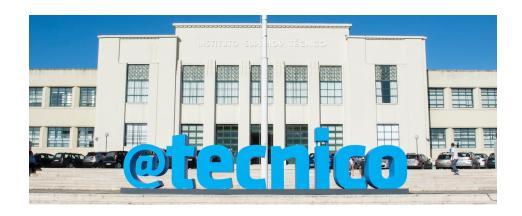


### UNIVERSIDADE DE LISBOA INSTITUTO SUPERIOR TÉCNICO



#### A Very Long and Impressive Thesis Title with a Forced Line Break

John Very Longname Doe

**Supervisor**: Mary Doe Adviser Name

**Co-supervisor**: John Doe Co-Adviser Name

John Doe other Co-Adviser Name

Thesis approved in public session to obtain the PhD Degree in Study Program Name

Jury final classification: Aprovado com ...



### UNIVERSIDADE DE LISBOA INSTITUTO SUPERIOR TÉCNICO



#### A Very Long and Impressive Thesis Title with a Forced Line Break

#### John Very Longname Doe

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Chair: Name of the committee chairperson

Full Professor, FCT-NOVA

Members: Another member of the committee

Full Professor, Another University

Yet another member of the committee

Assistant Professor, Another University

#### A Very Long and Impressive Thesis Title with a Forced Line Break

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This document was created with the (pdf/Xe/Lua)I processor and the NOVAthesis template (v7.4.1).

J. M. Lourenço. *The NOVAthesis LTEX Template User's Manual*. NOVA University Lisbon. 2021. URL: https://github.com/joaomlourenco/novathesis/raw/main/template.pdf.

Dedicatory lorem ipsum.

# Acknowledgements

Acknowledgments are personal text and should be a free expression of the author.

However, without any intention of conditioning the form or content of this text, I would like to add that it usually starts with academic thanks (instructors, etc.); then institutional thanks (Research Center, Department, Faculty, University, FCT / MEC scholarships, etc.) and, finally, the personal ones (friends, family, etc.).

But I insist that there are no fixed rules for this text, and it must, above all, express what the author feels.

"You cannot teach a man anything; you can only help him discover it in himself."

— **Galileo**, Somewhere in a book or speach (Astronomer, physicist and engineer)

### **Abstract**

Regardless of the language in which the dissertation is written, usually there are at least two abstracts: one abstract in the same language as the main text, and another abstract in some other language.

The abstracts' order varies with the school. If your school has specific regulations concerning the abstracts' order, the NOVAthesis LaTeX (novothesis) (LaTeX) template will respect them. Otherwise, the default rule in the novothesis template is to have in first place the abstract in the same language as main text, and then the abstract in the other language. For example, if the dissertation is written in Portuguese, the abstracts' order will be first Portuguese and then English, followed by the main text in Portuguese. If the dissertation is written in English, the abstracts' order will be first English and then Portuguese, followed by the main text in English. However, this order can be customized by adding one of the following to the file 5\_packages.tex.

```
\ntsetup{abstractorder={<LANG_1>,...,<LANG_N>}}
\ntsetup{abstractorder={<MAIN_LANG>={<LANG_1>,...,<LANG_N>}}}
```

For example, for a main document written in German with abstracts written in German, English and Italian (by this order) use:

```
\ntsetup{abstractorder={de={de,en,it}}}
```

Concerning its contents, the abstracts should not exceed one page and may answer the following questions (it is essential to adapt to the usual practices of your scientific area):

- 1. What is the problem?
- 2. Why is this problem interesting/challenging?
- 3. What is the proposed approach/solution/contribution?
- 4. What results (implications/consequences) from the solution?

 $\textbf{Keywords:} \ \ \text{One keyword} \cdot \text{Another keyword} \cdot \text{Yet another keyword} \cdot \text{One keyword more} \cdot \text{The last keyword}$ 

### Resumo

Independentemente da língua em que a dissertação está escrita, geralmente esta contém pelo menos dois resumos: um resumo na mesma língua do texto principal e outro resumo numa outra língua.

A ordem dos resumos varia de acordo com a escola. Se a sua escola tiver regulamentos específicos sobre a ordem dos resumos, o template (IATEX) novothesis irá respeitá-los. Caso contrário, a regra padrão no template novothesis é ter em primeiro lugar o resumo no mesmo idioma do texto principal e depois o resumo no outro idioma. Por exemplo, se a dissertação for escrita em português, a ordem dos resumos será primeiro o português e depois o inglês, seguido do texto principal em português. Se a dissertação for escrita em inglês, a ordem dos resumos será primeiro em inglês e depois em português, seguida do texto principal em inglês. No entanto, esse pedido pode ser personalizado adicionando um dos seguintes ao arquivo 5\_packages.tex.

```
\abstractorder(<MAIN_LANG>):={<LANG_1>,...,<LANG_N>}
```

Por exemplo, para um documento escrito em Alemão com resumos em Alemão, Inglês e Italiano (por esta ordem), pode usar-se:

```
\ntsetup{abstractorder={de={de,en,it}}}
```

Relativamente ao seu conteúdo, os resumos não devem ultrapassar uma página e frequentemente tentam responder às seguintes questões (é imprescindível a adaptação às práticas habituais da sua área científica):

- 1. Qual é o problema?
- 2. Porque é que é um problema interessante/desafiante?
- 3. Qual é a proposta de abordagem/solução?
- 4. Quais são as consequências/resultados da solução proposta?

**Palavras-chave:** Primeira palavra-chave  $\cdot$  Outra palavra-chave  $\cdot$  Mais uma palavra-chave  $\cdot$  A última palavra-chave

### Анотація

This document was automatically translated. Improvement suggestions are very welcome!

Незалежно від того, якою мовою написана дисертація, зазвичай  $\epsilon$  щонайменше два автореферати: один автореферат ті $\epsilon$ ю ж мовою, що й основний текст, а інший - іншою мовою.

