

AUTOMATIC TIME TABLE GENERATION

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Abstract— The manual system of preparing time table in colleges is very time consuming and tedious task which usually ends up with various classes clashing either at identical room or with same teachers having more than one class at a time. Due to manual approach, proper use of resources is neither effective nor efficient. To overcome all these problems we propose to make an automated system with computer assisted timetable generator. The system will take various inputs like number of subjects, teachers, maximal lectures a teacher can conduct, priority of subject and topics to be covered in a week or a lecture, depending upon these inputs it will generate possible time tables for working days of the week, making optimal use of all resources in a way that will best suit the constraints. An appropriate timetable is then chosen from the optimal solutions generated. Timetable creation is a very arduous and time consuming task. To create timetable it takes lots of patience and man hours. Time table is created for various purposes like to organize lectures in school and colleges, to create timing charts for train and bus schedule and many more. To create timetable it requires lots of time and man power .In our paper we have tried to reduce these difficulties of generating timetable by Heuristic Algorithm.

I. INTRODUCTION

The class timetabling difficulty could be a planning formula with nice interest and implications within the fields of operational analysis and AI. Most institutes subsume this drawback manually, i.e. an effort and error methodology is employed to line a timetable. whereas setting a timetable, importance is given to effective utilization of re that becomes a really exhausting task that has to be self-addressed a minimum of once a year by each educational institute. The class timetabling problem is a scheduling algorithm with great interest and implications in the fields of operational research and artificial intelligence. The problem was first studied by Gotlieb, who formulated a class-teacher timetabling problem by considering that each lecture contained one group of students and one teacher, such that the combination of teacher and students can be chosen freely . Dynamic changes in the context of timetabling problems, had started to be studied at . A survey of existing approaches to dynamic scheduling can be found in .Because of the size of real problem, almost all effective solutions are heuristic in nature, and do not guarantee optimality. Among the well known results there are that deal with various cases of the problem settings . While setting a timetable, importance is given to effective utilization

of resources such as the classroom, the teacher, etc.` This becomes a very tedious task which needs to be addressed at least once a year by every academic institute.

.This system provides a simple interface for generating the timetable automatically. It can be used by educational institutes or colleges to view their timetable in most efficient and easy manner. Achieving this objective is difficult as there are large number of clashes occur and it becomes a more tedious process to generate timetable for large number of classes. All these problems are solved using automatic timetable generation system. The paper focuses on presenting information in an easy and intelligible manner which provides facilities like viewing the student timetable and staff time table separately. Creation of timetable thus reducing paper work and automating the generation process in an educational institution. The timetable generated can automatically viewed in pdf format

A. PURPOSE

The purpose is to generate automatic timetable which contains all the staff and students time table. The purpose of generating a manual timetable is no clashes occur between the classes and staffs. .

B. OBJECTIVES

- To generate time table automatically for individual classes and staffs.
- To view timetable in easier manner.
- To increase the efficiency of the work

II. PROBLEM STATEMENT

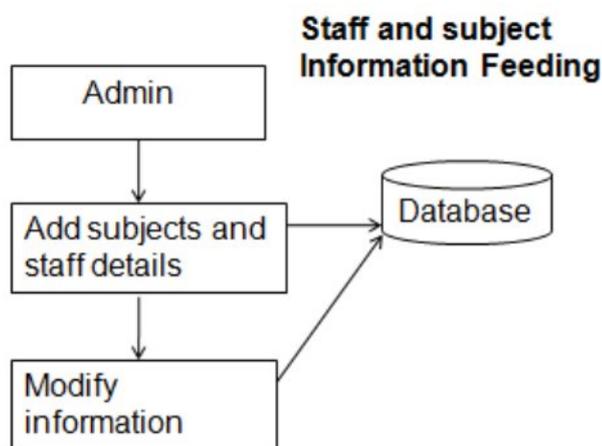
The time tabling problem can be modeled as a constraint satisfaction problem with many parameters and loose constraints. These constraints have to be modeled in a format that can be handled efficiently by the scheduling algorithm. The scheduling involves allowing for a number of pair wise restrictions on which tasks can be done simultaneously. For instance, in attempting to schedule classes at an institute, two courses taught by the same faculty member cannot be scheduled for the same time slot. Similarly, two courses that are required by the same group of students also should not conflict.

