The title of a renowned thesis in the field

Very renowned

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Thesis to obtain the Master of Science Degree in

Electrical and Computer Engineering

Supervisor: Prof. Full Name

Examination Committee

Chairperson: Prof. Full Name
Supervisor: Prof. Full Name
Member of the Committee: Prof. Full Name

October 2022

Abstract

Insert your abstract here.

Resumo

O "abstract" em português vai aqui!

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List of Tables

Glossary

mentioned definition A mentioned definition is a definition that is mentioned throughout the length of the text and is therefore shown in the glossary.

Acronyms

IST Instituto Superior Técnico

MOnarCH Multi-Robot Cognitive Systems Operating in Hospitals

Nomenclature

a A custom, but relevant variable.

b Another custom, but relevant variable.

c Yet another custom, but relevant variable.

Greek Letters

ϕ Roll

ψ Yaw

θ Pitch

Constants

π A mathematical constant that is the ratio of a circle's circumference to its diameter, approximately equal to 3.14159.

Chapter 1

Introduction

1.1 About the template

This Master's thesis template isn't just a pretty face! It also comes with a set of examples on:

- How to use glossary definitions, acronyms and nomenclature;

- How to include images in different layouts (either using the subimage or the minipage methods);

- How to cite from the bibliography (.bib) file;

- How to insert pretty contrast boxes for relevant notes;

- How insert a formatted piece of code;

- How insert a directory tree.

Don't forget to read de README.md file with more important information such as:

- How to build your final pdf document;

- How to set up VSCode, the superior IDE (sorry Vim lovers), as local "Overleaf";

This template follows the guide provided by Técnico on how a Master's thesis should be formatted as per 2022. You can find the guide and a whole lot of gusty info on how to write your thesis here.

1.2 Credit where credit is due

This pretty template is an adapted and more recent version of Prof. André Marta's template. You can find the original template along with an extended abstract template here.

The images I am using are not mine. Here is a list of their authors and URLs:

- The Técnico Alameda campus photo on the cover was taken from Técnico's website: `https://tecnico.ulisboa.pt/files/2015/07/campus-alameda-banner21.jpg`;

- The ISTSat-1 image is from the "110 Histórias, 110 Objetos" podcast for the ISTSat-1 episode: https://tecnico.ulisboa.pt/files/2022/02/110-historias-110-objetos-o-istsat-1.jpg;

- The robot in the appendix is Gasparzinho which was designed as part of the MOnarCH project. The image was taken from Técnico's website: https://tecnico.ulisboa.pt/files/2015/10/monarch.jpg.

Chapter 2

Literature Review

2.1 How to use the glossary, acronyms and nomenclature

The glossary, acronym and nomenclature entries must all be listed in the "glossary.tex", "acronym.tex" and "nomenclature.tex" files, respectively.

If you want to mention a term that is defined in your glossary, do this: mentioned definition. If you check the "glossary.tex" file, you will see that there is one more definition there which isn't printed out in the pdf document. This is because glossary entries that are not invoked throughout the text are not printed out to the final document. **This is also true for acronyms, nomenclature and bibliography entries**.

If you want to use an acronym you can do it in many ways, such as:

- This: IST;

- This: Instituto Superior Técnico;

- And this: Instituto Superior Técnico (IST);

- The glossaries package can also be used for a nomenclature list. You call the listed nomenclature like you would a regular glossary entry, like this: ϕ, θ, ψ, π, a, b, and c.

2.2 How to cite from your bibliography file

If you don't know what a bibliography file looks like, go check out the contents of this document's bib file: "references.bib". If your bibliography is small and you can afford to create a bib file by hand, go ahead. However, if your bibliography is too big and/or you'd like to learn how to automatically add entries to your bib file without having to copy and paste stuff from the browser, check out the README.md file!

After a bibliography entry has been added to your bib file you can now cite it. Here are several ways to cite:

- You can cite normally like this: [1];

- What if you also want to include the author's name? Do this: Reynaud et al. [1];

- For just the author's name: Reynaud et al.;

> **A note on citations**
>
> As you probably know there are several citation styles. This document is using the IEEE citation style. If you wish to change the citation style loo for the natbib package within the "preamble.tex" file and change the "IEEEtranN" part to your desired bibliography style.

Chapter 3

Developed work

3.1 How to add formatted code

In the developed work section you will probably want to add some code you developed. You can use the listings package to do this.

```python
import numpy as np

def incmatrix(genl1,genl2):
  m = len(genl1)
  n = len(genl2)
  M = None #to become the incidence matrix
  VT = np.zeros((n*m,1), int)  #dummy variable

  #compute the bitwise xor matrix
  M1 = bitxormatrix(genl1)
  M2 = np.triu(bitxormatrix(genl2),1)

  for i in range(m-1):
    for j in range(i+1, m):
      [r,c] = np.where(M2 == M1[i,j])
      for k in range(len(r)):
        VT[(i)*n + r[k]] = 1;
        VT[(i)*n + c[k]] = 1;
        VT[(j)*n + r[k]] = 1;
        VT[(j)*n + c[k]] = 1;

        if M is None:
          M = np.copy(VT)
        else:
          M = np.concatenate((M, VT), 1)

        VT = np.zeros((n*m,1), int)

  return M
```

This example was taken from the Overleaf documentation, here.

