eBlackboard- An Interactive Digital School System

Team:

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Abstract:

With the advent of new technologies everything becomes digitalized. From the Health Care Systems to the Systems that we use in the daily life have been digitalized. e-Black board is the one which makes digitalization of the tasks performed in the school among the teachers, students, and the parents of the students. This one includes the data of every student in the school, parent of each student and the teacher who teaches the students. The teacher can post the grades and the grades of the student are available not only for the student but also available to their parents so that they can know the progress of their kids.

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1. Introduction

Use of digital technologies in day to day school activities makes the things happen easier. There are many things that are done in the schools like student registration, class registration, associating teacher to classes, assigning teachers to their respective subjects of interest, course scheduling and timetable, posting marks, posting attendance, fee payment, exams, and grades, etc., Maintaining the school records offline is a traditional way of storing the data which insists manual effort. Each time a change occurs to a student or parent or staff record their respective class, course or personal details should be modified. This in turn requires searching the entire record base, finding the records and either redo the tasks or simply discard and make a new record. All these tasks can be made easy just by transforming the entire offline school file system to online storable database.

Through the project e-blackboard we tried to upgrade the offline school system into totally an online internet based interactive system. This project helps students, teachers and parents make their interaction easier when digitalized.

2. Our Approach

Every new project in the initial state requires certain predefined steps to be followed. Approach we followed is to first discuss the purpose of the project, steps to reach the expected final state, requirement gathering and analysis, designing the database and graphical user interface for easy interaction, integration of database to front end through a server package, software that can be used to build the web application, linking all the modules, testing for expected result and finally deployment. Summarizing all the tasks, below is the list of activities we have done:

- First step of our approach includes detail study of how a school works and list down all the major activities.
- Listing down major activities include tasks that can be done by admin, students, faculty(staff) and parents (or guardian).
- Constructing all these activities into ER diagram and then converting these into relational schema model. Further normalizing them into fine tables.
- Creating all the tables in the backend database and linking them to the front-end user interface (web page) such that all the transactions done on the GUI reflects the changes in the backend.
- Once the build is done the entire system is tested for defects and performance.

3. Requirement Gathering and Analysis

In this phase, we analyzed the requirements of the users say Admin, Teacher, Student, and the Parent, who are going to perform operation on or using the database. Few of the tasks include, Teacher teaches many number of courses and uploads course material regarding the courses he teaches. Teacher also uploads the marks and grades of the students. Students can view the materials regarding the courses they have taken, the grades and attendance they have obtained in the courses they have taken. All the files that can be viewed by the student and his/her parents are updated by the teacher. They can contact the teacher with the help of the e-mail that has been provided. Admin has the total control over the database such as he can add, delete, or modify the entire database records related to school.

4. Design

In this phase the issues faced are whether a user should be represented as an entity or as an attribute of another entity. If there is a relationship between two entities, then the issue is what type of relation exists among them and the participation constraints of the entities that are participating in the relation. If a user is represented as an entity, then the design issue to be considered is whether it is a weak entity or a strong entity. If a relation is going to be present between three entities, then the design issue is whether it is a ternary relation or two binary relations or an association. After completing the design of the entities and the relation among them another issue will be granting the privileges to the different users i.e., the issue of data transparency.

4.1 E-R diagram:

For the tables to be decided, based on the requirements Entity Relationship model diagram is constructed. Once this is done all the entities and their respective relationships are constructed into relational schema model.

Then all these are converted to tables ensuring key constraints. The E-R diagram of the database of our project is as follows:

