Class Schedule System

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Class Schedule System

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***Abstract*—Class Scheduling System is a software that improves these processes that system has features can provide a database for storing records and information. It allows the end-user to add, edit, delete, save and update records or information if some changes occur. It can generate reports for example class schedule, class list, instructors list, hall list, department list and school year with different semesters. Class Schedule System is a Class management system for a university for handling the course studying in which semester, managing user profiles and allowing authority for users to let them retrieve and export information of course details. It is a better solution with many flexible and convenient features, allowing class administrators and instructors to maximize efficiency while reducing time wastage. In this paper a class schedule system is designed and developed as a web database application system by PHP language with MySQL database management system. Finally, it takes a few minutes to come up with complete high quality solution for assigning a significant improvement over of manual work. The most effective point for this system that has a flexibility and scalability which is very important for the future you can do more development on it. Class Schedule System needs some future work and correlations. Design and implementation of smartphone application is remained as a future work. Users can access to the application anytime and in anywhere with smartphone application, even though they don't have access to desktop applications.**

Keywords; Database (DB); Class Schedule System (CSS); MySQL; PHP; Apache

I. INTRODUCTION

Now a days the technology has grown very fast, it have a big impact on our daily lives. Using it goes toward the advantage in learning field and very effective. However database is the organized gathering data, it is making the relationship between tables and a collection of schemas, tables, views, queries and reports [1].

The class schedule project is a game oriented medium where questions are distributed rely on the responses knowledge levels and very helpful orientations are provided. Creating such platforms very helpful for instructors to search the subjects, students that have this class, semester, and the length of the class per week.

It helps instructors to utilize reducing the load to in order to know the fully information about the students, classes, department, and the faculty to arrange their time table. As we know the database management system is developing continuously day by day, it makes easier of our daily work by using technology. Meanwhile it supports user to do the routine work with saving time and human resource efforts, and provides the data accuracy and better quality.

Class schedule management system provides the accessibility for admin and instructors to use it in simplest way to determine their data, it connects the relational table together such as (Class table, instructor table, time table, class table and etc.). Then the users can exporting the required reports for any queries that they need it. A scalability of this project is most important role to expand it by requesting more new ideas and thoughts. Finally the simple and friendly system will make the flexibility to use different level of understanding knowledge of users.

II. BACKGROUND

Class schedule project has been used to manage the university courses to show the course requirements which is selected and terminated by administrator to give the authority to who needs to have, also providing all reports which is requested by admin and the instructors which have been designed.
However the system have capability to expand the additional requirement by adding any tables, queries, and any report.

Head department is responsible of planning faculty heaps of each every instructor under his/her department of expertise wherein teachers present a reduction of significant subjects he likes to deal with for a particular semester. Also to enroll the students who asked to take the course, needs to be validated then approved by admin. Some of the important approaches are classified and explained as below:

A. Definition

The objective of this project is to improve Scheduling Class System and explain the accessibility with the database in easiest way. This database implemented by using web application program language PHP and database management system MySQL.

This project created to supply the boundary for admin and instructors to nominate coursework including, instructor table, Course table, timetable, classroom table, day's table and give comments on each coursework. This is to the students are exposed in any case optimization fundamental, streamlining model that even the weaker students can define for the class schedule and fathom without anyone else. For all students, detailing up and coming semester's timetable is a vital piece of their student life.

B. Database

Firstly, Database can described as a databank or a data store, abbreviated as DB. A database could be expansive amount of recorded advanced data. It can be looked, referenced, compared, changed or controlled with an ideal speed and negligible with a minimum cost [1].

A database is built and maintained by employing a database programming dialect. The foremost common database dialect is SQL, but there are numerous "flavors" of SQL, depending on the sort of database being utilized. Each flavor of SQL has contrasts within the SQL sentence structure and are planned to be utilized with a particular sort of database. For illustration, a database employments PL/SQL and Prophet SQL (Oracle's form of SQL). A Microsoft database employs Transact-SQL (T-SQL).

Database components: A database is made up of a few fundamental components:

Schema - A database contains one or more patterns, which is essentially a collection of one or more tables of data.

Table - Each table contains numerous columns, which are comparative to columns in a spreadsheet. A table can have as small as two columns and as numerous as one hundred or more columns, depending on the sort of information being put away within the table.

