

# Algorithm for efficient seat allocation process in college exam system

<sup>1</sup>PROF. NILIMA NIKAM, <sup>2</sup>AKSHATA JAGDALE, <sup>3</sup>GUNJAN PATIL, <sup>4</sup>PRACHI PATIL

<sup>1234</sup>Yadavrao Tasgaonkar Institute Of Engineering And Technology

\*\*\*

**Abstract-** Exam seat allocation is one of the major concerns in quality education. With the increasing number of students, subjects, departments and rooms, exam seat management becomes complex. Maintaining a decent exam environment with the proper seating arrangement is one of the difficult jobs for authority. This research offers solution for exam seating arrangement problems that can be achieved through the sequential execution of three proposed algorithms. This research offers a solution for preventing some exam hall cheating by arranging seats for large students and it also finds out the best combination of rooms to be assigned for the exam to organize perfect seating based on the room orientation and size, number of students, differentiation of subjects. To do this research, we have collected data and methods from a university those are being used for their exam seating arrangement. By using university exam information we test our algorithms. It provides better seating plan than the manual system used by the university.

**Keywords—** Exam; Seating Plan; Seat Allocation; Algorithm

## I. Introduction

A successful distribution of seats in exam is one of the primary concerns of a well prepared exam hall. While distributing seats in the exam hall, authority tries to ensure a minimum distance between students to protect cheating as like as copying from “crib sheet” and other students [1], [6]. Another important issue is

to utilize the best use of seats. The process of exam seat assign starts with the exam timetabling [2],[3] but in some cases timetabling is separate from exam seating [4]. Usually Exam seats are allocated manually based on some basic rules. Most of the cases, it demands high cost and time to provide the optimum solution while there are a large number of students and they are from multiple disciplines or subjects. Some of the cases there are possibilities of having some empty seats, overlapping students with different subjects in the same column and also having no distance between the students with getting same question set. As a result it becomes very tough for invigilators to control the exam hall and also to ensure a proper exam environment. With the increasing number of students and subjects, it becomes more difficult to arrange the proper seat plan for the students. Most of the institutions do this process manually. Although there have many related works of exam arrangement, institutions face difficulties to do those works. Most difficulties arise from the exam timetabling and room assignment problem. Though centralize exam affects educational achievement, but it is essential for standard education [10]. Most of the institutions are becoming unwilling to centralize examination system [11] day by day. One of the major causes is that with the increasing number of students, courses and departments, it becomes almost unmanageable to allocate proper exam seats. It is quite difficult to properly allocate the seats among a large number of students whenever the students are from

different subjects. We have to follow some preconditions for proper allocation of exam seats. Minimum one column of distance needs to be maintained while seating the students of the same subject. The students of different subjects should not be allowed into one column. The best use of the seats should be confirmed. This may possible for a small number of students to do it manually with fulfilling these preconditions, but for a large number of, it becomes harder.

To get rid of these hassles, some institutions encourage decentralize the exam system instead of the centralize exam system [11]. They offer the course teachers to arrange the exams individually for the students of the same course. But it is very hard for a course teacher to manage quality examination while conducting exams this way.

Though centralize exam affects educational achievement, but it is essential for standard education [10]. Most of the institutions are becoming unwilling to centralize examination system [11] day by day. One of the major causes is that with the increasing number of students, courses and departments, it becomes almost unmanageable to allocate proper exam seats. It is quite difficult to properly allocate the seats among a large number of students whenever the students are from different subjects. We have to follow some preconditions for proper allocation of exam seats. Minimum one column of distance needs to be maintained while seating the students of the same subject. The students of different subjects should not be allowed into one column. The best use of the seats should be confirmed. This may possible for a small number of students to do it manually with fulfilling

these preconditions, but for a large number of, it becomes harder.

This exam seating problem can be simplified into two parts, the first part is exam timetabling and the second part is seating and room assignment. Our research objective is to find out the solution of exam seating or room assigning problems to prevent cheating in exams.

The hard constraints of exam seating problems are as follows:

H1: To prevent cheating (copying from another), no student of the same query set should allow to sit beside.

H2: Students having different query sets do not allow in nearest columns.

H3: As less as extra seats will be available in the exam hall during the exam.

H4: As many as seats will be used during the exam for student seating.

