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FACULTY
OF INFORMATION
TECHNOLOGY
CTU IN PRAGUE

Bachelor's thesis

Thesis title (SPECIFY)

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Department of ...(SPECIFY)
Supervisor: Your Supervisor's Name (SPECIFY)

November 3, 2020

Acknowledgements

THANKS (remove entirely in case you do not with to thank anyone)

Declaration

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Abstrakt

V několika větách shrňte obsah a přínos této práce v českém jazyce.

Klíčová slova Replace with comma-separated list of keywords in Czech.

Abstract

Summarize the contents and contribution of your work in a few sentences in English language.

Keywords Replace with comma-separated list of keywords in English.

Contents

List of Figures

Chapter 1

Introduction

1.1 Motivation, Focus of Thesis

Finite automata have been first described by Warren McCulloch and Walter Pitts in 1943 and since then they have become one of the cornerstones of computer science. While finite automata research is limited nowadays, it is still something that we build upon today and every student of computer science needs to understand its concepts.

And although there is a lot of resources one can learn from, there is a lack of those that utilize modern tools. One of such modern tools is iPad (and touch devices in general). I'd like to fill in this gap and build a finite automata editor native application for iPad in this thesis.

Furthermore, I'd like to expand on the recent work done at FIT CTU concerning development of algorithms library and, more importantly for this thesis, finite automata algorithms including simulating input. This library is named Algorithms Library Toolkit and it has been open sourced.

Last but not least, in this thesis I will try out the new iOS programming declarative paradigm which has been introduced by Apple with the new SwiftUI framework with the combination of a functional architecture, called Composable Architecture.

The main motivation of this thesis is to improve how students learn finite automata and more specifically, enhance the current course BI-AAG that is taught at FIT CTU. It's also an opportunity to try out algorithms library in practice and create a concrete example of how it can be leveraged.

1.2 Thesis Goals

Goals of this thesis are the folowing:

- prepare and explore how to create interface for automata library

- find possible solutions of how to detect automata elements from shapes made by hand on the touch screen
- implement a prototype of an automata editor for iPad
- assess the usability of SwiftUI and Composable Architecture
- perform user testing of the implemented automata editor prototype

1.3 Thesis Structure

Let me now introduce you to the structure of the rest of the thesis:

- In **Chapter 2** I will go over the theoretical concepts to properly explain terms and concepts on which it will be built upon later.
- **Chapter 3** is concerned with analysis of already existing solutions of creating automata editor.
- **Chapter 4** is about the design of the editor itself.
- In **Chapter 5** I will write about the implementation.
- **Chapter 6** will go into the specifics of user testing and its outcomes.
- In **Chapter 7** I will assess the usability of the new SwiftUI framework alongside with a functional Composable Architecture.
- **Conclusion** is the last chapter of this thesis.

Chapter 2

Theory

Chapter 3

Analysis

Chapter 4

Automata Editor Design

Chapter 5

Implementation

Chapter 6

User testing

Chapter 7

SwiftUI and Composable Architecture Assessment

Chapter 8

Conclusion

Appendix A

Acronyms

GUI Graphical user interface

XML Extensible markup language

Appendix B

Contents of enclosed CD

- `readme.txt` ..... the file with CD contents description
- `exe` ..... the directory with executables
- `src` ..... the directory of source codes
  - `wbdcm` ..... implementation sources
  - `thesis` ..... the directory of LaTeX source codes of the thesis
- `text` ..... the thesis text directory
  - `thesis.pdf` ..... the thesis text in PDF format
  - `thesis.ps` ..... the thesis text in PS format