Column - Each column contains one of a few sorts of information or values, like dates, numeric or numbers values, and alphanumeric values (too known as varchar). Row - Information in a table is recorded in columns, which are like lines of information in a spreadsheet. Regularly there are hundreds or thousands of lines of information in a table [3].

C. Database Management System (DBMS)

A DBMS makes it potential for end user clients to make, read, upgrade and erase information in a DB. The DBMS basically turns as mediator between the DB and end clients or applications, guaranteeing that information is reliably systematized and remain easily accessible [2].

The DBMS controls three vital things: the data, the database motor that permits data to be locked and adjusted and the DB pattern, which characterizes the database's coherent structure. These three foundational components offer assistance give concurrency, security, data integrity and regular organization methods. Ordinary database administration tasks propped by the DBMS incorporate alter administration, execution monitoring/tuning and backup the recovery. Numerous database management frameworks are moreover capable for mechanized restore, restart and get the data as well as the entry and review of actions.

The DBMS might be most valuable for giving a centralized view of data that can be accessed to by numerous clients, from numerous locations, in a controlled way. The DBMS can offer both logic and physical independent data. Meaning it can secure clients and applications from requiring to know where information is put away to be attentive to changes to the physical structure of data (capacity and hardware). As long as programs utilize the application programming interface (API) for the database that's provided by the DBMS, engineers won't need to adjust programs, since it has been made to the database [2]. With social DBMSs (RDBMSs), this API is SQL, a standard programming definition for characterizing, securing and getting to information in a RDBMS [4]. As shown in figure 1.

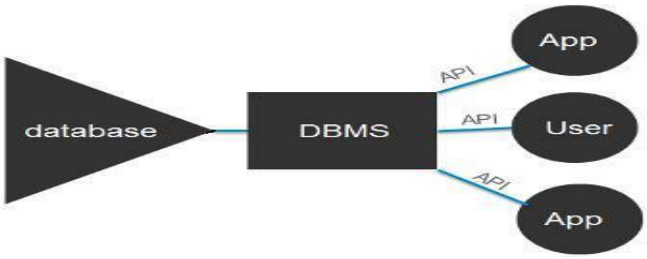

Fig 1 - DBMS interface

D. Tables

In computer programming, a table is a data structure used to organize information, just as it is on paper. There are many different types of computer-related tables, which work in a number of different ways which is using a model of vertical columns (identifiable by name) and horizontal rows, the cell being the unit where a row and column intersect. A table has a specified number of columns, but can have any number of rows [1].

E. Program Language

As A programming language is a vocabulary and set of grammatical rules for instructing a computer or computing device to perform specific tasks. The term programming language usually refers to high-level languages, such as BASIC, C, C++, COBOL, Java, FORTRAN, Pascal and PHP.

High-level programming languages, while simple compared to human languages, are more complex than the languages the computer actually understands, called machine languages. Each different type of CPU has its own unique machine language [3].

Abnormal high level programming languages, while straightforward contrasted with human language, are more mind boggling than the dialects the PC really comprehends, called machine dialects. Each extraordinary kind of CPU has its own special machine dialect. As shown in figure 2.

Lying between machine language and abnormal high level languages are known Assembly language. Assembly Low level language are like machine language, however they are significantly simpler to program in light of the fact that they enable a software engineer to substitute names for numbers. Machine languages comprise of numbers as it were [3]. At that point we require arranges or translator to change over the machine language to human language with the goal that the PC to be know and comprehend of words and codes. There are two approaches:

Compile the program.
Interpret the program.

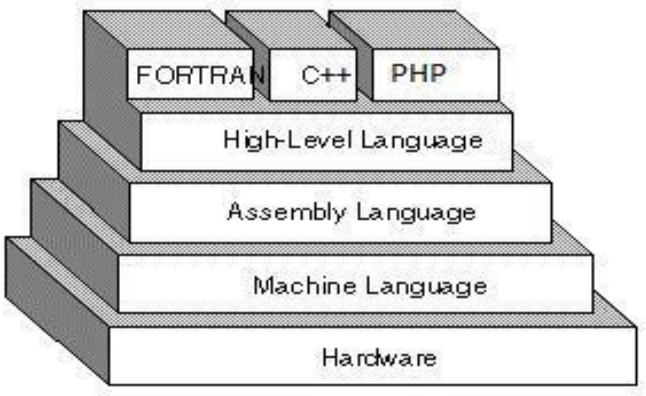

Fig 2- Program Language Hierarchy

F. Hardware and Software Requirements

Here is explain the necessary requirements for both Software & Hardware parts which are supporting the Class Schedule System to run on the PC without any obstacles.

