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DESIGN AND DEVELOPMENT OF WEB BASED E-LEARNING AND TEACHER ASSISTANT SYSTEM FOR TVET (TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING) IN BANGLADESH

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Design and development of web based e-learning and Teacher assistant System for TVET (Technical and Vocational Education and Training) in Bangladesh

Abstract

The System will provide a best communication way for teaching learning system to need for our TVET (Technical and Vocational Education and Training) institutions. Especially the teachers and students can able to develop a good relationship between them. Teacher can make schedule of their class and teaching related activities and student also communicate with teachers and themselves by using chatting, blogging, emailing, collecting and sharing knowledge and others facilities. There have some other facilities like Project showcasing system for show the projects, innovation through this system. Student can download video tutorial, Project showcasing, other educational contents without any cost. Student can submit their valuable opinion about the tutorials.

Chapter 1
Introduction

Introduction

Design and development of web based e-learning and Teacher assistant System for TVET system in Bangladeshis a web based service which provides a great support to develop TVET students' career and also act as an assistant of teachers. As technology have growth in 20th century, the online education, communication and commerce system change dramatically.
Now days from conventional education system, the students and teachers are interested on online system by getting information with a click. For sharing knowledge and making relationship with others the blogging and chatting system is very popular. Without these social communications we can't thing a single day. Video tutorial and E-book are very essential elements to learn quickly. Now student can get opportunity to study in anywhere and anytime by their phone or laptop computer. Teachers are interested to control their teaching activities via online so that student can get information easily and instant.

Our system provides a great opportunity to communicate with each other by Blogging and Chatting. They can share their knowledge and innovative ideas. By this system student can also download video tutorial, E-book, and others contents. Our system provides assistance for the teachers to manage their teaching activities in teaching learning system. In Project showcasing any user can showcase their educational projects, elements, innovation, others work. We want include all these facilities in single platform which basically help in the field of TVET system.

1.1 History of TVET

TVET system basically was start after the Second World War. When whole world need experienced worker to develop infrastructure of countries. Then Britain, France, Germany started their Technical and vocational education for experienced worker who will develop the infrastructure of destroyed country. In 1985 when the World Wide Web spread over the world then some Technological development started in the field of TVET system. The authority took some step to make TVET system according to modern technology. In 1995 some organization comes forward to online education, but not all over the world. In January, 2000 **CourseNotes.com,** founded by entrepreneur, and then UT student, Alan Blake, launches in early 2000, with dozens of classes at the **University of Texas at Austin.** The service was marketed since the summer of 1999, and provides comprehensive professor web sites, including virtually all features offered by Blackboard (i.e., course documents, calendaring, grades, quizzes & surveys, announcements, etc.). The company was later renamed class map and operational until early 2001. But for the TVET system there was no specific web based learning system even not now.

1.1.1 TVET system in the world

There are many countries working with TVET of their country. They are working with TVET since 1900. For that result they already established a strong Industry, economy and human

development in their countries. Some example for improvement of TVET in Korea and China is now very strong in many area of development at Technological area. Russia started their TVET activities from almost 16th century. From these developments, the TVET spread out very quickly in the whole over the world. Then other strong and leading countries like America, Germany, England, Korea, China, and India have come forward for developing TVET activities. As a developing country, India has improved very much for only emphasis on TVET. Some worldwide organizations are currently working with TVET research and development like UNISCO, ILO, UN, European Union, National and international NGO, world Bank. UNESCO, ILO, EU and work Bank currently working for reform of TVET in Bangladesh.

1.1.2 TVET system in Bangladesh

Bangladesh stared TVET from early of 18th century with making Craft and handmade product. Gradually different TVET institutions are established for development TVET students, Teachers and industries. In 1955 the old and largest polytechnic the "Dhaka Polytechnic Institute" has established with 8 technological areas like Electrical technology, Electronics Technology, Mechanical technology, automobile technology, chemical technology etc. During this time other polytechnic institutes also established and they provided three years Diploma Engineering from different technology. Then after our **Liberation War** many government and private vocational and technical school college and institute are established for development of TVET students and teachers. One of the most famous was **ICTVTR (Islamic Centre of Technical and Vocational Training and Research)** now present **"Islamic University of Technology" (IUT).** Now 58 government polytechnic institutes and almost 158 private polytechnic institutes are providing4 - year Diploma Engineering degree in different fields.

1.2 Advantages of web based e-learning system

There are many advantages of web based e-learning system. Any person can learn without any boundary of place, time and teacher. Some of are given below

- Anywhere any time
- Free access
- Save time and reducing paper work
- Ensure security
- Effective and efficient
- Communicate with world community
- Long life education
- No need big books

1.3 Limitation of web based e-learning system

There is lot of facilities in e-learning system but also some limitations also. Some are technical and some are non-technical limitations. These limitations are discussed below.

1.3.1 Technical limitation

- Lack of universally accepted standards quality, security and reliability
- Telecommunication bandwidth is insufficient (Content sharing system)
- Software development tools are still evolving.
- Difficulties in integrating the internet and content sharing website like web based e-learning and teacher assistant
- Applications and databases
- Special web servers are needed in addition to the network servers (added cost).

1.3.2 Non-technological limitation

- Security and privacy may be sometime problem.
- Sometime people are not interested to learn from web sites and don't want to share tutorial but the situation is changing.
- There is no instant question answer to learn from web based e-learning system and teacher assistant system.
- People do not like to learn come physically in the school or to the teacher every time.

Chapter 2
Project Vision

Introduction

In this chapter we will discuss our project goal and vision, scope of project, interaction, integration, facilities of the project, and limitations of the project and so on.

2.1 Project Vision

Web based e-learning is very popular and demandable for every student and teacher in every area in the world. Student and teacher always want to communicate with each other via online. Now also android application is very familiar in the modern world. Teacher always want to do their teaching activities with help of such android application.

To overcome present system's problems and provide an effective web based e-learning system and Teacher assistant where student and teacher can interact easily and share resource without facing any difficulties. We have mentioned some vision and aim of our project.

- Make a common web based e-learning platform for all students and teacher of TVET system in Bangladesh.
- Make a web based system for teacher and student to convert all paper works to digital web based system. Where teacher and student will not need to do their activities with conventional paper system. They just made one time and use many time.
- Make a common resource sharing system for TVET students on educational purpose.
- Ensure data security of educational contents.
- Ensure teacher and student long-time relationship via online community.
- Ensure teacher assistant for mobile device via some android applications.
- Ensure online help from different student and teacher for educational purpose.
- Make platform for student where they can show their educational project for showcasing which will be his future reference.

2.2 Goal of the project

The main goal of our project is to implement a web based e-learning system for TVET institution. Described in below:

User registration: Teachers and students coming to this site to create a profile as a teacher or student and give their academic information via filling registration form. The information of users will be stored in a secured database. All users can log in by using their username and password that they have given during their registration to access the all facilities of this site.

