**
2. **Background** – extended background, fundamentals,  
Related Work (detailed literature review, state of the art)
3. **Methods**
4. **Results**
5. **Discussion**
6. **Conclusions**



# Report (rapporten)

## Structure (*struktur*)

1. **Introduction**
2. **Background**
3. **Methods** – your *tools* used to address the research question, *motivated* method selection, description of your experiments, data, evaluation etc. (what is needed to reproduce your study)
4. **Results**
5. **Discussion**
6. **Conclusions**



# Report (rapporten)

## Structure (*struktur*)

1. **Introduction**
2. **Background**
3. **Methods**
4. **Results** – *a story* where you present what you have achieved, illustrated with tables, figures; objective outcomes, suitable analyses to demonstrate findings relevant to the study
5. **Discussion**
6. **Conclusions**





# Report (rapporten)

## Structure (*struktur*)

1. Introduction
2. Background
3. Methods
4. Results
5. **Discussion** – brief summary of the key findings and subjective, reflective analysis of the results from a broader perspective: critical evaluation, analysis of limitations, strengths & weaknesses; impact, relevance to the field/state of the art; ethical and sustainability considerations
6. **Conclusions**



# Report (rapporten)

Structure (*struktur*)

1. Introduction
2. Background
3. Methods
4. Results
5. Discussion
6. **Conclusions** – answer(s) to the research question(s), main results, closing remarks (*future work*)



# Report requirements (krav på rapporten)

- **Title and abstract** (titel och sammanfattning)
  - Title clearly describes your study
  - Abstract/summary reflects the content of the report
- **Introduction** (Inledning)
  - Research question is easy to identify, project aims, purpose and scope are clear
  - The problem (and students' contribution) is clearly delimited and its relevance is motivated and put in a context
- **Background** (Bakgrund)
  - Students demonstrate knowledge in the field and familiarity with previous work (state of the art, relevant and significant literature)
  - The background is coherent, relevant and not excessive



# Report requirements (krav på rapporten)

## ➤ **Methods (Metoder)**

- Selection of methods is well motivated, their use is correct
- Methods are well documented with suitable references
- Focus on how methods are used, how the study is designed, evaluated

## ➤ **Results (Resultat – objektiva observationer)**

- Results are structured in a coherent and logical way
- The storyline is supported with clear illustrations, tables etc.
- Suitable analysis is conducted in a correct way (technical soundness)

## ➤ **Discussion and Conclusions (Diskussion och slutsatser)**

- The most important findings are emphasized and briefly summarized
- They are critically evaluated given the limitations and assumptions, links to the state of the art and their impact on the field
- Conclusions are reasonable, relevant, concrete and address the research question

