

Oxiflex - A Constraint Programming Solver for MiniZinc written in Rust

Bachelor project

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Hand-In-Date

Abstract

This thesis discusses the thesis template using some examples of the Turing Machine.

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1

Introduction

This is the introduction to the thesis template. The goal is to give students a starting point on how to format and style their Bachelor or Master thesis¹.

Please make sure to always use the most current version of this template, by downloading it always from the original git repository:

<http://www.github.com/ivangiangreco/unibas-latex>

We will use throughout this tutorial some references to Turing's imitation game [3] and the Turing machine [2]. You may be interested in reading these papers.

The package comes with an option regarding the bibliography style. You can include the package with

```
\usepackage[citeauthor]{basilea}
```

to be able to cite authors directly with

```
\citet{turing:1950}
```

If the option is enabled, then the following reference should print Turing [2]: Turing [3]

¹ This document also shows how to use the template.

2

Rust

This is an introduction to rust the programming language.

2.1 Structure

2.1.1 Sub-Section

2.1.1.1 Sub-Sub-Section

Paragraph

Even Sub-Paragraph This is the body text. Make sure that when you reference anything you use labels and references. When you refer to anything, you normally capitalise the type of object you reference to, e.g. Section 2.1 instead of section 2.1. You may also just use the `cref` command and it will generate the label, e.g., for Section 2.1, we did not specify the word “Section”.

Hint: Try to structure your labels as it is done with `sec:my-label` and `fig:machine`, etc.

2.2 Equations

A Turing Machine is a 7-Tuple:

$$M = \langle Q, \Gamma, b, \Sigma, \delta, q_0, F \rangle \quad (2.1)$$

A Turing Machine is a 7-Tuple even if defined in the text, as in $M = \langle Q, \Gamma, b, \Sigma, \delta, q_0, F \rangle$.

2.3 Tables

Some tables can also be used as shown in Table 2.1². Remember that tables might be positioned elsewhere in the document. You can force positioning by putting a `ht!` in the definition.

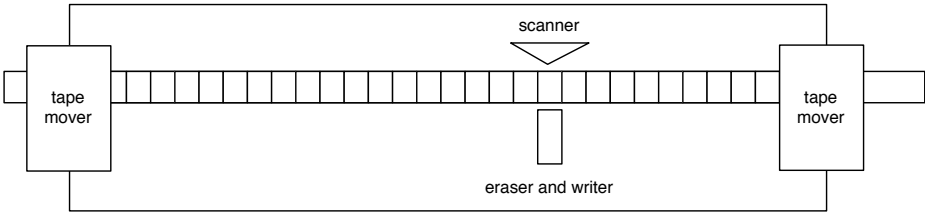
² Table captions are normally above the table.

Table 2.1: Frequency of Paper Citations. By the way: Make sure to put the label always after the caption, otherwise L^AT_EX might reference wrongly!

| Title | f | Comments |
|---|------|----------------|
| The chemical basis of morphogenesis | 7327 | |
| On computable numbers, with an application to the ... | 6347 | Turing Machine |
| Computing machinery and intelligence | 6130 | |

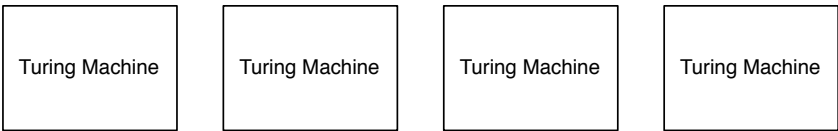
2.4 Figures

Figures are nice to show concepts visually. For organising well your thesis, put all figures in the Figures folder. Figure 2.1 shows how to insert an image into your document. Figure 2.2 references a figure with multiple sub-figures, whereas the sub-figures are referenced by Fig. 2.2(a), etc.



Missing: Description figure.

Figure 2.1: A Turing machine.



(a) Turing Machine 1 (b) Turing Machine 2 (c) Turing Machine 3 (d) Turing Machine 4

Figure 2.2: Plots of four Turing machines

2.5 Packages

These packages might be helpful for writing your thesis:

- caption** to adjust the look of your captions
- glossaries** for creating glossaries (also list of symbols)
- makeidx** for indexes and the back of your document
- algorithm**, **algorithmicx**, **algpseudocode** for adding algorithms to your document

3

Constraint Satisfaction Problems

Introduction for constraint satisfaction problems.

3.1 MiniZinc

MiniZinc [1] is a free and open-source constraint modeling language.

3.1.1 FlatZinc

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Oxiflex

Introduction to oxiflex.

4.1 Dependencies

4.1.1 flatzinc

A FlatZinc parser for rust.

4.1.2 structopt

4.2 Naive Backtracking

4.3 Inference

5

Conclusion

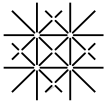
My conclusions for Constraint Satisfaction Problems using rust.

Bibliography

- [1] N. Nethercote, P.J. Stuckey, R. Becket, S. Brand, G.J. Duck, and G. Tack. Minizinc: Towards a standard cp modelling language. In C. Bessiere, editor, *Proceedings of the 13th International Conference on Principles and Practice of Constraint Programming*, volume 4741 of *LNCS*, pages 529–543. Springer, 2007.
- [2] Alan M Turing. On computable numbers, with an application to the entscheidungsproblem. *Proceedings of the London mathematical society*, 42(2):230–265, 1936.
- [3] Alan M Turing. Computing machinery and intelligence. *Mind*, 59(236):433–460, 1950.



Appendix



Declaration on Scientific Integrity

(including a Declaration on Plagiarism and Fraud)

Translation from German original

Title of Thesis: _____

Name Assessor: _____

Name Student: _____

Matriculation No.: _____

I attest with my signature that I have written this work independently and without outside help. I also attest that the information concerning the sources used in this work is true and complete in every respect. All sources that have been quoted or paraphrased have been marked accordingly.

Additionally, I affirm that any text passages written with the help of AI-supported technology are marked as such, including a reference to the AI-supported program used. This paper may be checked for plagiarism and use of AI-supported technology using the appropriate software. I understand that unethical conduct may lead to a grade of 1 or "fail" or expulsion from the study program.

Place, Date: _____ Student: _____

Will this work, or parts of it, be published?

No

Yes. With my signature I confirm that I agree to a publication of the work (print/digital) in the library, on the research database of the University of Basel and/or on the document server of the department. Likewise, I agree to the bibliographic reference in the catalog SLSP (Swiss Library Service Platform). (cross out as applicable)

Publication as of: _____

Place, Date: _____ Student: _____

Place, Date: _____ Assessor: _____

Please enclose a completed and signed copy of this declaration in your Bachelor's or Master's thesis.