H5: The minimum number of exams takes place in

## EXISTING SYSTEM

The existing system offers the course teachers to arrange the exams individually for the students of the same course. But it is very hard for a course teacher to manage quality examination while conducting exams this way. For maintaining central examination some institutions offer one room for one exam to get rid of this hassle of preparing a seating plan. As a result the quality of examination as well as education becomes questionable for lots of the educational institutions.

### DISADVANTAGES.

- Its manual system so its take a lot of time for prepare seating chart.
- Increase the ratio of exam hall cheating by arranging seats for large students.
- Maintain the paper work.
- Manpower was required.

### OBJECTIVE

Our research objective is to find out the solution of exam seating or room assigning problems to prevent cheating in exams.

### II. LITERATURE SURVEY

In this literature Serve there are few solutions for exam room assignment [3],[7]. The Senior Capstone Project [5] of Prince of Songkla University, Thailand is offered a solution but the feature not effective enough. M.N.M. Kahar and G. Kendall [7] provided a solution for room assignment and they consider that only one exam will take place in one room at a time, but it may create an opportunity to cheat in exam hall as like as copying from other. M. Ayob and A. Malik[3] also did the same thing about the room assignment, but they consider some special exam. This type of exam environment is easy to maintain, but it does not ensure the quality of exam environment To solve this problem, this research offers a system to generate an exam seat plan for a large number of students from different subjects. This system mostly focused on optimum uses of seats, having a distance of students getting same query set to prevent cheating (copying from others) in the exam, avoiding seat overlapping and finally full seating arrangement that is comfortable both for the students and invigilators

### III. PROPOSED SYSTEM

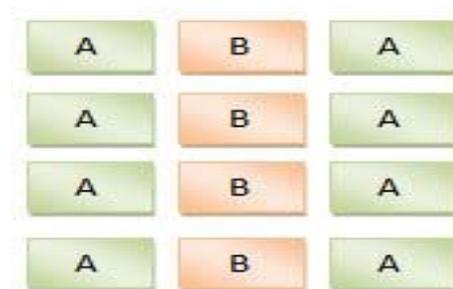
In our proposed system there are no fixed rules for exam seating. Different institutions follow the different seat allocation methodology in exam based on the number of students, capacity of seats, environment and exam type. Mostly two types of seating methodologies are used for exam seating where the room is rectangular or square. These methodologies look like as the English letter X and I.

### SYSTEM ANALYSIS

- Consider A and B are two subjects having only one question set for each subject.