III. SYSTEM DESIGN

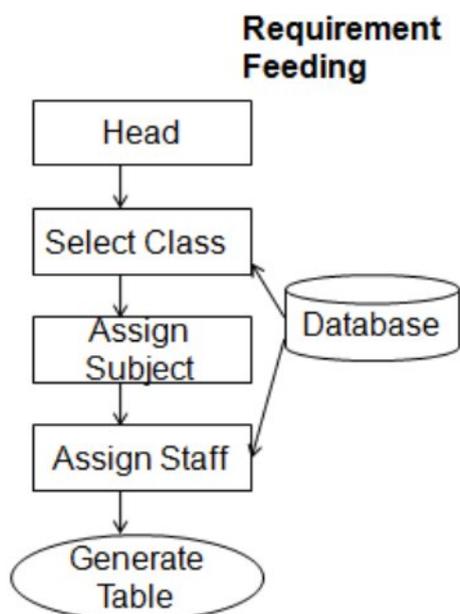
List of Modules:

- Staff and Subject Information Feeding
- Requirement feeding.
- Verification and Validation.
- Database storing and retrieval

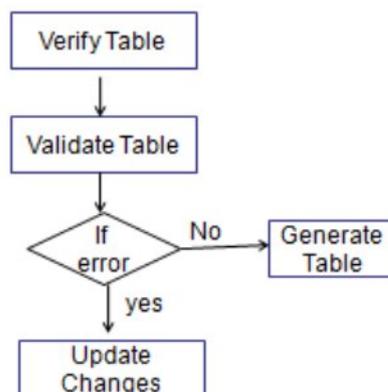
A. STAFF AND SUBJECT INFORMATION FEEDING



B. REQUIREMENT FEEDING.



C. VERIFICATION AND VALIDATION.



D. DATABASE DESIGN PROCESS

It is fair to say that database play a critical role in almost all areas where computers are used, including business, electronic commerce, engineering, medicine, law, education, and library science. A database is collection of a related data. A database has the following implicit properties:

- A database represents some aspect of the realworld, sometimes called the mini-world or the Universe Of Discourse (UOD) changes to the mini world are reflected in the database. A database is a logically coherent collection of data with some inherent meaning.
- A random assortment of data cannot correctly be referred to as a database.
- A database is designed, built, and populated with data for a specific purpose. It is an intended group of users and some preconceived application which these users are interested

Database Management System (DBMS) is a collection of programs that enables users to create and maintain a database. DBMS is a general –purpose software system that facilitates the process of defining, constructing, manipulating, and sharing database among various users and applications. Defining a database involves the specifying the data types, structures, and constraints of the data to be stored in the database. The database definition or descriptive information is also stored in the database in the form of dictionary; it is called Meta data constructing the database is the process of storing the data on the storage medium that is controlled by the DBMS.

Manipulating a database includes functions such as querying the database to retrieve specific data, updating the database to reflect in the mini-world, and generating reports from the data. Sharing a database allows a multiple users and programs to access the database simultaneously.

Application program accesses the database by sending queries or request for data to the DBMS . A query typically causes some data to be retrieved; a transaction may cause some data to be read and some data to be written into the database.

