Tables, figures, algorithms

Computational Pangenomics – Summer 2020

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Figures

Why do we need figures?

- text becomes more lively
- highlight central ideas of your text
- facilitate understanding of complex ideas and data (e.g. experimental results)
- can be used to show trends and relationships

Technical rules

Each figure

- has to...

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Check your papers!

Technical rules

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- has to contain an explicit citation in the caption if it is not your own,
- has to be briefly explained in the caption such that it is self-contained,
- has to be scaled appropriately (font size equals font size of main text) , and
- is put to the top or bottom of a page by Latex (don't mess up the placing manually).

Usage

Figures can be used to

- show trends and relationships (e.g. with graphs)
- present large amounts of data (e.g. with graphs)
- present data structures and processes (e.g. with diagrams)
- present data that was initially in a tabular format

Purpose

It is always a good idea to use a figure where possible, but always ask yourself about its purpose!

Placement

- figure supports a key point of your explanations
- figure is a summary of results for completeness

Realization

- How a figure looks like should always depend on what you want to say with it
- Keep a figure as simple as possible (e.g. ticks, legend)

Tables

Should be used if

- data does not fit into a figure
  e.g. property overview of some data sets
- exact values are important
- information is to sparse/simple for a figure

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Hierarchy

Tables have a hierarchical structure

- each column has a heading
- each row has a label at the left
- hierarchy is indicated by (double) lines or white space

Openness

Tables should be open

- not too many vertical and horizontal lines
- not too dense
- not to many columns:
  - split table
  - filter out important infos

Usage

Reading tables is hard work!

- Use tables to refer to!
- Do not rely on tables to convey essential information!

Algorithms

- Algorithms often are a core contribution of your work.
- Presentations of algorithms should not be limited to a pure description.
- Do not only explain how it works, but why!

Reason

Always clearly state the reason for your algorithm!

- Is it the first algorithm for some problem?
- Is it better than previous ones?
- What does “better” mean in your case?
  - improved results?
  - less compute resources required?

Composition

Things to talk about when introducing an algorithm:

- algorithmic steps performed
- input/output of the algorithm and data structures used
- scope of applications and limitations
- properties that allow to demonstrate correctness
- demonstration of correctness
- complexity analysis (space **and** time)
- experiments confirming theoretical results

Pseudocode

- useful to describe complex algorithms
- can be done on different levels:
  listing of algorithmic steps $\rightarrow \cdots \rightarrow$ code instructions using the syntax of a specific programming language
- may be put into own environments like figures and tables (see latex template)

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Technical rules

Additionally:

- Always specifiy input and output!
- Make sure your code is correct!
  A bug in the pseudocode may kill a paper.