Порядок подання авторефератів залежить від навчального закладу. Якщо у вашому навчальному закладі існують особливі правила щодо порядку розташування рефератів, шаблон novothesis (IATEX) буде їх дотримуватися. В іншому випадку, за замовчуванням у шаблоні novothesis на першому місці розміщується анотація мовою такою самою, що й основний текст, а потім анотація мовою іншою мовою. Наприклад, якщо дисертація написана португальською мовою, то порядок анотацій буде таким: спочатку португальська, потім англійська, а потім основний текст португальською. Якщо дисертація написана англійською мовою, то порядок анотацій буде наступним: спочатку англійською, потім португальською, а потім основний текст англійською мовою. Однак цей порядок можна змінити, додавши до файлу 5\_packages.tex один з наступних рядків.

Translated with www.DeepL.com/Translator (free version)

```
\ntsetup{abstractorder={<LANG_1>,...,<LANG_N>}}
\ntsetup{abstractorder={<MAIN_LANG>={<LANG_1>,...,<LANG_N>}}}
```

Наприклад, для основного документа, написаного німецькою мовою, з рефератами, написаними німецькою, англійською та італійською мовами (у такому порядку):

```
\ntsetup{abstractorder={de={de,en,it}}}
```

Щодо змісту, то тези не повинні перевищувати однієї сторінки і можуть відповідати на наступні питання (важливо адаптуватися до звичайних практик вашої наукової галузі):

- 1. У чому полягає проблема?
- 2. Чому ця проблема  $\epsilon$  цікавою або складною?
- 3. Який запропонований підхід / розв'язання / внесок?
- 4. Які результати (наслідки / висновки) отримано завдяки цьому рішенню?

**Ключові слова:** Одне ключове слово · Інше ключове слово · Ще одне ключове слово · Ще одне ключове слово · Останн $\epsilon$  ключове слово

## Περίληψη

# Αυτή είναι μια μετάφοαση "Google Translate" από την αγγλική έκδοση! Διοφθώσεις και διοφθώσεις είναι ευπρόσδεκτες!

Ανεξάρτητα από τη γλώσσα στην οποία έχει γραφτεί η διατριβή, συνήθως υπάρχουν τουλάχιστον δύο περιλήψεις: μία περίληψη στην ίδια γλώσσα με το κύριο κείμενο και μία περίληψη σε κάποια άλλη γλώσσα.

Η σειφά των πεφιλήψεων διαφέφει ανάλογα με το πανεπιστήμιο. Εάν το πανεπιστήμιό σας έχει συγκεκφιμένους κανονισμούς σχετικά με τη σειφά των πεφιλήψεων, το πφότυπο novothesis (IΔΤΕΧ) θα τους τηφήσει. Διαφοφετικά, ο πφοεπιλεγμένος κανόνας στο πφότυπο novothesis είναι να τοποθετείται πφώτα η πεφίληψη στη γλώσσα του κύριου κειμένου και στη συνέχεια η πεφίληψη στη δεύτερη γλώσσα. Για παφάδειγμα, εάν η διατφιβή είναι γφαμμένη στα Ποφτογαλικά, η σειφά των πεφιλήψεων θα είναι πφώτα στα Ποφτογαλικά και μετά στα Αγγλικά, ακολουθούμενη από το κύφιο κείμενο στα Ποφτογαλικά. Εάν η διατφιβή είναι γφαμμένη στα Αγγλικά, η σειφά θα είναι πφώτα Αγγλικά και μετά Ποφτογαλικά, ακολουθούμενη από το κύφιο κείμενο στα Αγγλικά και μετά Ποφτογαλικά, ακολουθούμενη από το κύφιο κείμενο στα Αγγλικά. Ωστόσο, αυτή η σειφά μποφεί να πφοσαφμοστεί πφοσθέτοντας μία από τις ακόλουθες εντολές στο αφχείο 5\_packages.tex.

```
\ntsetup{abstractorder={<LANG_1>,...,<LANG_N>}}
\ntsetup{abstractorder={<MAIN_LANG>={<LANG_1>,...,<LANG_N>}}}
```

Για παράδειγμα, για ένα κύριο έγγραφο γραμμένο στα Γερμανικά με περιλήψεις στα Γερμανικά, Αγγλικά και Ιταλικά (με αυτή τη σειρά) χρησιμοποιήστε:

```
\ntsetup{abstractorder={de={de,en,it}}}
```

Όσον αφορά το περιεχόμενο, οι περιλήψεις δεν πρέπει να υπερβαίνουν μία σελίδα και μπορούν να απαντούν στις ακόλουθες ερωτήσεις (είναι σημαντικό να προσαρμόζονται στις συνήθεις πρακτικές του επιστημονικού σας τομέα):

- 1. Ποιο είναι το πρόβλημα;
- 2. Γιατί είναι ενδιαφέρον/προκλητικό αυτό το πρόβλημα;

- 3. Ποια είναι η προτεινόμενη προσέγγιση/λύση/συμβολή;
- 4. Τι αποτελέσματα (συνέπειες/συνέπειες) από τη λύση;

**Λέξεις-κλειδιά:** Μία λέξη-κλειδί · Μια άλλη λέξη-κλειδί · Μια άλλη λέξη-κλειδί · Μία λέξη-κλειδί ακόμα · Η τελευταία λέξη-κλειδί

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# Glossary

#### computer

An electronic device which is capable of receiving information (data) in a particular form and of performing a sequence of operations in accordance with a predetermined but variable set of procedural instructions (program) to produce a result in the form of information or signals. This is a test that adds a citation [2] to the glossary! (*p.* 16)

## Acronyms

aaa acronym aaa (p. 16)aab acronym aab (p. 16)aba acronym aba (p. 16)

**abbrev** abbreviation of a longer text (p. 16)

**bbb** acronym bbb (*p.* 16)

**DI** Department of Computer Science (p. 1)

FCT NOVA School of Science and Technology (pp. 1, 7)

**NOVA** NOVA University Lisbon (*p.* 1)

novathesis NOVAthesis IATEX (pp. ix, xi, xiii, xv, xix, 1-5, 7-10)

# Symbols

- μ Mu (p. 16)
- $\pi$  the numerical value of pi (p. 16)
- r the radius of a circle (p. 16)

### Introduction



This is the novothesis LATEX template Version 7.4.1 from Template!date2025-10-05.