Updating profile: A users can update their profile. They can change their personal information and educational information.

Write blog: Every user of this site can write blog related to their educational area and also share their experiences. Student can ask question according to their problem and any one can answer or suggest for this question by using comment system.

Upload lecture: teacher can upload their lecture via our system for specific group of students.

Download lecture: students can download lectures which are given for their group.

Make notice: for any emergency or any kind notice teacher can publish to the specific group of students.

Mark distribution: Teacher can entry and distributed different exam marks.

Write tutorial and download: Student or teacher anyone can write tutorial for the students of different subjects. And anyone can also download these.

Project showcasing: TVET student always make a final project for their educational purpose. Here they can showcase their project which will be helpful for his future reference and also help for other student to get idea and inspiration about their own project.

2.3 Scope of Our Project

- To make a good relationship with teacher and student by resource sharing.
- To provide a user friendly online learning system for teacher and student where student and teacher can upload and download different type of tutorials.
- Making a project showcasing platform for showcase student's made project to inspiration and help to others students.
- To provide a common and specific platform for TVET student and teacher for explore knowledge and discuss themselves via blog system.
- Make an Android application for Teacher assistant system where teacher can make important notice and submit marks for student with using android smart phone. Students also get notice and their marks via android application with android smart phone.

2.4 Features of Our project

Our system offers some facilities for students and teacher. For better communication between teacher and student these feature will be very helpful. Some are given below:

- Blog System
- Chatting system
- Ecommerce system where student and teacher can buy and sell their educational product.
- Tutorial upload / download system
- Teacher assistant system where teacher can give marks, notice, upload class content for students.
- Android application with cloud.

2.5 Interaction the project

Interaction refers to the manner in which each component function with other component of the system. It is actually the link between different parts of the system. In web based e- learning and teacher assistant system there is huge interaction with the teachers and students.
As a teacher: After registration as a teacher, he /she can write blog with different topics update their post and also delete posts which related with TVET curriculum. He/she can also write specific tutorial with any subject and also update and delete these.
A teacher can use **Teacher assistant** facilities from our system. By using the Teacher assistant he/she can upload students' mark, make notice for their student and upload lecture.
As a student: After registration as a student he /she can write blog with different topics update their post and also delete posts which related with TVET curriculum. He/she can also write tutorial with any subject and also update and delete these. They can see their notice and different exam mark also. They can download lecture which uploaded by teacher.

2.6 Integration the project

Integration refers to the holism of the system. All parts of the web based e- learning and teacher assistant system working together with in the system even though each part performs unique function. This successful integration produces a synergistic effect of the whole system. This effect has greater total impact than if each component work separately. As a result the system becomes faster and less time consuming.

2.7 Central objective

Central objective of a system is the objective for which the system with all its parts is working together. Like other systems the Web based e-learning and Teacher assistant system have a central objective and this is web based learning, content share, give assistance to the student and teachers. The central objective of this system is to share knowledge, content and assistance for teacher and student's in well-designed way. All the part of the system is working together to achieve the central objective of the system.

2.8 Elements of the project

The web based e- learning and teacher assistant system has element just like the other systems.
They are:

- Input/output
- Process
- Control
- Feedback
- Environment
- Boundaries and interface

The elements of the web based e- learning and teacher assistant system are discussed briefly as follows.

2.8.1 Input and Output of project

The inputs are the elements that enter the system for processing, and output is the outcomes of the system. Processing a system feeds on input to produce an output in much the same way that a business bring in human to produce goods and services from the raw inputs. In web based e-learning and teacher assistant the inputs of the system are students and teachers specific information like full name, institute name, department, semester, roll etc. For blog part the input is post title post content with picture, video and with text styling. For Tutorial part input is title of tutorial, text or video. The outputs of our system are user profile, user post for blog, user post for tutorial, file download links, notice, student marks.

2.8.2 Process of the project

Process is the operation of the system that involves the actual information of input in to output of the system. The processor process the input element to desired output. In some cases the input is modified to enable processor to handle the transformation. The process operation finishes output information stored in database or in files. For example: after completing register as a teacher can input student marks' and after processing a student can see it or as a input write a post for blog or tutorial after processing any one can read these posts.

2.8.3 Control of the project

The control guides the system. It is the decision making subsystem that controls the activities of input, process and output. According to the control element the welfare of the business effect to the all the organization environment. The control element controls the flow of data as well as it controls interaction between different levels. Without the authority the system has no guidance actually. The authority does the job for the system.
Here for blog and tutorial system teachers and students are authorities for managing blog writing, deleting, updating and other operation. For teacher assistant teachers are the authorities of distributing marks for specific group of students, published notices, uploading lectures and other processes.

2.8.4 Feedback of the project

Output information is feedback for input or process section. Control in a dynamic system is achieved by feedback. Feedback maybe positive that reinforce the good performance of the system and negative feedback generally provides the controller with some information for action. This feedback often results in enhancement to meet the user's requirement. For example: Feedback of an web based e- learning and teacher assistant system to distribute marks, comment system in blog and reporting about popularity of an blog and opinion about project showcasing from the users to publisher in a successful manner that taking the response from users that service was transferred in a safe mode to the target users.

2.8.5 Environment of the project

Environment is the source of the external element that impinges on the system.
In fact it often determines how system must function. The organizational environment is consisting of students, teacher and other users. In web based e- learning and teacher assistant system, registration of teacher or student, write post for blog or tutorial, comments on other posts, upload and download lecture, mark distribution is environment of the system.

2.8.6 Boundary and Interface of the project

A system can be defined well by its boundaries. Boundaries are the limits of the system that identify its components, processes and interrelationships when interfaces with other systems. Boundaries and interfaces give the idea about the working area of the system. To write a post or make notice or see students notice user must complete their registration in these web sites. If anyone has no registration then he/she can visit only posts of blog and tutorial.

Chapter 3
Feasibility study

Introduction

In this chapter we will discuss about feasibility study of our system. We will discuss technical and economic feasibility study and so on.

3.1 Feasibility study

The objective of the feasibility study is to determine whether the proposed system is feasible or not. It help to know what are the requirements we need and which are the appropriate sector for this system and what are the problems and set minimum cost for this system.

3.1.1 Technical feasibility

The technical feasibility of our project is determining that weather the technology is available or not. Our current technical resources are enough to develop the project or not. We need some hardware: Minimum Dual core machine, printer, scanner, ups.
Software: XAMPP or WAMP with PHP and MySQL server, Dream weaver, Notepad/sublime Text2, MS word, PowerPoint, for front end, backend, report and analysis and presentation.

3.1.2 Economical feasibility

Economical issue is most important part of a system. We have done Cost analysis for our system to give a best system for our TVET system which is originally cost effective and available for every user. Some cost related analysis is given bellow.

- Cost of equipment such as computer and networking.
- Cost of resources such as software development cost.
- Cost of programmers' time.
- Cost of other cost (analysis of existing system cost).