### X METHODOLOGY

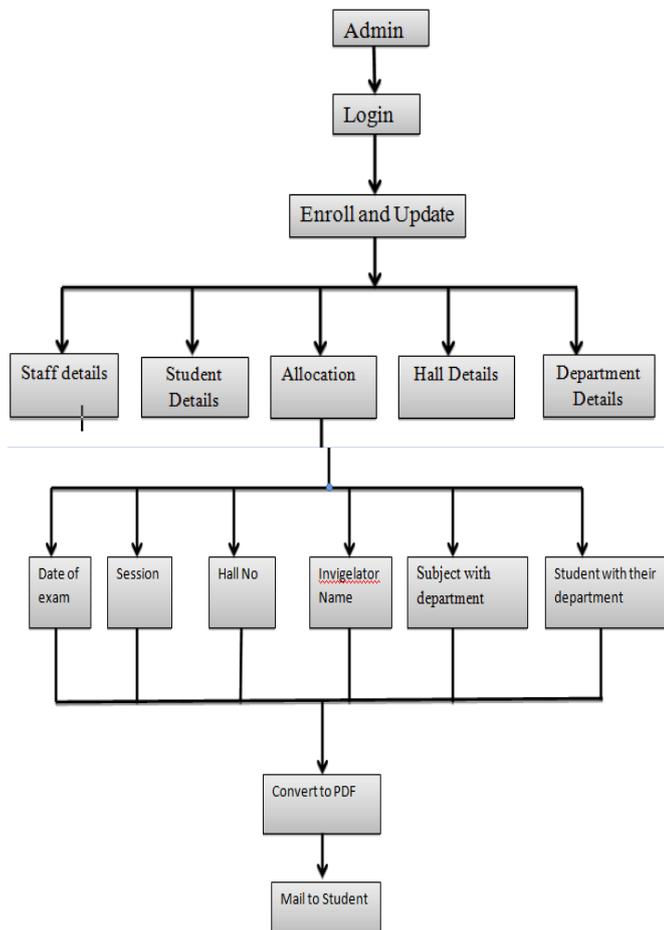


### I METHODOLOGY

**Fig No 1: Types of seating Arrangement**

## SYSTEM ARCHITECTURE

### Data flow diagram [ADMIN]

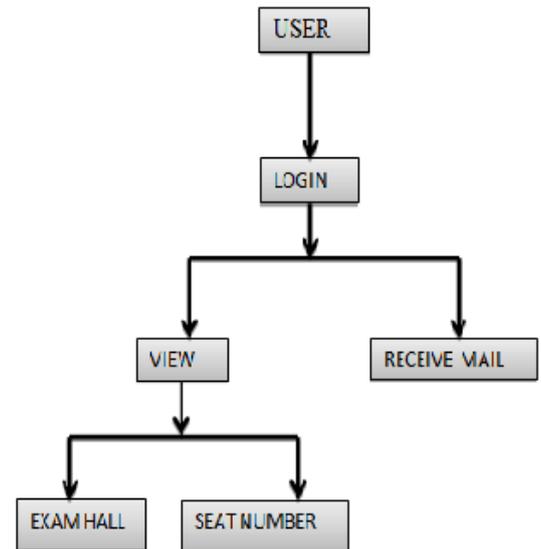


### 1. User Module

Users are the student they can login and see their details. Student can view their exam hall details and their seat number. Date of examination and their invigilator are all viewed by the student. For every student mail will be sent of their hall allocation.

## Data flow diagram

### [USER]



## IV. METHODOLOGY

### System Description

In this project, we are going to offer a model and some algorithm to solve exam seating problem. Our proposed system is applicable for I shape seat allocation system. The system needs two types of data as input, Room information and Exam information. The total number of students must have to be less than or equal to the total seats. For offering an optimum seating solution we followed some steps. These algorithm will be followed for each slot of examination.

Step 1: Two types of data sets are needed for exam seating, one is room information having room id, size of columns and rows; another is exam information with subject id and number of students. By processing room and exam information it will calculate total number of seats and students. Finally it will calculate the number of extra seats available after seating.

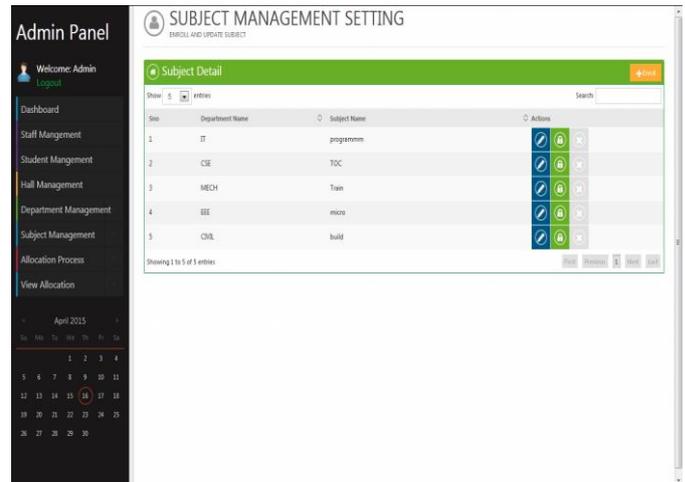
Step 2: When the amount of extra seats is greater than any room capacity, then it may possible of having one or more extra room. In this step it will search those rooms, which will be kept empty at the time of exam.

Step 3: Our main concept is to distribute column to the subject so at first it needs to calculate the number of columns and the capacity or number of rows for each column. To prevent copying from other it tries to ensure at least one column distance among students having same query set. That is why it will also calculate maximum usable column and its capacity for any subject.

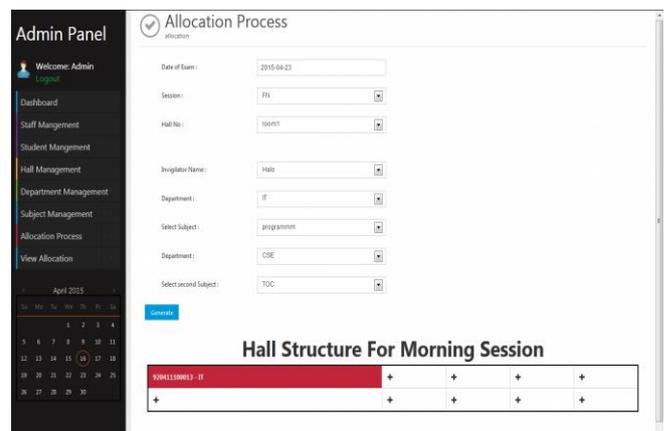
Step 4: Then it will allot columns to the subjects. By using a combination of column size (row) we can ascertain the set of columns which will be assigned to subjects. After that it will provide a set of columns for each subject. In best case extra seats are not required, but in worst case it may require to assign some extra seats to subject for getting a set of column for exam seating.

