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Department of Applied Mathematics and Computer Science

Laursen's XeLaTeX thesis template

A *nice* thesis template

John Doe (sABCDEF)

Kongens Lyngby 2018

Summary

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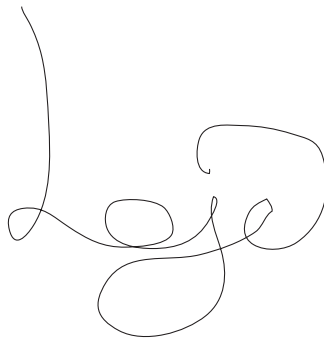
Preface

This xxx thesis was prepared at the department of Applied Mathematics and Computer Science at the Technical University of Denmark in fulfillment of the requirements for acquiring a yyy degree in zzz.

Kongens Lyngby, August 30, 2018

John Doe (sABCDEF)

Acknowledgements

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Contents

Todo list

Introduction

- Upright shape

- *Italic shape*

- *Slanted shape*

- SMALL CAPS SHAPE

- Medium series

- **Bold series**

- Roman family

- Sans serif family

- `Typewriter family`

I love to write special characters like øæå inside my TEX document. Also á, à, ü, û, ë, ê, î, ï could be nice. So what about the " " character. What about ° é ® † ¥ ü | œ ' @ ö ä ¬ ‹ « © f ß ª Ω … ç √ ñ µ , · ¡ " £ ∞ ™ [ ] ± '.

Some dashes - – —, and the latex form - – —

$$x = \mathbf{x}, \mathbf{x}, x, x_{1_{2_{3_4}}}^{1^{2^{3^4}}} \cdot hello * \text{hello worldmy world\r{u}third world}t$$

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1.0 (1) Make a cake

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1.0 (2) Do it now

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Maecenas at suscipit orci. See Figure 1.1.

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See Table 1.1.

1.1   Torquent Arcu

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fringilla tincidunt risus nec accumsan. Curabitur vel sagittis ante. Integer eget plac-
erat leo. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per
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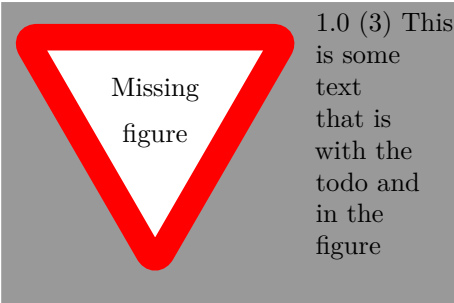
Figure 1.1: This is my special figure. Aliquam ultricies, arcu quis tempor rhoncus,
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interdum arcu quis vestibulum.

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e	e	e

Table 1.1: This is a caption to the table.

