John Longname Doe
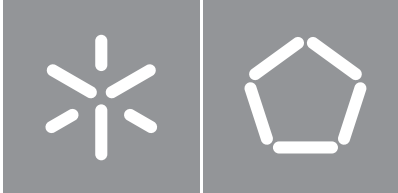
A Very Long and Impressive Thesis Title With a Line Break

Universidade do Minho
Escola de Engenharia

John Longname Doe

**A Very Long and Impressive Thesis Title
With a Line Break**

Dissertação de Mestrado
Mestrado em Engenharia Informática

Trabalho efetuado sob a orientação do(a)
John Doe Adviser Name
John Doe Co-Adviser Name

Novembro, 2021

DIREITOS DE AUTOR E CONDIÇÕES DE UTILIZAÇÃO DO TRABALHO POR TERCEIROS

Este é um trabalho académico que pode ser utilizado por terceiros desde que respeitadas as regras e boas práticas internacionalmente aceites, no que concerne aos direitos de autor e direitos conexos.

Assim, o presente trabalho pode ser utilizado nos termos previstos na licença abaixo indicada.

Caso o utilizador necessite de permissão para poder fazer um uso do trabalho em condições não previstas no licenciamento indicado, deverá contactar o autor, através do RepositóriUM da Universidade do Minho.

Licença concedida aos utilizadores deste trabalho

DECLARAÇÃO DE INTEGRIDADE

Declaro ter atuado com integridade na elaboração do presente trabalho académico e confirmo que não recorri à prática de plágio nem a qualquer forma de utilização indevida ou falsificação de informações ou resultados em nenhuma das etapas conducente à sua elaboração.

Mais declaro que conheço e que respeitei o Código de Conduta Ética da Universidade do Minho.

—————, ——————————————————

(Localização)   (Data)

——————————————————————

(John Longname Doe)

Lorem ipsum.

Agradecimentos

The acknowledgements. You are free to write this section at your own will. However, usually it starts with the institutional acknowledgements (adviser, institution, grants, workmates, ...) and then comes the personal acknowledgements (friends, family, ...).

Resumo

Um título de tese muito longo e impressionante com uma quebra de linha

Independentemente da língua em que está escrita a dissertação, é necessário um resumo na língua do texto principal e um resumo noutra língua. Assume-se que as duas línguas em questão serão sempre o Português e o Inglês.

O *template* colocará automaticamente em primeiro lugar o resumo na língua do texto principal e depois o resumo na outra língua. Por exemplo, se a dissertação está escrita em Português, primeiro aparecerá o resumo em Português, depois em Inglês, seguido do texto principal em Português. Se a dissertação está escrita em Inglês, primeiro aparecerá o resumo em Inglês, depois em Português, seguido do texto principal em Inglês.

O resumo não deve exceder uma página e deve responder às seguintes questões:

- Qual é o problema?

- Porque é que ele é interessante?

- Qual é a solução?

- O que resulta (implicações) da solução?

E agora vamos fazer um teste com uma quebra de linha no hífen a ver se a LaTeX duplica o hífen na linha seguinte...

zzzz zzz zzzz zzz zzzz zzz zzzz zzz zzzz zzz zzzz zzz zzzz zzz zzzz zzz zzzz comentar-lhe zzz zzzz zzz zzzz

Sim! Funciona! :)

Palavras-chave: Palavras-chave (em Português) ...

Abstract

A Very Long and Impressive Thesis Title With a Line Break

The dissertation must contain two versions of the abstract, one in the same language as the main text, another in a different language. The package assumes that the two languages under consideration are always Portuguese and English.

The package will sort the abstracts in the appropriate order. This means that the first abstract will be in the same language as the main text, followed by the abstract in the other language, and then followed by the main text. For example, if the dissertation is written in Portuguese, first will come the summary in Portuguese and then in English, followed by the main text in Portuguese. If the dissertation is written in English, first will come the summary in English and then in Portuguese, followed by the main text in English.

The abstract shoul not exceed one page and should answer the following questions:

- What's the problem?

- Why is it interesting?

- What's the solution?

- What follows from the solution?

Keywords: Keywords (in English) ...