1. Hardware Requirements
   SYSTEM: Pentium III 700
   MHz HARDDISK: 40 GB
   MONITOR: 15 VGA Colour
   RAM: 128MB
2. Software Requirements
   Tool : notepad++ , web browser
   Coding Language : PHP, HTML, JavaScript, CSS,
   Server : xampp server
   Database : MYSQL

III. DATABASE METHODOLOGIES AND CONTRIBUTION

A. Problem Statement

The required system is to determine the following problems who is give authorities for the users, the administrator can control the system by modifying, adding and deleting the available tables that we have it for all students and instructors based on his request.

Also let the instructors to arrange their lecturers with students. However to support students to know their marks, exam times and how many hours they have per week or semester. In this system of the main issues is that when the student ask for changing from MWF to TTH or vice versa, the conflict between the classroom when Instructor has a course in one hall, it should be clear and pop up from another instructors to avoid asking the same hall.

B. Scope of Study

The aim of design Class Schedule System based on customer's perspective and needs, objective design specifications define the scope of work and clearly state the project objectives including the following:

a. Design specifications of the requested system, project design and implement a class scheduling for schedule table which offers three times per year such as:
   - Fall Semester.
   - Spring Semester.
   - Summer Semester.

b. Critical design issues, constraints, database system is dived in two parts:
   - 1st part (Administrator): This part is the most important phase of the project, admin who has authority to apply and select the classes, Instructors and season study for each student. Meanwhile give the acceptance for each new instructor and students who want to teach and take the new courses, then exporting the different reports based on the queries.
   - 2nd part (Instructors): Let the teachers to add and select the courses and the classrooms based on the availability and approval by admin.
   - 3rd part (Student part): as a student can see their parts and seasons study such as lecturers, days and subjects that to be taken per semester. And the name of instructor. (The system is not implement this part, because it's not requested)

c. Period time Classes length such as:
   - (MWF) Monday -Wednesday-Friday: class duration is 50 minutes.
   - (TTH) Tuesday and Thursday: class duration is 75 minutes.

C. Design

I suggested CSS database to explain all required details for problem solution, the reader should know and understand which program and server utilizing for design this project.

1. Method:

The questions are asked and the requirements are submitted, the information's are gathered from admin and instructors in order to finalizing the expectations and setting up the design.

2. Design:

As agreed in the proposal I have been implemented and designed Class Schedule System (CSS) by using web interface programs (Web Database) to design the system, designed by PHP and MySQL due to below reasons:

- PHP & MySQL are very common programs and easy to modify for the future, modern, objected now a days
- Creating web application to make simplest platform for admin, lecturers and students
- Being available and online in real time that you need use this system in everywhere and every time.
- Friendly interface, all users can open and use in all browsing application [4].

D. PHP

(PHP: Hypertext Preprocessor) A scripting language that is widely used to create dynamic Web pages. Combining syntax from the C, Java and Perl languages, PHP code is embedded within HTML pages for server side execution. It is commonly used to extract data out of a database on the Web server and present it on the Web page. Originally known as "Personal Home Page," PHP is supported by all Web servers and widely used with the MySQL database [4].

PHP Operators

Operators are used to perform operations on variables and values. PHP divides the operators in the following groups:

Arithmetic operators
Assignment operators
Comparison operators
Increment/Decrement operators
Logical operators

E. Database Relationship

If we have a related data to another one then we have a relationship between tables too. One column called primary key which is a reference and other column in another table called foreign key. [5].

While linking two tables together there are some options while making the relationship which are: null and cascade, null means if the primary key is deleted leave the data empty on foreign key however cascade means whatever happens to primary key do same on foreign key. Database relationships are very similar like family associations between tables. There are three types of relationships:

- One-to-one: Both tables can have only one record on either side of the relationship. Each primary key value relates to only one (or no) record in the related table.
- One-to-many: The primary key table contains only one record that relates to none, one, or many records in the related table
- Many-to-many: Each record in both tables can relate to any number of records (or no records) in the other table. For instance, if you have several siblings, so do your siblings(havemanysiblings).Many-to-many relationships require a third table, known as an associate or linking table, because relational systems can't directly accommodate the relationship.

