



Review report of a final thesis

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Thesis title: P4 Language Server
Branch / specialization: System Programming
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Evaluation criteria

1. Fulfillment of the assignment

- ▶ [1] assignment fulfilled
- [2] assignment fulfilled with minor objections
- [3] assignment fulfilled with major objections
- [4] assignment not fulfilled

All objectives defined in the assignment were fulfilled.

It is unrealistic to develop a fully-fledged LSP for a non-trivial real language in the scope of a FT and the version presented already goes beyond what is expected.

While the P4 language does not seem to be terribly complicated for an LSP, the presence of a preprocessor does make it significantly harder.

2. Main written part

80/100 (B)

The text is well written but could have been better structured and balanced among the objectives.

There are 18/47 pages dedicated to the P4 language. Indeed one of the objectives was to become familiar with it but to describe the meat of the thesis, i.e., the LSP, it could have been shortened.

I wish the chapter would have some running example to illustrate the different language constructs and only highlights the parts of the language that will be interesting for the LSP.

In its current form, the chapter feels more like a semi-official language reference.

The saved space could have been used for evaluation (although the assignment requires only a brief assessment).

The work is excellent; thus, it would be far more interesting to have 18 pages of evaluation and three pages of P4 introduction.

The text contains a reasonable amount of detail and is mainly to the point (except for the overview of a batch compiler).

The downside is that much of this is in large paragraphs, which little structure is, leaving the reader to synthesize the information.

It would be great to provide an overview for each section with what will be presented, why it is important, and the alternatives (if applicable).

This way, the reader knows what to expect.

For example, the Result chapter should start discussing how to evaluate such a project.

What are the challenges? What are the axes?

How do we design the benchmarks? How do we test correctness? How do we test resilience? What about memory consumption? ...

Finally, I would like to learn more about the actual implementation. The code is available, but it would be better if the work is self-contained.

3. Non-written part, attachments

90 /100 (A)

I only looked at the analyzer-core crate which should be the main contribution of the author and I find the implementation to be good.

I'm surprised about the lack of tests. I would have imagined a corpus of snapshot tests, but it is true that it was not explicitly required in the objectives.

As a side note - I wonder if the auxiliaries in extensions.rs really do bring that much value?

4. Evaluation of results, publication outputs and awards

100 /100 (A)

SDN are quite far from my community, but LSP for any language is good as it improves lives (literally!)

The overall evaluation

90 /100 (A)

+ Aim at production ready LSP for a language used in real-world which as a possibility of impacting the work of many.

- The text could have been better.

- The evaluation could have been much better.

Questions for the defense

- Did you consider some alternative approaches for the incremental parsing? Popular incremental parser is treesitter (although I have not seen it used in any LSP I know).

- I don't know how large the P4 programs tend to be, but did you look at how much the incrementality actually helps?

- Did you consider using rowan for the lossless syntax trees?

Instructions

Fulfillment of the assignment

Assess whether the submitted FT defines the objectives sufficiently and in line with the assignment; whether the objectives are formulated correctly and fulfilled sufficiently. In the comment, specify the points of the assignment that have not been met, assess the severity, impact, and, if appropriate, also the cause of the deficiencies. If the assignment differs substantially from the standards for the FT or if the student has developed the FT beyond the assignment, describe the way it got reflected on the quality of the assignment's fulfilment and the way it affected your final evaluation.

Main written part

Evaluate whether the extent of the FT is adequate to its content and scope: are all the parts of the FT contentful and necessary? Next, consider whether the submitted FT is actually correct – are there factual errors or inaccuracies?

Evaluate the logical structure of the FT, the thematic flow between chapters and whether the text is comprehensible to the reader. Assess whether the formal notations in the FT are used correctly. Assess the typographic and language aspects of the FT, follow the Dean's Directive No. 52/2021, Art. 3.

Evaluate whether the relevant sources are properly used, quoted and cited. Verify that all quotes are properly distinguished from the results achieved in the FT, thus, that the citation ethics has not been violated and that the citations are complete and in accordance with citation practices and standards. Finally, evaluate whether the software and other copyrighted works have been used in accordance with their license terms.

Non-written part, attachments

Depending on the nature of the FT, comment on the non-written part of the thesis. For example: SW work – the overall quality of the program. Is the technology used (from the development to deployment) suitable and adequate? HW – functional sample. Evaluate the technology and tools used. Research and experimental work – repeatability of the experiment.

Evaluation of results, publication outputs and awards

Depending on the nature of the thesis, estimate whether the thesis results could be deployed in practice; alternatively, evaluate whether the results of the FT extend the already published/known results or whether they bring in completely new findings.

The overall evaluation

Summarize which of the aspects of the FT affected your grading process the most. The overall grade does not need to be an arithmetic mean (or other value) calculated from the evaluation in the previous criteria. Generally, a well-fulfilled assignment is assessed by grade A.