

# Requirements Analysis Document

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## COMP3000 Computing Project 2022/2023

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### Project Title

ChessAI – A Chess Practice Tool

### Project Lead Developer / Manager

Callum Organ

### Project Supervisor

Lingfen Sun

### Links

Source code: <https://github.com/ORG4N/ChessAI>

Kanban board: <https://trello.com/b/TubtD2KW/chessai>

Document Revision History			
Date	Ver.	Description	Changed by
01/11/2022	1	Initial Requirements Analysis document.	Callum Organ
04/12/2022	1.1	Added <i>Technology</i> section.	Callum Organ

# Document Overview

The purpose of this document is to outline the stakeholders of the project and thereby unearth the requirements of the project. These requirements start as high-level features/functions/tasks and are then decomposed into user stories. This further analysis of requirements enables requirements to be described in relation to a user's needs and wants. Prioritisation of these user stories provides a value to each of the user's expectations of the project. The backlog is the formal list of all requirements.

For a greater understanding of the Project's goals, objectives, and vision see the Project Initiation Document within the GitHub repository.

## Stakeholders

Stakeholder Interest and Impact Table			
Stakeholder	Interests	Estimated Project Impact	Estimated Priority
End-users	Use application to improve at chess. Use application for entertainment.	High + High +	1
Project Supervisor(s)	Ensure project is on track. Provide advice to primary stakeholders.	High + High +	5
Project Manager(s)	Improve soft skills. Expand project management knowledge. Make sure deadlines are met.	Medium + Medium + High ?	3
Project Owner(s)	Improve soft skills. Ensure prototypes meet user needs.	Medium + High +	4
Project Developer(s)	Improve hard skills, expand technologies. Expand project portfolio. Ensure code is not buggy.	Medium + Low + High +	2

The project will have many stakeholders and these stakeholders each have different interests within the project, and these may conflict with the interests of other stakeholders. For example, managers want features to be done by a specific date, which puts stress on developers as they are interested in developing bugless code, which consumes extra resources, such as time. Each stakeholder has a different idea of how to make the project successful and therefore it is important to prioritise the needs of each stakeholder and determine the impact that they have within the project.

Within the *Stakeholder Interest and Impact table* it is identified that the end-user is the most important stakeholder – this is because they are the ones that will interact with prototypes throughout the delivery of the project, and they are the target audience for the completed chess application.

## High Level Requirements

Functional requirements describe features and system behaviour. The end-user should be able to use these features to perform specific actions. On the other hand, non-functional requirements identify criteria that the system can be judged upon – often to describe a systems capability.

### Functional Requirements

No.	Description
1	User can play Chess against an AI.
2	User can choose to start with White or Black pieces.
3	User can select difficulty range of AI.
4	User can see their personal win rate against AI.
5	User can see statistical analysis at the end of each match.
6	User can select match type (rapid, blitz).
7	User can play against AI mimicking selected professional player.
8	User can Abandon or Surrender the game (counts as loss).
9	User can view history of previous games played.
10	User can create profile or be a guest visitor.
11	Application will be a Single Page Web Application.
12	Application will have homepage.
13	Application will have login / create account page.
14	Application will have Play Chess page.
15	Application will have profile page.
16	Profile will display username, picture, statistics, match history, badges.
17	User can earn Achievements/Badges by beating AIs at different ratings.
18	Database will store user profile information.
19	Database will store user login information.
20	Application will be accessible via desktops.
21	Application will be accessible via smartphone.
22	Strong password checking when creating account.
23	Application locks user out when they attempt too many incorrect logins.
24	

Technology requirements to be further researched...