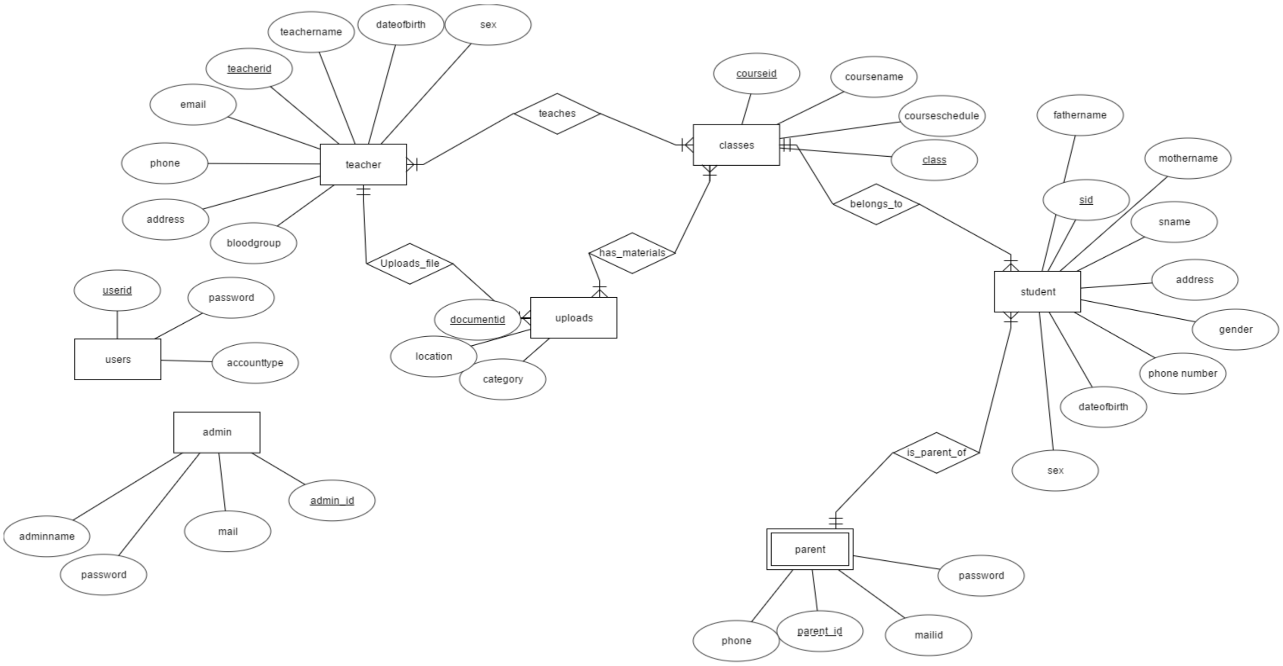


Fig 1(a): E-R diagram

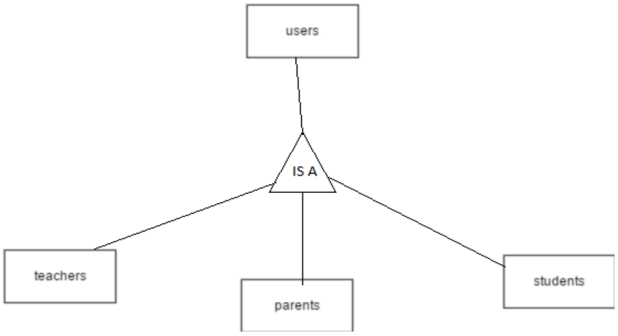


Fig 1(b): E-R diagram

The notation used in the above diagram is as follows

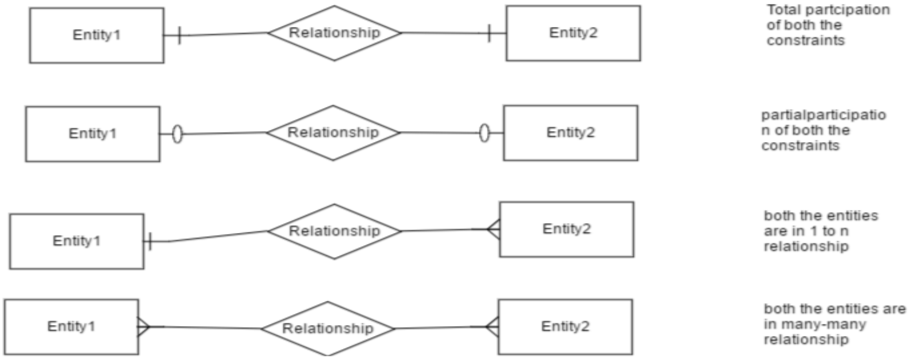

Entity1
Relationship
Entity2
Total partcipation of both the constraints
Entity1
Relationship
Entity2
partialparticipatio n of both the constraints
Entity1
Relationship
Entity2
both the entities are in 1 to n relationship
Entity1
Relationship
Entity2
both the entities are in many-many relationship

Fig 2: The notation that is used to represent the entity and relationships

The tables that are used in our diagram are as follows:

- Teacher
- Student
- Parent
- Classes
- Uploads
- Users

The relationships that are present in our database are as follows:

- Gives: Relationship between Teacher and the Uploads.
- Teaches: Relationship between Teacher and the Classes.
- Has_material: Relationship between Classes and the Uploads.
- Belongs_to: Relationship between Students and the Classes.
- Is_Parent_of: Relationship between Parent and Student.