F. MySQL

MySQL is an open source relational database management system (RDBMS) based on Structured Query Language (SQL).

MySQL runs on virtually all platforms, including Linux, UNIX, and Windows. Although it can be used in a wide range of applications, MySQL is most often associated with web-based applications and online publishing and is an important component of an open source enterprise stack called LAMP. LAMP is a Web development platform that uses Linux as the operating system, Apache as the Web server, and MySQL as the relational database management system and PHP as the object-oriented scripting language [4].

MySQL is a relational database management system based on SQL – Structured Query Language. The application is used for a wide range of purposes, including data warehousing, e-commerce, and logging applications. The most common use for MySQL however is for the purpose of a web database [5].

G. Server

A server is a high-performance and powerful computer, it has high speed of CPU, large memory and large disk space [6]. However, a single and normal computer with normal specifications can be act as a server, there are programs specialized for server runs on the computer to be server.

H. Web Server

Web server refers to server software, or hardware dedicated to running said software, that can serve contents to the World Wide Web. A web server processes incoming network requests over the HTTP protocol (and several other related protocols).

The primary function of web server is to store, process and deliver web pages to clients. The communication between client and server takes place using the Hypertext Transfer Protocol (HTTP). Pages delivered are most frequently HTML documents, which may include images, style sheets and scripts in addition to the text content [6].

Below are the latest statistics of the market share of all sites of the top web servers on the Internet by W3Techs Usage of Web Servers for Websites on Oct 2017. As shown in Table – 1.

Product	Vendor	Percent
Apache	Apache	48.50%
nginx	NGINX, Inc.	35.40%
IIS	Microsoft	10.80%
LiteSpeed Web Server	LiteSpeed Technologies	2.90%
GWS	Google	1.10%

Table 1 – Web Server Usage

I. Apache Web Server

Apache Web Server is created by a group of software developers for server and database creations, management and deployment. Apache is an open-source server which managed by Apache Software Foundation. Shown in figure 3.

''Apache Web Server is designed to create web servers that have the ability to host one or more HTTP-based websites. Notable features include the ability to support multiple programming languages, server-side scripting, an authentication mechanism and database support. Apache Web Server can be enhanced by manipulating the code base or adding multiple extensions/add-ons. It is also widely used by web hosting companies for the purpose of providing shared/virtual hosting, as by default, Apache Web Server supports and distinguishes between different hosts that reside on the same machine'' [7].

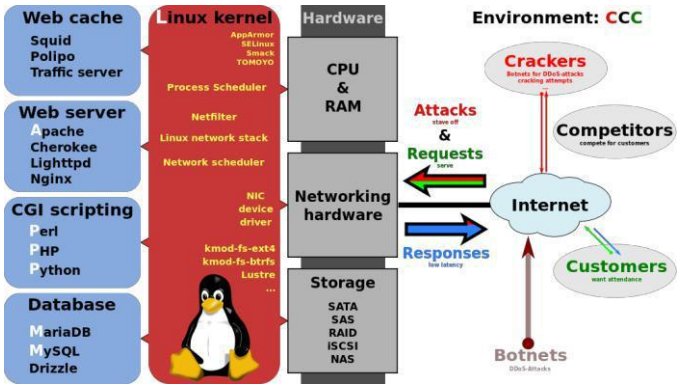

Fig 3 – Technology Architecture

J. Php MyAdmin

PhpMyAdmin is one of the most popular applications for MySQL database management. It is a free tool written in PHP. Through this software you can create, alter, drop, delete, import and export MySQL database tables. You can run MySQL queries, optimize, repair and check tables, change collation and execute other database management commands.

All the Site Ground clients can manage their MySQL databases through the pre-installed phpMyAdmin software which is integrated in cPanel [8].

K. Database Design

ERW in database design diagram for Class Schedule System is shown in Figure 4. The diagram shows identified tables, their columns and relationships among tables. According to the Figure 5, seven tables have been identified with their primary keys. Primary key columns set as auto increment fields which allow a unique number to be generated when a new record is inserted into a table [9]. The core table of the database is "Subject". This tracks information about particular equipment and each field holds a single piece of information about the equipment.