This work is licensed under the LATEX Project Public License v1.3c. To view a copy of this license, visit the LaTeX project public license.

This first Chapter introduces the novothesis template and how it is organized. In Chapter 2 you can find some specific instructions on how to use this template. Chapter 3 shows some examples and give some hints on how to write your text. Please read these next Chapters carefully.

### 1.1 The NOVAthesis Template

The novothesis template was born at the Department of Computer Science (DI) of NOVA School of Science and Technology (FCT) of NOVA University Lisbon (NOVA), Portugal. But the user base grew... initially grew to other Departments of FCT-NOVA, then to other Schools of NOVA, and later to other Schools of other Universities. Currently more than 25 Schools are natively supported by the novothesis template. The full list of supported Schools can be found at the Project's GitHub page.

#### 1.1.1 Your Time is Precious

Did you learn how to drive by sitting by the wheel and throwing your car into the road? Most probably you did take your time *learning the rules* and *practicing* first! Likewise, it is not wise to throw yourself at the task of writing a thesis/dissertation in LATEX without seriously considering the following recommendation!

If you are going to spend zillions of hours writing your thesis/dissertation using the novothesis LATEX template (or some other LATEX template), be wise and spend a couple of hours learning how to use it properly by reading its manual. And then, be even wiser, and spend a few more hours learning some LATEX. I am sure that the time you are investing now will pay itself countless times before you submit your thesis/dissertation.

— João Lourenço

#### 1.1.2 Recognition

The novothesis template was born in 1996, and what you see now accumulates to many many hundreds (thousands?!) of working hours, unpaid and stolen from family and friends. This work is available to the community under the LATEX Project Public License v1.3c, which means you are entitled to use it for free and change it at your will. However, if you decide to use this template to write your thesis/dissertation, be fair to the developers and:

- 1. Cite the novothesis manual [11] in a place of your choice (e.g., in the *Acknowledgments*) of your thesis/dissertation with "\cite{novathesis-manual}". If you cite it this way, the correct entry will be added automatically to your bibliography (no need to worry with the necessary BibTeX entry, as it will be added automatically);
- 2. Go to the project web page in GitHub and give the project a star (marked with a red ellipse at the top-right in Figure 1.1); and
- 3. Make a donation by visiting the novothesis project page and clicking in the button marked with a green ellipse at the top-center in Figure 1.1). Alternatively, just click **HERE** and your browser will be directed to the right page.

### 1.2 Getting Started

The template provides an *easy to use* setting for you to write your thesis/dissertation in LATEX:

- Select your school;
- Fill your thesis metadata (title, research field, etc) in the file "template.tex";
- Create your thesis/dissertation contents using the files in folder "Chapters"; and
- Process using you favorite LATEX processor (pdfLATEX, XALATEX or LuaLATEX).

#### 1.2.1 Using Overleaf

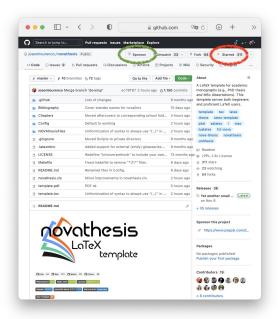


Figure 1.1: The novothesis project web page in GitHub.

Overleaf is a collaborative cloud-based LaTeX editor used for writing, editing and publishing scientific documents. Like "Google Docs", for LATeX users. You can edit and compile your LATeX source on the cloud, without installing software in your own computer, and, much like *Google Docs*, you can share your document with others users and everybody can edit the same file at the same time (this may be dangerous).

If you do not have an account in Overleaf, you must create one first.

Once you have an account, please access the **novothesis** template in Overleaf and select the green button *Open as Template* (see Figure 1.2).



Figure 1.2: NOVAthesis template in Overleaf.

Please notice that the version currently available in Overleaf (v7.1.18) is slightly outdated (current version is v7.4.1). A new version (v7.1.29) will be submitted to Overleaf soon. Until then, please:

- 1. Download the latest version from the GitHub repository as a Zip file.
- 2. Login to your favorite LaTeX cloud service. I recommend Overleaf but there are alternatives (these instructions apply to Overleaf and you'll have to adapt for other providers).
- 3. In the menu select: New project  $\rightarrow$  Upload project.
- 4. Upload the zip file.

- 5. Select "template.tex" as the main file.
- 6. Let Overleaf compile the document.

Notice that you need a (student) subscription to compile the **novothesis** template in Overleaf, otherwise your compilation will always time out.

#### 1.2.2 Using a Local Lation Local

First of all, start by installing IATEX in your computer. There are two main distributions, MikTEX and TEXLive, and both of them are available for the 3 most popular Operating Systems: Linux, macOS and Windows.

Be aware that a full installation of MikT<sub>E</sub>X or T<sub>E</sub>XLive will take near 5 GB of hard disk space. So, think twice before installing the full distribution. See the novothesis Wiki for the list of packages required to compile the template.



Figure 1.3: The NOVAthesis Project page in GitHub.

Once you have LATEX up and running, remember to install a good LATEX text editor. I recommend you to take a look at this post in the tex.stackexchange.com site. If you want a quick and dirty recommendation, try TeXStudio.

