Guidelines, requirements and recommendations for Masters' Theses at LAR

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Preamble

When reaching the phase of writing their Masters' theses, students are encouraged to perform the writing in two stages: create an early version with the skeleton and structure of the thesis, followed by a discussion with the supervisor, and then embrace the writing of the full document.

Skeleton and early structure of the dissertation

The structure of the dissertation in the early stage must include the chapters and the most important sections to help the analysis of what remains to be done. There is not a unique way for everyone, but all dissertations may be based on a structure whose first level is indicated below; also, each student has to adapt the title of chapters and possibly their number. Additionally, the "skeleton" of the dissertation must already include the required formatting according to the UA model and the standard known fields (title, author, etc.). In the details, the names and chapter numbers may be different for each student, but all will include, with these or other names, the following:

- Introduction
    - Background/motivation
    - Problem description
    - Objectives
    - Related work and state of the art (sometimes this is a chapter on its own)
- Experimental infrastructure
    - Description of the system where the work is carried out from the hardware and software points of view (equipments, sensors, IDEs, special libs and packages, etc.)
- Proposed solution
    - Presentation of the basics of the proposed solution;
    - Tools and methods used for its development;
    - Detailed description of algorithms and techniques used.
- Tests and results
    - Describe which tests (experiments, data–sets) were made or used;
    - Describe the results obtained, and include the possible statistical analysis of data (so we can draw conclusions about the validity / relevance of the developed solutions.)
- Conclusions and Future work
    - Indicate to which extent the findings support the proposed solution and thereby the extent to which the solution allowed to reach the initial goals.

- This section must also express some critical sense on the degree of achievement of the proposed goals.
- Also, this section should mention the possible continuity of the work in the future, and which are the perspectives.

- References

  - List of references cited in the text (not a list of recommend readings!)

- Annex/Appendix (if any)

  - Everything that was important in the development of the work but that is not essential to its understanding (and that can be read independently of the rest of the text) should go to annexes/appendices.
  - The development of specific dedicate tools, both in hardware or software normally fit this category. Usually, electrical and larger mechanical projects, which spread throughout more than one page and that are not necessary in the text, fall in this category.
  - In this part may fall also specific operations concerning the platform used, such as installing a package or Operating System.
  - Also, instructions to operate the solution are described here (power-on procedures, launch files, maintenance or debugging information found to be relevant, etc.)

In some cases, some of the previous chapters and sections can be sub-divided in two, or even recombined. Students should do a review of their work and make their own division of the works and the writing.

Frequently Asked Questions (FAQ)

1. **Should I write in English or in Portuguese?**

   This is an option that each student must take. English has the advantage of larger dissemination. Anyway, any well written text is acceptable! Many examiners like to see the dissertations in English and it is an advantage for when there are collaborations with people from other countries, but if that means an effort much higher in writing, then it is better to stay in Portuguese! If anyone wants a more specific opinion on which language to use, just propose a preliminary summary of the work and show it to the advisor.

2. **What lays in the state of the art?**

   The state of the art reports to available developments and techniques to solve this or similar problems. It's not supposed for a masters' dissertation to outperform the state of the art, but at least students should know the most part of it and, therefore, articles and other duly published texts (avoid too many specific quotes from on-line sites that are in danger of going off-line), must be properly cited and referenced. Many masters' themes have a more intense and more experimental application; in those cases, the state of the art will be more like a "related work" section, which reports the available solutions (commercial or otherwise) that are used in similar problems.

3. **Should I write in LaTeX?**

   This is a very strong "recommendation" in order to standardize the formatting, therefore, the answer is, with very exceptional exclusions, yes, LaTeX is compelling!

4. **What is preferable: code snippets, pseudo code or flow charts?**

   It is a matter of taste (and knowledge): code snippets can be interesting, but not always; when it explains the constitution of a class in C++ or Java, it is interesting, but if it is a large chain of loops or numerous instructions, it can be confusing and useless. The pseudo code keeps the visual structure of the code snippets, but allows less syntactic stiffness, and can simplify the presentation. Pseudo code is a common procedure in theses, books and even articles, and LaTeX has tools to do it with packages such as {algorithm} and the {algorithmic},{Algorithm2e}, {algorithmicx} or {program}, among possibly others. The flowcharts are also interesting (provided they are not too large) and sometimes preferable for small examples (state machines, etc.) and also they can be made automatically inside LaTeX, or for more complex cases using tools such as DOT (graphviz), and then convert (dot2tex) for an importable format into LaTeX.

Requirements for a work to be ready to apply for the public defense

The dissertation must be completely written, with the possible exception for some results and conclusions. However, in those cases, the experiments must already be mentioned in the thesis, even though the full results may yet to be collected. That is, the dissertation must be complete, but not necessarily in its final version.

The code (programs) concerning the work must be present in the LAR official repository (svn or git, depending on the cases), and must compile/execute properly.