FUNCTIONAL DESIGN SPECIFICATION

SudoClue

Subject	*Programming Project*
Project Name	*SudoClue (Sudoku solver)*
Author	*Izabela Orłowska (imorlowska@gmail.com)*
Last Updated	*15/03/15 19:00*
Version Number	*0.2*
Status	*Review*
Client & Reviewer	*dr Jacek Lembas*

Changes and Reviews

Time Stamp	Editor or Reviewer	Organization Unit	Changes
13/03/15	Izabela Orłowska	imorlowska	version 0.1
15/03/15	Izabela Orłowska	imorlowska	version 0.2

1. Introduction

1.1 Purpose

This document will provide information about a project called SudoClue. This project is being developed as part of Programming Project class at Jagiellonian University in the 2nd term of 2014/2015 academic year.

SudoClue will be a program used for solving Sudoku puzzles. Apart from solving normal puzzles, more advanced options should be available: like choosing specific fields to accept only odd/even numbers (like in Sudoku X or Sudoku Y puzzles).

The program should assist the user in two ways:

a. Solving the puzzle completely from start
b. Solving the puzzle step by step, explaining each move to the user (teacher mode)

1.2 Terminology

Term	Definition
SudoClue	The name of the project
Repository	Special source used to coordinate work on the project. Address of the repository: bitbucket.org/imorlowska/sudoclue
Sudoku puzzle	A 9x9 grid with empty or number (1-9) filled fields.
Option	A list of all numbers that would fit into a field according to sudoku rules.
Rules	A detailed information about rules can be found on this website: http://www.sudoku.name/rules/en

1.3 Related Documents

Document Name	Date	Author

1.4 Required Skills

The following skill sets are required to complete this development:

Skill	Level Required	Comments
JavaScript	fluent	Most of the functionality will be implemented in JS.
HTML/CSS	intermediate	For graphical user interface.
Design patterns	Intermediate	In order to make the code more adaptable for future changes and to improve its quality.
Scrum	Intermediate	To keep the project development in order.
Bootstrap	intermediate	To make the graphical user interface prettier.

2. Client Summary

2. 1 Executive Summary of Solution

2. 1. 1 Introduction

The program will be used by a single user on a Linux/Windows/Mac OS, accessible from a browser (Chrome/Firefox/Opera/Internet Explorer etc). It will give the user the option to solve a sudoku puzzle completely or to give hints how to solve the puzzle step by step.
The special features will include the puzzle options (even/odd fields), way of solving, reading and writing to/from files.

2. 1. 2 System Functionality Summary

The system will comprehensively support...

	Function	**Description**
	Input puzzle	User inputs the puzzle through a graphic interface.
	Load puzzle (import)	Loads a puzzle from an XML file.
	Save puzzle (export)	Saves a puzzle to an XML file.
	Solve puzzle	Given input puzzle, solves it and presents a completed version. If impossible to solve, will print information about it (error).
	Solve step by step	For users wanting to learn how to solve puzzles, SudoClue will provide an option to explain each step of solving the puzzle.

3. Constraints and Requirements

	Constraint
1	OS: Linux/Windows/Mac OS
2	A mouse and a keyboard
3	A monitor with 800x600 pixels resolution or higher
4	16 MB RAM
5	64 MB memory on hard drive
6	26Gz Ivy Bridge processor or better
7	SVGA graphics
8	An Internet browser (Chrome/Firefox/Opera etc.) with enabled JavaScript

4. Performance requirements

	Performance requirements
1	Load main window: 2 seconds
2	Load puzzle from XML: max 2 seconds
3	Save puzzle to XML: max 2 seconds
4	Solve puzzle (whole): max 30 seconds
5	Solve puzzle (step): max 3 seconds

5. Implementation Implications

5. 1 Test Impacts

5. 1. 1 Test Plans Required

Unit tests will be provided for each implemented functionality. Furthermore, once the system is up and working, a sufficient time will be spent testing the various functions in the graphical mode on top of multiple integration tests.