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1.1.1   Vestibulum

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```python
# This is a comment
import easy
str = "I am a string"
str2 = "Now i have an awesome string with ´ '' `` which are not TeX'ed"
str3 = "What about awesome unicode characters? Like ", , ", Ω, ç. \" This"
def fib(n):
    if n == 0:
        return 0
    elif n == 1:
        return 1
    else:
        return fib(n-1) + fib(n-2)
str4 = "Yes it is possible with 80 characters. Which this string proves. Wiiii.
"
str5 = "It adjusts according to the spine"
```

Listing 1.1: Fibonacci.

1.2   Luctus

Praesent et pellentesque arcu. Phasellus venenatis mi eu lorem convallis et iaculis ante aliquet. Aenean rhoncus placerat metus, vel convallis leo suscipit eu. Integer dapibus venenatis commodo. Cras laoreet faucibus sem nec luctus. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos himenaeos. Cras consectetur lacinia dolor at gravida. Phasellus ipsum arcu, vulputate fermentum ultricies eget, tempor eu odio. Aenean accumsan vestibulum risus a mattis. See it on Algorithm 1.
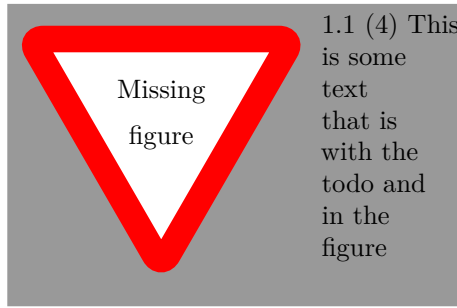
(a) 1 pass
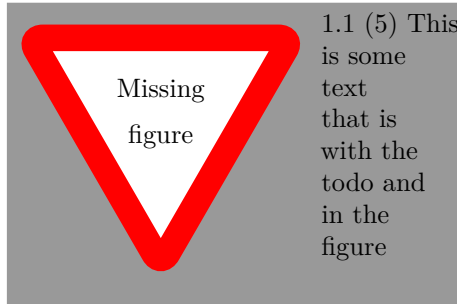
(b) 5 passes

Figure 1.2: loop performance comparison.

Fusce id suscipit sem. Aliquam venenatis nibh nec nisl luctus vel consectetur neque dapibus. Nulla feugiat egestas turpis, ac viverra eros cursus sit amet. Cras tincidunt felis vel tellus ultrices condimentum. Quisque vehicula, arcu vitae interdum dignissim, purus tortor cursus libero, sit amet accumsan quam magna in neque. Phasellus luctus leo odio. Aliquam ultricies, arcu quis tempor rhoncus, tellus nisl tempus justo, condimentum tempor erat odio ac purus. Integer quis ipsum felis. Aliquam volutpat, leo ac consequat egestas, lectus lacus adipiscing quam, id iaculis dolor quam in erat. Phasellus tempor interdum arcu quis vestibulum. Pellentesque sit amet augue purus. Curabitur condimentum suscipit arcu, sit amet convallis urna pellentesque ac. Quisque fringilla tincidunt risus nec accumsan. Curabitur vel sagittis ante. Integer eget placerat leo. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos himenaeos. Vestibulum quis risus in nulla fermentum pellentesque dictum et erat. Nulla vel pretium nunc. Integer tortor lorem, suscipit sit amet ultricies non, porta at metus. Sed pharetra, ante facilisis interdum porta, mi dolor fringilla quam, ac porttitor urna dolor quis massa. Proin viverra semper tincidunt. Vivamus pulvinar pharetra condimentum. Pellentesque rutrum mollis tellus ac scelerisque.


Algorithm 1 Modified mini-batch K-means

 1: Given: K, mini-batch size B, iterations T, dataset X, correlation matrix P.
 2: Initialize $C = \{\mathbf{c}^{(1)}, \mathbf{c}^{(2)}, \ldots, \mathbf{c}^{(K)}\}$ with random $\mathbf{x}$'es picked from X.
 3: $A \leftarrow B \cdot T$ sorted random indexes to X, denoted $a_1, a_2, \ldots, a_{B \cdot T}$.
 4: $X' \leftarrow \{\mathbf{x}^{(a_1)}, \mathbf{x}^{(a_2)}, \ldots, \mathbf{x}^{(a_{B \cdot T})}\}$ ▷ Cache all points
 5: $\mathbf{size} \leftarrow 0$
 6: **for** $i = 1$ to T **do**
 7:     $M \leftarrow B$ examples picked randomly from X'
 8:     **for** $\mathbf{x} \in M$ **do**   ▷ *Assignment step*
 9:        $\mathbf{d}[\mathbf{x}] \leftarrow f(C, \mathbf{x}, \mathrm{P})$ ▷ Cache closest center
10:     **end for**
11:     **for** $\mathbf{x} \in M$ **do**   ▷ *Update step*
12:        $\mathbf{c} \leftarrow \mathbf{d}[\mathbf{x}]$ ▷ Get cached center for current $\mathbf{x}$
13:        $\mathbf{size}[\mathbf{c}] \leftarrow \mathbf{size}[\mathbf{c}] + 1$ ▷ Update cluster size
14:        $\eta \leftarrow \frac{1}{\mathbf{size}[\mathbf{c}]}$ ▷ Get learning rate
15:        $\mathbf{c} \leftarrow (1 - \eta)\mathbf{c} + \eta\mathbf{x}$ ▷ Take gradient step
16:     **end for**
17: **end for**
18: **return** C, $\mathbf{size}$
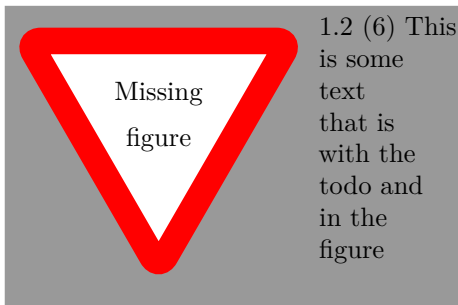
Figure 1.3: This is the caption I wrote.

1.3   Sollicitudin vestibulum

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taciti sociosqu ad litora torquent per conubia nostra, per inceptos himenaeos. Cras
consectetur lacinia dolor at gravida. Phasellus ipsum arcu, vulputate fermentum
ultricies eget, tempor eu odio. Aenean accumsan vestibulum risus a mattis.

