

**SSN COLLEGE OF ENGINEERING**  
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**P1:Timetable Management System for an**  
**Academic Institution**

Project Report

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## **Abstract:**

Timetable generation is a very difficult task. It is a time consuming, and arduous process. To manually generate a timetable, takes a lot of time, effort, and manpower. However, a timetable scheduling system is designed for different purposes such as: organizing lectures in higher institutions, private organization, airlines, bus station, etc. This report gives an overview of our program that generates timetable for academic purposes. The program we created uses a simple approach to the problem and gives a closer solution to the solution without any complex knowledge of algorithms. This paper tries to give a simple solution for generating an academic timetable using random values. This helps to minimize the time taken to generate a timetable when done manually.

## **Introduction:**

Timetabling is the procedure of assigning classes to time-slots and classrooms, subjected to various constraints. A timetable scheduling system allocates the given courses to the most feasible time slot in a day with respect to the faculty available. This system is used in every educational institution like schools, colleges etc... The timetable management system faces a series of challenges like: slowness and misallocation of course units, lecture time, lecture rooms, practical sessions and they always find it hard to make updates of the timetables perfectly because they do not always allocate some course units, lecturers' names on the timetables and even when some are allocated, there is always collision in different lecture, tests, or examinations. This results into failure of some students to have specific lectures according to the semester course outline or re-scheduling of specific tests or examination papers. This prompts for a timetable generation system that allocates lecture and examination rooms to specific courses.

## **Existing Work:**

After doing research on timetabling problems, we have found the input requirements of a problem for timetabling using list of teachers and classes. A paper dated 1969, by N.L. Lawrie, describes the problem of school timetabling. His paper describes a larger approach based on linear programming (optimization technique to achieve a best outcome), yet the results are not that impressive. Another paper presented by Shrinivasan et'al (2002) was an evolutionary algorithm-based approach for solving heavily constrained timetabling problem. Abramson and Abela (1992) proposed a genetic algorithm-based approach but it was too slow. Although speed up was achieved later on by exploiting parallel processing. Kheiriet'al (2016) presented a hyper-heuristic search strategy for solving the problem. A different approach was presented by Bhaduri (2009), where an evolutionary technique was shown to solve the time table scheduling with mixed success problem by using a combination of Genetic and Evolutionary algorithms. Bagulet'al (2016) presented a solution to the problem which was achieved by simply automating the manual processes and choosing the optimal solution from a set of possible solutions. This was achieved using a heuristics algorithm that takes values and manages the constraints and

resource scheduling one by one. This paper was aimed at developing a simple, collision free scheduling by implementing a slight variation of the solution provided by Saviniec et'al. This is made possible by using a simple logarithmic algorithm, precisely the modified quick sort algorithm for assembling parallel collision free frameworks (Nanda, Pai and Gole, 2012). This is essentially useful in the process of generating the lecture slots based on the timetable indexes. Also, Heuristics and context-based reasoning have been used before to obtain feasible timetables within a reasonable computing time. From the past reports, solutions using genetic algorithms yielded better results than other methods. But as we are beginners, we try to solve the problem by using basic concepts of programming language like loops, if-else etc... After going through all these papers, we have decided to give a basic solution for the problem using our beginner knowledge.

### **Problem Statement:**

The allocation of whole events in timeslots performs by university course timetabling process considering the hard and soft constraints, so that no conflict I such allocations.

### **Input:**

The following inputs should be first received from the user:

- Lab courses and their slots
- List of all courses with hours per week
- Faculty names
- Number of sections
- Number of subjects and teacher

The timetable is to scheduled by getting input first and stored in suitable datatypes. Lab courses with the available slots for a week are inputted by the user.

For each course, the following details are taken as input:

- Course name
- Hours per week

Then the faculty in charge for each course is taken from user. All the input data is stored in appropriate data types for easier access and modification.

### **Output:**

The output will be the timetable for all the classes . It will be in a table format. Each timetable will contain 10 columns and 5 rows subject to the constraints. The rows and column are filled

with the subject name which is determined by the algorithm employed. The output will be displayed in the command-line after receiving inputs from user. The Output is written to a text file.

### **Constraints:**

Maximum of 3 hours allotted for a faculty in a day.

No repetition of classes other than labs.

All the lab sessions are allotted in the Afternoon.

Maximum 3 special classes in a week.

Consecutive classes should not be allotted for a faculty.

Maximum of 2 sections have common lab

There should be 6 classes per day for a total of 5 days per week.

There are some other constraints which are not considered but implements such as giving mandatory break between classes in FN and lunch periods before AN classes.

### **Tools:**

The language to be used is C. The reason for using C is its speed. C is one of the fastest computing languages of all time. C makes us to make faster computations which will be slower in modern languages. But the disadvantage is that it does not support modern object-oriented approach. Even though it can be neglected as we can use structures in C. Also, it does not support dynamic programming as each time we have to compile our program to run it. We also used file handling in C to display the timetables.