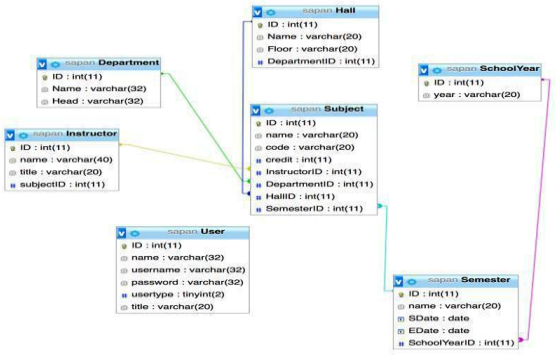

Fig 4 – ERW, Table relationship

L. System Structure

The research aimed at the design of a set of the system of anthropomorphic class scheduling system which emphasizes the teacher's personal expectations. Each Agent represents a teacher to create an environment every data must be categorized in the database together with its correct format and data types well are a start to three schedule input, process, and output [9]. See figure 5.

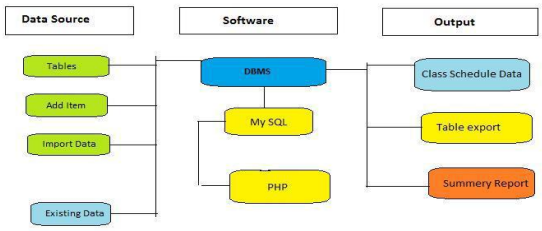

Fig 5 – Database Structure

IV. SYSTEM IMPLEMENTATION AND VALIDATION

Design Class Schedule System (CSS)

The design for CSS database been created based on the problem statement and the issue which the requester asked. The aims and objectives of this database is solved in the best manner by using the web application program and web server. Actually the system is implemented to use the online format of arranging and managing the courses in order to calculate the

derived data items within the database. CSS is providing the database for three different cementers, weekly courses which is divided to two categories: MWF and TTH within the period times, instructor information and class information, and etc.

There are a lot of number of popular databases software packages available in the market, most important point is the selection the best one to design the flexible and scalable one. And it's very important to use very common interface and user friendly programs.
Here is I am doing this project by using the My SQL and PHP to design the perfect database with good features i mentioned in previous section.

This system is build up by writing codes, coding is the main part of the project, I am going to send all source codes and executable files by separate part and submitted in schoology.

Implementing database:

Implementation is the process of writing source code for a system. The objective is to transform the design into program and code modules. The final deliverables of implementation phase are source code and related documents. This part of this paper details the implementation process of "Class Schedule System", "Class table" application and database scripts (scripts, stored procedures and views). Further it describes the different technologies, methods and patterns used during CSS development.

Implementation of CSS project needs some steps before running the project, here I explained in some steps:

1. Open (XAMPP Control Panel) program then click on the "start" under actions for both (Apache & MySQL) buttons to run the server [10]. As shown in figure 6.

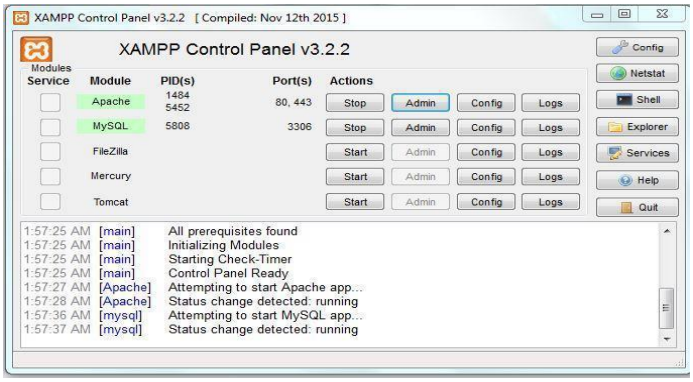

Fig 6 – XAMPP Control Panel Interface

2. In the same window, click on Admin button to go active the phpMyAdmin interface to work on the web server as shown in figure 7.