3.1.2.1 Estimated cost

All Items	Cost Tk.
1. computer hardware:	
Processor - Dual core	5500
Motherboard—Gigabyte GA 81542	4600
HDD-Samsung 500 GB	7500
Monitor-17''samsung	8200
Ram-Apacer2 GB	1500
DVD Rom—Sony	1800
Printer—Hp Laser jet 1102	10000
Keyboard	550
Mouse	400
Cable	1000
Connectors	150
Switch	1200
2. Computer software (XAMPP or WAMP with PHP and MySQL server, Dream weaver/Notepad/sublime Text2,MS word and PowerPoint)	7000
3. Bandwidth coast	12000
4. Computer operator	5000
5. Domain and Hosting cost per year	5000
Total Cost -	71400

Figure: Estimated cost table

3.1.3 Operational feasibility

The operational feasibility is belonging to the following people involve system.

Administrative: In our system there is a system administrator. Some of the administrative users are the teachers and they can manage some authentication for some specific group of students. In Teacher assistant part teacher is the main authority to distribute notice, lecture, marks and other for the specific group of students.

Users: The People who interact with our web based e-learning and teacher assistant system are two types first those who are teachers they have an account and they can distribute notice, lecture, marks and others for specific group of students and second those who are just visiting the site specific group of students from all over the polytechnic institute students and they have an account. They can share information through the blog and tutorial. They can take the academic notices, exam marks, lecture contents and other information by using teacher assistant.

3.2 Identifying Training need for the administrative and other users

As our site is user friendly and there is no need for the users to be trained. About administrative activities and other users activities details are given in this site as training. This note is enough for maintaining the system.

Chapter 4
Current system analysis

Introduction

In this chapter we will discuss different current system and their facilities with some limitation. We will compare different system and existing features and technology.

4.1 Some systems of different category

1. **Video Tutorial: YouTube** is a biggest video sharing web site but it is not only the purpose of Education. Other some famous video tutorial sites are **Tutsplus.com**, **rrfundation.net, Lynda.com**, **LearnersTV.com**, and **Treehouse.com**. But their video is not free maximum are premium. These video tutorials are English and Bangle languages are used.
2. **Blog: '**SomewhereinBlog' is the first Blogging system in Bangladesh. But it is also not the specific for TVET system. There is lot of category and people also write blog in different topic. For the student it is very hard to read a specific educational blog and also write blog. Sharing knowledge increase the knowledge. If there is a specific site where TVET student can share their knowledge between others.
3. **Teachers Assistant:** In the modern field of education teacher need a virtual assistant who will help a teacher to provide effective education via online. There are some websites provide the teacher assistant but not specific for the TVET system.
4. **Android application for teacher assistant:** There are some android application as teacher assistant but not specific for TVET and also these applications are not sufficient for common educational institutions.

4.2 Project initiation requirement gathering

In this stage to formulate and define our objective we have communicated with the teachers and students of TVET system who are interested in the web based e-learning and teacher assistant system. We have gathered information by questionnaire and verbal interview about the need of them. They always emphasis that e-based web site and teacher assistant system where every one of TVET system can share content with blog, audio video tutorial, project showcasing and teacher assistant system combined with in one site. They have also given emphasis of Android application for these systems. According to the wishes of the teachers and students of TVET system we have decide to develop and design a site which will be serve their all demand.

4.3 Web based e-learning and teacher assistant system

The web based e-learning and teacher assistant system allows the students and teacher to access site and browses through different tutorials, discussion in blog posts. And using
Web based e-learning and teacher assistant they can share educational content and make a discussion with blog comment and teacher can upload lecture and make notice for the student and marks also.

4.4 Requirement gathering for System

The objectives for the requirement gathering for the online shopping

- Identifying the content requirement for the sharing in web based e-learning and teacher assistant system, such as name, address, and ID, etc.
- Identifying the functional requirement such as write, updating, delete the posts for blog and tutorial and teacher assistant system.
- Identifying the project showcasing system and manage in good way.

4.5 Lack of specific content of web based e-learning for our TVET system

There are some content sharing systems already exist but they not for TVET system. Bangladesh government made a web site named **http://www.nctb.gov.bd/** which is provides text book of e-book version for primary and secondary education. But there is also no part for content sharing in this site.
There is no specific web site for the teacher assistant related service. There some web site which just provides some service that is not sufficient for the teacher and also student.

4.6 Lack of communication

In Bangladesh there are almost 200 TVET institution but without own institution there is no a common platform in online where student and teacher of TVET can communicate each other and share knowledge and information between each other.

4.7 Limitation of the time

In normal education system teacher teaches in institution and provides all lecture hand to hand. There some problem to ensure all students has get or not the lecture copy. If it is online system there is no uncertainty to find his or her copy. It can reduce the student and teacher time also. For notice, a manual notice board is used to view notice but if it is online teacher can give notice for specific group of students easily within a short time.

4.8 Lack of project showcasing

In our TVET system we have done many real life projects. But there are no opportunities for sharing this type of knowledge through the online. If it is possible to share our skill based knowledge in our web based e-learning system it will be better for motivate our TVET student to create something new.

4.9 Our system analysis

In this section, we present the requirement specification, software and hardware Requirements for system developers and system users, process model and data model.

4.9.1 Requirement specification

In this part we describe the functional requirements and non-functional requirements of our system.

4.9.2 Functional requirements

Functional requirements define the functions that are requested by our stakeholder. Different functions are needed by different system users. In our system we have two types of members who have an account and they are registered persons in our database. Once a member login the system, he or she can write post for blog and tutorial download and upload the tutorial and class lecture contents. Besides, administrator can maintain and control the system. The system can identify the authority of an administrator after he login.

4.9.2.1 Functional requirements for teacher

There are some functional requirements for teacher which are very important for our project.

- Login
- write post
- Change of password
- Change of personal information
- Upload and download contents
- Make notices
- Update and delete contents
- Input marks

4.9.2.2 Functional requirements for students

There are some functional requirements for student which are very important for our project.

- Login
- write post
- Change of password
- Change of personal information
- Upload and download contents
- Update and delete contents

4.9.2.3 Functional requirements for admin

There are some functional requirements for admin which are very important for our project.

- Login
- write post
- Change of password
- Change of personal information

- Read and update all post and tutorial
- Remove any unrelated posts
- Mange the whole system
- Remove and add users

4.9.3 Non- functional requirements

Non-functional requirements define the operational requirements and project schedule that are requested by our stakeholder.

4.9.4 Operational requirements

The system can be viewed by Microsoft Internet Explorer, Mozilla Firefox, Opera, Google chrome, Safari.

- We can only use Mysql to develop the database of our system.
- The development of system is completed by the end of 15thSeptember 2014.
- The mitigation testing and final user acceptance testing is scheduled at the end of
- September 2014.
- This project is not for business purpose

4.10.1 Software and hardware requirements for developers

During our system development, we have to design both static and dynamic website interfaces, create website functions and a database system, edit photos and pictures, and print out reports, so it has a set of software and hardware requirements.

