Exam Timetabling in a University

# Abstract

Examination timetabling is one of the most important administrative activities that takes place in all academic institutions. Time-tabling problem (TTP) is basically the scheduling and assignment of the lessons into appropriate

time-slots and resources respectively, without causing time clashes for the students and the teachers, as well as the resource clashes [1]. The drawing up of university timetables is a slow, laborious task, performed by people working on the strength of their knowledge of resources and constraints of a specific institution.

# Constraints

Scheduling problem is defined as n/p complete problem which means that there is no perfect solution for it, but there is a nearest solution to perfect solution; because there are many constraints that should be satisfied for solving the problem and for this many methods can solve the problem but there is one solution better than others because it satisfies the hard constraints and another solution is better than the first because it satisfies all hard constraints and some of soft constraints and so on

**Hard constraints:**

Hard constraints are those constraints that must be met by the timetable in order for the Exam timetable to be feasible. For example, there should not be any clashes,

i.e. students should not be required to write two exams at the same time.

## Soft constraints:

Soft constraints are constraints that we would like the timetable to satisfy, but can be broken if necessary.

For example, students’ examinations must be well spaced over the timetable; examinations with a large number of students must be scheduled early in the examination timetable.

**Genetic Algorithms**(GAs) :

Genetic Algorithms are adaptive heuristic search algorithms that belong to the larger part of evolutionary algorithms. Genetic algorithms are based on the ideas of natural selection and genetics. They are commonly used to generate high-quality solutions for optimization problems and search problems.

Each generation consists of a population of individuals and each individual represents a point in search space and possible solution. Each individual is represented as a string of character/integer/float/bits. This string is analogous to the Chromosome.

**Memetic algorithm**(MA) :

A memetic algorithm is an extension of the traditional genetic algorithm. Memetic algorithms use another local search rather than global search algorithms. When we combine global and local search, it becomes a global optimization process.Various experimental results show that memetic algorithms perform better than the genetic algorithms .

**Hybrid algorithm**(HA) :

A hybrid algorithm is an algorithm that combines two or more other algorithms that solve the same problem, and is mostly used in programming languages like C++, either choosing one (depending on the data), or switching between them over the course of the algorithm. This is generally done to combine desired features of each, so that the overall algorithm is better than the individual components.

"Hybrid algorithm" does not refer to simply combining multiple algorithms to solve a different problem – many algorithms can be considered as combinations of simpler pieces – but only to combining algorithms that solve the same problem, but differ in other characteristics, notably performance.

**Heuristic algorithm(HA):**

A heuristic algorithm is one that is designed to solve a problem in a faster and more efficient fashion than traditional methods by sacrificing optimality, accuracy, precision, or completeness for speed. Heuristic algorithms are times used to solve NP-complete problems, a class of decision problems.Heuristic algorithms are most often employed when approximate solutions are sufficient and exact solutions are necessarily computationally expensive.

# Tools:

## ANDROID APP TOOL :

Timetable is the most beautiful and intuitive app on Google Play for managing your school or university life. Save your timetable and all tasks from homework to exams. You only need to enter them once, because Timetable syncs across all your Android devices. Often forget to turn down your phones volume? No problem the app automatically mutes your phone during lessons.

[https://play.google.com/store/apps/details?id=taosif7.android.timetablegenerator&hl=en\_IN&gl=](https://play.google.com/store/apps/details?id=taosif7.android.timetablegenerator&hl=en_IN&gl=US) [US](https://play.google.com/store/apps/details?id=taosif7.android.timetablegenerator&hl=en_IN&gl=US)

This application is used to generate a time table for a class schedule.It uses some of the algorithms as we mentioned before.We will use this model and modify this application to generate an exam timetable.

Advantages in application:

* No errors when it generates a single timetable.
* It generates a timetable with a proper user interface.

Drawbacks in application:

* The main drawback is that it generates only a single class timetable not for multiple classes.
* The second drawback is having periods of two classes at the same time.

Microsoft web app addon based tool:

https://apps.microsoft.com/store/detail/school-timetable-maker/9P03RL9H4113?hl=en-us&gl=U S

An automatic timetabling software for educational institutions, an effective tool for managing the management of school timetables.

The main feature that identifies GHC is the engine, which automatically and satisfactorily solves any problem of planning teachers, classrooms, subjects, class units, etc. The GHC engine provides a solution extremely quickly, if there is one, according to the criteria you have set.

It is intended for primary schools, high schools, vocational training institutions, universities and other academic institutions. Its main objective is to fit the weekly school schedules taking into account all the necessary conditions in each institution.

Please note that the GHC Lite version is currently activated for free, in the future you can also activate the Optimum version.

**Reference Materials:**

Research Gate : <https://www.researchgate.net/> https://[www.researchgate.net/publication/273521527\_Final\_Exam\_Scheduling\_Timetabl](http://www.researchgate.net/publication/273521527_Final_Exam_Scheduling_Timetabl)e\_a\_Case\_

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