UNIVERSITI TEKNOLOGI MARA

EXAMINATION INVIGILATION TIMETABLE USING GENETIC ALGORITHM

MOHAMAD FAKHRULLAH BIN IBRAHIM

BACHELOR OF COMPUTER SCIENCE (HONS.)

JANUARY 2025

ACKNOWLEDGEMENT

Firstly, praises and thanks to Allah S.W.T because of His Almighty and blessings I was able to finish this research within the given period. First and foremost, I would like to express my gratitude to CSP600 lecturer who has guide me through this project, Madam Ummu Fatihah binti Mohd Bahrin. I also would like to thank my supervisor, Dr. Norulhidayah Isa who has supervised and help me in many aspects throughout this research. Without the non-stop guidance and assistance from my lecturer and supervisor, I would not be able to finish my research.

Special appreciation also goes to my beloved parents as they are supporting me through this research. Their encouragement, and prayers have made the process of me doing research runs smoothly. Their sacrifices and belief in my ability have been my driving force.

Lastly, I would like to thank myself for believing in me. I want to thank me for never quitting. Also, my friend who also had been my support system. Their assistance and supports have helped me to accomplish my research in the specific time frame. I would also like to thank people that are not listed above who have help, guide, support, and give encouragement for me through this research.

ABSTRACT

This report addresses the challenges faced by Hal Ehwal Akademik (HEA) at UiTM Kuala Terengganu in manually managing examination invigilation timetables. The current manual process is labor-intensive, error-prone, and time-consuming. To overcome these issues, a system utilizing a Genetic Algorithm (GA) was developed to automate and optimize the timetabling process. GA employs key steps, including population initialization, fitness evaluation, selection, crossover, and mutation, to iteratively improve solutions. The fitness function in this system minimizes constraints such as invigilator availability, equitable workload distribution, and adherence to examination rules. The study involves a comprehensive literature review on GA and timetabling methodologies, aiming to automate and optimize the invigilator timetabling process. By implementing GA, the project seeks to ensure equitable distribution of workload among invigilators, reduce administrative burden, and improve overall timetabling effectiveness. The research framework includes phases such as preliminary study, system design and development, and evaluation of GA performance in examination invigilation timetables. Through this project, the results demonstrate the effectiveness of GA in achieving a balanced and efficient timetable. The system reduced timetabling time significantly while ensuring fairness among invigilators and compliance with institutional requirements. Additionally, the optimized timetable led to a more streamlined and error-free timetabling process. For the future enhancements include integrating dynamic data updates for real-time timetabling adjustments, incorporating hybrid optimization techniques to further refine results, and expanding the system's application to other timetabling scenarios, such as lecture timetables and resource allocation

TABLE OF CONTENTS