Step 5: We have subject having different column size and number. We have also room identity which is represented by column number and row number as column size. So the common attribute is column size. By using this it assigns room and column number to the subject by maintaining one column distance between the columns having the same subject. After completing the column and room distribution it will provide a complete seating solution for the exam.

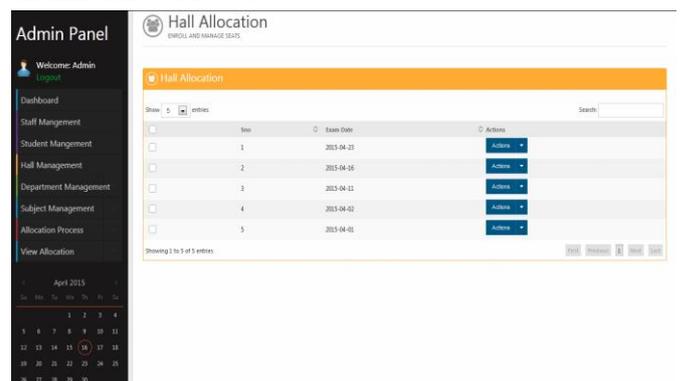
## V. IMPLIMENTATION



### ALLOCATION PROCESS:

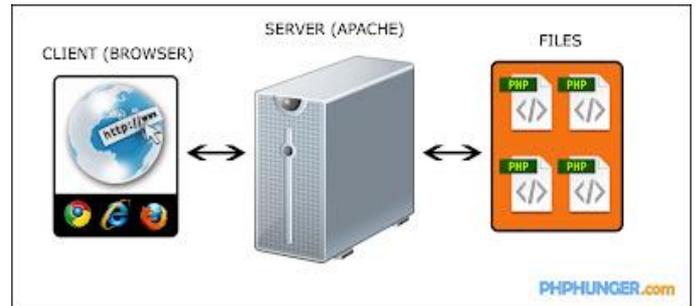
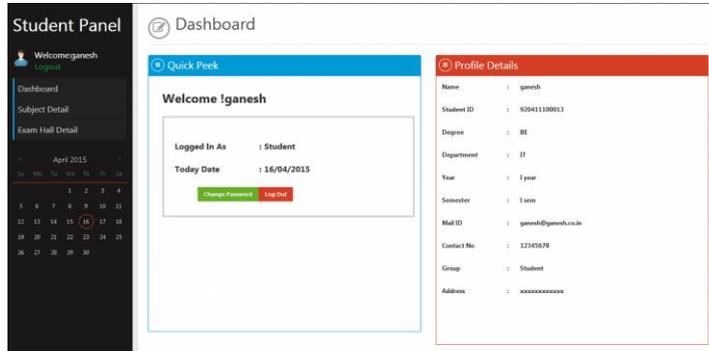


### HALL ALLOCATION:



STUDENT PANEL:

DASHBOARD:



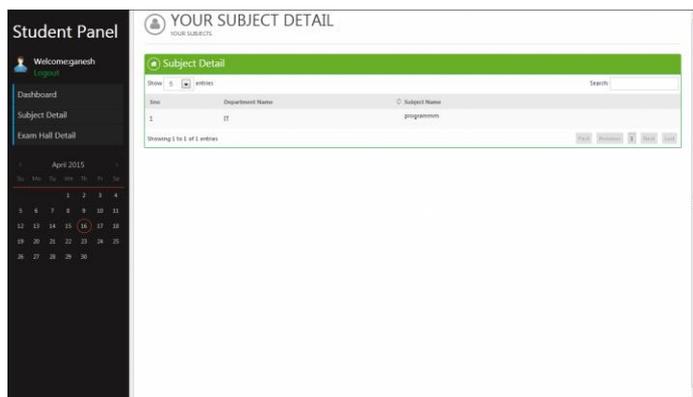
Step 1:

Start WAMP Control Panel Application and start Apache and MySQL services. If you don't know how to start WAMP and its services please see here.