4.10.1.1 Software requirements

There are some software requirements we have used for our project. Every software and tools provide different facilities for completing our project successfully.

- Notepad++ /Sublime Text2
- Photoshop CS5
- Xampp/Wamp Server
- Microsoft Word
- Web browsers

4.10.1.2 Hardware requirements

There are some hardware requirements we have used for our project. Every hardware and tools provide different facilities for completing our project successfully.

- CPU – Intel Core 2 Duo
- RAM – 2 GB
- Hard disk – 320 GB
- Operating System – Windows 7

4.10.2 Software and hardware requirements for system users

The following is the requirements for the system users including members and administrators.

4.10.2.1 Software requirements

Browser software is very helpful for the users to operate our system. Some browser software is given below.

- Web browser - Microsoft Internet Explorer, Mozilla Firefox, Opera, Google chrome, Safari.

4.10.2.2 Hardware requirements

Without hardware our system user cannot do any works over our system. Hardware requirements are first requirements for using our system properly.

- CPU – Minimum Intel Pentium 4 processor
- RAM – 1 GB
- Hard disk – 160 GB
- Operating System – Windows XP or Windows 7 or Windows 8

4.11 E-R diagram of our system

In our system there are some parts like tutorial, blog, teacher assistant and project showcasing. We describe our system within two separate E-R diagrams.

- E-R diagram of project showcasing, blog, tutorial.
- E-R diagram of teacher assistant.