Now, you must access the **novothesis** repository in GitHub, select the green button *Code* and then *download* (or *clone*) the template. You will always get the latest version of the template (currently v7.4.1 from 2025-10-05).

### 1.3 Getting Help

No! You don't have to use this template to write your thesis. You don't even have to use LATEX. However, writing a thesis is serious stuff, and which tool you shall use to write it is not a decision to make lighthearted.

IATEX is hard enough by itself. This template aims at making your life easier, but not easy. If you choose to use this template to write your thesis, you are very welcome. However, don't expect me to provide you help with IATEX. Look for help with your friends (you have some friends, don't you?), or search the web, or try even to read some book(s) on IATEX. In the end you will certainly find the experience rewarding.

When you come to the point of "How do I do this with the novathesis template?", remember...

- 1. To check the novothesis wiki and have some hope! :D
- 2. Google is your best friend.

- 3. Search the GitHub Discussions page for a question related to yours. *If and only if* you don't find one, then post your own question in English please!
- 4. Search the NOVAtheis Facebook group for a question related to yours. *If and only if* you don't find one, then post your own question in either Portuguese or English, at your preference.

When you post your own question, remember to **always** state the **novothesis** version number you are using and referring to.

Please do not attempt to contact me directly (email, Messenger, etc)...

I WILL NOT REPLY!

#### 1.3.1 Suggestions, Bugs and Feature Requests

**Help:** If you just need some help, see above Section 1.3.

**Suggestion:** Do you have a suggestion/recommendation? Please add it to the wiki and help other users!

**Bug:** Did you find a bug? Please open an issue. Thanks!

**New Feature:** Would you like to request a new feature (or support of a new School)? Please open an issue. Thanks!

#### 1.4 Donors

The list of *Donnors* is available in the **novothesis** Project page.

#### 1.5 Disclaimer

Although the novothesis template is endorsed by some Schools (e.g., linked from FCT-NOVA web site), the novothesis template this not an official template for any School.

The novothesis template exists to make your life easier and we do our best to make it compliant to the supported (+25) Schools' regulations but, in the end of the line, you and only you are accountable for both the look and the contents of the document you submit as your thesis/dissertation.

# NOVAthesis Template User's Manual

# This manual is outdated and must be revised!

#### 2.1 Introduction

This Chapter describes how to use the NOVAthesis LATEX (novothesis) template. It is assumed that you have a working of LATEX, either local (in your own computer) or remote (in Overleaf), and that you were able to generate a PDF for the default configuration of the template: a PhD thesis for NOVA School of Science and Technology (FCT).

## 2.2 Quick Start

#### 2.2.1 With a Local LATEX Installation

Follow these steps to get started with a local IATEX installation:

- 1. Download LATEX. There are two major LATEX distributions MikTEX and TEXLive that share lots of similarity, and LATEX documents are portable between them. This means that, for most users, both systems are equally usable.
  - **TEX-Live** is maintained by (La)TEX developers and is certainly the best distribution you may install in your computer: However, the default distribution will take more than 5 GB on your hard disk... so, if you are not short on disk space, install TEXLive!
  - **MikT<sub>E</sub>X** will, by default, install only a minimal set of packages. The extra/additional packages will be installed on the fly. Installing packages on the fly is useful if disk space is limited, but has its own caveats in the longer term. Definitely choose MikT<sub>E</sub>X if you're short on disk space.

Which one to download? There are pros and cons for both distributions so it is essentially a question of where does your heart fall first! Mine falls to TEXLive, but yours can fall elsewhere! :D

- 2. Install LATEX. Installation of LATEX is as hard as installing any other software. Just do your best and you will certainly succeed.
- 3. Update your LATEX installation using the *TEXLiveUtility* program of the MikTEX console.
- 4. Download the **novothesis** template by either:
  - Cloning the GitHub repository with

or

```
git clone --depth=1 https://github.com/joaomlourenco/novathesis.git
```

- Downloading the latest version from the GitHub repository as a Zip file.
- 5. Download additional School specific files if applicable:

```
Universidade do Minho (UMINHO) download the required NewsGotT font files
    from https://github.com/joaomlourenco/novathesis-extras/raw/main/Fonts/
    NewsGotT.zip
    then unzip the file and copy the 3 font files
        "n015002t.ttf", "n015003t.ttf", and "n015006t.ttf"
    to the folder
        "NOVAthesisFiles/FontStyles/Fonts".
```

Escola Superior de Enfermagem do Porto (ESEP) download the required Calibri font files from https://github.com/joaomlourenco/novathesis-extras/raw/main/Fonts/Calibri.zip then unzip the file and copy the 4 font files

"Calibri.ttf", "Calibrib.ttf", "Calibrii.ttf", and "Calibriz.ttf" to the folder

- NOVAthesisFiles/FontStyles/Fonts.
- 6. Compile the document with you favorite LaTeX processor (pdfLaTeX, XeLaTeX or LuaLaTeX).
  - The main file is named "template.tex", but you are free to rename it as you please.
  - Either load the main file in your favorite LaTeX text editor and press the appropriate (magic) button to generate a PDF file, or open a terminal and compile it with "latexmk -pdf template". If you use a LATeX text editor, please notice that the novothesis template uses "biber" and not "bibtex" to process the bibliography, which means that most probably you have to open the Editor

*Preferences* and somewhere (depending on the Editor you are using) change "bibtex" to "biber".