```
1  # This is a comment
2  import easy
3  str = "I am a string"
4  str2 = "Now i have an awesome string with ´ '' `` which are not TeX'ed"
5  str3 = "What about awesome unicode characters? Like ", , ", Ω, ç. \" This"
6  def fib(n):
7      if n == 0:
8          return 0
9      elif n == 1:
10         return 1
11     else:
12         return fib(n-1) + fib(n-2)
13 str4 = "Yes it is possible with 80 charactes. Which this string proves. Wiiii."
14 str5 = "It adjusts according to the spine"
```

Listing 1.2: Fibonacci2.

CHAPTER 2

Long chapter $\phi \wedge \sigma$ title with π, very long title, and also $math = \sigma$

My favorite RFC is [Wai99]. Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum. What about some inline sans serif text?. $x = 4, y = 7$ which means that $\sqrt{4} = 2$.

Sans serif testing:

- π

-

- π

- *italic*

- ***bold italic***

- **bold**

- `teletype`

- Math Sans Serif

- Text Sans Serif

CHAPTER 3

Heading on Level 0 (chapter)

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

3.1 Heading on Level 1 (section)

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

3.1.1 Heading on Level 2 (subsection)

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written

in of the original language. There is no need for special content, but the length of words should match the language.

3.1.1.1 Heading on Level 3 (subsubsection)

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

Heading on Level 4 (paragraph)   Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

3.2   Lists

3.2.1   Example for list (itemize)

- First item in a list
- Second item in a list
- Third item in a list
- Fourth item in a list
- Fifth item in a list

3.2.1.1 Example for list (4*itemize)

- First item in a list
  - First item in a list
    * First item in a list
      · First item in a list

· Second item in a list

∗ Second item in a list

− Second item in a list

• Second item in a list

3.2.2   Example for list (enumerate)

1. First item in a list

2. Second item in a list

3. Third item in a list

4. Fourth item in a list

5. Fifth item in a list

3.2.2.1   Example for list (4*enumerate)

1. First item in a list

    a) First item in a list

        i. First item in a list
            A. First item in a list
            B. Second item in a list
        ii. Second item in a list

    b) Second item in a list

2. Second item in a list

3.2.3   Example for list (description)

First item in a list

Second item in a list

Third item in a list

Fourth item in a list

Fifth item in a list

3.2.3.1   Example for list (4*description)

First item in a list

    First item in a list

        First item in a list

           First item in a list

           Second item in a list

        Second item in a list

    Second item in a list

Second item in a list

CHAPTER 4

Conclusion

Morbi pharetra ligula integer mollis mi nec neque ultrices vitae volutpat leo ullamcorper. In at tellus magna. Curabitur quis posuere purus. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Suspendisse tristique placerat feugiat. Aliquam vitae est at enim auctor ultrices eleifend a urna. Donec non tincidunt felis. Maecenas at suscipit orci.

APPENDIX A

An Appendix

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Bibliography

[Ada80]   Douglas Adams. *The hitchhiker's guide to the galaxy*. Hitchhiker's Guide to the Galaxy Series. Harmony Books, 1980. ISBN: 9780517542095.

[Wai99]   D. Waitzman. *IP over Avian Carriers with Quality of Service*. RFC 2549 (Informational). Internet Engineering Task Force, April 1999. URL: http://www.ietf.org/rfc/rfc2549.txt.