This is a LaTeX exercise using the IEEE template

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Abstract—In this exercise, I must recreate this document (or be able to make an appropriately close clone). By doing this, I will practice some of the shown LaTeX commands, but will also need to discover how to do some typesetting that was not shown in the workshop. I fear this second part.

Index Terms—LaTeX, Workshop, 25/10, Awesome Presenter, Fun Exercise, Overall Perfect

I. Introduction

Although I have always hated **Microsoft Word**, I have also always been afraid to make the switch to **LaTeX**. However, thanks to the **perfect workshop** by *dr. ing. Jens Vankeirsbilck* I am now confident to at least try LaTeX for my masterthesis. He showed us the basic commands which give us at least 80 % of what we need. Furthermore, some of the missing 20 % is involved in this exercise.

Although I usually *despise* hands-on exercises, this exercise is **really fun**. Since LaTeX resembles coding, I understand I can only learn it by practicing.

The remainder of this document is structured as follows. Section II practices typesetting equations, while Section III is concerned with figures. Next, Section IV includes a short listing example. Following, more typesetting is practiced through Section V. Finally, conclusions are drawn in Section VI.

II. Equations

In this section, I will typeset some equations., i.e. (1) through (6). Start with the example from the slides (1). This already includes lot of the steps necessary to create some equations.

$$x_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \tag{1}$$

Let's revise some of the Trigonometric identities (2) to (4).

$$\sin^2(A) + \cos^2(A) = 1 \tag{2}$$

$$\cos(\alpha \pm \beta) = \cos\alpha\cos\beta \mp \sin\alpha\sin\beta \tag{3}$$

$$
\begin{aligned}
\tan(1 + \cos(2A)) &= \frac{\sin A}{\cos A} \times (1 + \cos(2A)) \\
&= \frac{\sin A}{\cos A} \times 2\cos^2 A \\
&= 2\sin A \cos A \\
&= \sin(2A)
\end{aligned}
\tag{4}
$$

Special thanks to dr. ing. Jens Vankeirsbilck to show me the basics of LaTeX and prepare this wonderful exercise for me!

Figure 1. Do you like fishsticks? Source: https://nl.pinterest.com/pin/506092076847821283/

Finally, let's end with the standard formula to calculate the Moments about the x-axis (5) and y-axis (6) of a plate bounded by two curves.

$$M_x = \int \frac{\delta}{2}[f^2(x) - g^2(x)]dx \tag{5}$$

$$M_y = \int x\delta[f(x) - g(x)]dx \tag{6}$$

III. Figures

Someone[1] once said:

> A picture paints a thousands words.

So, let's include a picture here. I'll break my own rule and use a .jpg file for Fig. 1. Replace this by your own picture, just to practice getting a picture in a LaTeX document.

There's nothing more to it. Simple environment and simple command. In case you want, you can also test to span this picture over both columns if you're using a multicolumn template. This is the sole purpose of Fig. 2 .

IV. Listing

Since some of the participants will probably produce code in their masterthesis, it might be relevant to typeset that code using LaTeX. For those people, this section is included. The source code is taken from the ROS1 Wiki [http://wiki.ros.org/ROS/Tutorials/WritingPublisherSubscriber%28python%29], so do yourself a favor and also copy it from there. This exercise is about learning to use the correct package and commands, not typing code.

ROS is based on the publish-subscribe pattern to make multiprocess code easier. As can be seen in Lst. 1, a *publisher*

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[1] Reportedly it was Frederick R. Barnard in *Printer's Ink* (Dec. 1921)

Figure 2. "Do you like fishsticks" now over both columns

Listing 1. ROS1 simple Python publisher

```python
#!/usr/bin/env python
# license removed for brevity
import rospy
from std_msgs.msg import String

def talker():
    pub = rospy.Publisher('chatter',
                   String, queue_size=10)
    rospy.init_node('talker', anonymous=True)
    rate = rospy.Rate(10) # 10 Hz
    while not rospy.is_shutdown():
        hello_str = "hello world %s"
                   % rospy.get_time()
        rospy.loginfo(hello_str)
        pub.publish(hello_str)
        rate.sleep()

if __name__ == '__main__':
    try:
        talker()
    except rospy.ROSInterruptException:
        pass
```

can publish to a certain topic at a certain rate (in Hz). The topic is here defined as *chatter* and while ROS is executing, the publisher will send the message `hello world` accompanied by the time at a rate of $10\,\text{Hz}$.

As shown in the slides, by better defining the style, keywords can be highlighted in color, Strings can be highlighted differently. If you have many listings, it is best to do this, as this increases readability. This, however, falls out of scope of this exercise.

V. SOME MORE TYPESETTING

Something that was not covered yet, were bulleted and numbered lists. Let's practice that here.

An example of a bulleted list:

- First bullet;
- Second bullet;
- Final and third bullet. This was easy.

While bulleted lists can be used, it is better to use a numbered list when the different options are ranked, or present steps in a process.

1) First, you have to define the list;
2) Then, you can fill it with actions, steps, content.
3) Also, do not worry about very very very very very very very very very very long and elaborated content. LaTeX knows how to deal with this, so you don't have think about it.

Now you know how to create lists.

PS: did you notice that in Section IV the content of the publisher, i.e. `hello world`, was also typeset? Make sure you can recreate this, as this is often used to set code-variables, etc. apart in your text. Again, this increase readability.

VI. CONCLUSIONS

Table I summarizes what you have learned through this exercise. Of course, all references to section, equations, figures, etc. where made through commands and were not typed manually!

Table I
OVERVIEW OF LEARNED TYPESETTING. (CAPTION ALWAYS ABOVE TABLES)

Section	Typesetting learned
I	**bold**, *italic*, <u>underline</u>, colors, combinations and typesetting %
II	equations
III	figures, quotes, footnote and typesetting an URL
IV	code listing, `typewriter` and SI unit
V	bulleted list and numbered list
VI	table

Together with the slides, this should give you a very good command of LaTeX and give you the confidence to create your masterthesis (and future papers) in LaTeX. Thank you for participating in the Workshop!