4.11.1ER-diagram of project showcasing, blog, tutorial

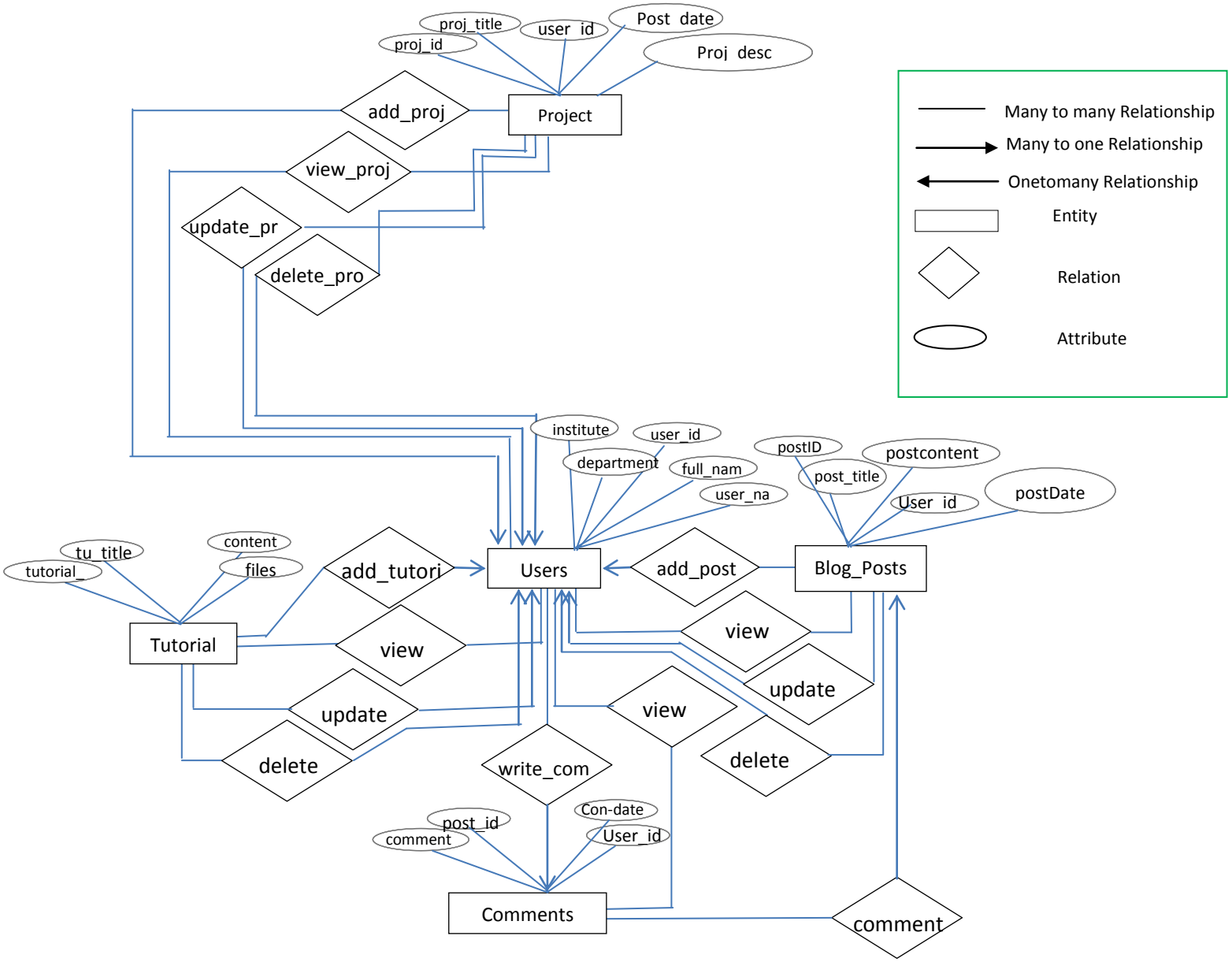

Figure: ER-diagram of project showcasing, blog, tutorial

4.11.2 ER-diagram of teacher assistant

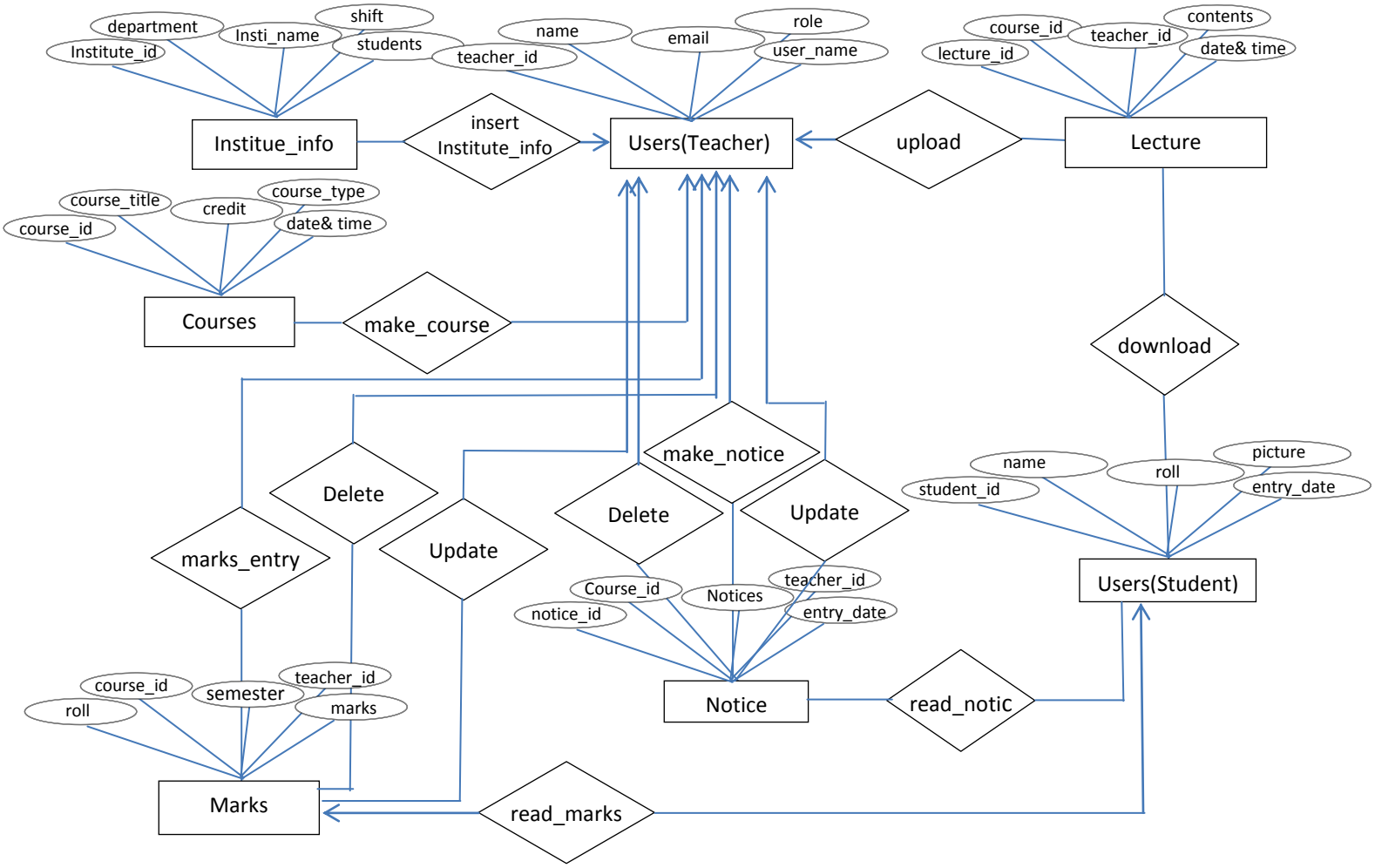

Figure: ER-diagram of teacher assistant

4.12 Activities diagram of our system

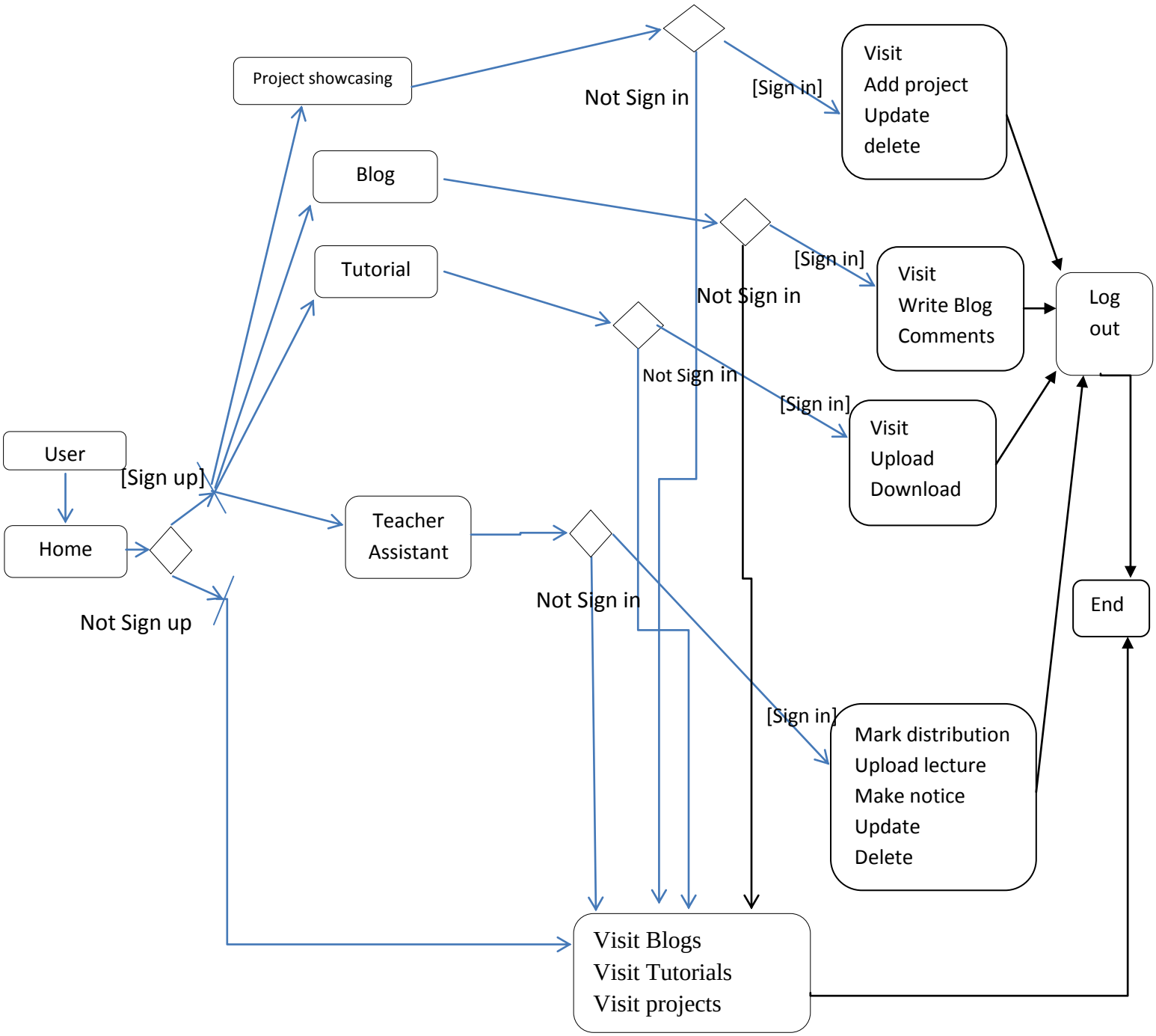

Figure: Activities diagram of whole system

Activity diagram describe our all project overview. There are two type of user in our system. Register user and unregister user. Unregister user can just visit all tutorials and blog posts and can read all of posts. But who are register user in our system they can do many things. For register there are two options. Sign up as student and sign up as teacher. If anyone registers as student and he/she login in our system then he can write post for blog, can change their personal information and see profile. They can write text tutorial, upload tutorial file (audio and video), they can also see notice from teacher, download lecture and see their marks in different examination. They can also upload a project for showcasing. And if user is a teacher he/she can write blog post, write tutorial and update, and delete all of things. From the teacher assistant system they can insert students' marks and make notice for the students. They can also upload a project for showcasing.