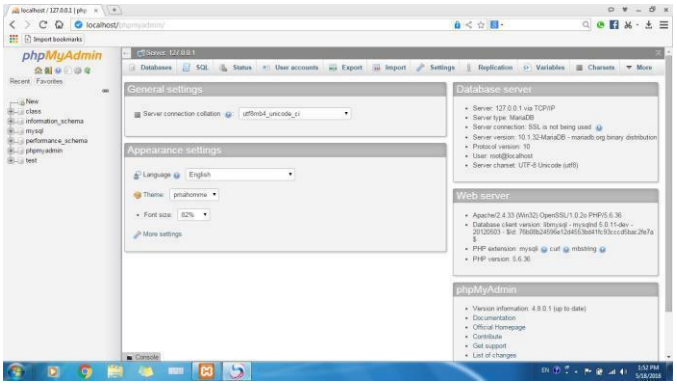

Fig 7 – php MyAdmin Interface

3. Importing the created database by creating new database, then click on import finally create to add CSS database into this program, as shown in figure 8.

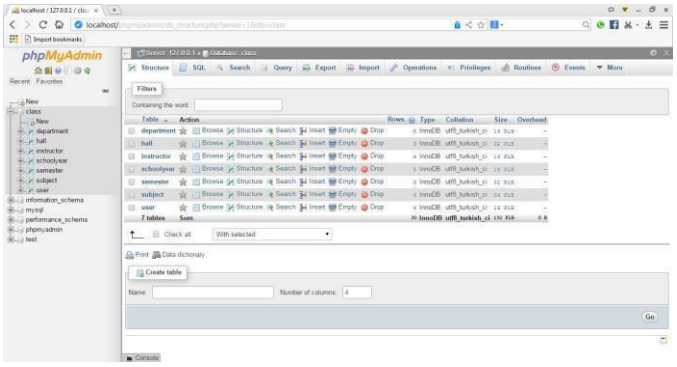

Fig 8 – Importing CSS database

4. We can go to any internet browsing application such as (Internet explorer, Chrome and Baidu) to open and run our database, by writing "localhost/Sapan" as shown in figure 9. Click on Admin part to access the CSS database.

Fig 9 – Web browsing Access Interface

Now we can access Class Schedule database System, the first part is "User Registration" The system check the user that who want to login to the system, if the user is not created and approved by Administrator is not allow to enter the database.

We have three user types to access this system with different privileges such as (Admin, Instructor and Student), in this

project I focused on the first two users, for Student in not required. As Dr. Coskun assigned to make the admin to have all level of authorities for this system, by using "admin" in both username & password parts, as shown in figure 10.

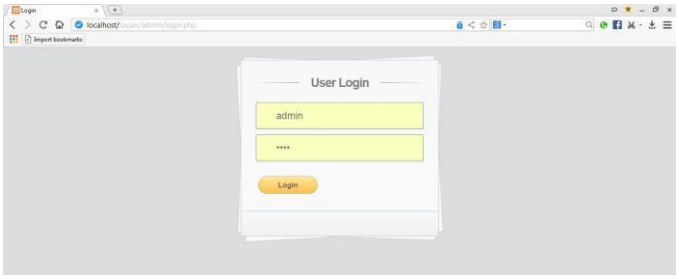

Fig 10 – CSS Login Interface

By putting the correct username and password you can enter the database system to see the dashboard as shown figure 11. In this part "Add New User" we can add another people and let them using system by creating users for Admin, Instructor and Students, we can select the authority level in field user type.

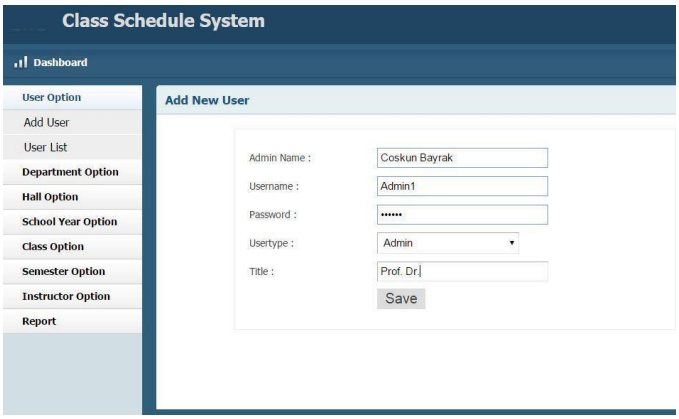

Fig 11 – CSS Dashboard Interface

Then we can go to the "User List" to see how many users we have in the system and make the update for changing the authority and delete any account. As shown in figure 12.