The E-R diagram when converted into the conceptual design the Relational schema is as follows:

- Teacher (teacherid, teachername, dateofbirth, sex, bloodgroup, address, address, phone, email, password)
- Student (studentid, sname, dateofbirth, sex, bloodgroup, phone, email, password, fathername, mothername, address, class)
- Parent (parentid, studentid, mailid, password, phone, address)
- Uploads (documentid, class, courseid, teacherid, category, location)
- Classes (class, courseid, coursename, courseschedule, teacherid)
- Users (userid, password, accounttype)

Normalization:

Normalization is the process of organizing the tables and columns in the database to reduce the redundancy. Without the process of normalization, the update and delete operation will cause the data loss to occur. Different normalizations present are:

1NF – As per 1NF there should not be any multivalued attribute in the table.

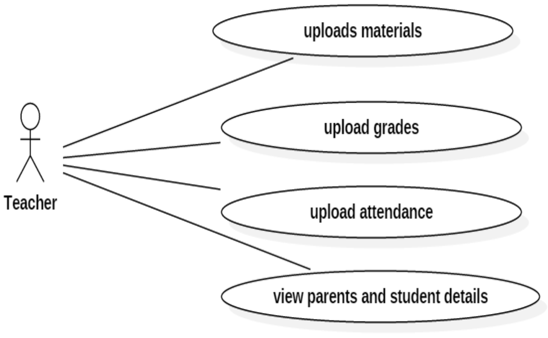
2NF - As per 2NF there should not be any partial dependencies. Partial dependency is nothing but the part of a primary key being able to determine the non-primary attribute.

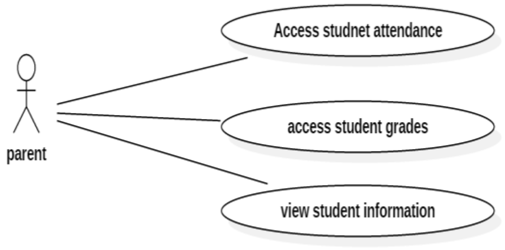
3NF - As per 3NF there should not be any transitive dependencies. That is every non-primary attribute should be dependent on the primary key.

Database designed in our project achieved 3rd normal form.

4.2 UML diagram

For easy understanding of all the tasks that are performed by the actors present in the database, UML diagrams are shown. Each actor has their own set of actions to perform as shown below:





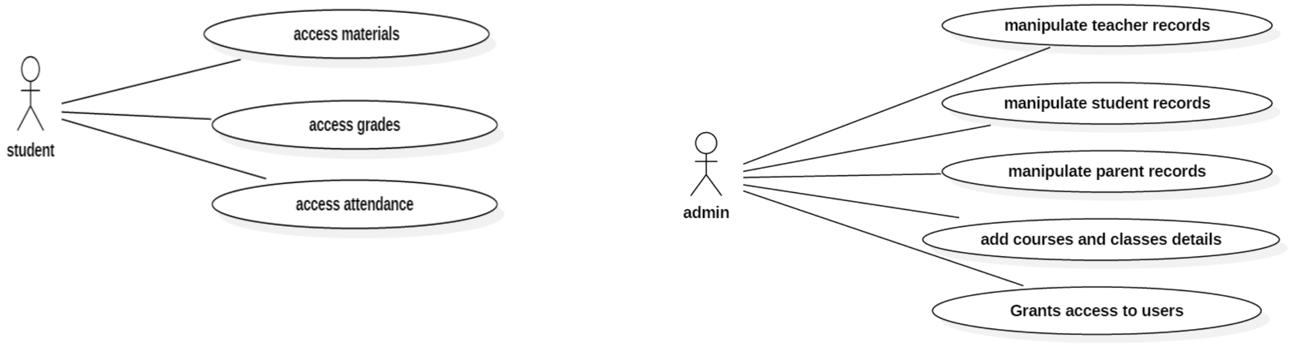

access materials
student
access grades
access attendance
manipulate teacher records
manipulate student records
admin
manipulate parent records
add courses and classes details
Grants access to users

Fig 3: Use case diagram for Teacher, Student, Parent and Admin

5. Implementation

As we are done with the formation of relational schema in the above sections next comes the database and user interface design. This section explains the tools and technologies that are used to develop the project and also different modules present in the entire project. Following tools or technologies are used to develop the project's front end and back end:

5.1 Technologies used

Server package: XAMPP

XAMPP, which is a cross platform server package helps in creating a local web server on the developer's system. This package includes support for PHP, MySQL and Apache.