IV. REQUIREMENTS

Hardware Requirements:

Processor : Intel Pentium
RAM : 2 GB

Software Requirements:

OS : Windows
Software : NetBeans
Front End :Java
Back End :My SQL

V.ALGORITHM

--Time slots of the time tables:- ts1, ts2, ts3.....,tsn
--List of Subjects:- s1,s2,s3,, sn
--Teachers:- t1,t2,t3,, tn
--Batches of students:- c1,c2,c3,, cn
--Flags indicating finalized timeslots :- tsf1, tsf2, tsf3,, tsfn
--Data structure to hold Final Timetable:-final_tt
--Count for day of week: Day count
--Number of days of the week:- n
--Data structure to hold Subject-clash within the day:- clash
--Each element of Clash data structure:-clash_element
--Data structure for Subject-clash across days:-Dayclash
--Each element of Day clash data structure:-day_clash_element
--Subject contained in day clash:-sdc
--Teacher associated with subject in dayclash:-tdc
--Max number of lectures of subject si in the week:-k
--Counter for the number of subjects:-counter_sub
--Random number indicating random slot allotment for subject:-rand_sub_allot
--Data structure to hold randomly allotted subject:-rand_sub_seq
--Data structure to hold all subjects:-init_sub

ASSUMPTION:-

This algorithm is designed to solve and generate college time tables. The following is a list of assumptions made while developing this algorithm:

- The algorithm produces optimum outputs in a five-day week.
- The number of subjects (s1, s2, ...,sn) need to be finalized before the algorithm begins execution.
- Number of teachers (t1, t2, ...,tn) entered before execution of the algorithm are assumed to be constant and cannot be changed during or after the algorithm has been executed.
 - Any change in the above two assumptions will require a new generation of Timetable for the changed data.
 - In each time table, all time-slot is filled with, a unique combination of subjects without any repetition of subjects.

Any teacher is allowed at most „k“ number of lectures in a week. The value of k is accepted before execution of the algorithm.

It is assumed that a teacher cannot take more than one lecture for the same class in a day.

Timeslots ts1, ts2, ... ,tsn once entered at the beginning cannot be changed throughout the execution.

Every day in the week is assumed to have equal number of time slots.

Classrooms for any batch id fixed throughout the day.

User-Input Time slots of the time tables:- ts1, ts2, ts3....
Tsn List of Subjects:- s1,s2,s3,, sn
Teachers:- t1,t2,t3,, tn
Max number of lectures of subject si in the week:- k
Batches of students:- c1,c2,c3,, cn.

SQL: SQL stands for Structured Query Language. SQL lets us access and manipulate databases. SQL is an ANSI (American National Standards Institute) standard. SQL can execute queries against a database ,retrieve data from a database, insert records in a database, update records in a database, delete records from a database, create new databases , create new tables in a database , create stored procedures in a database,create views in a database, set permissions on tables, procedures, and views.

VI. RESULTS

Home Page: The system starts with home page where there are two login ,admin and system login.Each login is provided by separate user id and passwords.Fig. 4 shows homepage which includes login form.



Fig 4

Login Form: The staff can login and add all the details required.Use id and passwords are given such that others could not modify the timetable.This is shown in fig 5



Fig 5

After successful login message is prompted and it moves to the next window as shown in fig 6



Entry tab: The staff can select the year and section for which the timetable is to be generated or he can select the year and section and view the timetable if it has been already created.



Fig 6

Subject entry form: After selecting the year and section click generate it will move to the following fig 7. Here select all the subject according to your class and select the staff which will be displayed on the dropdown list box and also select the subjects for lab and its corresponding staffs.

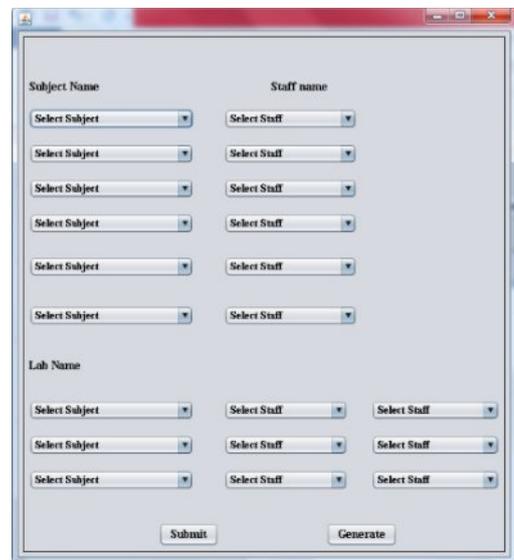
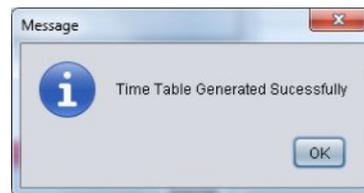


