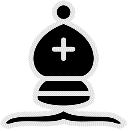
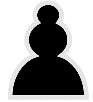
**A Level computer Science**

Component 3

Single player chess game with artificial intelligence

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Table of Contents

[Chapter One: Analysis of the problem](about:blank) **Error! Bookmark not defined.**

[1.1 Introduction 4](#_heading=h.30j0zll)

[1.2 Problem Identification 5](#_heading=h.1fob9te)

[1.3 Why the problem is suited to a computational solution 6](#_heading=h.3znysh7)

[1.4.1 Stakeholders 7](#_heading=h.2et92p0)

[1.4.2 Interviews with Stakeholders 8](#_heading=h.tyjcwt)

[1.4.3 Conclusions from Interview 9](#_heading=h.3dy6vkm)

[1.5 Research 10](#_heading=h.1t3h5sf)

[1.6 Features of the proposed solution 11](#_heading=h.4d34og8)

[1.7 Limitations of the solution 11](#_heading=h.2s8eyo1)

[1.8 Stakeholder Consultation 12](#_heading=h.17dp8vu)

[1.9 Hardware and software requirements 13](#_heading=h.3rdcrjn)

[1.10 The requirements of the solution 13](#_heading=h.26in1rg)

[1.11 Success Criteria 14](#_heading=h.lnxbz9)

# Chapter One:

# Analysis of the problem

## 1.1 Introduction

For this project, I will create a single player chess game with an artificial intelligence opponent. There will be graphical interfaces for the main game and other settings and features.

There will be appealing visuals supported by effective and an enjoyable user experience, through vigorous testing and well-informed decision making.

The engine will use an existing chess engine, as well as a lower-skill custom AI which I will program.

## 1.2 Problem Identification

Chess is an ancient game, but a timeless one. Throughout history, chess has been a signifier for logic and problem-solving – a game of true strategy without the crutch of randomness. Since the victory of Deep Blue vs Kasparov, chess engines have developed greatly over the years, with increased computational power making current best engines extremely powerful.

The most common ways to play chess against artificial intelligence, are with popular websites such as ‘chess.com’ or ‘lichess.org’, or programs such as ‘ChessBase’ which are very popular among grand-masters and professional chess players.

There are many chess programs built for PC’s, but they often come in two flavours: extremely powerful but with terrible user experience and overcomplicated, or pleasant aesthetic but limited in functionality.

I will aim to create a PC chess program which avoids both of the former pitfalls, with powerful functionality and strong AI, as well as pleasant user experience and visuals.

The user will be able to choose which side to play as (white or black), and will be able to see available moves when they click on a piece. They will then be able to move that piece by clicking one of the available moves, and the AI will then move shortly after.

There will be an evaluation indicator on the side of the screen, to show who is winning at any given time (through the chess engines analysis)

The user will be able to change visuals with ease, choosing from multiple colour palettes and piece sets. With this I hope to make the experience feel less complicated, and hopefully fix the problem of overwhelming the user.

## 1.3 Why the problem is suited to a computational solution

This chess program is suited to a computation solution for many reasons, one of which is that chess programs have been created successfully many times before, and I have enough understanding of these solutions that I will be capable of creating this program using a computer, and it’s requirements.

For this program, I will limit the resources which the AI can use, by adjusting the settings and parameters to ensure the experience is enjoyable to the user. This also suits it to a computational approach, as there will be an achievable use of resources.

Non-computational solutions to this, such as a mechanical solution are ill-fitted here, as chess is a game which can be measured and calculated through algorithms and brute force, lending itself well to a computational, algorithmic approach.

## 1.4 Stakeholders analysis

### 1.4.1 Stakeholders

### 1.4.2 Interviews with Stakeholders

### 1.4.3 Conclusions from Interview

## 1.5 Research

## 1.6 Features of the proposed solution

## 1.7 Limitations of the solution

## 1.8 Stakeholder Consultation

## 1.9 Hardware and software requirements

## 1.10 The requirements of the solution

## 1.11 Success Criteria