Database Server: MySQL

MySQL is an open source relational database management system which is useful for access and manipulating the data in database.

Front-End & Scripting: PHP, HTML/CSS

For a user to access the database which runs in the backend, there should be easy to use graphical interface. Design of static webpages is done using HTML, styling using CSS and dynamic pages using PHP.

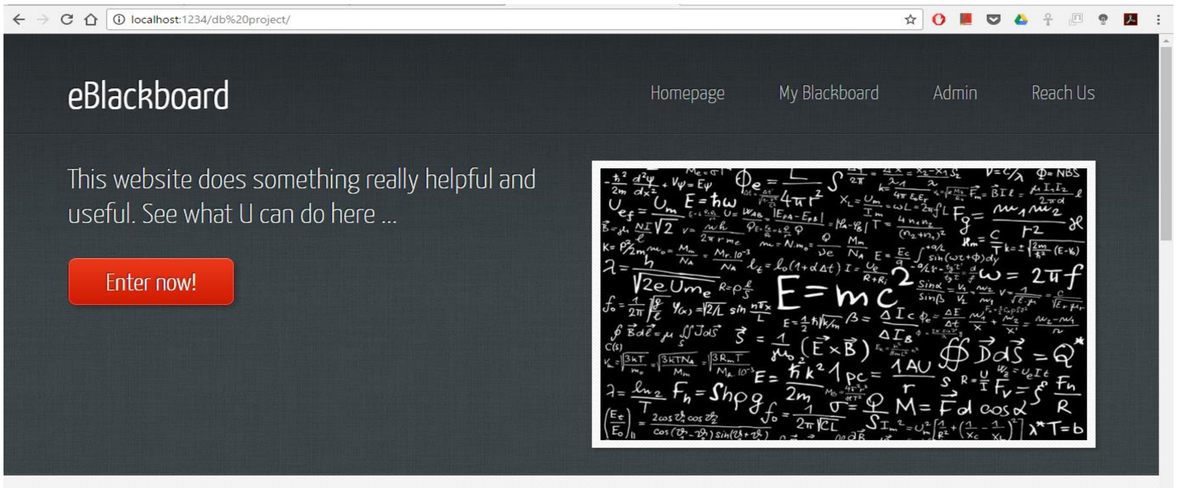
Application Software: Dreamweaver

All the web pages are coded using the website development software Dreamweaver developed by Adobe. This software supports the integration of testing web server with the web pages.

5.2 Modules Explained- Results

Homepage:

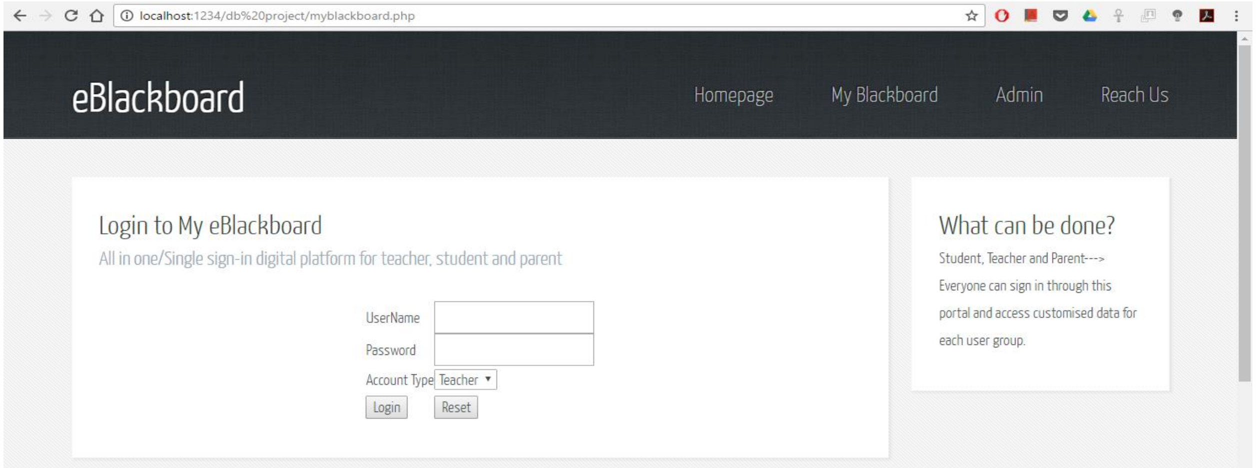
After the entire database is designed following basic creation rules and ensuring database constraints the application is hosted through Apache server running in XAMPP. As soon as MySQL server is initiated in the XAMPP, the application can be run on a web browser using the following URL; *localhost:1234/db project***.** Browser displays the homepage(index.php) as shown in the below snapshot. Each tab present on the interface has their own functionalities and consistent interface across all the web page modules.