## Non-Functional Requirements

No.	Description
1	Application must be accessible and online 24/7.
2	Application will be native English.
3	Application should support hundreds of people accessing it at the same time.
4	Pages should load within 5 seconds.
5	Customer should log in within 10 seconds.
6	Customer should be locked out after 5 invalid login attempts.
7	

## Technology

Minimum Viable Product (MVP)		
Item	Category	Justification
Python 3	Language	Has many open-source libraries and tools that make implementing AI and Machine Learning easier.
Javascript	Language	Implement the interactivity of the web app. Frontend development.
HTML CSS	Language	Used to implement the structure/design of the web pages. How content is displayed. Necessary for web development.
Flask	Web app framework	Very lightweight, compared to its alternative Django. Flask is one of the most popular web-app frameworks – lots of support and increase employability.
Atom	IDE / text editor	Easy to use, easy to configure, GitHub integration, multiple files open at once, open projects.
GitHub	Repository	Store documentation and code online within Cloud storage. Easy to access and maintain – version control.
SQL Server	Database	Industry standard relational database management system. Vast number of resources, and lead developer already has experience.
Trello	Kanban	Kanban board used for project management - track tasks.

# User Stories

As a General User...	I want to play chess on my smartphone so that I can play wherever I am (outside, in bed, on the sofa).
	I want to play chess on my desktop/laptop so that I can have the match full screen.
	I want to change the language of the application so that I can use it in my native languages.
	I want to create a profile so that I can see all my statistics and match history in one place.
	I want to customise my profile's display name and profile picture so that my profile is personalised.
	I want to be able to share my profile with other people so that they can my statistics.
	I want to make my profile private so that only I can see it.
	I want to play as a guest so that I can remain anonymous and don't have to create an account or sign in.
	I want to unlock badges and display them on my profile, so that I can show off my achievements and progress.
	I want to change and update my password so that my account is secure.

As a person with a disability...	I want to use my screen reader so that I can read the text on the screen because I have a visual impairment.
	I want to be able to change the colour of the chess board and/or pieces so that I can differentiate them because I am colour blind.
	I want to be able to navigate the website using keyboard because I have a motor disability.
	I want to be able to play chess matches using algebraic input so that I can use my keyboard instead of my mouse because I have a motor disability.
	I want to input my chess moves using my voice because I have a motor or vision disability.

As a Chess Player ...	I want to drag and drop chess pieces to make my moves on a graphical interface so that the app is more interactive and entertaining.
	I want to learn new openings so that I can improve at the game.
	I want to choose to start with white or black pieces, so that I can practice different openings.
	I want to select the rating of my opponent, so that I can train against easier or harder opponents.
	I want to view my personal statistics such as win rate so that I know if I am improving or not, and gain confidence to keep playing chess.
	I want to review a match that I just played, so that I can see where I made mistakes/blunders.
	I want to select and play different match types (bullet/blitz/rapid), so that I can play either short or long games.

	I want to play against chess professionals, so that I can challenge myself.
	I want to abandon the match, so that I can stop playing and do something else, or because I feel like the game is lost.
	I want to view my match history so that I can review past games / see if I'm on a loss or win streak.

*1. The persona General User has been explicitly identified as their needs/desires are not solely those of a Chess Player and could reflect the wants of a user that has no idea what Chess is.*

*2. Chess Players could have been further decomposed into Beginners and Experienced, however they share the same goal: to improve at the game, and therefore their needs are similar.*

*3. This list of use stories will be added to throughout the project as further requirements are identified via the agile cycle.*

