****

**FINAL PROJECT**

„Title”

**Jan KOWALSKI**

**Student identification number <……….>**

**Programme: Automation and Electronic Systems**

**Specialization:** **<Automation / Electronic Systems>**

**SUPERVISOR**

**<** **title, first name, surname >**

**DEPARTMENT <** **insert appropriate department name>**

**Faculty of Automatic Control, Electronics and Computer Science**

**CONSULTANT (only if applicable, otherwise delete this line)**

**<title, first name, surname>**

**GLIWICE Year**

**Thesis title:**

(Thesis title in English)

**Abstract:**

(Thesis abstract – to be copied into an appropriate field during electronic submission.)

**Keywords:**

(2-5 keywords, separated with commas)

**Tytuł pracy:**

(Thesis title in Polish)

**Streszczenie:**

(Thesis abstract – to be copied into an appropriate field during electronic submission, in Polish.)

**Słowa kluczowe:**

(2-5 keywords, separated with commas, in Polish)

# Contents

[1. Introduction 1](#_Toc98764815)

[2. [Problem analysis] 3](#_Toc98764816)

[3. [Requirements and tools] 5](#_Toc98764817)

[4. [External specification] 7](#_Toc98764818)

[5. [Internal specification] 9](#_Toc98764819)

[6. Verification and validation 11](#_Toc98764820)

[7. Conclusions 13](#_Toc98764821)

[Bibliography 15](#_Toc98764822)

[Index of abbreviations and symbols 16](#_Toc98764823)

[Listings 17](#_Toc98764824)

[List of additional files in electronic submission 18](#_Toc98764825)

[List of Figures 19](#_Toc98764826)

[List of Tables 20](#_Toc98764827)

# Introduction

Indented first line in a paragraph. Font: Times New Roman or Callibri 12pt. 1.3 interline spacing.

This chapter contains following elements:

* introduction into the problem domain,
* settling of the problem in the domain,
* objective of the thesis,
* scope of the thesis,
* short description of chapters,
* clear description of contribution of the thesis’s author – in case of more authors table with enumeration of contribution of authors.

# [Problem analysis]

This chapter contains following elements:

* problem analysis,
* state of the art, problem statement,
* literature research (all sources in the thesis have to be referenced [1, 2, 4, 3]),
* description of existing solutions (also scientific ones, if the problem is scientifically researched), algorithms, location of the thesis in the scientific domain.

(1)

# Requirements and tools

This chapter contains following elements:

* functional and nonfunctional requirements,
* use cases (UML diagrams),
* description of tools,
* methodology of design and implementation.

# External specification

This chapter contains following elements:

* hardware and software requirements,
* installation procedure,
* activation procedure,
* types of users,
* user manual,
* system administration,
* security issues,
* example of usage,
* working scenarios (with screenshots or output files).

The entire document should contain references to the illustrations contained therein (Fig. 4.1).

|  |
| --- |
|  |
| Fig.4.1. *The variation funkstioni* |

# Internal specification

This chapter contains following elements:

* concept of the system,
* system architecture,
* description of data structures (and data bases),
* components, modules, libraries, resume of important classes (if used),
* resume of important algorithms (if used),
* details of implementation of selected parts,
* applied design patterns,
* UML diagrams.

A short code insertion in the text line is possible, e.g. class Main. Longer fragments should be written in *Courier* or *Courier New* font size 10 in frames (Listing 4.1) with a space between the lines of the value 1. All lines of code should be numbered so that they can be referenced in the text of the document.

*Listing 1. Generating random numbers*

|  |  |
| --- | --- |
| 1  2  3  4  5  6  7  8  9  10  11  12  13  14  15  16  17 | **package** polsl.iinf.lab;  **import** java.util.Random;  **public** **class** Main {  **public** **static** **void** main(String[] args) {  Random r = **new** Random();  // drawing a number from the range 1..10  **int** a = r.nextInt(10 + 1);  System.*out*.println(a);  // drawing a number from the range -5..15  System.*out*.println(r.nextInt(21) - 5);  }  } |

# Verification and validation

This chapter contains following elements:

* testing paradigm (eg. V model),
* test cases, testing scope (full / partial),
* detected and fixed bugs,
* results of experiments (optional).

|  |  |
| --- | --- |
| Tabela 4.2. The table header is above the table. | |
| Poziom 1 | 24 pt |
| Poziom 2 | 20 pt |
| Poziom 3 | 16 pt |
|  | |

# Conclusions

This chapter contains following elements:

* achieved results with regard to objectives of the thesis and requirements,
* path of further development (eg. functional extension . . . ),
* encountered difficulties and problems.

# Bibliography

1. First name Surname, First name Surname. *Book title*. Publisher, Publication city, 2017.
2. First name Surname, First name Surname. Title of a journal paper. *Journal name*, 157(8):1092–1113, 2016.
3. First name Surname, First name Surname. Conference paper title. *Conference name*, pp. 5346–5349, 2006.
4. www.address.com (access:DD.MM.YYYY)

# Index of abbreviations and symbols

|  |  |
| --- | --- |
| *DNA* | deoxyribonucleic acid |
| *MVC* | model–view–controller |
| *N* | cardinality of data set |

# Listings

# List of additional files in electronic submission

Additional files uploaded to the system include:

* source codes of the application,
* test data,
* a video showing how software or hardware developed for thesis is used,
* etc.

# List of Figures

4.1 The figure caption is under the figure 12

# List of Tables

6.1 The table header is above the table 16