Solving Kolej Poly-Tech Mara Examination Timetabling Problem

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Examination timetabling involves assigning the exams into timeslots and rooms, fitting the student numbers into suitable exam locations, and ensuring adequate rest gaps between exams for all students. In this study, the examination timetabling problem from Kolej Poly-Tech Mara (KPTM) Kuantan, is being investigated. The KPTM dataset is a capacitated problem with unique constraints when compared to the benchmark examination datasets from the literature. Currently, KPTM Kuantan uses proprietary software to generate the timetable. However, it requires manual process to determine whether the timetable satisfies the constraints. Furthermore, having no mathematical model makes it difficult to determine the timetable quality. The research aim is to develop a formal mathematical model and test the proposed model by producing an examination timetable. The generated timetable is compared with the KPTM Kuantan proprietary software examination timetable. The experiment shows that our result outperforms the timetable produced by KPTM while adhering to the hard constraints which the proprietary software fails to achieve.

Keywords: Computational Intelligence, Examination Timetabling Problem, Metaheuristic

1. INTRODUCTION

The examination timetabling problem involves assigning exams into timeslots and rooms. The examination timetable needs to satisfy all of the constraints (i.e., requirements) from the institution. An example of this constraint includes clash free timetable, fits a group of students into a suitable location, ensuring adequate rest gaps between exams and many others. These constraints can be categorized as hard and soft. Hard constraints must

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be satisfied while soft constraint includes requirements that as much as possible to be satisfied. Hence, the soft constraint is used to determine the quality of the timetable, and it is defined as a cost function.

An examination timetabling problem is categorized as capacitated and un-capacitated problem. The un-capacitated does not consider the room capacities, unlike the capacitated problem where it considers the room capacity as a hard constraint. The KPTM Kuantan includes room capacity constraint into its examination timetable.