3.2 How to add a directory trees

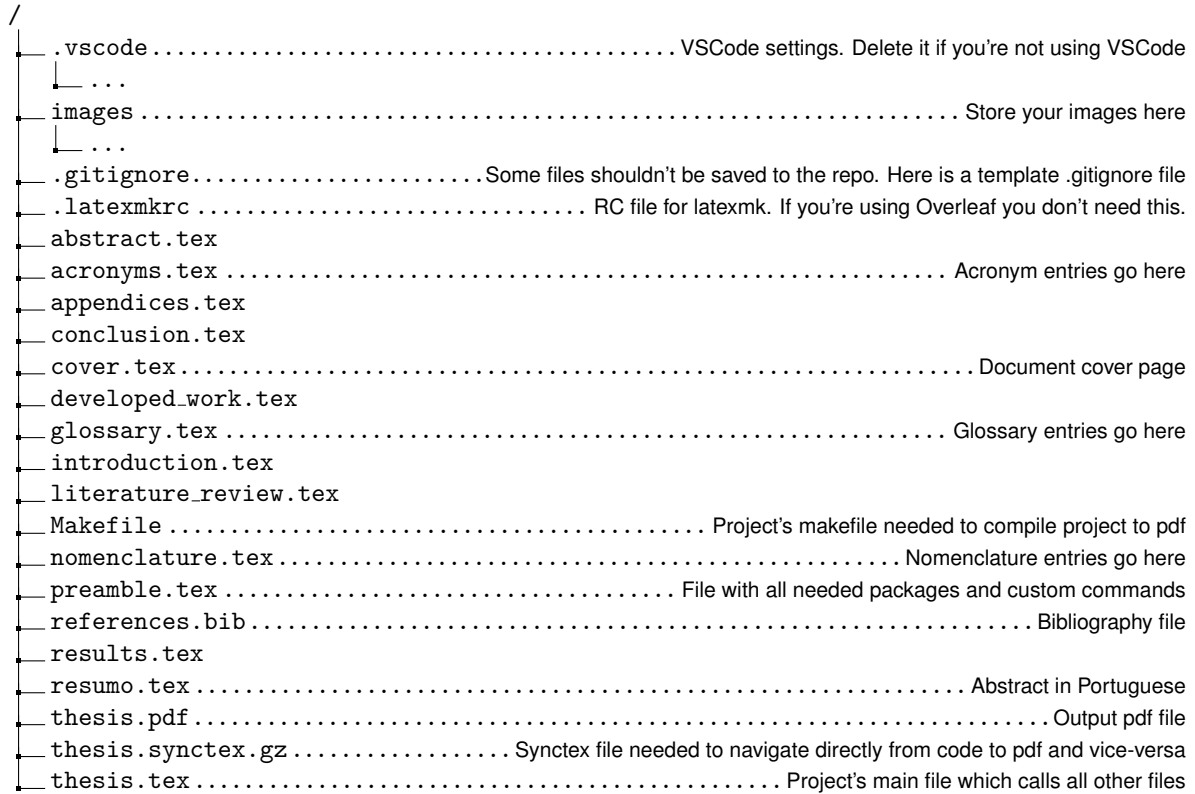Check this project's directory tree in Figure 3.1 for more information on each file.

```
/
├── .vscode .......................................... VSCode settings. Delete it if you're not using VSCode
│   └── ...
├── images .............................................................. Store your images here
│   └── ...
├── .gitignore ....................... Some files shouldn't be saved to the repo. Here is a template .gitignore file
├── .latexmkrc ............................... RC file for latexmk. If you're using Overleaf you don't need this.
├── abstract.tex
├── acronyms.tex ...................................................... Acronym entries go here
├── appendices.tex
├── conclusion.tex
├── cover.tex ............................................................... Document cover page
├── developed_work.tex
├── glossary.tex ...................................................... Glossary entries go here
├── introduction.tex
├── literature_review.tex
├── Makefile ........................................... Project's makefile needed to compile project to pdf
├── nomenclature.tex .................................................. Nomenclature entries go here
├── preamble.tex ..................................... File with all needed packages and custom commands
├── references.bib ............................................................. Bibliography file
├── results.tex
├── resumo.tex ...................................................... Abstract in Portuguese
├── thesis.pdf ................................................................. Output pdf file
├── thesis.synctex.gz .................. Synctex file needed to navigate directly from code to pdf and vice-versa
└── thesis.tex ............................................. Project's main file which calls all other files
```

Figure 3.1: This project's directory structure.

3.3 How to add tables

You can create a table using LaTeX. Use this LaTeXtable generator to help you out.

Table 3.1: A simple table with dummy values.

	column 1	column 2
row 1	1	2
row 2	3	4

You can also include tables which are images instead of tabulars. To do this, create your own table, screenshot it and include it in your document as a table (as opposed to a figure). Like this:

Table 3.2: Another simple table. As you can see anything can be a table in LaTeX! Don't lose too much time trying to create all your tables using the tabular environment.

