

# AUTOMATIC TIMETABLE GENERATION

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## ABSTRACT

The class timetabling problem is a scheduling algorithm with great interest and implications in the fields of operational research and artificial intelligence. The project proposes a general solution for the timetabling problem. Most heuristic proposed earlier approaches the problem from the students' point of view. This solution, however, works from the teachers' point of view i.e. teacher availability for a given time slot. While all the hard constraints are resolved rigorously, the scheduling solution presented here is an adaptive one, with a primary aim to solve the issue of clashes of lectures and subjects, pertaining to teachers.

**Keywords:** Time Tabling, Pertaining, Clashes.

## 1. INTRODUCTION

### Overview

Every educational institution has a timetable of its own to be followed by the students who study there. Preparing a timetable will be easy only when there are less number of students in that particular institution i.e., (preparing it manually) . Here comes the use of Timetable generator i.e., using a software to manage timetable. Automatic timetable generation is a java based software that makes it convenient for the designer of timetable to prepare the timetable. The system aids solving the timetabling problem while giving importance to teacher availability. This problem uses a heuristic approach to give a general solution to timetabling problem. During automatic timetable generation, there are different requirements that need to be satisfied and they might clutter the user interface. It takes the user input of a number of subjects, number of teachers, subjects every teacher takes, number of days in a week for which the timetable needs to be set, number of time slots in a day and the maximum lectures a teacher can conduct in a week.

## 2. PROBLEM STATEMENT

During analysis of this problem, we can remark than an automatic creation of timetables has two aspects. First problem is in complexity of the solution and searching algorithm for the solution. This is a combinatorial problem with a large number of variables. Only small percent of them are feasible timetables, and some of them can be considered as good ones. The problem is partially solvable using a variety of heuristic and optimization methods, integer linear programming, taboo search, genetic algorithms etc. Much less explored problem is in defining requirements of the timetable. This question is related not only to automatic time table solving, but also for usage in software which only check constraints, or for documentation of manual timetabling. Sometimes it is enough to enter a matrix with

the names of teachers and classes in the matrix header, filled with weekly number of hours that the teacher teaches in the particular class.

### **Objective**

Normally timetable generation done manually. As we know all institutions have their own timetable, managing and maintaining these will not be difficult. Considering workload with tis scheduling will make it more complex. As mentioned, when Timetable generation is being done, it should consider the maximum and minimum workload that is in a college. In those cases timetable generation will become more complex. Also, preparing timetable manually consumes a lot of time so, the main objective is to design an algorithm that can solve this problem efficiently and effectively and implement that algorithm through a specified programming language like java.

### **Organisation of report**

- The concept of timetabling has become a very complex problem now a days for any organisation. So, this problem requires a very efficient solution to make the designing of timetable an easy task.
- The project as a whole requires to store records and content of working staff in that institution. So, a database is required to maintain the information of these records.
- The problem of timetabling needs to meet the requirements of constraints that matter in that institution and the constraints may not be same as different institutes follow different timetable and rules.
- These all details maintained in database are to be protected in order to misuse those details of staff.
- The generated timetable by considering all the above factors should be efficient with time and made to look quite simple.
- The user interface design must be easy as even a normal person should understand.

### **3. EXISTING SYSTEM**

Generally timetable generation is done manually. Present day preparator of timetable use MS EXCEL and MS WORD . This way of preparing timetable doesn't make the system efficient and makes it look more complex it is also a time consuming process.

### **4. ISSUES IN EXISTING SYSTEM**

As we know all institutions/organisation have its own timetable managing and maintaining these will be difficult . Considering the workload of staff will make the scheduling part of timetable more complex . Because of these constraints managing staff with respect to their workloads will be difficult .

### **5. PROJECT SCOPE**

Timetable Generation System generates timetable for each class and teacher, in keeping with the availability calendar of teachers, availability and capacity of physical resources such as classrooms and

rules applicable at different classes, semesters, teachers and subjects level. Best of all, this Timetable Generation System tremendously improves resource utilization and optimization.

## CONCLUSION

The intention of the project is to generate a time-table that can schedule automatically. Timetabling problem being the hard combinatorial problem that is would take more than just the application of only one principle. The timetable problem may only be solved when the constraints and allocations are clearly defined and simplified thoroughly and more than one principle is applied to it (i.e. A hybrid solution – a combination of different solution techniques ). This incorporates a number of techniques, aimed to improve the efficiency of scheduling. It also, addresses the important hard constraint of clashes between the availability of teachers. The non-rigid soft constraints i.e. optimization objectives are also effectively handled. Thus, through the process of automation of the time-table problem, many an-hours of creating an effective timetable have been reduced eventually. By considering all these constraints effectively and efficiently a timetable can be generated which eventually can be used for a specific class of an institution and may also be saved for future. This complete process of storing data of staff and subjects and retrieving them by timetable generation part uses database and thus generates a well scheduled timetable by considering the above constraints.

## FUTURE WOKS

With good data structures, it is possible to generate a set of equations that generate the timetable automatically, or can be used to check the manually generated timetable against the constraints. Given the generality of the operation, it can further be adapted to more specific scenarios, e.g. University, examination scheduling and further be enhanced to create railway time tables. The most interesting future direction in the development of the project lies in its extension to constraint propagation. Timetable problem is NP-Complete. Timetable management has been made easier with this solution. It includes a web app to generate timetable and push to android devices

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