5. 1. 2 UAT

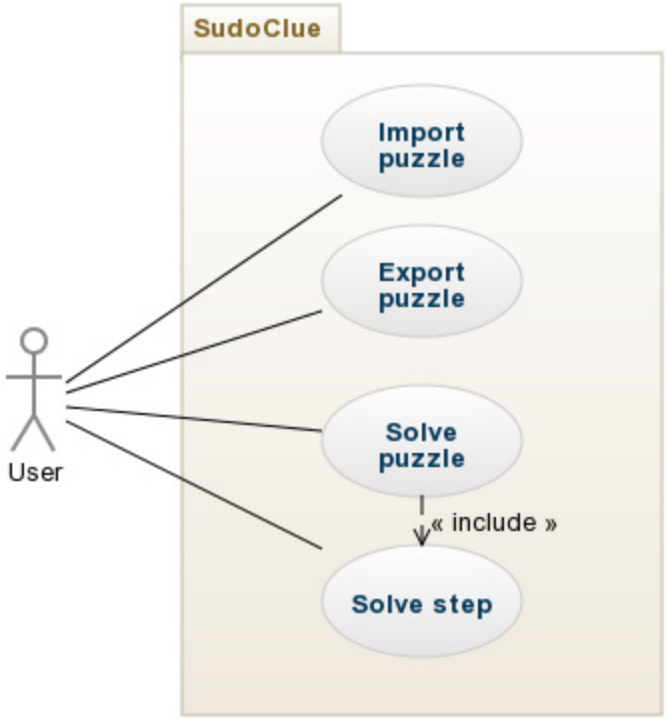
Before the final release of the product, the reviewer will take the role of the Subject Matter Expert (SME) and provide feedback and in the end the confirmation after trial or review. It will be one of the final stages of a project before the client accepts the new system.

5. 2 Development forecast

Expected completion date of the project is scheduled for the mid June 2015. With fortnightly milestones, I believe that the first prototype will be presented at the beginning of May 2015.

6. Functional Overview

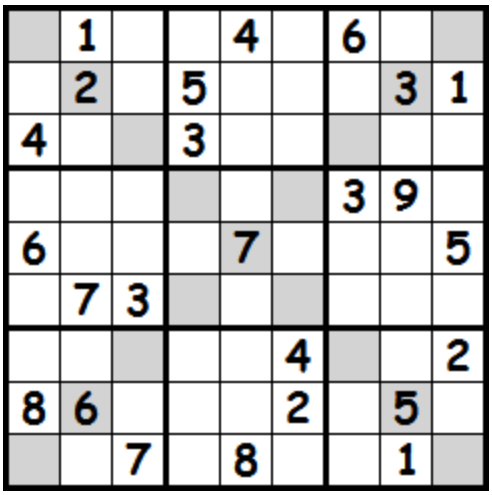
6. 1 Use Case Diagram



- Import puzzle
  - The user should be able to import the puzzle either from an XML file or by hand.
- Export puzzle
  - The user should be able to export a puzzle to an XML file.
- Solve puzzle
  - The program should be able to solve a puzzle from input or print out a message saying the puzzle can't be solved (incorrect input).
- Solve step
  - The program should enable an option to show how to solve the puzzle step by step and provide information, why such a move is possible/optimal.

7. Look and Feel / User Experience

Sample input:

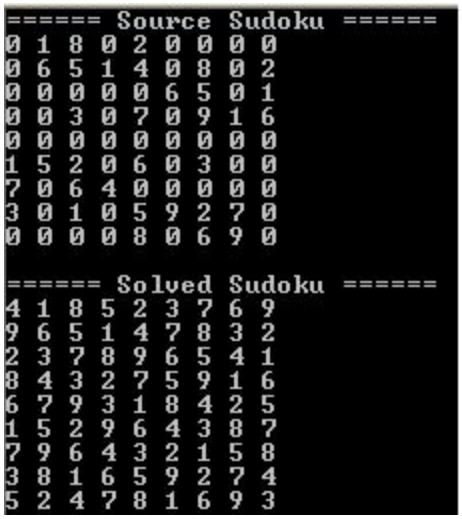


	1			4		6		
	2		5				3	1
4			3					
						3	9	
6				7				5
	7	3						
					4			2
8	6				2		5	
		7		8			1	

Sample solver:

8	6	2	5	1	3	7	9	4
9	4	3	2	8	7	6	5	1
5	1	7	6	9	4	3	2	8
4	2	1	7	3	9	5	8	6
3	5	8	1	2	6	4	7	9
7	9	6	4	5	8	1	3	2
2	3	4	8	7	1	9	6	5
1	8	9	3	6	5	2	4	7
6	7	5	9	4	2	8	1	3

Sample API (JS)



8. Issues and Questions

Issue/Question	Status	Priority	Date Resolved	Solution/Answer	Assigned to
add diagrams	Done	High	15/03/15	Added	imorlowska
add look/feel	Done	High	15/03/15	Added	imorlowska