4.12.1 Activity diagram of teacher assistant

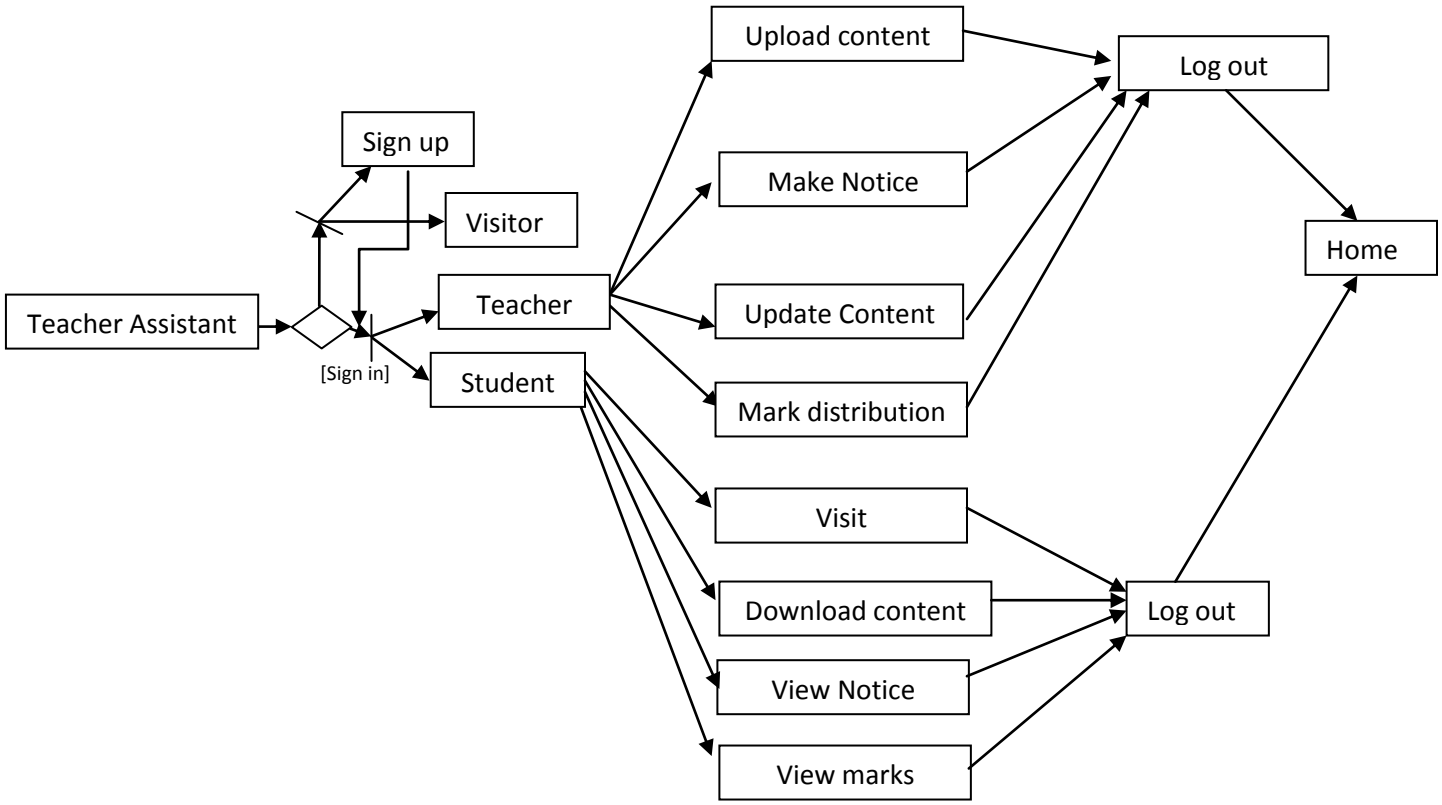

Figure: Activity diagram of teacher assistant

In the teacher assistant system a register teacher can add notice, add marks of student, view all things, update and delete marks, notice and can upload class lecture.

4.12.2 Activity diagram of tutorial

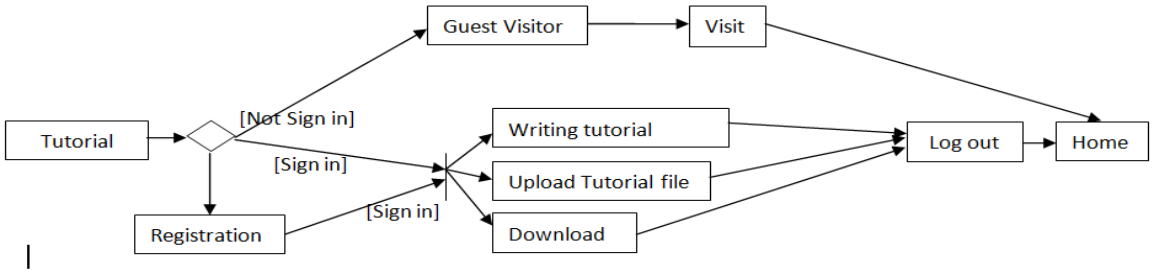

Fig: Tutorial activity diagram

In tutorial part in our system register user can upload and download tutorial, write text tutorial, update tutorial, delete tutorial. If the user is not register than he or she can just read or visit all of tutorials.

4.12.3 Activity diagram of project showcasing

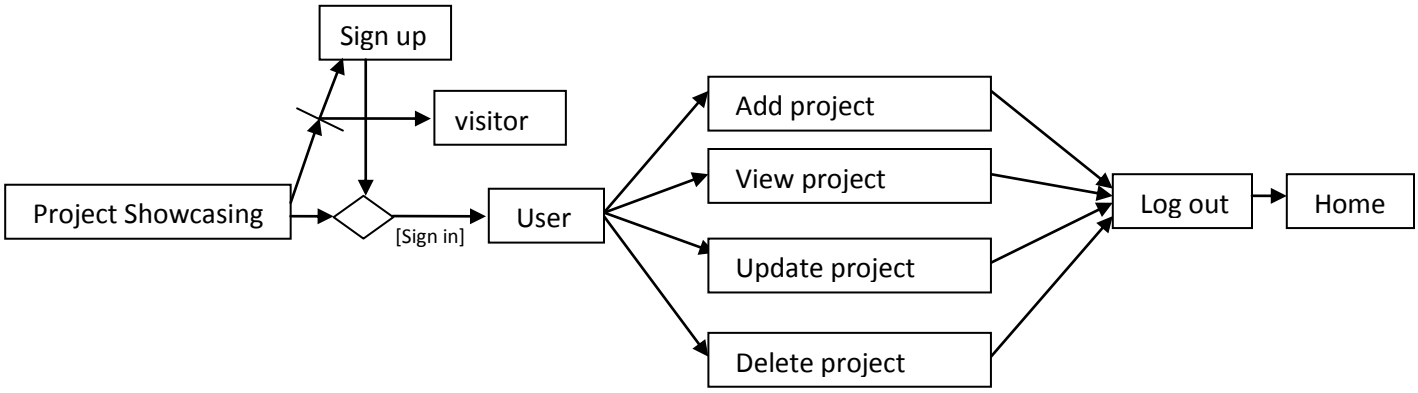

Figure: Activity diagram of project showcasing

In project showcasing part a register user can add new project, update project, delete project. For add project user have to give project title, project description, project picture, and contact information. But if a user is not register in our system then he / she can visit all projects.