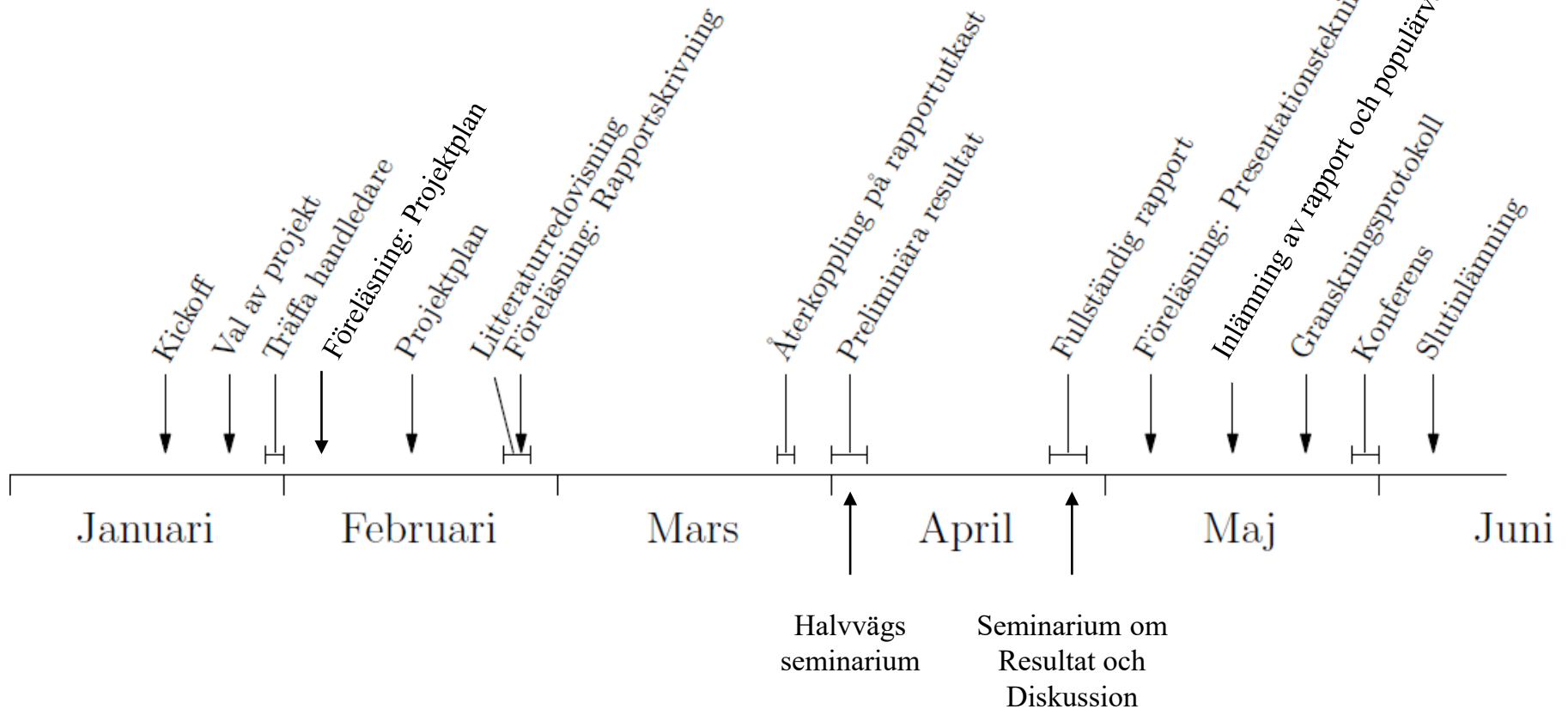


# General characteristics of the report (generella egenskaper)

- The report should be coherent and focused on the problem – the project aims should be reached and the content should support your research investigation (test hypothesis) avoiding irrelevant detours
- Presentation style (academic) has to be suitable for the target group – your peers
- Tables, diagrams, illustrations used in the report should be clear, have informative captions and each must be referred to in the text
- The content must be well structured and the linguistic form (language) should fulfill academic standards (incl. correct grammar, spelling etc.)