- Notice that, due to the external font sets used, pdflATeX will not work for both **UMINHO** and **ESEP**, and you have to use either XHATeX ("latexmk -pdfxe template") or LualATeX("latexmk -pdflua template").
- 7. Edit the files in the "Config" folder. See Table 2.2.
- 8. Recompile de document.
- 9. And you're done with a beautifully formatted thesis/dissertation! :D

#### 2.2.2 With a Remote Cloud-based Service

Follow these steps to get started with a remote LATEX installation:

- Download the latest version from the GitHub repository as a Zip file.
- Login to your favorite LaTeX cloud service. I recommend Overleaf but there are alternatives. These instructions apply to Overleaf and you'll have to adapt for other providers.
- Select "template.tex" as the main file.
- Follow from Step 5 above in Section 2.2.1 (With a Local LATEX Installation).

#### 2.3 Folder and Files

The novothesis template is organized into many files and folders. At the main level it includes the following files and folders listed in Table 2.1.

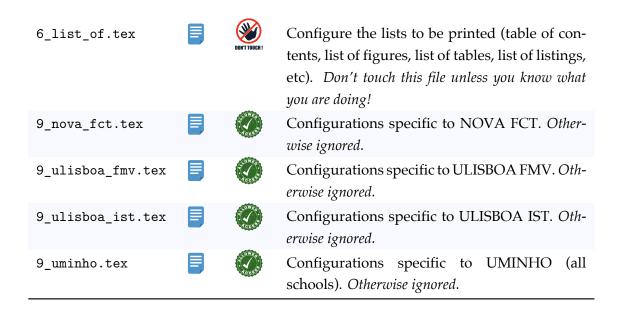
Table 2.1: The folders and files (top level).

Name	Туре	Access	Contents
template.tex		DON'T TOUCH!	The main template file. You need to <i>compile</i> this file with one of pdfIATEX, XHATEX, or LuaIATEX to obtain the PDF file ("template.pdf"). I recommend the usage of the "latexmk" command or, if you use a UN*X-like OS, you may use "make" (and the ggiven "Makefile").
Config		( Control	Configuration files. Please customize your template by changing the files in this folder!

Chapters		Examples of document contents, including Chapters, Appendices, Annexes, Abstracts, Glossaries, Lists of Symbols, etc. Replace them with your own.
Bibliography		Where all your bibliography files should be located. You may have has many bibliography files as you want.
template.pdf		A possible result of applying pdfLATeX to the "template.tex" file. The look and feel of the document will depend on the parametrization/configuration (e.g., School) of this template.
novathesis.cls	DON'T TOUCH!	The main class file.
NOVAthesisFiles	BONT TOUCH!	Additional files for the novothesis template. This is where all the juice is so, unless you are a TEXmagician, don't mess up with the files and folders inside this folder.

Table 2.2: The configuration files (Config folder).

Name	Туре	Access	Contents
O_memoir.tex		DONT TOUCH!	Options specific for the memoir class. Don't touch this file unless you know what you are doing!
1_novathesis.tex			The main configuration file for the template, e.g., select the document type, the school, the used languages, etc.
2_biblatex.tex			Select how your citations and bibliographic references will be printed. The default is numbers inside square brackets, e.g. [11], but you can change it to other formats, such as author-year, e.g., Lourenço (2021).
3_cover.tex			Configure cover contents (e.g., author's name, thesis/dissertation title, author, advisers, committee, etc)
4_files.tex		Tools of	Select which files shall be included in the document as chapters, appendices, annexes, etc
5_packages.tex			User's customization, such as loading additional packages and declare user defined commands.



## 2.4 Customizing the novathesis template

The *novathesis* template can be customized by editing the files in the Config folder.

## 2.4.1 Options in 1\_novathesis.tex

### 2.4.1.1 Most Relevant Options (1\_novathesis.tex)

doctype=OPT  phd, phdprop, phdplan, msc, mscplan, bsc, plain	The type of the document. $phd \rightarrow PhD$ thesis ( $\Leftarrow$ default). $phdprop \rightarrow PhD$ thesis proposal (for FCT-NOVA). $phdplan \rightarrow PhD$ thesis plan. $msc \rightarrow MSc$ thesis. $mscplan \rightarrow MSc$ thesis plan. $bsc \rightarrow BSc$ report. $plain \rightarrow Other$ report.
--	---

#### school=OPT

nova/fct, nova/fcsh, nova/ims,
nova/ims/mcsig, nova/ims/mgt,
nova/ensp, nova/itqb/green,
nova/itqb/gray, ulisboa/ist, ulisboa/fc,
ulisboa/finv, uminho/eaad, uminho/ec,
uminho/ed, uminho/eeg, uminho/eeng,
uminho/elach, uminho/emed,
uminho/epsi, uminho/ese, uminho/i3bs,
uminho/ics, uminho/ie, iscteiul/eta,
ips/ests, ipl/isel, ipl/isel/meb, ulht/deisi,
ulht/mge, other/esep

# Selection of the university and of the school (and degree variant).

 $\Rightarrow$  Default: school=nova/fct

This option changes the typesetting of the de document to some specific School formating and layout, like covers, margins, fonts, paragraph spacing and indentation, etc.

ulht/mge, other/esep				
docstatus=OPT draft, provisional, final	The current status of the document. working $\rightarrow$ Working version ( $\Leftarrow$ <i>default</i> ). provisional $\rightarrow$ Version for submission. final $\rightarrow$ Final version.			
lang=OPT en, pt, de, es, fr, gr, it	The main language for the document.  en $\rightarrow$ Enlgish ( $\Leftarrow$ default).  pt $\rightarrow$ Portuguese.  de $\rightarrow$ German.  es $\rightarrow$ Spanish.  fr $\rightarrow$ French.  gr $\rightarrow$ Greek.  it $\rightarrow$ Italian.			
media=OPT screen, paper	The target media for the PDF. screen $\rightarrow$ No empty/white pages ( $\Leftarrow$ default). paper $\rightarrow$ Empty/white pages are added when necessary			
print/webography=OPT User defined title	Generate a separate bibliography for @online references.  ⇒ Default: print/webography=undefined  If undefined, the @online references are list in the main bibliography. If defined, the @online references will be printed in a separate bibliography titled as given in the option.			
color/links=OPT	The color for the hyperlinks (URLs, cross refer-			

"svgname" color set.