### **Module Design:**

The project is divided into three modules to ease the workflow. Each module is done by each team member within a limited timeframe.

#### **Module 1:**

The first module of the project is dealing with input. This module gives details, theory and lab course details. This module deals with the creation of function which stores the input in an array of structures.

#### **Module 2:**

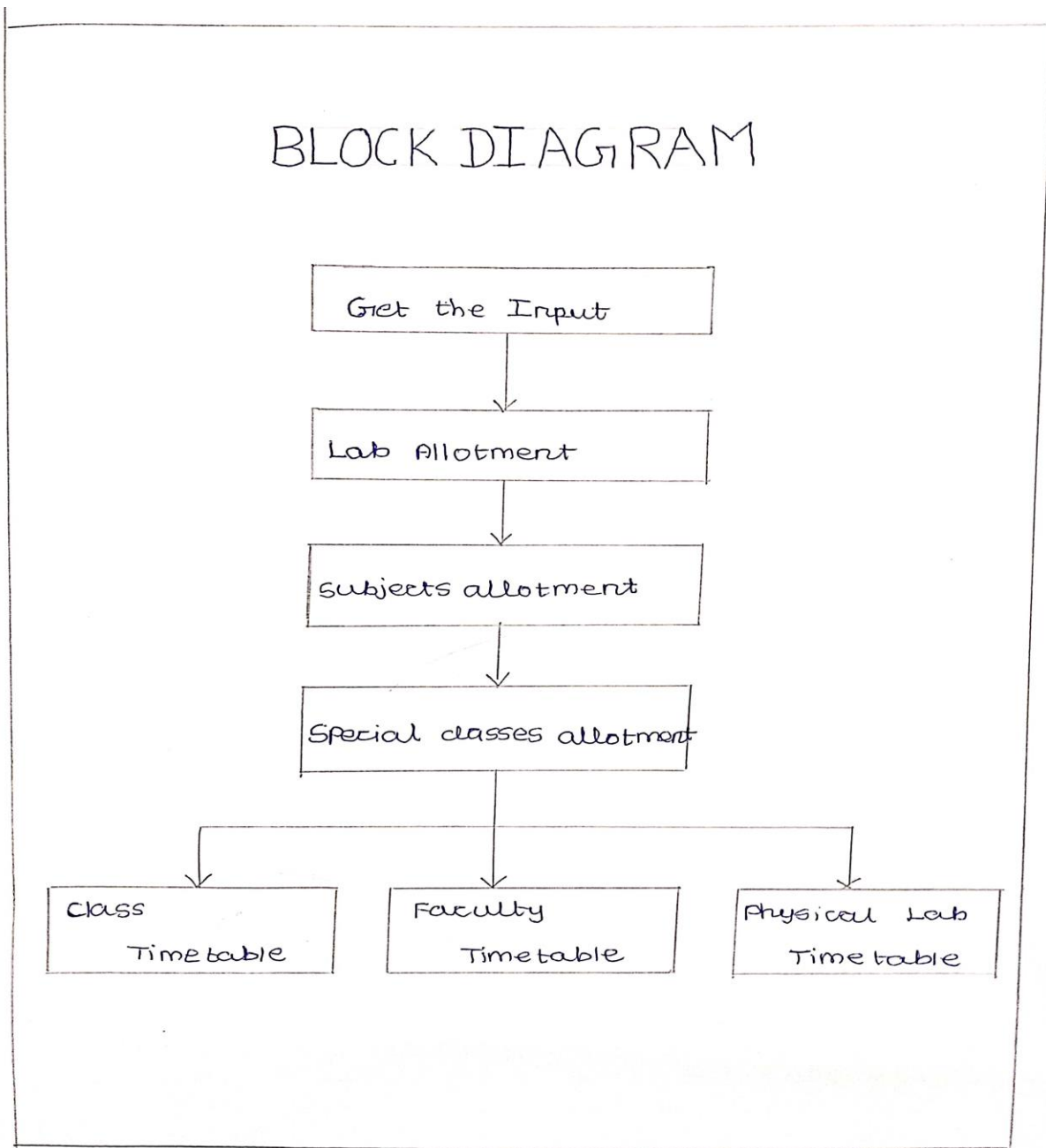
This part deals with scheduling of the classes, faculties and physical lab time tables. Suitable timetables are allocated based on given courses, faculties and lab sessions.

### Module 3:

The final module deals with files. In this part the scheduled time tables are written to a text files.

The Class timetables, Faculty Timetables and the physical lab timetables gets displayed in the file.