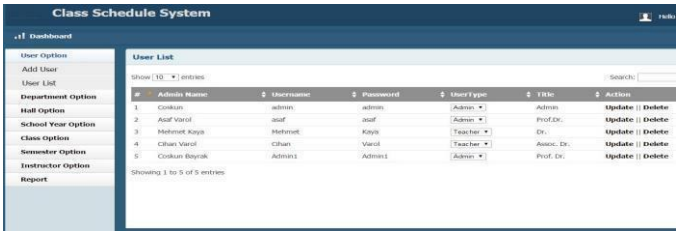

Fig 12 – CSS User List Interface

CSS has the same concept for another departments like (Department Option, Hall Option and School Year Option), we can add any new requirements and see any report that requested by admin.

Class Schedule Option

This is the most important part of Class Schedule System, Class Option schema been connected with all tables to retrieve all data from another tables.

Admin can add any course or subject to this system by filling all required fields like (Course name, Code, Credit, Period, Instructor name, Department, Hall and Semester) as shown in figure 13. By click on save button the new course been added.

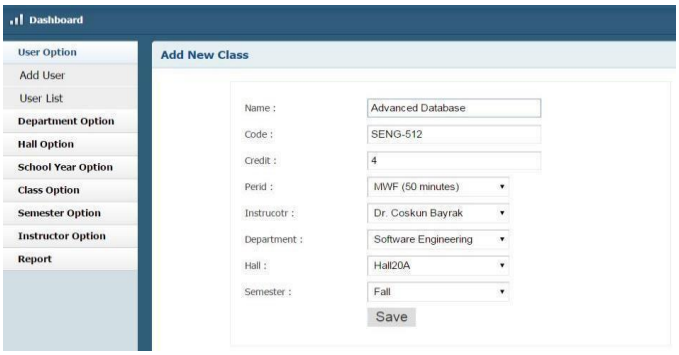

Fig 13 – CSS add new Class Interface

If the admin to see and export the course details, he/she can go to the Class list to find all information regarding class information as shown in figure 14.

Fig 14 – CSS Class List Interface

All data and information can be updated or deleted by click on the right side of the list.

I skimmed the (Semester Option and Instructor Option), I am going to the last and most important part which is Report summery for Class Schedule System.

Report part:

This part will be used for understanding the number of courses, class name, code, credit, Periods, Instructor name, department information, hall number and semester, as shown on figure 15. Administrator can download the detailed report of the Class Schedule System and exporting with selected file.

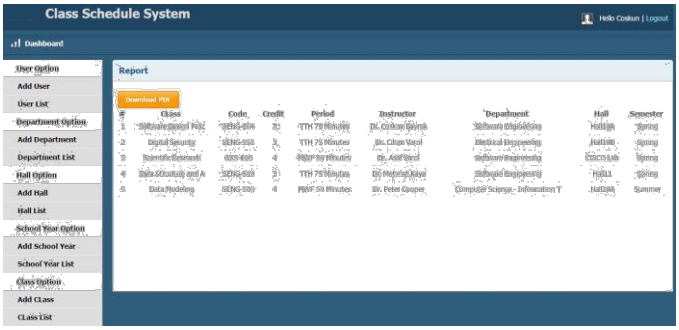

Fig 15 – CSS Report Interface

V. CONCLUSION AND FUTURE WORK

Database can described as a databank or a data store. A database could be expansive amount of recorded advanced data. It can be searched, referenced, compared, changed or controlled with a minimum time and cost.

Class Scheduling System is a software that improves these processes that system has features can provide a database for storing records and information. It allows the end-user to add, edit, delete, save and update records or information if some changes occur. It can generate reports for example class schedule, class list, instructors list, hall list, department list and school year with different semesters.

The system demonstrated here provides a complete solution to the Class Schedule System problem. It contains an attractive, intuitive user interface along with a user that can be used in a variety of tasks in shape or form for a fully automated solution.

In this paper a class schedule system is designed and developed as a web database application system by PHP language with MySQL database management system. Finally, it takes a few minutes to come up with complete high quality solution for assigning a significant improvement over of manual work.

The most effective point for this system that has a flexibility and scalability which is very important for the future you can do more development on it.

For future work of class schedule system is needed like to develop backup option, also it would be great if it is changed to online by reserving host and domain because it has good database infrastructure, since MySQL is for a web-based database program.

Class Schedule System needs some future work and correlations. Design and implementation of smartphone application is remained as a future work. Users can access to the application anytime and in anywhere with smartphone application, even though they don't have access to desktop applications.

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