Índice

Lista de Figuras

Lista de Tabelas

Listagens

Lista de Algoritmos

Glossário

aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

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.

cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat.

donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat a, molestie nec, leo.

integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus.

lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

maecenas lacinia nam ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat magna. Nunc eleifend consequat lorem.

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.

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 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.
nam dui	ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo.
name 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.
nulla malesuada	porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis.
sed lacinia	nulla vitae enim. Pellentesque tincidunt purus vel magna. Integer non enim. Praesent euismod nunc eu purus. Donec bibendum quam in tellus.

Siglas

aaa	acornym aaa
aab	acornym aab
aba	acornym aba
abbrev	abbreviation of a longer text
AEU	adipiscing elit ut
AFM	aenean faucibus morbi
AMD	a magna donec
ANP	ac nunc praesent
ATG	amet tortor gravida
AVF	adipiscing vitae felis
bbb	acornym bbb
CAS	curabitur auctor semper
CDG	curabitur dictum gravida
CEA	congue eu accumsan
CIV	consectetuer id vulputate
DIA	duis eget orci
DNM	dolor nulla malesuada
DNMC	duis nibh mi congue
DRN	dignissim rutrum nam
EII	est iaculis in
ENE	et netus et
EPA	eu pulvinar at
ESQ	eleifend sagittis quis

ESV   eget sem vel

ETS   eu tellus sit

FUP   fringilla ultrices phasellus

LID   lorem ipsum dolor

LNE   libero nonummy eget

LUB   leo ultrices bibendum

LVU   lectus vestibulum urna

MAC   mollis ac nulla

MFA   malesuada fames ac

MNA   mauris nam arcu

MTS   morbi tristique senectus

NDV   nulla donec varius

NPH   neque pellentesque habitant

OER   orci eget risus

PEV   purus elit vestibulum

PIS   placerat integer sapien

PQV   pretium quis viverra

SAO   sit amet orci

SNE   sem nulla et

STC   sit amet consectetuer

TEM   turpis egestas mauris

ULC   ut leo cras

UPA   ut placerat ac

VAE   vehicula augue eu

VMR   viverra metus rhoncus

xpto   and extension of a xpto xpto xpto xpto xpto xpto xpto xpto xpto xpto xpto xpto xpto xpto
        xpto xpto xpto xpto xpto

Símbolos

π the numerical value of pi

r the radius of a circle

Introduction

1.1 A Bit of History

The *novathesis* was originally developed to help MSc and PhD students of the Computer Science and Engineering Department of the Faculty of Sciences and Technology of NOVA University of Lisbon (DI-FCT-NOVA) to write their thesis and dissertations Using LaTeX. These student can easily cope with LaTeX by themselves, and the only need some help in the bootstrap process to make their life easier.

However, as the template spread out among the students from other degrees at FCT-NOVA, the demand for am easier-to-use template as grown. And the template in its current shape aims at answering the expectations of those that, although they are not familiar with programming nor with markup languages, so still feel brave enough to give LaTeX a try and rejoice with the beauty of the texts typeset by this system.

1.2 Disclaimer

It is up to you, the student, to read the FCT and/or NOVA regulations on how to format and submit your MSc or PhD dissertation.

This template is endorsed by the FCT-NOVA and even linked from its web pages, but it is not an official template. This template exists to make your life easier, but in the end of the line you are accountable for both the looks and the contents of the document you submit as your dissertation.

ThesisDIFCTNL User's Manual

2.1 Introduction

These instructions are outdated! Please see also the "template.tex" file!

This chapter describes how to use the LaTeX *novathesis* template (and the "`novathesis.cls`" class file).

Let's start with some simple suggestions:

1. 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.

2. LaTeX 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 LaTeX. 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 LaTeX. In the end you will certainly find the experience rewarding.

3. So, don't forget, when you come to the point of "*How do I do this with LaTeX?*" look for help! Google is your best friend.

4. If you believe the difficulty is related with the *novathesis* template itself (and not with LaTeX), please **do not** send me an email asking for help. Please look for help in the *novathesis* Google Group (URL) and the *novathesis* Facebook group (URL). If you can't find help there from previous posts/messages, then post your own question. Hopefully someone will answer you.