> **A note on table captions**
>
> Most people prefer table captions to show above the table itself. However, since the guide provided by Técnico (which you can find here) doesn't specify a specific placement, this is a matter of opinion. If you want your table caption to be above the table use the example of Table 3.1, otherwise use the example of Table 3.2.

Chapter 4

Results

4.1 How to add images

A simple image can be added like this.
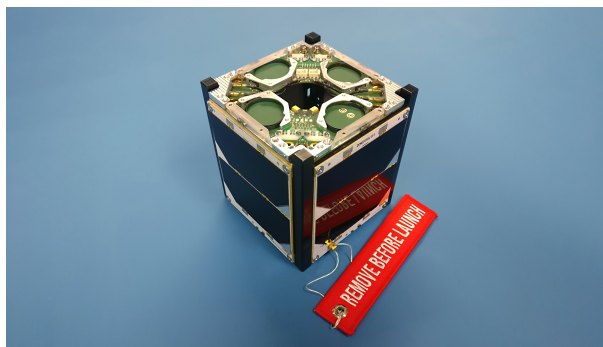
Figure 4.1: This piece of text will show up under the image itself. Having 2 different captions is useful when you want a long caption to appear next to the image itself since (as you can imagine) it won't look great to have a big description for a single figure in the list of figures.

Figure 4.1 shows a picture of ISTSat-1, a 1U CubeSat developed at Técnico. You can learn more about ISTSat-1 on this episode of the "110 Histórias, 110 Objetos" podcast or on the project's website: https://istsat.one.

What if you need something more difficult than just a single image? What if you need 2 images side by side?

You can use the example code for Figure 4.2 to have subcaptions for each of your subfigures and then a caption for both images.

However, if yiu just want to have 2 completely independent images side-by-side, just use the example code for Figures 4.3 and 4.4.

What if you need more than 2 images side by side? Follow the example of Figures 4.5, 4.6, 4.7 and 4.8.

For more than 1 row of figures follow the example of Figure 4.9.

(a) A caption.

(b) Another caption.

Figure 4.2: This example uses the subfigure environment. You can play with the space between images and image size by changing the percentages that are multiplied by "textwidth" for the images' widths.
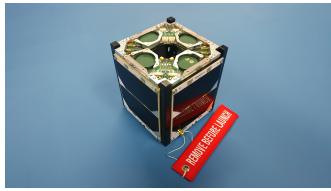

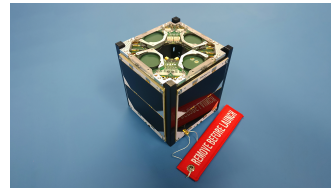**Figure 4.3:** An independent caption.

Figure 4.4: Another independent caption.
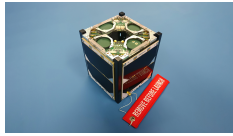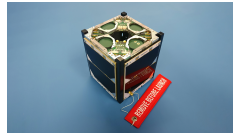

Figure 4.5: An independent caption.

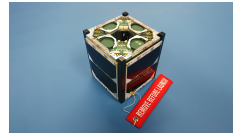**Figure 4.6:** Another independent caption.
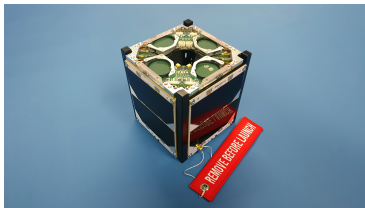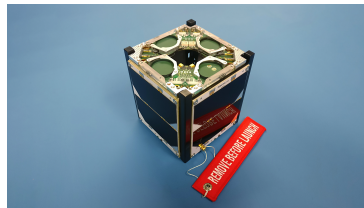
Figure 4.7: Another independent caption.

Figure 4.8: Another independent caption.

(a) A caption.

(b) A caption.
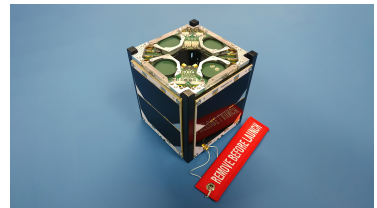
(c) A caption.

(d) A caption.

(e) A caption.

Figure 4.9: This example is using the subfigure environment.

Chapter 5

Conclusions

To sum up, LaTeX is not hard, it's just a bit annoying! However, having a cool template to start from and several useful code snippets will definitely make your life a bit easier. Anyways, here's a photo of my dog at the beach to help you get started with your writing:

Figure 5.1: The goodest girl at the beach.

Hope this template helped you!

References

[1] F. Reynaud, E. Ribeiro, and D. M. de Matos, "Active Learning Improves the Teacher's Experience: A Case Study in a Language Grounding Scenario ," in *Proc. IberSPEECH 2022*, 2022, pp. 141–145.

Appendix A

An important appendix

You can include whatever in the appendices section. This may include other documents, images or code. Here is an image of Gasparzinho! You can learn more about Gasparzinho on this podcast.