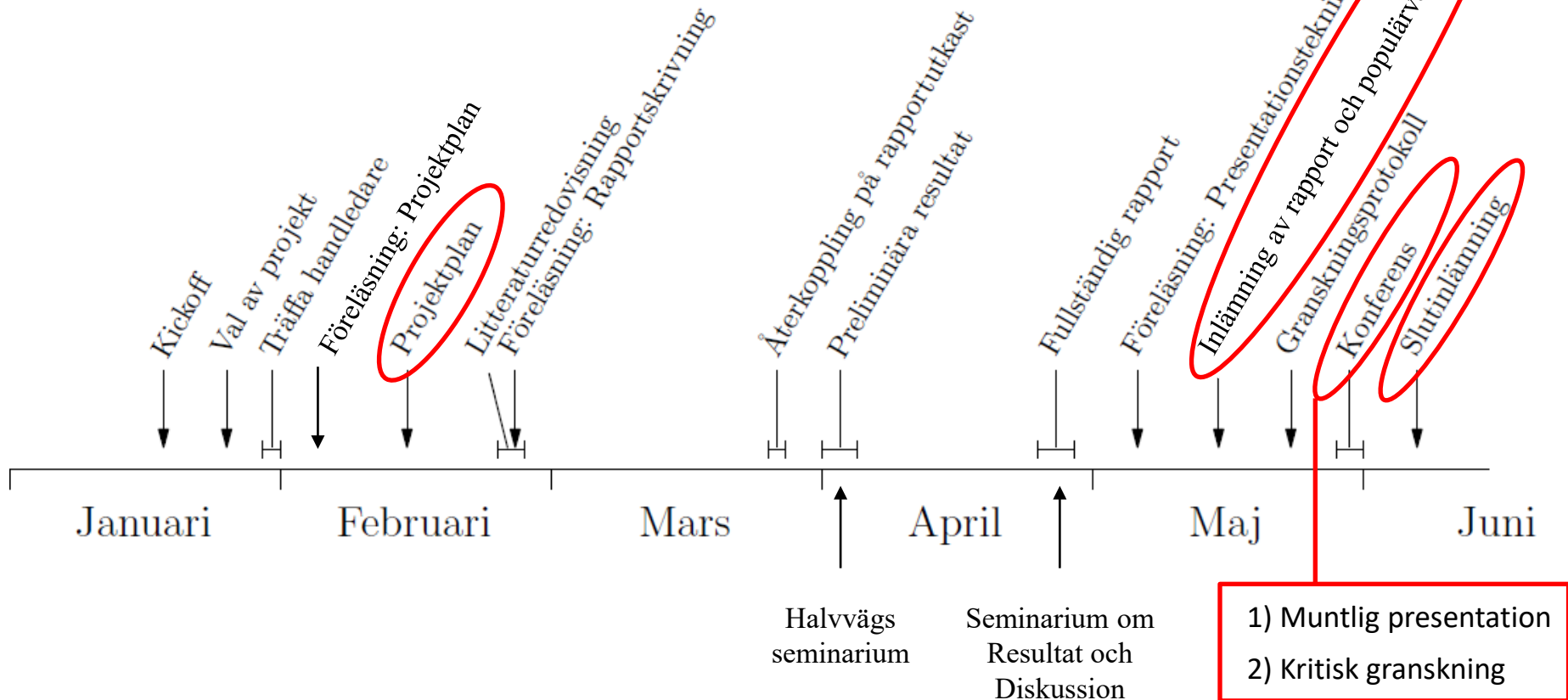
# Timeline (tidslinje)

Check [Kursöversikt](#) on Canvas



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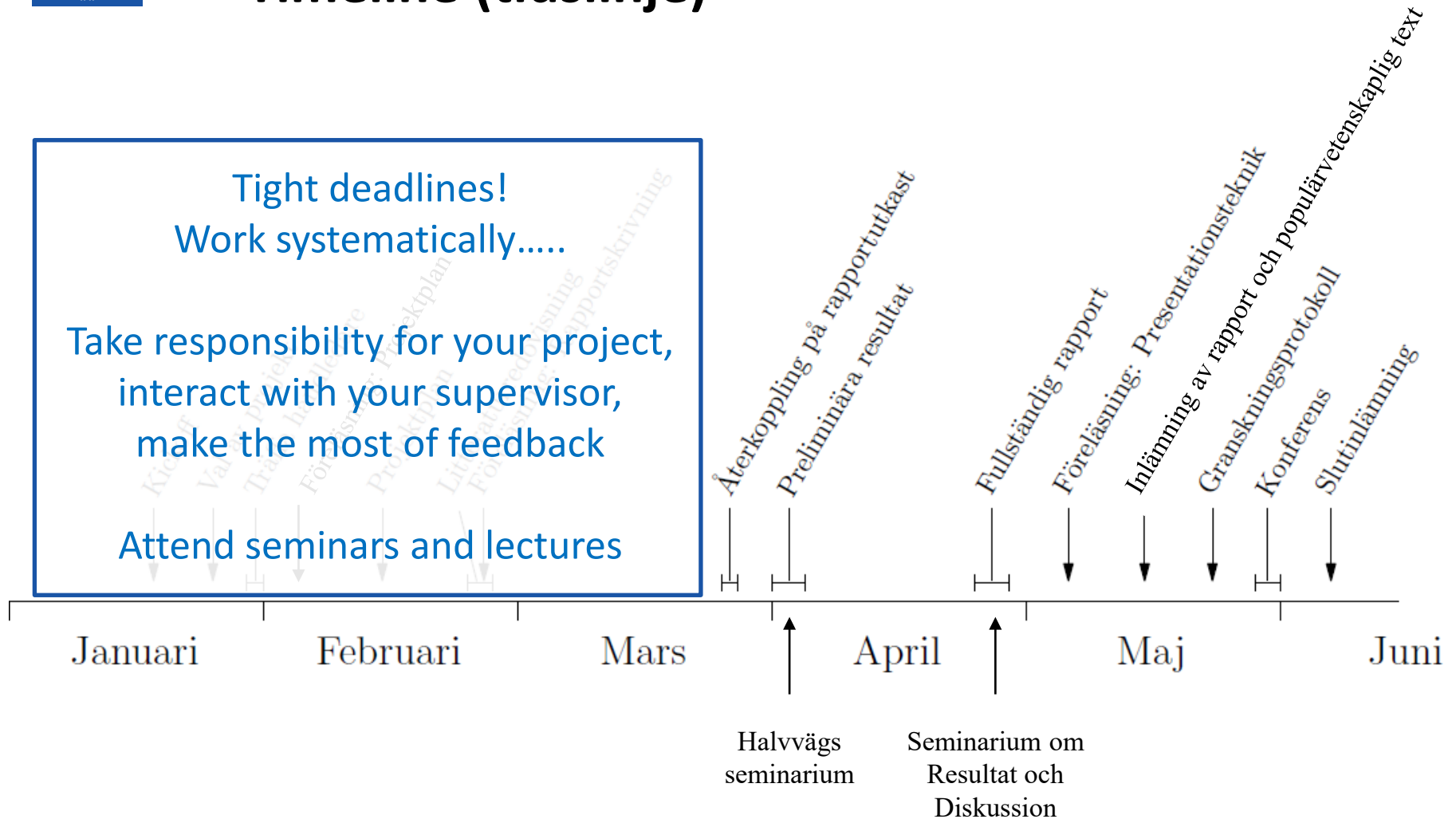