This website does something really helpful and useful. See what U can do here ...

My Blackboard module:

This module(myblackboard.php) allows Teacher, Parent and Student to login using the same web page and access their respective data. Even though the login is same each user is related and redirected to their respective web page(student/home.php, teacher/home.php and parent/home.php) based on the user's accounttype stored in the users table.



Login to My eBlackboard

All in one/Single sign-in digital platform for teacher, student and parent

UserName

Password

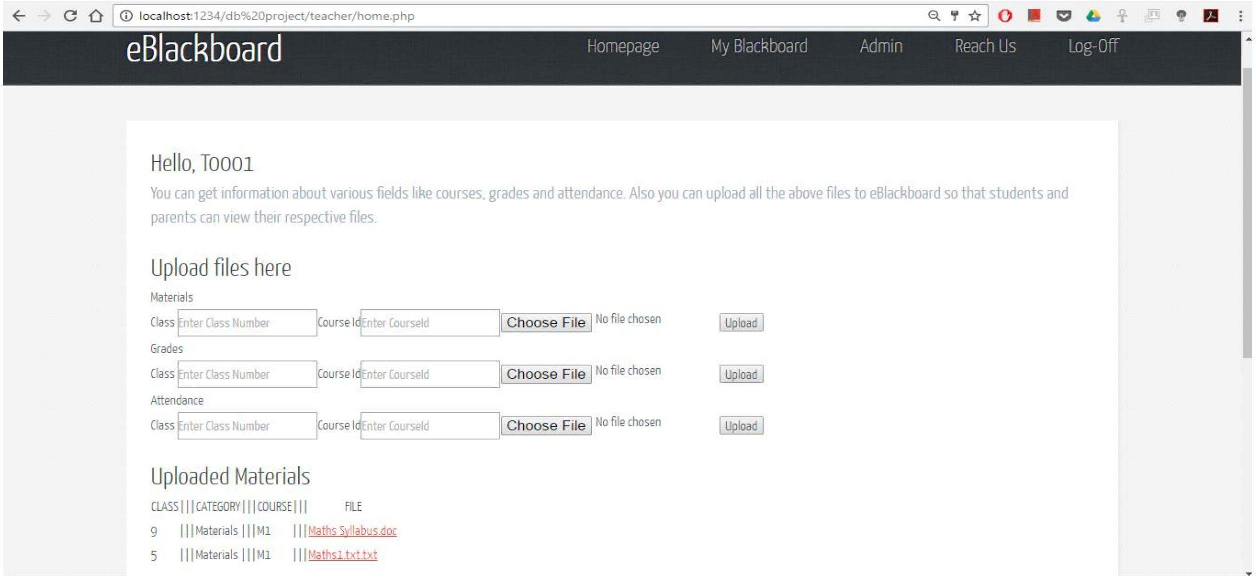
Account Type Teacher

What can be done?

Student, Teacher and Parent---> Everyone can sign in through this portal and access customised data for each user group.

Teacher module:

Once teacher logs in using the myblackboard.php page, he/she will be redirected to *teacher/home.php* page as shown in the below snapshot. Teacher has an option to either upload grades or materials or attendance related to a specific class using upload tab. All these uploaded files can be viewed under "Uploaded Materials" tab and these are reflected in the student's web page based on the class number entered by the teacher.



Hello, T0001

You can get information about various fields like courses, grades and attendance. Also you can upload all the above files to eBlackboard so that students and parents can view their respective files.