Now, let's go to a major issue for Windows users. Characters have to be encoded in files as numbers, and that is how character encodings were born. ASCII and EBCDIC standards are long lost in the past. The world now uses UTF-8. Well, not all the world... Windows is still stick in its *codepages*, and "latin1" is what windows uses as the codepage for Western Europe. This messes up with the template. Please be sure you use an editor with UTF-8 support. *Go to the preferences/options/... of your text editor and set up its default file encoding as UTF-8.*

2.2 Folder Structure

The *novathesis* template is organized into files and folders. At the main level it includes the following files and folders:

`novathesis.cls`	*file*	The main class file. It will include additional files from `novathesis-files` folder.
`template.tex`	*file*	The main user file. Use this file as the main file for your thesis.
`bibliography.bib`	*file*	An example of a bibliography file. You may have has many as you want.
`template.pdf`	*file*	A possible result of applying pdfLaTeX to the `template.tex` file. The template supports multiple types of documents (e.g., MSc dissertation, PhD thesis, ...) and multiple Schools (e.g., FCT-NOVA, FCSH-NOVA, IST-UL, FC-UL, ...) and each will produce different results.
`Chapters`	*folder*	Examples of thesis chapters. Replace them with your own chapters.
`Examples`	*folder*	Some more examples of the use of the template for different document types and Schools.
`Scripts`	*folder*	Some (possibly useful) scripts for Unix-based systems (Linux, Mac OSx). If you are a windows user, ignore this folder (you may safely delete it if you want).
`novathesis-files`	*folder*	Additional files for the `novathesis.cls` file. Unless you know what you are doing, avoid messing up with the files and folders inside this folder (except for deleting the unused Schools, see below).

The `novathesis-files` folder contains additional files and folders that complement the main `novathesis.cls` file. These are:

`README.txt`	*file*	A file that should be read! :)
`fix-babel.clo`	*file*	Simple fixes to the `babel` package.
`lang-text.clo`	*file*	Translations of important strings used in the template. Currently fully supported are Portuguese and English, but French is on the way. If you add translations for your own language, please be so kind and send them to me. Thank you!
`options.clo`	*file*	Processing of `novathesis.cls` options. *Don't mess with this!*
`packages.clo`	*file*	Additional packages to be loaded into the *novathesis* template. *You should not mess with this!*
`spine.clo`	*file*	This file is loaded only if the option `spine=true`, and includes the typesetting of the book spine.
`ChapStyles`	*folder*	Contains a lot of files, one for each chapter style. If you really know what you are doing, you may add your own chapter style here.
`FontStyles`	*folder*	Contains a few files, one for each set of fonts (main text font, chapter font, section font, subsection font, etc). If you really know what you are doing, you may add your own set here.
`Schools`	*folder*	Configuration files for each school. This folder is organized into subfolders, one for each university. *You may safely delete all the subfolders except the one for your University.* Then open the subfolder of your University and *you may safely delete all the subfolders except the one for your School/Faculty.*

As stated above, the `Schools` folder contains per-university folders and per-school (faculty) subfolders. Currently these are the available folders:

`ul / ist`	*folder*	The folder for the *Instituto Superior Técnico* of the *University of Lisbon*.
`nova / fcsh`	*folder*	The folder for the *Faculty of Human and Social Sciences* of the *NOVA University of Lisbon*.
`nova / fct`	*folder*	The folder for the *Faculty of Sciences and Technology* of the *NOVA University of Lisbon*.
`nova / novaims`	*folder*	The folder for the *Information and Management School* of the *NOVA University of Lisbon*.

2.3 `novathesis.cls` Class Options

The *novathesis* class can be customized with the options listed below.

---

docdegree=OPT   phd(*), phdplan, phdprop, msc, mscplan, bsc

   The type of the document: PhD Thesis (default), PhD Plan, PhD Proposal, MSc Disseration, MSc Plan, BSc Report

---

school=OPT   nova/fct(*), nova/fcsh, nova/ims, ul/ist, ul/fc

The name of the school. This option changes the typesetting of the cover and some School specific formating, like margins, fonts, paragraph spacing and indentation, etc...

lang=OPT   en(*), pt

The main language for the document. Currently only Portuguese and English are supported. Other languages are expected to be support in forthcoming versions.

fontstyle=OPT   bookman, charter, fourier, kpfonts(*), mathpazo1, mathpazo2, newcent