# Timeline (tidslinje)

Tight deadlines!  
Work systematically.....

Take responsibility for your project,  
interact with your supervisor,  
make the most of feedback

Attend seminars and lectures







## Resources (resurser)

- Supervisors and course responsible, examiner (*handledare, kursansvarig, examiner*) – their different roles
- Canvas course webpage and KTH social (*kurswebben*)
  - **general** announcements, discussions (*meddelanden*)
  - information webpages, forms, templates, evaluation checklists
- Literature (KTH library, Google Scholar, Scopus etc.) and previous body of work, theses at KTH (Diva)
- Language and Communication at KTH (*Språk och Kommunikation*)



# Research THEMES, not concrete projects shared by the supervisors

- Please visit Canvas website (under [Projektämnen/Project themes](#))



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- Themes  $\neq$  concrete projects -> you need to carve out your research question/problem to define and scope your own project



## Simulation and Visualisation of Crowd Behaviour

Crowds of realistically-behaving synthetic characters have many application domains, from special effects for entertainment, where they replace expensive extras and stunt performers, to evacuation and traffic simulations, where the safety and feasibility of designs can be tested and modified prior to the costly construction of real environments. This project area covers all aspects of 3D characters, including graphical methods for rendering and shading characters, simulation of crowd simulation methods and visualisation methods for crowd data. <https://www.csc.kth.se/~chpeters/ESAL/studentprojects.html>

Christopher Peters <[chpeters@kth.se](mailto:chpeters@kth.se)>



# Research THEMES, not concrete projects shared by the supervisors

- Please visit Canvas website (under [Projektämnen/Project themes](#))
- Themes  $\neq$  concrete projects -> you need to carve out your research question/problem to define and scope your own project
- Read, reflect and talk to your supervisor!



## Next steps (nästa steg) .....

- **Form groups of two**, *if you have not done it yet*
- **Choose/formulate project and notify Jörg via email** (see details under *Uppgifter / Skicka projektpreferenser*), *if you have not done it yet*
- Meet your supervisor and discuss the scope
- Attend a lecture/seminar on writing a project plan and problem formulation
- Do a lot of reading!
- Write your project specification draft (with your research question and time plan/Gantt chart) and discuss it with your supervisor (iterative process!)
- Submit the final version of the specification to Canvas
- Continue your literature review, start working on your first experiments
- Do not forget about the report and enjoy the experience as a researcher!