# Academic Skills in Software Engineering (ASiSE)

# Structuring, Outlining and Structured Writing

Exercise
Tuesday, 5. DS, APB/E001
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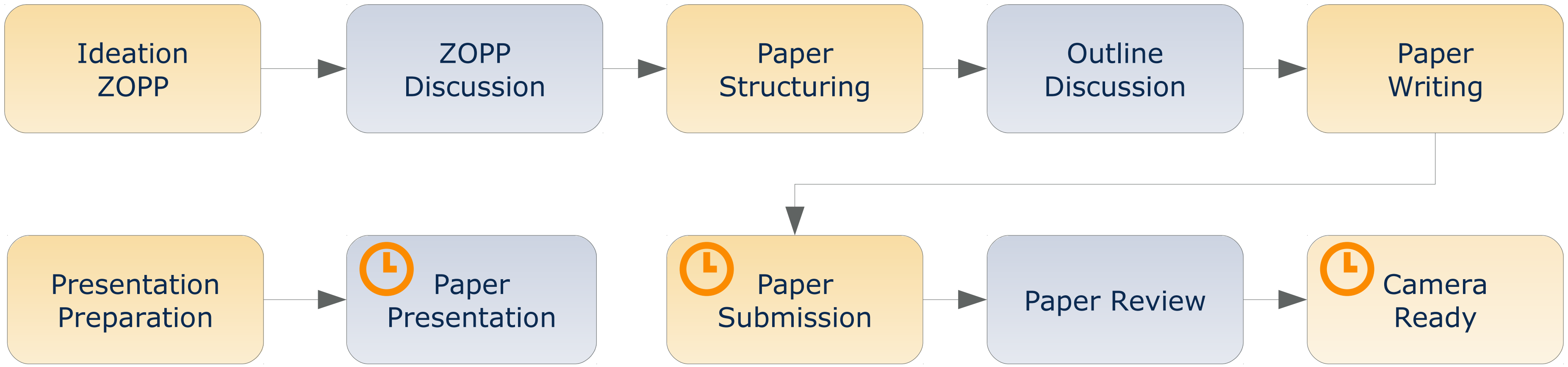
DRESDEN concept
Exzellenz aus Wissenschaft und Kultur

# Organization
## Paper Writing Process

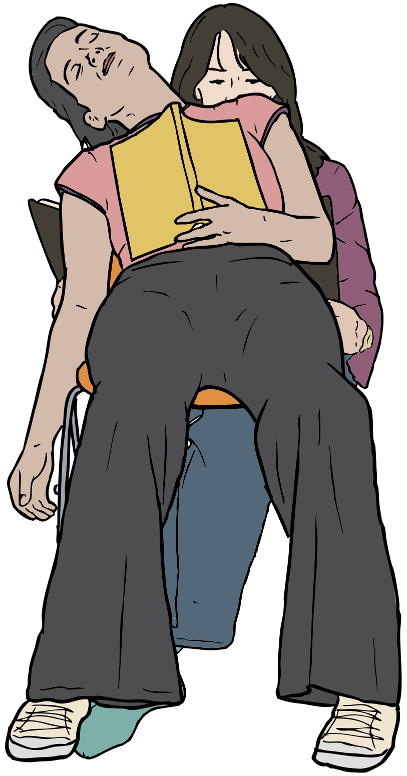


- *Give scientific presentations* (20 min + 10 min discussion)
  - Individual presentations **17. – 18.06.2019**
- *Write a research paper* (>=5 pages ACM Style)
  - Paper submission[1] **25.06.2019 (AoE)**
  - Paper camera ready[1] **12.07.2019 (AoE)**

[1] Per easychair.org

# Scientific Research
## Daily Business

### Reading



### Writing

### Organizing

Images from OpenClipart.org (Creative Commons by Steve Lambert)

## Previous Tasks

1) Create a **Classification Scheme** for your related work.

2) Classify at least 5 papers wrt. this **Classification Scheme**

3) Create **comparison table** and add it to the *Related Work* section.

**Me:** ***“Writing a thesis is like shredding!“***

**My supervisor:** ***“A road to success.”***

Image from MaxPixel.net (Creative Commons by Markus Baumeler)

# Paper Writing Process

## How it feels like

You

Your Writing Tool

Knowledge in your Head

Writing Result

Images from https://parske-shop.de/Gartentechnik/Haecksler/Erco-Holzhaecksler-GHX-CH1900-Zapfwelle-oder-Benzin.html

# Paper Writing Process

## How it should be

Image from MaxPixel.net (Creative Commons by Markus Baumeler)

## Common Tasks

- Structuring paper
  - Define chapters, sections, subsections
  - Summarize outline of each part
- Write individual paragraphs
  - Include individual artifact *images, tables, listings*
  - Outline points become individual paragraphs
  - Write a structured paragraph
  - Finalize paragraphs and transitions

## Structuring Papers

- Employ *recurring structure* of scientific papers in computer science
- Define the structure by means of **headings** for

  *parts, chapters, sections, subsections, ...*
- Write short outlines/summaries for each heading
  - Use bullet points and short statements outlining the intended content
  - Which questions are answered?
  - What arguments are provided?
  - What solutions/conclusions are described?