The font set to be used in the document. Please note that a font set include definitions for the main text, headings, maths, etc.

chapstyle=OPT   bianchi, bluebox, brotherton, dash, default, elegant(*), ell, ger, hansen, ist, jenor, lyhne, madsen, pedersen, veelo, vz14, vz34, vz43

The chapter style, i.e., the look of the chapter beginning.

converlang=OPT   en, pt(*)

The language to be used when typesetting the cover page.

otherlistsat=OPT   front(*), back

Where to put the other lists besides the table of contents. The default is (`front`) before the main text. But some scientific areas prefer them at the end of the document (`back`), just before the Appendixes.

aftercover=OPT   true, false(*)

Include or don't include the contents of the "`aftercover`" file. The default is for this file to be ignored (if if it exists).

linkscolor=OPT   darkblue(*), black

The color for all the hyperlinks in the PDF file. The "`media=paper`" option (see below) will override this option to "`black`"

spine=OPT   true, false(*)

Generate the book spine and the last page in the PDF.

biblatex=OPT   OPT={list of options for `biblatex`}

Customize `biblatex`, the bibliography management system used in this class. Probably you will want to change the value of the `biblatex` "`style`" option. For other customizations of `biblatex` check its manual.

memoir=OPT   OPT={list of options for `memoir`}

*Customize the base class `memoir`. The `memoir` manual should be the first document to be consulted when looking for "**how can I do this?**" You may wnat to change the base font size from 11pt to a smaller (10pt) or larger (12pt) size. Also, remember to change the "`draft`" to final when your document is finished.*

media=OPT   screen(*), paper

Behavior to be customized in the school options/configuration. Expected definitions for screen are: left and right margins are equal and use colored links. Expected definitions for paper are: left and right margins are different and use black links.

2.4 Additional considerations about the class options

In this section we will provide some additional considerations about some of the customizations available as class options.

2.4.1 The main language

The choice of the main language with the option "`lang=OPT`" affects:

- **The order of the summaries.** First is printed the abstract in the main language and then in the foreign language. This means that if your main language for the document in English, you will see first the "abstract" (in English) and then the "resumo" (in Portuguese). If you switch the main language for the document for Portuguese, it will also automatically switch the order of the summaries to "resumo" and then "abstract".

- **The names for document sectioning.** E.g., "Chapter" vs. "Capítulo", "Table of Contents" vs. "Índice", "Figure" vs. "Figura", etc.

- **The type of documents in the bibliogrpahy.** E.g., "Technical Report" vs. "Relatório Técnico", "PhD Thesis" vs. "Tese de Doutoramento", etc.

No mater which language you chose, you will always have the appropriate hyphenation rules according to the language at that point. You always get Portuguese hyphenation rules in the "Resumo", english hyphenation rules in the "Abstract", and then the main language hyphenation rules for the rest of the document.

2.4.2 Class of Text

You must choose the class of text for the document. The available options are:

1. **bsc** — BSc graduation report.

2. ***mscplan** — Preparation of MSc dissertation. This is a preliminary report graduate students at DI-FCT-NOVA must prepare to conclude the first semester of the two-semesters MSc work. The files specified by `\dedicatoryfile` and `\acknowledgmentsfile` are ignored, even if present, for this class of document.

3. **msc** — MSc dissertation.

4. **phdprop** — Proposal for a PhD work. The files specified by `\dedicatoryfile` and `\acknowledgmentsfile` are ignored, even if present, for this class of document.

5. **prepphd** — Preparation of a PhD thesis. This is a preliminary report PhD students at DI-FCT-NOVA must prepare before the end of the third semester of PhD work. The files specified by `\dedicatoryfile` and `\acknowledgmentsfile` are ignored, even if present, for this class of document.

6. **phd** — PhD dissertation.

2.4.3   Printing

You must choose how your document will be printed. The available options are:

1. **oneside** — Single side page printing.

2. ***twoside** — Double sided page printing.

2.4.4   Font Size

You must select the encoding for your text. The available options are:

1. **11pt** — Eleven (11) points font size.

2. ***12pt** — Twelve (12) points font size. You should really stick to 12pt...