Upload files here

Materials

Class Enter Class Number Course Id Enter CourseId Choose File No file chosen Upload

Grades

Class Enter Class Number Course Id Enter CourseId Choose File No file chosen Upload

Attendance

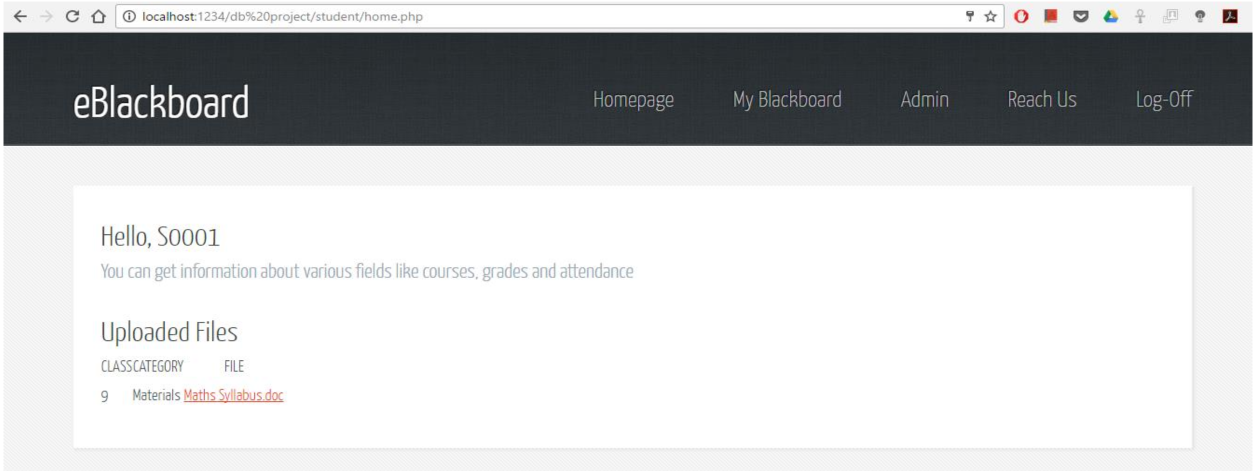
Class Enter Class Number Course Id Enter CourseId Choose File No file chosen Upload

Uploaded Materials

```
CLASS|||CATEGORY|||COURSE|||        FILE
9    |||Materials|||M1    |||Maths Syllabus.doc
5    |||Materials|||M1    |||Maths1.txt.txt
```

Student module:

When the student logs in to his/her portal, data related to grades, attendance and course schedule uploaded by teacher can be seen in student tab. Each student can view only data realted to his own class which keeps the data private to his/her class.



Hello, S0001

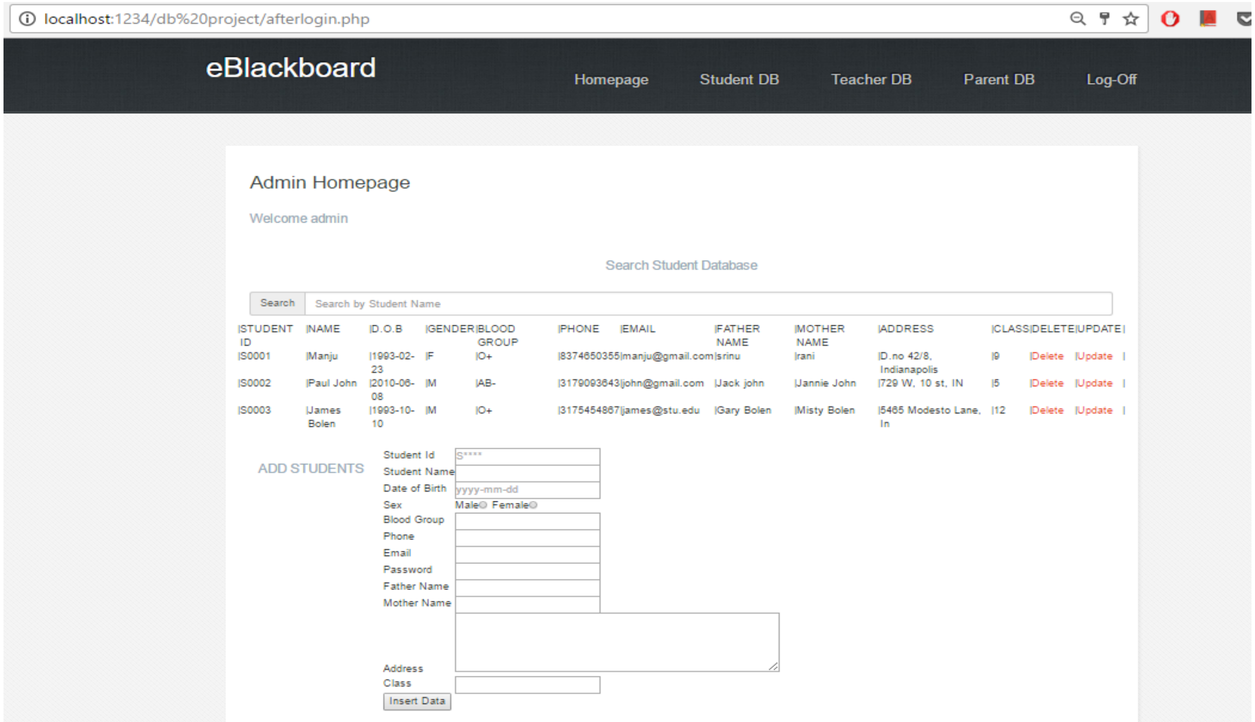
You can get information about various fields like courses, grades and attendance