### Architecture Diagram:



## Sample Input:

```
C:\Users\Success\Documents\Project_Team_M.exe
Enter number of Sections : 2
Enter number of Days : 5
Enter number of Periodss : 6
Enter number of subjects: 8
Enter number of theory classes: 6
Enter number of lab sections: 2
Enter theory subject 1: Tamil
Enter faculty for Tamil: Gayathri
Enter theory subject 2: English
Enter faculty for English: Veni
Enter theory subject 3: Physics
Enter faculty for Physics: Anandh
Enter theory subject 4: Maths
Enter faculty for Maths: Uma
Enter theory subject 5: Chemistry
Enter faculty for Chemistry: Siva
Enter theory subject 6: Computer
Enter faculty for Computer: Boopathi
Enter lab subject 1 : Tamil
Enter lab name : Language
Enter faculty for Tamil: Gayathri
Enter lab subject 2 : Phy&Chem
Enter lab name : Science
Enter faculty for Phy&Chem: Suresh
Enter number of periods per weeks
Enter number of period for Tamil: 3
Enter number of period for English: 4
Enter number of period for Physics: 4
Enter number of period for Maths: 5
Enter number of period for Chemistry: 3
Enter number of period for Computer: 3
Enter number of period for Tamil: 1
Enter number of period for Phy&Chem: 2
Enter number of subjects: 8

C:\Users\Success\Documents\Project_Team_M.exe
Enter number of subjects: 8
Enter number of theory classes: 6
Enter number of lab sections: 2
Enter theory subject 1: Tamil
Enter faculty for Tamil: Umarani
Enter theory subject 2: English
Enter faculty for English: Veni
Enter theory subject 3: Physics
Enter faculty for Physics: Anandh
Enter theory subject 4: Maths
Enter faculty for Maths: Yukesh
Enter theory subject 5: Chemistry
Enter faculty for Chemistry: Murugesh
Enter theory subject 6: Computer
Enter faculty for Computer: Boopathi
Enter lab subject 1 : Tamil
Enter lab name : Language
Enter faculty for Tamil: Umarani
Enter lab subject 2 : Phy&Chem
Enter lab name : Science
Enter faculty for Phy&Chem: Suresh
Enter number of periods per weeks
Enter number of period for Tamil: 3
Enter number of period for English: 4
Enter number of period for Physics: 4
Enter number of period for Maths: 5
Enter number of period for Chemistry: 3
Enter number of period for Computer: 3
Enter number of period for Tamil: 1
Enter number of period for Phy&Chem: 2

-----
Process exited after 224.3 seconds with return value 10
Press any key to continue . . .
```

## Sample Output:

Project\_Team\_M.c Project\_TeamM\_Output.txt

```

1 -----
2                               1-CSE-A Class Timetable
3 -----
4 Maths    Physics    Computer    Tamil    Phy&Chem    Phy&Chem
5 English  Maths      Tamil      Computer    Phy&Chem    Phy&Chem
6 Chemistry English    Maths      Physics     Tamil      Tamil
7 Computer  Chemistry Maths      English     Library     Physics
8 English   Mentor    Physics    Tamil      Chemistry   Maths
9 -----
10                              1-CSE-B Class Timetable
11 -----
12 English  Library    Chemistry Mentor    Maths      Physics
13 Tamil    Maths      English    Physics   Chemistry   Computer
14 Maths    Physics    Tamil      English   Phy&Chem    Phy&Chem
15 Maths    Physics    Tamil      Computer  Phy&Chem    Phy&Chem
16 Maths    Chemistry English    Computer  Tamil      Tamil
17 -----

```

Project\_Team\_M.c Project\_TeamM\_Output.txt

```

17 -----
18                               Language Lab Timetable
19 -----
20
21
22                               1-CSE-A    1-CSE-A
23
24                               1-CSE-B    1-CSE-B
25 -----
26                               Science Lab Timetable
27 -----
28                               1-CSE-A    1-CSE-A
29                               1-CSE-A    1-CSE-A
30                               1-CSE-B    1-CSE-B
31                               1-CSE-B    1-CSE-B
32 -----

```

Project\_Team\_M.c Project\_TeamM\_Output.txt

```

32 -----
33
34                               Staff Gayathri's Timetable
35 -----
36                               1-CSE-A
37                               1-CSE-A
38                               1-CSE-A    1-CSE-A
39
40                               1-CSE-A
41 -----
42                               Staff Veni's Timetable
43 -----
44 1-CSE-B
45 1-CSE-A    1-CSE-B
46           1-CSE-A    1-CSE-B
47           1-CSE-A    1-CSE-A
48 1-CSE-A    1-CSE-B
49 -----
50                               Staff Anandh's Timetable
51 -----
52           1-CSE-A                               1-CSE-B
53
54           1-CSE-B    1-CSE-A
55           1-CSE-B                               1-CSE-A
56
57 -----

```

## **Conclusion:**

The purpose of the report is how we have created the timetable scheduling system using basics fundamentals of programming. This project helps us to approach a problem technically and create a solution for it. Through this project, we are well revised with concepts of C. In further years, we will able to develop more efficient solution for real-world problems.

## **References:**

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**THANK YOU**