## Outlines

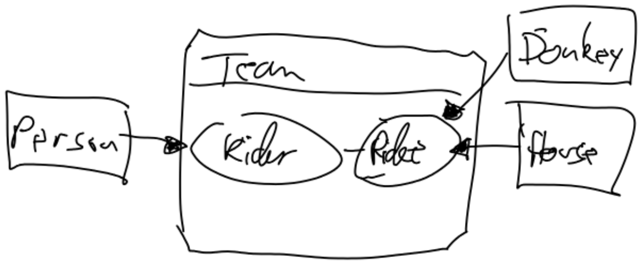
- *Not* written for the *reader*, but for **you**
- Summarizes intended content of *chapter*, *section*, *subsection*, and …
  - What concepts/ideas must be introduced/discusses?
  - Which parts in your text cover which parts of your ZOPP?
  - What questions should be raised and answered?
- Helps to focus writing and avoiding running off the topic
- Useful to track writing progress

# Outline Example

> **2.3. Graphical Editor Frameworks**
>
> - *Give a short overview on typical frameworks for the development of graphical editors*
>   - *Provide a clear description of the typical aspects that need to be implemented in such a framework, e.g. Language Concern (Metamodel), Editor Concerns, Edit Policies.*
>   - *Describe GEF, GMF, Graphiti, Sirius, and EuGENia*

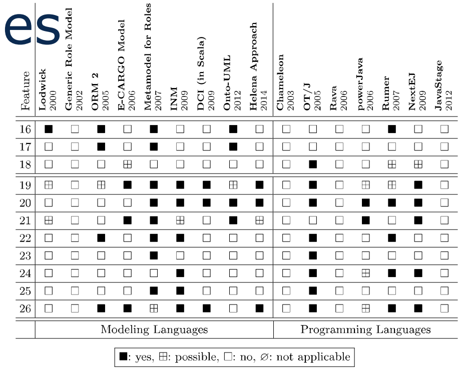
## Include Artifacts

### Images



- Start with sketches, low resolution images
- Later create scalable vector images *(time consuming)*

### Tables

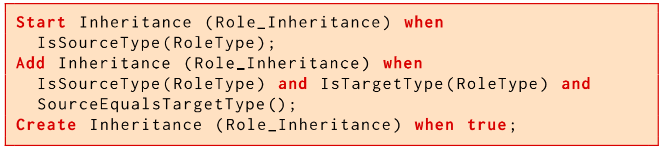


| Feature | **Lodwick** 2000 | **Generic Role Model** 2002 | **ORM 2** 2005 | **E-CARGO Model** 2006 | **Metamodel for Roles** 2007 | **INM** 2009 | **DCI (in Scala)** 2009 | **Onto-UML** 2012 | **Helena Approach** 2014 | **Chameleon** 2003 | **OT/J** 2005 | **Rava** 2006 | **powerJava** 2006 | **Rumer** 2007 | **NextEJ** 2009 | **JavaStage** 2012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | ■ | □ | ■ | □ | ■ | □ | □ | ■ | □ | □ | □ | □ | □ | ■ | □ | □ |
| 17 | □ | □ | ■ | □ | ■ | □ | □ | ■ | □ | □ | □ | □ | □ | □ | □ | □ |
| 18 | □ | □ | □ | ⊞ | □ | □ | □ | □ | □ | □ | ■ | □ | □ | ⊞ | ⊞ | □ |
| 19 | ⊞ | □ | ⊞ | ■ | ■ | ■ | ■ | ⊞ | ■ | □ | ■ | □ | ⊞ | ⊞ | ■ | □ |
| 20 | □ | □ | □ | □ | ■ | ■ | ■ | ■ | ■ | □ | ■ | □ | ■ | ■ | ■ | □ |
| 21 | ⊞ | □ | □ | ■ | ■ | ⊞ | □ | ■ | ⊞ | □ | □ | □ | ■ | □ | ■ | □ |
| 22 | □ | □ | ■ | □ | ■ | ■ | □ | □ | □ | □ | ■ | □ | □ | ■ | □ | □ |
| 23 | □ | □ | □ | □ | ■ | □ | □ | □ | □ | □ | ■ | □ | □ | □ | □ | □ |
| 24 | □ | □ | □ | □ | □ | ■ | □ | □ | □ | □ | ■ | □ | ⊞ | ■ | ■ | □ |
| 25 | □ | □ | □ | □ | ■ | ■ | □ | □ | □ | □ | ■ | □ | □ | □ | □ | □ |
| 26 | □ | □ | ■ | ■ | ⊞ | ■ | ■ | □ | ■ | □ | ■ | □ | ⊞ | ■ | ■ | □ |
|  | Modeling Languages |  |  |  |  |  |  |  |  | Programming Languages |  |  |  |  |  |  |