 $\Rightarrow$  Default: color/links=DarkBlue

The valid color names as listed in "xcolor" manual, the

color/gls=OPT	The color for the glossary managed hyperlinks			
Color name	(glossary, symbols, etc).			
	$\Rightarrow$ Default: color/gls=Black			
	The valid color names as listed in "xcolor" manual, the			
	"svgname" color set.			
print/index=OPT	Print the (words) index at the end of the docu-			
true,	ment.			
$false (\Leftarrow default)$	Print the index (in Portuguese <i>Índice Remissivo</i> ).			

# 2.4.1.2 Less Relevant Options (1\_novathesis.tex)

abstractorder=OPT	Forces the abstracts languages and order for				
$L_0 = \{L_1, L_2, L_n\}$	documents in language $L_0$ .				
	$\Rightarrow$ Default: abstractorder={en={en,pt}} for english				
	$\Rightarrow$ Default: abstractorder={L={L,en}} for lang L				
	$L_i$ is a two-letters language code from the set of valid				
	language codes, following ISO 3166-1 (alfa-2).				
lang/extra=OPT	List of additional languages are used in the doc-				
$\{L_1, L_2, , L_n\}$	ument besides the main laguage and those used				
	in the abstracts (above).				
	$\Rightarrow$ Default: lang/extra={}				
	$L_i$ is a two-letters language code from the set of valid				
	language codes, following ISO 3166-1 (alfa-2).				
gnumberlist=OPT	Shall the glossary entries list the page numbers				
$true$ , ( $\Leftarrow$ default)	where those entries are used? (Like a reverse in-				
false	dex!)				
numberallpages=OPT	Shall all the pages (except cover) be numbered?				
true,					
$false (\Leftarrow default)$					
tocintoc=OPT	Shall table of contents be listed in the table of				
true,	contents?				
false (← default)					
tocintoc=OPT	Shall a second cover page be forced?				
true,	If the contents for the second page are not defined, the				
$false \ (\Leftarrow default)$	second cover will be a replica of the first cover.				

print/committee=OPT  true,  false	Shall the evaluation committee be printed?  ⇒ Default: print/committee=true if docstatus=final  ⇒ Default: print/committee=false otherwise				
$print/frontmatter=OPT$ $true, (\Leftarrow default)$ $false$	Shall the front matter be printed? Set to false to generate a PDF with only the cover and the book chapters.				
$print/statement=OPT$ $true$ , $false (\Leftarrow default)$	Shall the honor/originality statement be printed?				
print/copyright=OPT  true, (← default)  false	Shall the copyright message be printed?				
print/timestamp=OPT true, false	Shall a timestamp (with the PDF generation date/time) be printed in the cover?  ⇒ Default: print/timestamp=true if docstatus=working ⇒ Default: print/timestamp=false otherwise				
$style/url=OPT$ $default$ , ( $\Leftarrow$ default) $same$	Use the same (main) font in URLs?				
style/font=OPT  arial, bookman, calibri, erewhon, kieranhealy, kpfonts, libertine, newpx, newsgott, scholax	Which font set to use in the document?  arial → Use 'arial' font. Requires XelATEX or LualATEX bookman → Use 'bookman' font.  calibri → Use 'calibri' font. Requires XelATEX or LualATE erewhon → Use 'erewhon' font.  kieranhealy → Use 'kieranhealy' font.  kpfonts → Use 'palatino' font.  libertine → Use 'libertine' font.  newpx → Use 'palatino' font. (← default)  newsgott → Use 'newsgott' font. Requires XelATEX or Lualscholax → Use 'scholax' font.				

style/chapter=OPT	Which chapter style to use in the document?					
See list on the side!	Besides the standard memoir chapter styles					
	(default, section, article, reparticle, hangnum,					
	companion, demo, bianchi, bringhurst, brotherton, chappell, culver, dash, demodemoell, ger, lyhne, madsen, pedersen, southall, thatcher, veelo, verville, crosshead, dowding, komalike,					
	ntglike, tandh, wilsondob), the customized					
	list of chapter styles below is also available.					
	bar $\rightarrow$ Use 'bar' chapter style. ( $\Leftarrow$ default)					
	$bar$ -compact $\rightarrow$ Use 'bar-compact' chapter style.					
	bluebox $\rightarrow$ Use 'bluebox' chapter style.					
	compact $\rightarrow$ Use 'compact' chapter style.					
	elegant $\rightarrow$ Use 'elegant' chapter style.					
	fmv $\rightarrow$ Use 'fmv' chapter style.					
	hansen → Use 'hansen' chapter style.					
	ist $\rightarrow$ Use 'ist' chapter style. ist2 $\rightarrow$ Use 'ist2' chapter style.					
	pedersen $\rightarrow$ Use 'pedersen' chapter style.					
lang/cover=OPT						
· ·	The main language for the cover.					
en, pt, de, es, fr, gr, it	$\Rightarrow$ Default: The same as the main language.					
lang/copyright=OPT	The main language for the copyright message.					
en, pt, de, es, fr, gr, it	$\Rightarrow$ Default: The same as the main language.					
spine/layout=OPT	Print the "book spine" at the end of the docu-					
no, full, trim	ment?					
	$\Rightarrow$ Default: `trim' if docstatus=final					
	$\Rightarrow$ Default: `no' otherwise					
	no $\rightarrow$ do not print the book spine.					
	full $\rightarrow$ print the book spine in a full page.					
	$\operatorname{trim} \to \operatorname{print}$ and $\operatorname{trim}$ the page to the width of the book spinor.					
spine/width=OPT	Force the width of the "book spine".					
	The defailt width for the book spine will be the width					
	of the number of pages of the document if printed in					
	standard paper ( $80g/m^2$ ).					

debug=OPT

cover, spine

Activate debug mode for cover and/or book spine.