Uploaded Files

```
CLASSCATEGORY      FILE
9     Materials Maths Syllabus.doc
```

Admin module:

Admin has total control to entire database which implies that he can add, delete and update student, teacher and parent records. One main feature we implemented is the search feature through which admin can directly update or delete the resulted records. To insert a record into database admin enters the data to form fields present on the page and clicks Insert Data button which posts the data to database and can be seen on the web page. To update or delete the records admin can click on the update or delete links. Each tab present on the admin homepage redirects to other web pages where he can manipulate the data realted to student, teacher or parent database. Once all the activities are done to protect the database from unauthenticated users admin can logout from his session. All the users accessing the database must be authentucated first to ensure data privacy and integrity.



Admin Homepage

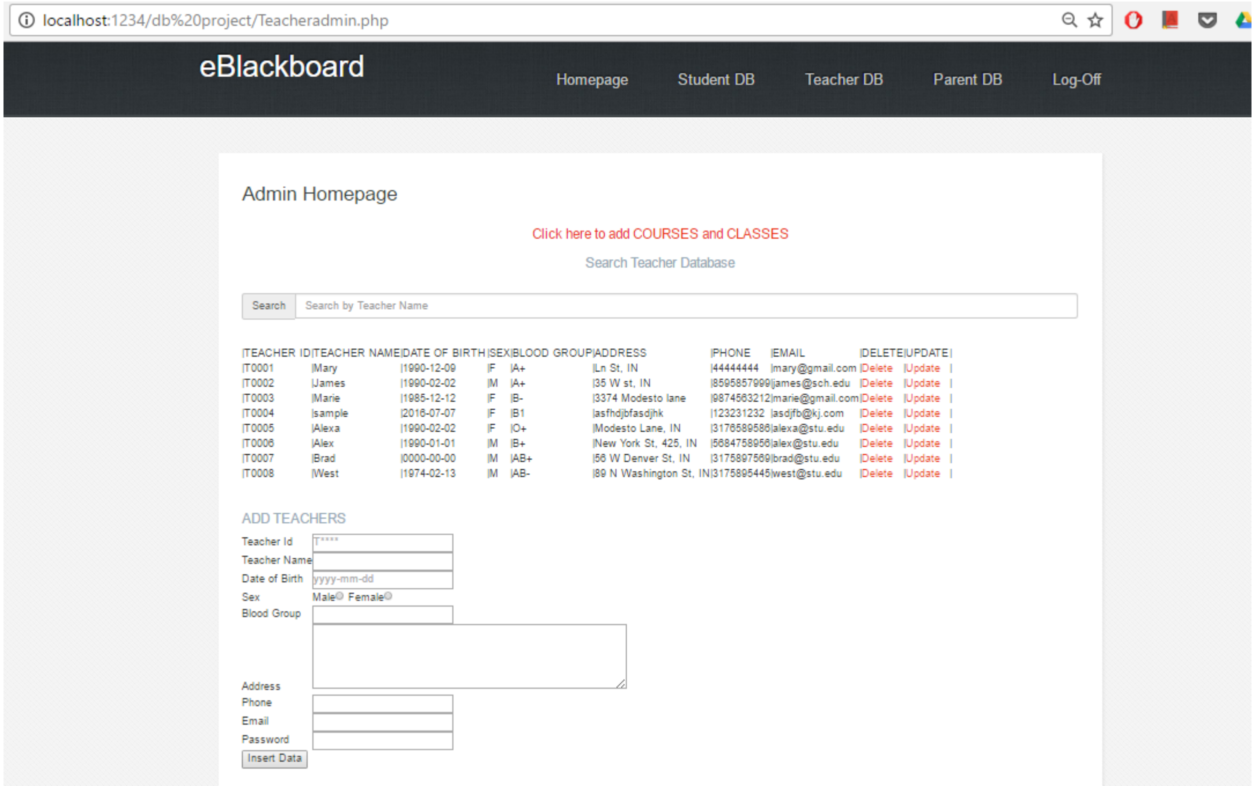
Welcome admin

Search Student Database

STUDENT ID	NAME	D.O.B	GENDER	BLOOD GROUP	PHONE	EMAIL	FATHER NAME	MOTHER NAME	ADDRESS	CLASS	DELETE	UPDATE
S0001	Manju	1993-02-23	F	O+	8374650355	manju@gmail.com	srinu	rani	D.no 42/8, Indianapolis	9	Delete	Update
S0002	Paul John	2010-06-08	M	AB-	3179093643	john@gmail.com	Jack john	Jannie John	729 W, 10 st, IN	5	Delete	Update
S0003	James Bolen	1993-10-10	M	O+	3175454867	james@stu.edu	Gary Bolen	Misty Bolen	5465 Modesto Lane, In	12	Delete	Update

ADD STUDENTS

Student Id S****
Student Name
Date of Birth yyyy-mm-dd
Sex Male○ Female○
Blood Group
Phone
Email
Password
Father Name
Mother Name
Address
Class



Admin Homepage

Click here to add COURSES and CLASSES

Search Teacher Database

TEACHER ID	TEACHER NAME	DATE OF BIRTH	SEX	BLOOD GROUP	ADDRESS	PHONE	EMAIL	DELETE	UPDATE
T0001	Mary	1990-12-09	F	A+	Ln St, IN	44444444	mary@gmail.com	Delete	Update
T0002	James	1990-02-02	M	A+	35 W st, IN	8595857999	james@sch.edu	Delete	Update
T0003	Marie	1985-12-12	F	B-	3374 Modesto lane	9874563212	marie@gmail.com	Delete	Update
T0004	sample	2016-07-07	F	B1	asfhdjbfasdjhk	123231232	asdjfb@kj.com	Delete	Update
T0005	Alexa	1990-02-02	F	O+	Modesto Lane, IN	3176589586	alexa@stu.edu	Delete	Update
