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AN INTEGER PROGRAMMING MODEL FOR SOLVING THE PROBLEM OF SCHOOL TIMETABLE

A Reasarch Project Submitted In Partial Fulfillment Of The Requirement For (I N P) Diploma

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عرفان بالجميل

بضع كلمات اعبر فيها عن أعمق تقديري وخالص امتناني لاساتذتى الذين تعلمت من فيض علمهم وأخلاقهم في هذا الصرح العظيم في هذا الصرح العظيم الذي ادعوا الله أن يبقيه ويقيه والقائمين عليه والعاملين به بإخلاص ليظل نورا يهدى الله به من يشاء.

وأتوجه بخاص شكري وتقديري إلى استاذى الدكتور / عبد الله الداعوشى الذي وضع قدمي على مسلك جديد على من مسالك البحث العلمي فأسال الله أن يكون هذا البحث أول قطر الغيث.....غيث البحث العلمي.

Contains

Introduction:

The construction of a timetable that satisfies all operational rules an needs in an academic institution, while at the same time fulfills as many of the wishes and requirements of the staff and the students is an important but extreme!}' difficult task for the staff involved. In most institutions this task is left to administrative staff and the current practice is to replicate the timetables of previous years with minor changes to accommodate newly developed situations. However, in recent years, changes occur more frequently and patching of what has been developed historically is not always the best policy. Under these circumstances, and in light of the progress achieved both in the hardware and software technologies, the scientific community continues to work on the problem in order to develop formal and automated procedures for constructing efficient and desirable timetables.

In this paper we'll use the integer programming model to solve the school timetable problem. This problem is a special case from the university timetable problem. So we'll divided this search to three parts.

The first part focus on university timetable problem ;definition, classification of this problem, solution method, characterizing of university timetable, and rules of it.

The second part about our problem school timetable problem .it's sub set from university timetable problem or special case from it .we'll concerned with defined this problem ;determine special features; integer model and explain it.

The third part is a case study for the primary school timetable; the data ,and timetable for two class.
In the end the results and conclusion.

Timetabling problem (TTP) :

The timetabling problem (TTP) is concerned with the allocation, subject to constraints, of given resources to objects in space and time in such a way as to satisfy as nearly as possible a set of desirable objectives.

The TTP is encountered mainly in education institutions, sport, health, airport and to a lesser extent in business too [Emzheyu and Kiseaksung2002].

Timetabling is a typical real world scheduling activity that arises at least once a year at every educational institution. The three most common educational timetabling problem categories are examination timetabling, course timetabling and class/teacher timetabling, as they are commonly called [Carrasco and Pato 2004].

- Exam timetabling problem:
  The exam timetabling problem is essentially concerned with scheduling a number of exams into a limited number of timeslots m-periods in order to satisfy, as much as possible, a set of specified constraints [Burkel and Pnewall 2004].

- Course timetabling :
  The problem of constructing course timetables for academic institutions consists of allocating the set of courses offered by the university to time periods and classrooms in such a way that no teacher, student or room is used more than once per period and that room capacities are not exceeded.[Dimopoulau and Miliotis 2001].

  This problem can be summarized as follows: given date sets of classes and their days , enrollments , and instructors ,rooms and their capacities , types , and locations ; distances between buildings ; priorities of each building for different departments ; and students and their class preferences . [Salah Elmohamed 2000].

- The class/teacher timetabling problem:
  The class/teacher timetabling problem, referred to as CTTP. It is usually found in schools with less flexible curricula, as is the case of most secondary schools and some universities, where the majority of the predefined lessons for each course is compulsory for the classes in question and can therefore in no way overlap.

The specific class/teacher timetabling problem can be defined as an Optimization problem relative to the scheduling of a set of lessons (Prior assignments of one or more rigid classes of students to one Teacher and one subject) over a weekly set of time periods, using Suitable rooms, while satisfying a broad spectrum of Constraints. [Carrasco and Pato 2004]