4.12.4 Activity diagram of Blog

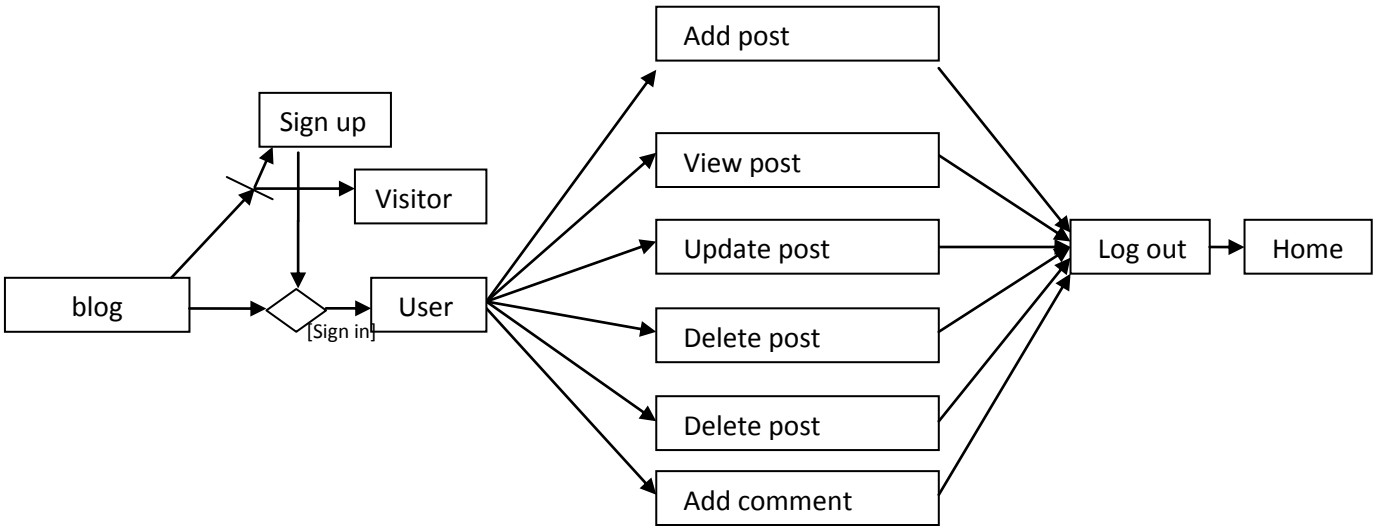

Figure: Activity diagram of blog

In Blog part in our system, register user can write new post for blog, update post, and delete post. In post user have to give post title, post description. In post description he can user styling, picture, text formatting, video. They can also comment in others' post. If the user is not register than he or she can just read or visit all of post.

4.13 Flow chart of our system

In our system there are some parts like tutorial, blog, teacher assistant and project showcasing. We describe our system within two separate E-R diagrams.

- Flowchart sample of teacher assistant.
- Total system's flowchart including
  - Flow chart of teacher assistant.
  - Flow chart of project showcasing.
  - Flow chart of blog.
  - Flow chart of tutorial.

4.13.1 Flowchart for notices of teacher assistant

We have mentioned the sample flowchart for teacher assistant where specify the notice distribution flow from our system by the teachers. Other flowcharts are also similar as like this flowchart so we have given a sample flowchart of our system.

