Software Requirements Specification for Chess Connect: Online tools combined with on-board vision to improve and share your game

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Table of Revisions

Table 1: Revision History

Date	**Developer(s)**	**Change**
2022-10-04	Jonathan Cels	Template creation and document formatting
2022-10-04	Jonathan Cels	Non-functional requirements
date	name	change

1 Units, Terms, Acronyms, and Abbreviations

1.1 Table of Units

Throughout this document SI (Système International d'Unités) is employed as the unit system. In addition to the basic units, several derived units are used as described below. For each unit, the symbol is given followed by a description of the unit and the SI name.

symbol	**unit**	**SI**
V	electric potential	volt
A	current	ampere
Ω	resistance	ohm
s	time	second
°C	temperature	centigrade
J	energy	joule
W	power	watt ($\mathrm{W} = \mathrm{J\,s^{-1}}$)

1.2 Abbreviations and Acronyms

symbol	description
A	Assumption
CSA	Canadian Standards Association
DD	Data Definition
FIDE	International Chess Federation or Fédération Internationale des Échecs
GD	General Definition
GS	Goal Statement
IM	Instance Model
LC	Likely Change
LCD	Liquid Crystal Display
LED	Light-Emmitting Diode
MCU	Micro Controller Unit
PS	Physical System Description
R	Requirement
SRS	Software Requirements Specification
T	Theoretical Model
VnV	Verification and Validation
WCAG	Web Content Accessibility Guidelines

1.3 Mathematical Notation

1.4 Terminology and Definitions

2 Introduction

2.1 Document Purpose

2.2 Characteristics of Intended Reader

2.3 Characteristics of Intended User

2.4 Stakeholders

3 Problem Description

Online chess has functionality for both beginners and experienced players to learn and practice the game. However, these forms of learning emphasize a visual style of learning using a standard keyboard and mouse, while physical boards place emphasis on tactile learning when learning or studying the game. The highest-rated chess players often use a combination of the two styles to optimize their play. However, no option exists for players of any skill level to integrate their over-the-board and online play with one solution.
This project plans to centralize these two mediums of studying the game in order to provide flexibility and remove constraints for new players in learning how to play chess.

9 Requirements

9.1 Functional Requirements

9.2 Nonfunctional Requirements

9.2.1 Look and Feel Requirements

9.2.1.1 Appearance Requirements

LF1. The product shall use white, black, grey, and brown as its primary colours.

LF2. The product shall use green, red, and blue as its secondary colours.

9.2.1.2 Style Requirements

LF3. The product shall look and feel similar enough to traditional chess boards and chess pieces that the target audience will recognize the product as a chess set when encountering it for the first time. The level and speed of audience recognition achieved by the design shall be described following the procedure given in Section 5.2.1 of the VnV (Verification and Validation) Plan.

9.2.2 Usability and Humanity Requirements

9.2.2.1 Ease of Use Requirements

UH1. The system shall require the user to place chess pieces fully on their intended squares.

UH2. Physical hardware components of the system will not impede the user during play.

9.2.2.2 Personalization and Internationalization Requirements

UH3. The system will only display information in English.

UH4. The system will only use the Arabic numerals.

9.2.2.3 Learning Requirements

UH5. The product shall be able to be used by members of the public over with no previous training. Details on the learnability of the system shall be described following the procedure given in Section 5.2.2 of the VnV Plan.

9.2.2.4 Understandability and Politeness Requirements

UH6. All symbols and words shall be similar to historically used Chess symbols. Wall (2003)

9.2.2.5 Accessibility Requirements

UH7. The system shall follow guidelines for correct size and colour contrast ratio for text to the background as stated in the WCAG.

9.2.3 Performance Requirements

9.2.3.1 Speed and Latency Requirements

PR1. The average time between a user placing down a piece and the visual model response shall be small.

PR2. The maximum time between a user placing down a piece and the visual model response shall be small.

PR3. The average time between a user picking up a piece and the visual board indicator response shall be small.