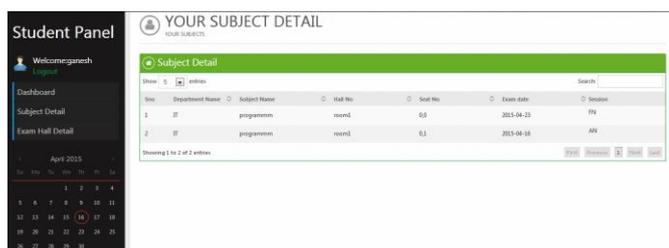
Step 2:

1. To run PHP code or PHP script you need a file. So create a file with a name called "myFirstPHPScript.php".
2. To create a file you should have any editor like Notepad or Notepad++. I suggest you to download Notepad++ for ease of writing the code. You can download from here Notepad++. Once you have downloaded, install it on to your machine and then write the following code in the Notepad++ editor.

SUBJECT DETAILS:



EXAM HALL DETAILS:



File Name :myFirstPHPScript.php

?

```
1 <?php
```

```
2 echo "Hello World! This is my first PHP code snippet!";
```

```
3?>
```

VI. SOFTWARE DESCRIPTION

Now let's see how to run PHP code or PHP script using WAMP. Let's get started.

OMG! I have written my first PHP code. It seems so simple. Yes, Its so simple if you keep on following my articles.

### Where to save PHP files and folders?

As you have written your PHP code now you will be confused about the file that where should

i save the file. The WAMP gives you a directory for storing all PHP files or folders in the " www" directory which i already discussed in my previous article.

Local Storage Location of PHP files and folders:

Lets see the location of www directory. See the below picture to find the location of "www" directory.

#### Note:

1. Every PHP file or PHP Project must be stored in this www directory.
2. If its a big project then keep all the PHP, HTML, CSS, JavaScript files in one folder and place them in the www directory.

### VII.CONCLUSION

This research solves one of the big issues of centralized examination system by offering a series of algorithms. This will reduce a huge number of workload that have to be given by the employees before exam to prepare an exam seating arrangement plan. Also this will reduce the risk of mismanagement during exam like not having seats for all students, overlapping of multiple students in the same seat, not having proper distance between students with same question sets, etc. Although the system does not provide the optimum result for worst case like very big

column size with very less students but it is very effective for large amount of students and seats. This gives good result while the number of students and seats are equal. In future we will try to solve these problems.

#### REFERENCE

- [1] Prof.Santa Kumar Chaki at ell "Algorithm For Efficient Seating Plan For Centralized Exam System" 2016 International Conference on Computational Techniques in Information and Communication Technologies (ICCTICT [2] A. Dammak, A. Elloumi, and H. Kamoun. "Classroom assignment for exam timetabling," Advances in Engineering Software, pp. 659 -666, 2006.
- [3] M. Ayob and A. Malik, "A New Model for an Examination-Room Assignment Problem," IJCSNS International Journal of Computer Science and Network Security, VOL.11 No.10, 2011
- [4] E.K.Burke, B.McCollum, and P.McMullan, "Examination Timetabling: A New Formulation," International Conference on the Practice and Theory of Automated Timetabling (PATAT 2006), Brno, Czech Republic, ISBN 80-210-3726-1, 2007 .
- [5] T. Prabnarong and S. Vasupongayya, "Examination management system: room assignment and seating layout," Proceeding of the Office of Academic Resources International Conference, Phuket, Thailand, pp. 25-27, 2011.
- [6] S.Vasupongayya, W.Noodam, and P.Kongyong, "Developing Examination Management System: Senior

Capstone Project, a Case Study,” World Academy of Science, Engineering and Technology, Vol:7 2013.

[7] M.N.M. Kahar and G. Kendall, “The examination timetabling problem at Universiti Malaysia Pahang: Comparison of a constructive heuristic with an existing software solution,” MIT Press and McGraw-Hill, ISBN 0-262-03141-8.

[8] M. Hegland, J. Garcke, and V. Challis, “The combination technique and some generalisations,” Linear Algebra and its Applications, vol. 420, pp. 249–275, 2007.

[9] S. Mathew and L. Ginsberg, “Dynamic Backtracking,” Journal of Artificial Intelligence Research, vol. 1, pp. 25-46, 1993.

[10] Ludger Wobmann, “How Central Exams Affect Educational Achievement: International Evidence from TIMSS and TIMSS-Repeat,” Harvard University Program on Education Policy and Governance Working Paper No. PEPG/02-10 y.