Evaluating UMP Examination Timetable

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This work presents a study of examination timetabling problem from Universiti Malaysia Pahang (UMP). UMP operated from two campuses (i.e., Gambang and Pekan) and this formed new constraints for consideration in producing quality UMP examination timetable. These new constraints include schedule exams into appropriate campus and similar exams held in different campus must be assigned to the same timeslot. These constraints have not been examined before in the literature. UMP unable to evaluate examination timetable quality due to having no formal mathematical model. Hence, this paper aims to investigate the UMP examination timetabling constraints by developing a formal mathematical model and evaluate the current UMP examination timetable using the proposed formal mathematical model.

Keywords: Computational Intelligence, Examination Timetabling, Scheduling

1. INTRODUCTION

The examination timetabling problem involves allocating examinations to a fix number of rooms and timeslots whilst fulfilling the constraints. The constraints differ from one institution to another. This constraints can be categorised as hard and soft constraints. The hard constraints must be satisfied. An example, no students were assign two examinations simultaneously. Timetable that meet the hard constraint are considered as a feasible timetable. The soft constraints refer to those requirements that need be met as much as possible. An example, maximise spreading of student examination papers. This would allow student to rest and do revision between their exam papers (which is preferred by many students). Hence, the soft constraints (also referred to as objective function) enable us to determine timetable quality. This involve a mathematical model that calculate the penalty cost value for every soft constraints violation. For a quality examination timetable, the total penalty value need to be minimised.

The uncapacitated problem does not consider room capacity unlike capacitated problem which considers room capacity as one of the hard constraint. Capacitated problem resemble the real-world problem because it take into account the room capacity as a hard constraint. The capacitated problems are more complex and challenging to solve compared to the uncapacitated problems. The room constraint increases the level of complexity to the overall problem in producing a high quality examination timetable.

In this paper, we present an investigation of Universiti Malaysia Pahang (UMP) examination timetabling problem which consists different constraints from the literature. Related work in examination timetabling is presented in section 2. The UMP examination timetabling problem and its constraints are presented in section 3. In section 4, the proposed UMP examination timetabling formal model is discussed. Section 5 and section 6 describe the investigated data and discussion on the results respectively. Finally, the conclusion and recommendation...