2.4.5   Text Encoding

You must choose the font size for your document. The available options are:

1. **latin1** — Use Latin-1 (ISO 8859-1) encoding. Most probably you should use this option if you use Windows;

2. **utf8** — Use UTF8 encoding. Most probably you should use this option if you are not using Windows.

2.4.6 Examples

Let's have a look at a couple of examples:

- Preparation of PhD thesis, in portuguese, with 11pt size and to be printed single sided (I wonder why one would do this!)

  `\documentclass[prepphd,pt,11pt,oneside,latin1]{thesisdifct-nova}`

- MSc dissertation, in english, with 12pt size and to be printed double sided

  `\documentclass[msc,en,12pt,twoside,utf8]{thesisdifct-nova}`

2.5 How to Write Using LaTeX

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

2.6 Example glossary, acronyms, and symbols

This is the first occurrence of an abbreviation: abbreviation of a longer text (abbrev). And now the second occurrence of the same abbreviation: abbrev. And a new acronym with capital letter: And extension of a xpto xpto xpto xpto xpto xpto xpto xpto xpto xpto xpto xpto xpto xpto xpto xpto xpto xpto xpto (xpto) and reused xpto. Let's also use a few other acronyms such as acornym aaa (aaa), acornym aab (aab), acornym aba (aba), acornym bbb (bbb) and xpto. In geometry, the area enclosed by a circle of radius r is πr^2. Here the Greek letter π is equal to the ratio of the circumference of any circle to its diameter. Lets add "computer" to the glossary!

A Short LaTeX Tutorial with Examples

This Chapter aims at exemplifying how to do common stuff with LaTeX. 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 Bibliogrpahy

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.

<div align="center">

(a) One sub-figure   (b) Another sub-figure

Figura 1: A figure with two sub-figures!

</div>

And this is a small text that references the Figure 1 and its Subfigures 1a and 1b.

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.
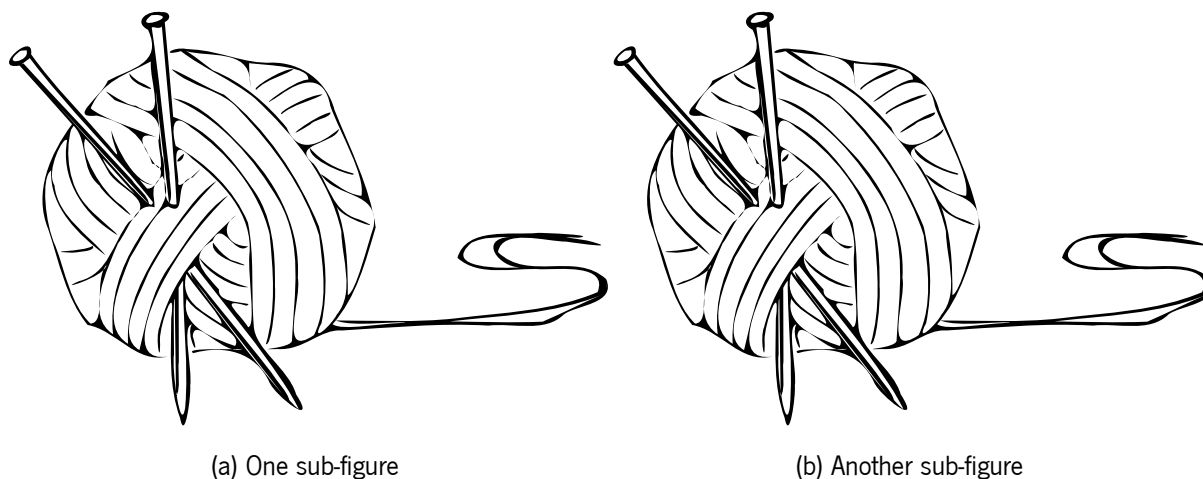
3.6   Text Formatting

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 Creating Source Files Compatible with both latex and pdflatex

Do not include the extension of the file in the `\includegraphics` command. E.g., use

`\includegraphics{sonwman}`

and not

`\includegraphics{sonwman.eps}`.

If you use the first form, `latex` or `pdflatex` will add an appropriate file extension.

This means that, if you plan to use only `pdflatex`, you need only to keep (preferably) a PDF version of all the images. If you plan to use also `latex`, then you also need an EPS version of each image.

