

CAPSTONE PROJECT 1
Planning Document

**Evaluation of Nature-inspired Optimisation
Algorithms in Solving Versus Tetris**

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Semester: April 2024

Date:

Abstract

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1 Introduction

Tetris is a popular video game created in 1984 by computer programmer Alexey Pajitnov [1]. It is a puzzle game that requires players to strategically place sequences of pieces known as "Tetriminos" into a rectangular Matrix (refer to Figure 1.1). In the classic game, players attempt to clear as many lines as possible by completely filling horizontal rows of blocks, but if the Tetriminos surpass the top of the Matrix, the game ends.

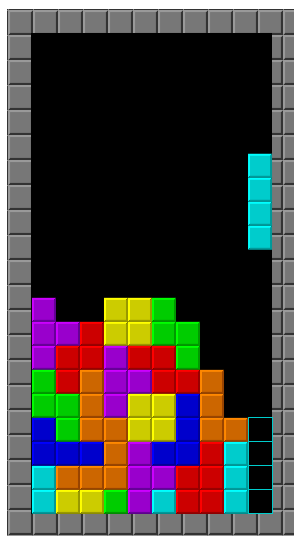


Figure 1.1: A Typical Tetris Game

Since its release, Tetris has captured the imagination of mathematicians and computer scientists alike, leading to a diverse array of research endeavours exploring the various facets of the game, including its complexity [2], and its possibility of being won [3] [4].

1.1 Motivation

1.2 Problem Statement

1.3 Aim

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5 References

- [1] Tetris Inc., *About Tetris*, <https://tetris.com/about-us>, [accessed Apr. 22, 2024].
- [2] E. D. Demaine, S. Hohenberger, and D. Liben-Nowell, “Tetris is hard, even to approximate,” in *Computing and Combinatorics*, T. Warnow and B. Zhu, Eds., Berlin, Heidelberg: Springer Berlin Heidelberg, 2003, pp. 351–363, ISBN: 978-3-540-45071-9.
- [3] J. Brzustowski, “Can you win at tetris?” Ph.D. dissertation, University of Waterloo, 1988.
- [4] H. Burgiel, “How to lose at tetris,” *The Mathematical Gazette*, vol. 81, no. 491, pp. 194–200, 1997. DOI: 10.2307/3619195.