T0006	Alex	1990-01-01	M	B+	New York St, 425, IN	5684758956	alex@stu.edu	Delete	Update
T0007	Brad	0000-00-00	M	AB+	56 W Denver St, IN	3175897569	brad@stu.edu	Delete	Update
T0008	West	1974-02-13	M	AB-	89 N Washington St, IN	3175895445	west@stu.edu	Delete	Update

ADD TEACHERS

Teacher Id T****
Teacher Name
Date of Birth yyyy-mm-dd
Sex Male○ Female○
Blood Group
Address
Phone
Email
Password

These are the major functionalities that are implemented in the project and one innovative idea we feel is that whenever admin tries to search a student or teacher or parent to manipulate their data, he can do that directly from the search result bar instead of selecting the result and then reaching other webpage to do that. As soon as admin types in for a search term in the Search bar, form automatically sends request to the server and retrieves the data dynamically which is very fast.

6. Future Scope:

Every newly developed software or a website is never perfect. Continuous change can be done to improve and implement the functionalities and make the application even more better. So, in near future we would like to add the following functionalities:

- Implementing an interface such that each student can view only his/her grades and attendance.
- Parent/Student can directly contact class teacher through email using his/her school login.
- Each user (Teacher, parent, and student) can register in the website directly through their given unique ids.
- We want to include a functionality to send notifications and e-mails regarding student details.

7. Work distribution

The analysis of the requirements, ER-model design for the project is done involving all the team members.

- Jwalitha: ER diagram construction, Presentation, one third of user interface and Scripting for Parent module. Related Summary report.
- Manjusha: Front end design, Database creation, PHP scripting for Teacher module. Related Summary report.
- Yashwanth: Rest of user interface design, Scripting of Admin and student module. Related Summary report.

All the source code and Readme.txt can be found in the source code folder.

8. References:

[1] Jquery-http://www.javatpoint.com/jquery-tutorial

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[9] Learning PHP, MySQL & JavaScript: With JQuery, CSS & HTML5 by Robin Nixon