⇒ Default: debug={}

## 2.5 How to Write Using LATEX

Please have a look at Chapter 3, where you may find many examples of LATEX constructs, such as Sectioning, inserting Figures and Tables, writing Equations, Theorems and algorithms, exhibit code listings, etc.

# 2.6 Example glossary, acronyms, and symbols

# A Short LATEX Tutorial with Examples

This Chapter aims at exemplifying how to do common stuff with IATEX. We also show some stuff which is not that common! ;)

Please, use these examples as a starting point, but you should always consider using the *Big Oracle* (aka, Google, your best friend) to search for additional information or alternative ways for achieving similar results.

#### 3.1 Document Structure

## 3.2 Dealing with Bibliography

Citing something online [4, 7, 9].

# 3.3 Inserting Tables

# 3.4 Importing Images

# 3.5 Floats, Figures and Captions

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat a, molestie nec, leo. Maecenas lacinia. Nam ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat magna. Nunc eleifend consequat lorem. Sed lacinia nulla vitae enim. Pellentesque tincidunt purus vel magna. Integer non enim. Praesent euismod nunc eu purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus. Donec et mi. Nam vulputate metus eu enim. Vestibulum pellentesque felis eu massa.

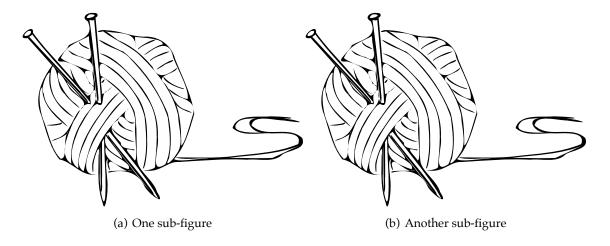


Figure 3.1: A figure with two sub-figures!

#### And this is a small text that references the Figure 3.1 and its Subfigures 3.1(a) and 3.1(b).

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat a, molestie nec, leo. Maecenas lacinia. Nam ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat magna. Nunc eleifend consequat lorem. Sed lacinia nulla vitae enim. Pellentesque tincidunt purus vel magna. Integer non enim. Praesent euismod nunc eu purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus. Donec et mi. Nam vulputate metus eu enim. Vestibulum pellentesque felis eu massa.

## 3.6 Text Formatting

## 3.7 Generating PDFs from LATEX

#### 3.7.1 Generating PDFs with pdflatex

You may create PDF files either by using latex to generate a DVI file, and then use one of the many DVI-2-PDF converters, such as dvipdfm.

Alternatively, you may use pdflatex, which will immediately generate a PDF with no intermediate DVI or PS files. In some systems, such as Apple, PDF is already the default format for LATEX. I strongly recommend you to use this approach, unless you have a very good argument to go for latex + dvipdfm.

A typical pass for a document with figures, cross-references and a bibliography would be:

```
$ pdflatex template
$ bibtex template
$ pdflatex template
$ pdflatex template
```

You will notice that there is a new PDF file in the working directory called template.pdf. Simple:)

Please note that, to be sure all table of contents, cross-references and bibliographic citations are up-to-date, you must run latex once, then bibtex, and then latex twice.

### 3.7.2 Dealing with Images

You may process the same source files with both latex or pdflatex. But, if your text include images, you must be careful. latex and pdflatex accept images in different (exclusive) formats. For latex you may use EPS ou PS figures. For pdflatex you may use JPG, PNG or PDF figures. I strongly recommend you to use PDF figures in vectorial format (do not use bitmap images unless you have no other choice).

#### 3.7.3 **Dealing with Citations**

Para fazer citações, deverá usar-se a chave da referência no ficheiro BibTeX. Se for uma única referência [2], usar um "~" para ligar o \cite{...} à palavra que o precede (...referência~\cite{Art Caso queira fazer múltiplas citações [12, 13, 6], deverá agrupá-las dentro de um úinico \cite{...}.

Note que o ficheiro de bibliografia pode ter tantas entradas quantas quiser. Apenas aquelas cuja chave seja referenciada no texto é que serão incluidas na listagem de bibliografia.

#### 3.7.4 Footnotes

Footnotes<sup>1</sup> will be numbered and shown in the bottom of the page.

#### 3.7.5 **Tables**

The Table 3.1 illustrates some important concepts associated with table construction:

- i) Do not use vertical lines;
- ii) The caption should be above the table;
- iii) Use the macros \toprule, \midrule and \bottomrule to make the top, inner and bottom horizontal lines, respectively.

Test	Anomalies	Warnings	Correct	Categories	Missed
Connection [3]	2	2	1	С	1
Coordinates'03 [1]	1	4	1	2B, 1C	0
Local Variable [1]	1	2	1	A	0
NASA [1]	1	1	1	_	0
Coordinates'04 [2]	1	4	1	3C	0

0

0

1

1

Table 3.1: Test results summary.

1

0

Buffer [2]

Double-Check [2]

StringBuffer [8]

Account [14]

2

0

1

0

0

0

1

2A, 1B, 2C, 2D

1A, 1B

<sup>&</sup>lt;sup>1</sup>This is a simple footnote.

Jigsaw [14]	1	2	1	С	0
Over-reporting [14]	0	2	0	1A, 1C	0
Under-reporting [14]	1	1	1	_	0
Allocate Vector [10]	1	2	1	C	0
Knight Moves [3]	1	3	1	2 <i>B</i>	0
Total	12	33	10	5A, 6B, 10C, 2D	2

### 3.7.6 Figures

The images inserted in the document must be of good quality, preferably in vector format (vector PDF) and not in *bitmap* (PNG, JPG, etc.). *bitmap* images (Figure 3.2) do not scale well and have negative effects on the quality of your document. On the other hand, *vector* images Figure 3.3 scale as much as necessary without degrading the quality of the image.