PR4. The maximum time between a user picking up a piece and the visual board indicator response shall be small. The degree of speed for PR1 through PR4 shall be described following the procedure given in Section 5.2.3 of the VnV Plan.

9.2.3.2 Health and Safety-Critical Requirements

PR5. The system shall be properly grounded according to the Canadian Electrical Code. CSA (2021)

PR6. The maximum power on any single wire shall be within the safety limits described in the Canadian Electrical Code.

9.2.3.3 Precision or Accuracy Requirements

PR7. The software application game state will model the game state on the Chess Connect hardware with a high degree of accuracy. The level of accuracy shall be described following the procedure given in Section 5.2.4 of the VnV Plan.

9.2.3.4 Reliability and Availability Requirements

PR8. The product shall be available with a high degree of uptime. The level of availability shall be described following the procedure given in Section 5.2.5 of the VnV Plan.

9.2.3.5 Robustness or Fault-Tolerance Requirements

PR9. The software application shall maintain the game state if the connection between the software and hardware systems is interrupted.

9.2.3.6 Capacity Requirements

PR10. The software shall require computer memory to function effectively. The level of memory capacity required shall be described following the procedure given in Section 5.2.6 of the VnV Plan.

9.2.3.7 Scalability or Extensibility Requirements

PR11. The product must support the addition of new features and components.

9.2.3.8 Longevity Requirements

PR12. The product must be supported while the application remains deployed.

PR13. The product will depend on the continued support of packages and libraries.

9.2.4 Operational and Environmental Requirements

9.2.4.1 Expected Physical Environment

OE1. The hardware and software systems shall be close enough to each other to facilitate communication. The degree of proximity required shall be described following the procedure given in Section 5.2.7 of the VnV Plan.

OE2. The area shall be clear of potentially dangerous or harmful environmental factors.

9.2.4.2 Requirements for Interfacing with Adjacent Systems

OE3. The system shall interface with an external server to make requests to a chess engine.

9.2.4.3 Productization Requirements

OE4. The product shall be deployed to a public website where users may access it.

9.2.4.4 Release Requirements

OE5. The product will be tested for bugs and issues. These issues will be fixed and the application will be redeployed accordingly.

9.2.5 Maintainability and Support Requirements

9.2.5.1 Maintenance Requirements

MS1. The product shall be maintained actively by the developers until the Chess Connect team graduates.

9.2.5.2 Supportability Requirements

N/A

9.2.5.3 Adaptability Requirements

MS2. The software application will be able to be hosted on Apple, Windows, and Linux devices.

MS3. The product shall be accessible from any web browser.

9.2.6 Security Requirements

9.2.6.1 Access Requirements

SR1. Only the Chess Connect team are able to modify the software system.

9.2.6.2 Integrity Requirements

SR2. The product will not store game data after a game has concluded.

9.2.6.3 Privacy Requirements

SR3. The product will not store or collect user data.

9.2.6.4 Audit Requirements

SR4. Requirements shall be easy to follow and verify against both the system and the VnV plan in order to facilitate regular inspections.

9.2.6.5 Immunity Requirements

N/A

9.2.7 Political and Cultural Requirements

9.2.7.1 Cultural Requirements

PC1. The product will not use and terms or symbols that are deemed offensive to any culture.

9.2.7.2 Political Requirements

N/A

9.2.8 Legal Requirements

9.2.8.1 Compliance Requirements

LR1. The system shall comply with the Canadian Electrical Code CSA (2021).

9.2.8.2 Standards Requirements

LR2. The product shall follow WCAG.

10 Likely Changes

11 Unlikely Changes

12 Traceability Matrix

A Values of Auxiliary Constants

A Reflection

A.1 Skills for Success

A.2 Knowledge and Learning Approaches

References

CSA. *Canadian Electrical Code*. CSA Group, 2021.

Bill Wall. History of chess sets and symbols. https://www.chesscentral.com/pages/chess-sets-pieces-boards/a-history-of-chess-pieces-and-chess-sets.html, 2003. Accessed: 2022-10-04.

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