To be included in the sections above

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{Artho04}). Caso queira fazer múltiplas citações [6–8], 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.

Footnotes[1] will be numbered and shown in the bottom of the page.

A Tabela 1 ilustra alguns conceitos importantes associados à contrução de tabelas:

i) Não usar linhas verticais;

ii) A legenda deve ficar por cima da tabela;

iii) Usar as macros \toprule, \midrule e \bottomrule para fazer a linha horizontal superior, interiores e inferior, respectivamente.

Tabela 1: Test results summary.

Test	Anomalies	Warnings	Correct	Categories	Missed
[3] Connection	2	2	1	*C*	1
[1] Coordinates'03	1	4	1	*2B, 1C*	0
[1] Local Variable	1	2	1	*A*	0
[1] NASA	1	1	1	—	0
[2] Coordinates'04	1	4	1	*3C*	0
[2] Buffer	0	7	0	*2A, 1B, 2C, 2D*	0
[2] Double-Check	0	2	0	*1A, 1B*	0
[4] StringBuffer	1	0	0	—	1
[9] Account	1	1	1	—	0
[9] Jigsaw	1	2	1	*C*	0
[9] Over-reporting	0	2	0	*1A, 1C*	0
[9] Under-reporting	1	1	1	—	0
[5] Allocate Vector	1	2	1	*C*	0
Knight Moves	1	3	1	*2B*	0
Total	**12**	**33**	**10**	**5A, 6B, 10C, 2D**	**2**

As figuras a inserir no documento deverão ser de qualidade, preferencialmente em formato vectorial (PDF vectorial) e não em *bitmap* (PNG, JPG, etc). As imagens *bitmap* (Figura 2) não escalam bem e têm reflexos negativos na qualidade do seu docuemnto. Pelo contrário, as imagens *vectoriais* Figura 3 escalam muito tanto quanto o necessário sem degradar a qualidade da imagem.

Só deve usar *screenshots* se não tive mesmo nenhuma alternativa. Em vez e gerar um *screenshot*, tente usar uma impressora virtual PDF e imprimir para um ficheiro PDF. Regra geral obterá um PDF

---

[1]This is a simple footnote.

vetorial. Mesmo que o seu PDF contenha imagens, elas terão sempre qualidade maior ou igual à que obteria com um *screenshot*.

Para agregar várias figuras numa única... Poderá assim referenciar o conjunto 4, a priemira delas 4 ou a segunda 4a.

Para incluir listagens de código no seu documento, deverá incluir o pacote *listings* e depois usar o ambiente *lstlisting*, como exemplificado na Listagem 1.

Listagem 1: Hello World

```
1  /**
2   * The HelloWorldApp class implements an application that
3   * simply prints "Hello World!" to standard output.
4   */
5  class HelloWorldApp {%
6      public static void main(String[] args) {%
7          System.out.println("Hello World!"); // Display the string.
8      }
9  }
```

3.8   Equações

O LaTeX é uma ferramenta poderosa para escrever em estilo matemático. Permite inserir fórmulas no meio do texto como por exemplo esta: $ax^2 + bx + c = 0$. Também permite que as fórmulas sejam destacadas numa linha separada e centradas na página

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

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

ou numeradas

$$aaa \tag{1}$$

que depois pode ser referida no texto como sendo a equação 1
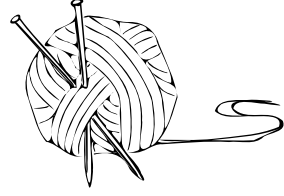
$$aa$$

$$a \tag{2}$$

$$b \tag{3}$$

$$c \tag{4}$$

$$\tag{5}$$

14

Figura 2: Imagem em formato *bitmap* (JPG)