You should only use *screenshots* for your plots, charts, etc, if you absolutely have no other alternative. Instead of generating a *screenshot*, try using a virtual PDF printer and printing to a PDF file. As a general rule, you will get a vector PDF. Even if your PDF contains images, they will always be of higher or equal quality than what you would get with a *screenshot*.

To combine several figures into a single one... You can then reference the set as Figure 3.4 or the sub-figures separately as 3.7.6 and 3.7.6.

# 3.8 Equations

LaTeX is a powerful tool for writing in a mathematical style. It allows you to insert formulas into the text, such as this:  $ax^2 + bx + c = 0$ . It also allows formulas to be highlighted on a separate line and centered on the page.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

or numbererd

$$e = mc^2 (3.1)$$

which can latter be referenced as equation 3.1

# 3.9 Test for algorithms

Uncomment the algorithms source below and add the following to file "5\_packages.tex"

\usepackage{algorithm2e}
\RestyleAlgo{ruled}

and uncomment

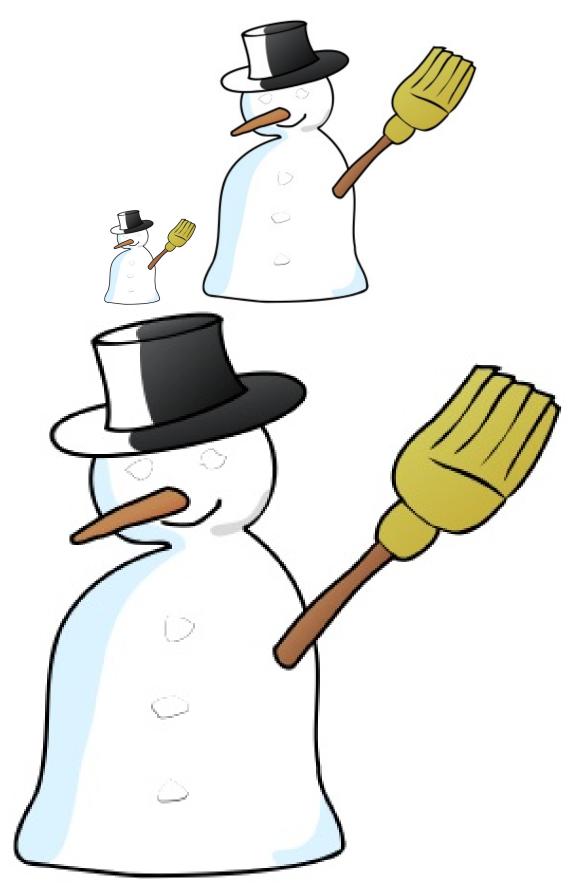


Figure 3.2: Bitmap image (JPG/PNG)



Figure 3.3: Vectorial image (PDF)

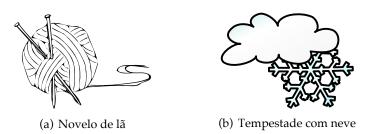


Figure 3.4: Exemplo de utilização de *subbottom* 

\ntaddlistof{listofalgorithms}

in file "8\_list\_og.tex".

# Adding Support to a New School (work in progress)

My advice to customize the **novothesis** template to another School/University/Department/Degree is to browse the existing supported degrees to find one that is *close enough*, and depart from there!

```
--- nova
| +-- Images
| +-- fct
| | \-- Images
| +-- ims
| | \-- Images
| ...
|
\-- uminho
| +-- Images
| +-- ea
| \-- Images
| --- ec
| \-- Images
...
```

The directory uminho contains the customization for all Schools of Universidade do Minho. This university is an example of the case where the regulations are defined at

University level and all the schools apply the same thesis layout and organization. So, the all the customization is done in the file uminho/uminho-defaults.ldf, except the definition of the name and logo of each individual school.

As another example, the directory nova contains the customization for all Schools from NOVA University Lisbon. This university grants a lot of freedom in the definition of the thesis layouts. In some cases, they are defined at the School level (e.g., NOVA FCT), while is some other cases they are defined separately for each degree (e.g., NOVA IMS).

- 1. Try all the already supported schools and check which one is closer to your needs;
  - a) Edit Config/1\_novathesis.tex and near line 28 uncomment the line with key \ntsetup{school=<SOMETHING>};
  - b) For each school supported (see the comment), replace <SOMETHING> with the school name, e.g., make it \ntsetup{school=ulisboa/fmv}
  - c) Recompile and check the document. Particularly, check the cover layout, the front-page (second cover) layout, the front-matter contents, the bibliography style;
  - d) Repeat for the next school, until you find one close enough.

2.

# Bibliography

- [1] C. Artho, K. Havelund, and A. Biere. *High-Level Data Races*. 2003. url: citeseer. ist.psu.edu/artho03highlevel.html (cit. on p. 20).
- [2] C. Artho, K. Havelund, and A. Biere. "Using Block-Local Atomicity to Detect Stale-Value Concurrency Errors". In: *ATVA*. Ed. by F. Wang. Vol. 3299. Lecture Notes in Computer Science. Springer, 2004, pp. 150–164. isbn: 3-540-23610-4 (cit. on pp. xxiii, 20).
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A

# NOVAthesis covers showcase

This Appendix shows examples of covers for some of the supported Schools. When the Schools have very similar covers (e.g., all the schools from Universidade do Minho), just one cover is shown. If the covers for MSc dissertations and PhD thesis are considerable different (e.g., for FCT-NOVA and UMinho), then both are shown.

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В

# Appendix 2 Lorem Ipsum

This is a test with citing something [5] in the appendix.

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# Annex 1 Lorem Ipsum

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