■: yes, ⊞: possible, □: no, ∅: not applicable

- Use generator for latex tables
- Refine/optimize table later

### Listings



```
Start Inheritance (Role_Inheritance) when
  IsSourceType(RoleType);
Add Inheritance (Role_Inheritance) when
  IsSourceType(RoleType) and IsTargetType(RoleType) and
  SourceEqualsTargetType();
Create Inheritance (Role_Inheritance) when true;
```

- Start with source code snippets
- Later remove all unnecessary statements

# Writing Individual Paragraphs

## Structured Paragraph

- Write paragraph for each major point of the outline
- Typical structure of paragraphs
  - **Thesis question**
  - **Thesis statement** topic, purpose or development scheme
  - Supporting/opposing **arguments**, claims, evidence or warrants
  - **Thesis conclusion** and transition
- Enumerate arguments

## Structured Paragraph Example

### 2.3. Graphical Editor Frameworks

***There exists several graphical editor frameworks for all platforms.***

***As our prototypical GEPL is based on Eclipse, we focus on corresponding frameworks.***

1) The Graphical Editing Framework *(GEF) is the basis for most other frameworks, as it facilitates means to implement rich graphical Java applications.*
2) The Graphical Modeling Framework *(GMF) is a model-driven editor generator, where the various concerns are specified in interrelated models, e.g., the domain model, the graphical definition, and the tooling definition.*
3) EuGENia *and* Sirius *are both frameworks for textual respectively visual specification of GMF editors.*
4) Graphiti *utilizes EMF models to provide a uniform pictogram model linked to a custom domain model, whereas visualizations, behaviors, and edit policies must be manually implemented in IPattern and IFeature classes..*

***None of them natively supports the modular definition of language features.***

## Finalize Paragraphs and Transitions

- Remove enumeration from structured paragraph
- Improve **wording**
- Link thesis question, thesis statement, and arguments with **transitions**
  - Additions: *Moreover, furthermore, especially, in detail, …*
  - Cause & Effect: *Thus, accordingly, as a result, consequently, hence, …*
  - *(More in the appendix)*
- Introduce **transition** and **pivot** sentences
- Add **controlling idea** to thesis conclusion

# Finalized Paragraph Example

## 2.3. Graphical Editor Frameworks

*There exists a* ***plethora*** *of graphical editor frameworks for all platforms,* ***yet*** *as our prototypical GEPL targets Eclipse, we focus on* ***associated*** *frameworks.*

***In general****, the* Graphical Editing Framework *(GEF) is the basis for most other frameworks, as it facilitates means to implement rich graphical Java applications.*

***On top of GEF, there exists both model-driven and model-based frameworks.***

***For the former****,* the Graphical Modeling Framework *(GMF) is a model-driven editor generator, where the various concerns are specified in interrelated models, e.g., the domain model, the graphical definition, and the tooling definition.*

***Moreover****,* EuGENia *[@kolovos2017eugenia] and* Sirius *[@viyovic2014sirius] are both frameworks for textual respectively visual specification of GMF editors.*

***By contrast****,* Graphiti *utilizes EMF models to provide a uniform pictogram model linked to a custom domain model, whereas visualizations, behaviors, and edit policies must be manually implemented in IPattern and IFeature classes.*

***Although these frameworks significantly simplify the design of graphical editors,*** *none of them natively supports the modular definition of language features.*

## Exercise

1) Revise the structure of your paper.

2) Write an **outline/summary** for each *section, subsection, subsubsection.*

3) Hand in the **structured document** with *outlines* before the next exercise.

### Writing

OK, WRITING SHOULDN'T BE SO HARD.
EVERYTHING I WANT TO SAY IS IN MY HEAD...
I JUST HAVE TO TRANSFER IT FROM MY BRAIN TO THIS COMPUTER.
24 in
61 cm
JORGE CHAM © 2014
WRITING: THE MOST IMPOSSIBLE SHORT DISTANCE IN THE HISTORY OF HUMANITY.
c'mon!
WWW.PHDCOMICS.COM

"Piled Higher and Deeper" by Jorge Cham (www.phdcomics.com)
used with permission

# Typical Transitions

## Cause and Effect

- accordingly
- as a result
- consequently
- hence
- it follows, then
- since
- so
- then
- therefore
- thus

## Conclusion

- as a result
- consequently
- hence
- in conclusion, then
- in short
- in sum, then
- it follows, then
- so
- the upshot of all this is that
- therefore
- thus
- to sum up
- to summarize

# Typical Transitions

### Comparison

- along the same lines
- in the same way
- likewise
- similarly

### Addition

- also
- and
- besides furthermore
- in addition
- in fact
- indeed
- moreover
- so too

### Contrast

- although
- but
- by contrast
- conversely
- despite the fact that
- even though
- however
- in contrast
- nevertheless
- nonetheless
- on the contrary
- on the other hand
- regardless
- whereas
- while
- yet

# Typical Transitions

### Concession

- admittedly
- although it is true that
- granted
- I concede that
- of course
- naturally
- to be sure

### Example

- after all
- as an illustration
- consider
- for example
- for instance
- specifically
- to take a case in
- point

### Elaboration

- actually
- by extension
- in short
- that is
- in other words
- to put it another way
- to put it bluntly
- to put it succinctly
- ultimately