



**Warsaw University of Technology**

**Faculty of Mathematics  
and Information Science**

# Bachelor's diploma thesis

in the field of study Computer Science and Information Systems

Thesis title

**Author One**

student record book number 123456

**Author Two**

student record book number 654321

thesis supervisor

title/degree Name Surname

consultation (optional)

academic title/degree Name and Surname

WARSAW 2022



## **Abstract**

### ENGLISH TITLE

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**Keywords:** keyword1, keyword2, ...



## **Streszczenie**

### **POLISH TITLE**

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**Słowa kluczowe:** słowo klucz 1, słowo klucz 2, zażółć gęślą jaźń...



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## 1. Introduction

What is the thesis about? What is the content of it? What is the Author's contribution to it?

WARNING! In a diploma thesis which is a team project: Description of the work division in the team, including the scope of each co-author's contribution to the practical part (Team Programming Project) and the descriptive part of the diploma thesis.

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## 2. Example chapter

This T<sub>E</sub>X file is to be compiled with pdfLaTeX (it's just quick build in TeXMaker).

### 2.1. Example section

**Definition 2.1 (Definition).** A *definition* is a statement of the meaning of a term (a word, phrase, or other set of symbols).

#### 2.1.1. Example subsection

It's the deepest deph of sectioning allowed by rector.

**Definition 2.2 (Equation).** In mathematics, an *equation* is a statement of an equality containing one or more variables.

**Example 2.3.** This is an example of an equation:

$$2 + 2 = 4. \tag{2.1}$$

Equation without a number:

$$2 + 2 = 4,$$

or:

$$2 + 2 = 4.$$

It is worthwhile to peruse other mathematical environments like *multline*, *align* and their versions with a star (, i.e. without numeration). The description of their use can be found at <https://texdoc.org/serve/amsldoc.pdf/0> starting from the end of the third page.

Equation (2.2) is false. References (and some other things) work properly after compiling T<sub>E</sub>X file twice.

$$\int_0^1 x \, dx = \frac{3}{2}. \tag{2.2}$$

Theorem 2.4 is a very interensting result.

**Theorem 2.4 (Pythagoras’ Theorem).** Let  $c$  represent the length of the hypotenuse and  $a$  and  $b$  the lengths of the triangle’s other two sides. Then:

$$a^2 + b^2 = c^2.$$

*Proof.* The proof has been presented in [1] and [2]. We can write then [1, 2]. □

**Corollary 2.5.** The use of the term *corollary*, rather than *proposition* or *theorem*, is intrinsically subjective.

**Remark 2.6.** You can find a rather comprehensive list of available symbols at [https://www3.nd.edu/~nmark/UsefulFacts/LaTeX\\_symbols.pdf](https://www3.nd.edu/~nmark/UsefulFacts/LaTeX_symbols.pdf).

If you want to find a symbol by its shape, you can use the following site: <https://detexify.kirelabs.org/classify.html>.

**Lemma 2.7 (Someone’s Lemma).** Ten lemat jest nie na temat.

*Proof.* Dowód przez indukcję. □

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## 2.2. Floats – tables and figures

Place labels after captions or you get the wrong labelling.

In Table 2.1 there are additional options for `table` and `figure` environments.

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Table 2.1: Additional options

symbol	effect
<b>h</b>	Place the float here, i.e., approximately at the same point it occurs in the source text (however, not exactly at the spot)
<b>t</b>	Position at the top of the page
<b>b</b>	Position at the bottom of the page
<b>p</b>	Put on a special page for floats only
<b>!</b>	Override internal parameters LaTeX uses for determining "good" float positions
<b>H</b>	Places the float at precisely the location in the <code>L<sup>A</sup>T<sub>E</sub>X</code> code. Requires the float package,[1] i.e., <code>\usepackage{float}</code> . This is somewhat equivalent to <code>!ht</code> .

Figure 2.1: Example figure – it has been drawn by `LATEX` default tools

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### 3. The next chapter

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#### 3.1. Matrices

Simple matrix:

$$\begin{array}{cccc} a & b & c & d \\ d & e & f & g \\ 1 & 1 & 1 & 1 \end{array}$$

Matrix with parentheses:

$$A = \begin{pmatrix} a & b & c & d \\ d & e & f & g \\ 1 & 1 & 1 & 1 \end{pmatrix}$$

Matrix with brackets:

$$\begin{bmatrix} a & b & c & d \\ d & e & f & g \\ 1 & 1 & 1 & 1 \end{bmatrix}$$

You can also use more general environment:

$$\begin{array}{ccc} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{array}$$

Matrix with braces:

$$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

**Definition 3.1.** Let  $A \neq \emptyset$ ,  $n \in \mathbb{N}$ . Every function  $f: A^n \rightarrow A$  is called an *n-ary operation* or *działaniem* określonym na  $A$ . 0-ary operations are constant functions.

**Definition 3.2 (Algebra).** The ordered pair  $(A, F)$ , where  $A \neq \emptyset$  is a set and  $F$  is a family of operations defined on  $A$ , shall be called an *algebra* (or *F-algebra*). The set  $A$  is called *the set of elements, support* or *universe* of an algebra  $(A, F)$  and  $F$  is called *the set of elementary operations*.

**Proposition 3.3.** I state that, having passed to the limit, the only thing left me me is to camp at said limit or return, or, maybe, search for a pass or an exit to other areas.

## Bibliography

- [1] A. Author, *Title of a book*, Publisher, year, page–page.
- [2] J. Bobkowski, S. Dobkowski, Title of an article, *Magazine X*, No. 7, year, PAGE–PAGE.
- [3] C. Brink, Power structures, *Algebra Universalis* 30(2), 1993, 177–216.
- [4] F. Burris, H. P. Sankappanavar, *A Course of Universal Algebra*, Springer-Verlag, New York, 1981.

## List of symbols and abbreviations

nzw.    nadzwyczajny

\*       star operator

~       tilde

If you don't need it, delete it.



## List of Figures

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If you don't need it, delete it.

**Spis tabel**

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## List of appendices

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2. Appendix 2
3. In case of no appendices, delete this part.