# MoSCoW Prioritisation

MUST	I want to play chess on my desktop/laptop so that I can have the match full screen.
	I want to create a profile so that I can see all my statistics and match history in one place.
	I want to customise my profile's display name and profile picture so that my profile is personalised.
	I want to be able to share my profile with other people so that they can my statistics.
	I want to make my profile private so that only I can see it.
	I want to play as a guest so that I can remain anonymous and don't have to create an account or sign in.
	I want to change and update my password so that my account is secure.
	I want to use my screen reader so that I can read the text on the screen because I have a visual impairment.
	I want to drag and drop chess pieces to make my moves on a graphical interface so that the app is more interactive and entertaining.
	I want to learn new openings so that I can improve at the game.
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	I want to view my personal statistics such as win rate so that I know if I am improving or not, and gain confidence to keep playing chess.
	I want to review a match that I just played, so that I can see where I made mistakes/blunders.
	I want to select and play different match types (bullet/blitz/rapid), so that I can play either short or long games.
	I want to abandon the match, so that I can stop playing and do something else, or because I feel like the game is lost.
	I want to view my match history so that I can review past games / see if I'm on a loss or win streak.
SHOULD	I want to unlock badges and display them on my profile, so that I can show off my achievements and progress.
	I want to be able to change the colour of the chess board and/or pieces so that I can differentiate them because I am colour blind.
	I want to be able to navigate the website using keyboard because I have a motor disability.
	I want to be able to play chess matches using algebraic input so that I can use my keyboard instead of my mouse because I have a motor disability.
	I want to play against chess professionals, so that I can challenge myself.
COULD	I want to play chess on my smartphone so that I can play wherever I am (outside, in bed, on the sofa).
	I want to change the language of the application so that I can use it in my native languages.
	I want to input my chess moves using my voice because I have a motor or vision disability.
WONT	

*After a user story is prioritised, it is then placed within the Product Backlog alongside other related items, which together make a component.*

# Product Backlog

Date	Component	Item	Priority
15/11/22	Accessibility	I want to play chess on my desktop/laptop so that I can have the match full screen.	High
15/11/22	Accessibility	I want to play chess on my smartphone so that I can play wherever I am (outside, in bed, on the sofa).	Low
15/11/22	Accessibility	I want to use my screen reader so that I can read the text on the screen because I have a visual impairment.	High
15/11/22	Accessibility	I want to change the language of the application so that I can use it in my native languages.	Low
15/11/22	Accessibility	I want to input my chess moves using my voice because I have a motor or vision disability.	Low
15/11/22	Accessibility	I want to be able to change the colour of the chess board and/or pieces so that I can differentiate them because I am colour blind.	Medium
15/11/22	Accessibility	I want to be able to navigate the website using keyboard because I have a motor disability.	Medium
15/11/22	Accessibility	I want to be able to play chess matches using algebraic input so that I can use my keyboard instead of my mouse because I have a motor disability.	Medium
15/11/22	Accessibility	I want to drag and drop chess pieces to make my moves on a graphical interface so that the app is more interactive and entertaining.	High
15/11/22	Account	I want to create a profile so that I can see all my statistics and match history in one place.	High
15/11/22	Account	I want to play as a guest so that I can remain anonymous and don't have to create an account or sign in.	High
15/11/22	Account	I want to change and update my password so that my account is secure.	High
15/11/22	Profile	I want to customise my profile's display name and profile picture so that my profile is personalised.	High
15/11/22	Profile	I want to be able to share my profile with other people so that they can see my statistics.	High
15/11/22	Profile	I want to make my profile private so that only I can see it.	High
15/11/22	Profile	I want to view my personal statistics such as win rate so that I know if I am improving or not, and gain confidence to keep playing chess.	High
15/11/22	Profile	I want to unlock badges and display them on my profile, so that I can show off my achievements and progress.	Medium
15/11/22	Match history	I want to view my match history so that I can review past games / see if I'm on a loss or win streak.	High
15/11/22	Matchmaking	I want to choose to start with white or black pieces, so that I can practice different openings.	High
15/11/22	Matchmaking	I want to select the rating of my opponent, so that I can train against easier or harder opponents.	High
15/11/22	Matchmaking	I want to select and play different match types (bullet/blitz/rapid), so that I can play either short or long games.	High



15/11/22	Matchmaking	I want to abandon the match, so that I can stop playing and do something else, or because I feel like the game is lost.	High
15/11/22	Learn	I want to review a match that I just played, so that I can see where I made mistakes/blunders.	High
15/11/22	Learn	I want to learn new openings so that I can improve at the game.	High
15/11/22	Design/Plan	Wireframes	High
15/11/22	Design/Plan	Storyboard	High
15/11/22	Design/Plan	UML Diagrams	High
15/11/22	Design/Plan	Risk Register and Matrix	High
15/11/22	Design/Plan	Technology poster	High
15/11/22	Design/Plan	Use-case scenarios	High