Figura 3: Imagem em formato PDF vectorial

a Novelo de lã

b Tempestade com neve

Figura 4: Exemplo de utilização de *subbottom*

Simplest form of the *Central Limit Theorem*: *Let X_1, X_2, $\cdots$ be a sequence of iid random variables with mean 0 and variance 1 on a probability space $(\Omega, \mathcal{F}, \mathbb{P})$. Then*

$$\mathbb{P}\left(\frac{X_1 + \cdots + X_n}{\sqrt{n}} \le y\right) \to \mathfrak{N}(y) := \int_{-\infty}^{y} \frac{e^{-t^2/2}}{\sqrt{2\pi}}\, dt \quad \text{as } n \to \infty,$$

or, equivalently, letting $S_n := \sum_{1}^{n} X_k$,

$$\mathbb{E}f\left(S_n/\sqrt{n}\right) \to \int_{-\infty}^{\infty} f(t)\frac{e^{-t^2/2}}{\sqrt{2\pi}}\, dt \quad \text{as } n \to \infty, \text{ for every } f \in bC(\mathbb{R}).$$

$$I_j = \int_{\Omega} f_j(x)d\mu(x) \tag{6}$$

$$F = \sum_{i=1}^{n} \frac{1}{n_i} \sum_{j=1}^{n_i} \omega_i(X_{i,j}) \frac{f(X_{i,j})}{p_i(X_{i,j})} \tag{7}$$

$$\omega_i(x) = \frac{n_i p_i(x)}{\sum_k n_k p_k(x)} \tag{8}$$

$$I = \sum_{s \ge 0} \sum_{t \ge 0} \omega_{s,t}(x_{s,t}) \frac{f_j(x_{s,t})}{p_{s,t}(x_{s,t})} \tag{9}$$

3.9   Algorithms

Algoritmo 1 Calculate $y = x^n$

Require: $n \geq 0 \vee x \neq 0$
Ensure: $y = x^n$
  $y \Leftarrow 1$
  if $n < 0$ **then**
    $X \Leftarrow 1/x$
    $N \Leftarrow -n$
  else
    $X \Leftarrow x$
    $N \Leftarrow n$
  end if
  while $N \neq 0$ **do**
    if N is even **then**
      $X \Leftarrow X \times X$
      $N \Leftarrow N/2$
    else if N is odd **then**
      $y \Leftarrow y \times X$
      $N \Leftarrow N - 1$
    end if
  end while

Bibliografia

[1]   C. Artho, K. Havelund e A. Biere. *High-Level Data Races*. 2003. url: `citeseer.ist.psu.edu/artho03highlevel.html`.

[2]   C. Artho, K. Havelund e A. Biere. "Using Block-Local Atomicity to Detect Stale-Value Concurrency Errors". Em: *ATVA*. Ed. por F. Wang. Vol. 3299. Lecture Notes in Computer Science. Springer, 2004, pp. 150–164. isbn: 3-540-23610-4.

[3]   N. E. Beckman, K. Bierhoff e J. Aldrich. "Verifying Correct Usage of Atomic Blocks and Typestate". Em: *SIGPLAN Not.* 43.10 (2008), pp. 227–244. issn: 0362-1340. doi: `http://doi.acm.org/10.1145/1449955.1449783`.

[4]   C. Flanagan e S. N. Freund. "Atomizer: a dynamic atomicity checker for multithreaded programs". Em: *POPL '04: Proceedings of the 31st ACM SIGPLAN-SIGACT symposium on Principles of programming languages*. Venice, Italy: ACM, 2004, pp. 256–267. isbn: 1-58113-729-X. doi: `http://doi.acm.org/10.1145/964001.964023`.

[5]   *IBM's Concurrency Testing Repository*.

[6]   J. E. B. Moss. *Nested transactions: an approach to reliable distributed computing*. Cambridge, MA, USA: Massachusetts Institute of Technology, 1985. isbn: 0-262-13200-1.

[7]   N. Shavit e D. Touitou. "Software transactional memory". Em: *PODC '95: Proceedings of the fourteenth annual ACM symposium on Principles of distributed computing*. Ottowa, Ontario, Canada: ACM, 1995, pp. 204–213. isbn: 0-89791-710-3. doi: `http://doi.acm.org/10.1145/224964.224987`.

[8]   A. Silberschatz, H. F. Korth e S. Sudarshan. *Database System Concepts*. Fifth. McGraw-Hill, 2006. isbn: 007-124476-X.

[9]   C. von Praun e T. R. Gross. "Static Detection of Atomicity Violations in Object-Oriented Programs". Em: *Journal of Object Technology*. 2003, p. 2004.

Appendix 1 Lorem Ipsum

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.

Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacus tincidunt ultrices. Lorem ipsum dolor sit amet, consectetuer adipiscing elit. In hac habitasse platea dictumst. Integer tempus convallis augue. Etiam facilisis. Nunc elementum fermentum wisi. Aenean placerat. Ut imperdiet, enim sed gravida sollicitudin, felis odio placerat quam, ac pulvinar elit purus eget enim. Nunc vitae tortor. Proin tempus nibh sit amet nisl. Vivamus quis tortor vitae risus porta vehicula.

Fusce mauris. Vestibulum luctus nibh at lectus. Sed bibendum, nulla a faucibus semper, leo velit ultricies tellus, ac venenatis arcu wisi vel nisl. Vestibulum diam. Aliquam pellentesque, augue quis sagittis posuere, turpis lacus congue quam, in hendrerit risus eros eget felis. Maecenas eget erat in sapien mattis porttitor. Vestibulum porttitor. Nulla facilisi. Sed a turpis eu lacus commodo facilisis. Morbi fringilla, wisi in dignissim interdum, justo lectus sagittis dui, et vehicula libero dui cursus dui. Mauris tempor ligula sed lacus. Duis cursus enim ut augue. Cras ac magna. Cras nulla. Nulla egestas. Curabitur a leo. Quisque egestas wisi eget nunc. Nam feugiat lacus vel est. Curabitur consectetuer.

Appendix 2 Lorem Ipsum

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.

Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacus tincidunt ultrices. Lorem ipsum dolor sit amet, consectetuer adipiscing elit. In hac habitasse platea dictumst. Integer tempus convallis augue. Etiam facilisis. Nunc elementum fermentum wisi. Aenean placerat. Ut imperdiet, enim sed gravida sollicitudin, felis odio placerat quam, ac pulvinar elit purus eget enim. Nunc vitae tortor. Proin tempus nibh sit amet nisl. Vivamus quis tortor vitae risus porta vehicula.

Fusce mauris. Vestibulum luctus nibh at lectus. Sed bibendum, nulla a faucibus semper, leo velit ultricies tellus, ac venenatis arcu wisi vel nisl. Vestibulum diam. Aliquam pellentesque, augue quis sagittis posuere, turpis lacus congue quam, in hendrerit risus eros eget felis. Maecenas eget erat in sapien mattis porttitor. Vestibulum porttitor. Nulla facilisi. Sed a turpis eu lacus commodo facilisis. Morbi fringilla, wisi in dignissim interdum, justo lectus sagittis dui, et vehicula libero dui cursus dui. Mauris tempor ligula sed lacus. Duis cursus enim ut augue. Cras ac magna. Cras nulla. Nulla egestas. Curabitur a leo. Quisque egestas wisi eget nunc. Nam feugiat lacus vel est. Curabitur consectetuer.

Anexo I

Annex 1 Lorem Ipsum

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.

Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacus tincidunt ultrices. Lorem ipsum dolor sit amet, consectetuer adipiscing elit. In hac habitasse platea dictumst. Integer tempus convallis augue. Etiam facilisis. Nunc elementum fermentum wisi. Aenean placerat. Ut imperdiet, enim sed gravida sollicitudin, felis odio placerat quam, ac pulvinar elit purus eget enim. Nunc vitae tortor. Proin tempus nibh sit amet nisl. Vivamus quis tortor vitae risus porta vehicula.

Fusce mauris. Vestibulum luctus nibh at lectus. Sed bibendum, nulla a faucibus semper, leo velit ultricies tellus, ac venenatis arcu wisi vel nisl. Vestibulum diam. Aliquam pellentesque, augue quis sagittis posuere, turpis lacus congue quam, in hendrerit risus eros eget felis. Maecenas eget erat in sapien mattis porttitor. Vestibulum porttitor. Nulla facilisi. Sed a turpis eu lacus commodo facilisis. Morbi fringilla, wisi in dignissim interdum, justo lectus sagittis dui, et vehicula libero dui cursus dui. Mauris tempor ligula sed lacus. Duis cursus enim ut augue. Cras ac magna. Cras nulla. Nulla egestas. Curabitur a leo. Quisque egestas wisi eget nunc. Nam feugiat lacus vel est. Curabitur consectetuer.