Fig 7

After entering all the details click submit button and then click generate to generate the timetable as shown in fig 8



Day/Period	1	2	3	4	5	6	7	8
1	DataMining / S5	DataMining / S2	DataMining / S2	DataMining / S2	DataStructure / S3	DataStructure / S3	DataStructure / S4	DataMining / S1
2	DataMining / S7	DataStructure / S8	DataStructure / S4	DataStructure / S4	DataMining / S5	DataMining / S1	DataStructure / S3	DataStructure / S8
3	DataMining / S1	DataMining / S7	DataMining / S5	DataMining / S5	DataStructure / S4	DataMining / S5	DataMining / S5	DataMining / S6
4	DataStructure / S3	DataMining / S7	DataStructure / S8	DataStructure / S8	DataMining / S1	DataStructure / S8	DataStructure / S4	DataMining / S6
5	DataStructure / S4	DataStructure / S8	DataStructure / S8	DataStructure / S8	DataMining / S1	DataMining / S1	DataStructure / S3	DataMining / S7
6	DataStructure / S6	DataStructure / S3	DataMining / S7	DataMining / S7	DataMining / S5	DataStructure / S8	DataStructure / S4	DataStructure / S3

Fig 8

Table generation: Once after the table is generated we can view the table in pdf format. Table generated will automatically be saved in pdf which make the user to easily view the table .This is shown in fig 9.

Day/Period	1	2	3	4	5	6	7	8
Hours	9.00-9.50AM	9.50-10.40AM	9.00-9.50AM	11.45-12.30PM	1.15-2.00PM	2.00-2.45PM	3.00-3.45PM	3.45-4.30PM
1	DataMining / S1	DataMining / S9	DataMining / S1	DataMining / S9	DataStructure / S2	DataStructure / S2	DataStructure / S3	DataMining / S7
2	DataMining / S4	DataStructure / S6	DataMining / S4	DataStructure / S3	DataMining / S1	DataMining / S7	DataStructure / S2	DataStructure / S6
3	DataMining / S7	DataMining / S4	DataMining / S7	DataMining / S1	DataStructure / S3	DataStructure / S8	DataStructure / S8	DataStructure / S8
4	DataStructure / S2	DataMining / S4	DataStructure / S2	DataStructure / S6	DataMining / S7	DataStructure / S6	DataStructure / S3	DataMining / S1
5	DataStructure / S3	DataMining / MSW	DataStructure / S3	DataMining / MSW	DataMining / S7	DataMining / S7	DataStructure / S2	DataMining / S4
6	DataStructure / S6	DataStructure / S2	DataStructure / S6	DataMining / S4	DataMining / S1	DataStructure / S6	DataStructure / S3	DataStructure / S2

Fig 9

VII.CONCLUSION

The intention of the algorithm to generate a time-table schedule automatically is satisfied. The algorithm incorporates a number of techniques, aimed to improve the efficiency of the search operation. It also, addresses the important hard constraint of clashes between the availability of teachers. The non-rigid soft constraints i.e. optimization objectives for the search operation are also effectively handled. Given the generality of the algorithm operation, it can further be adapted to more specific scenarios, e.g. University, examination scheduling and further be enhanced to create railway time tables. Thus, through the process of automation of the time-table problem, many an-hours of creating an effective timetable have been reduced eventually. The most interesting future direction in the development of the algorithm lies in its extension to constraint propagation. When there is a value assigned to a variable, such assignment can be propagated to unassigned variables to prohibit all values which come into conflict with the current assignments. The information about such prohibited values can be propagated as well.

VIII.REFERENCES

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