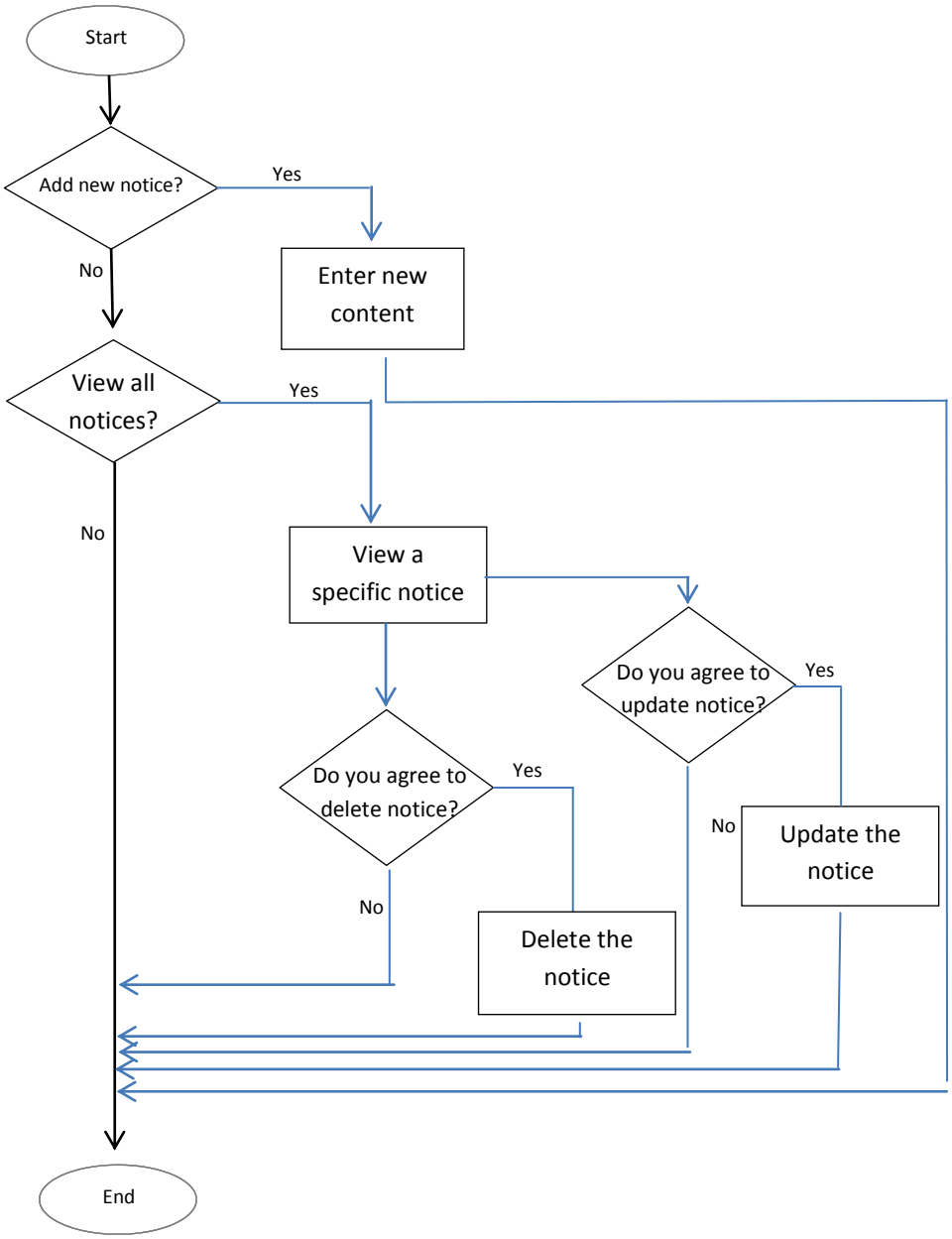

Figure: Flowchart of notice distribution for teacher

4.13.2 Flowchart for marks of teacher assistant

We have mentioned the sample flowchart for teacher assistant where specify the marks collection flow from our system by the students. Other flowcharts are also similar as like this flowchart so we have given a sample flowchart of our system.

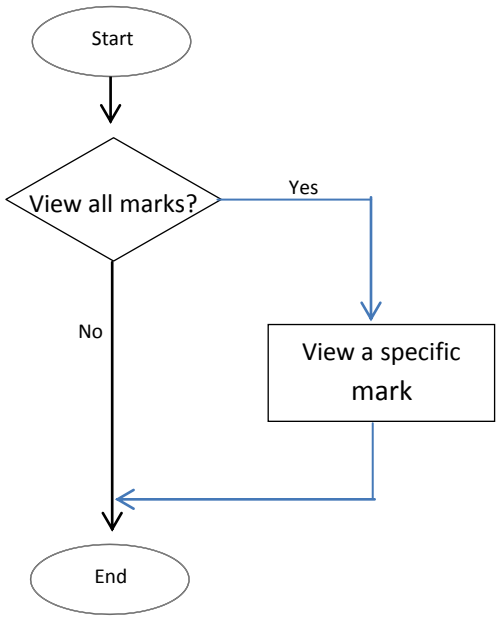

Figure: Flowchart of marks for student

4.13.3 Flowchart of our total system

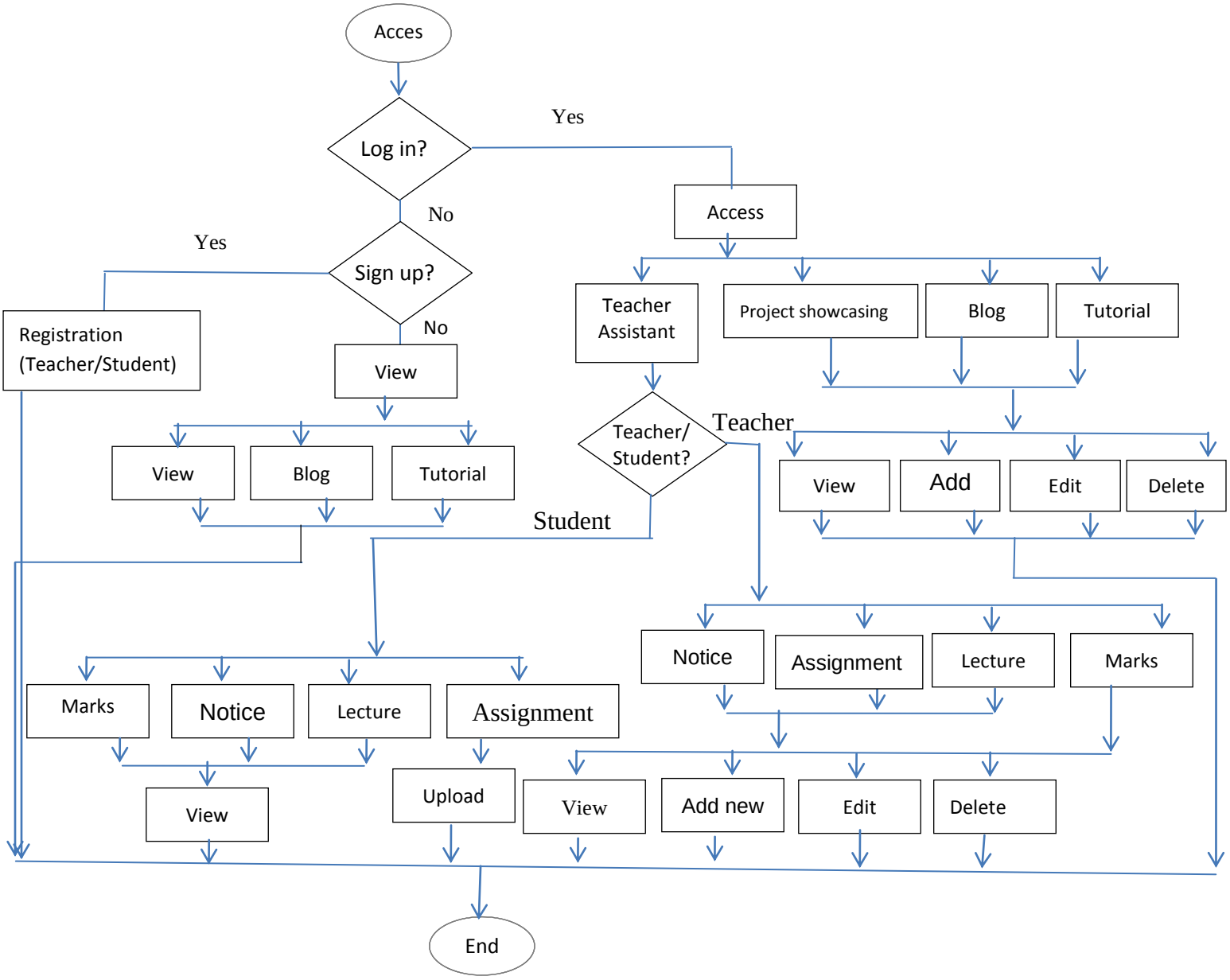

Figure: Total system flowchart

Chapter 5
System implementation

Introduction

In our implementation section, we present our web based e-learning and teacher assistant system in terms of the functions for users, visitors, the functions for Administrators and the system printouts.

5.1 Home page of our project

In **home page** of our project we have a slider with some sliding picture and information. We have a **sticky menu bar**. In this menu a visitor can visit our blogs, tutorials, showcased project and contact with us. There is a sidebar with login area and with sign up area. If anyone has not a user name password yet then he/ she can do registration as a teacher or as a student.
In footer we have some information and quick links like menu items and some short links. Here is the picture of our home page.

Figure: Snapshot of Home page of our system

5.2 Functionalities of users, visitors and administrators

Every system has some actors who interact with the system. In our system there are some actors who have performed some functionality with our system. Registered users are teachers, students and administrators. Normal visitors also visit our system for increasing their knowledge. Some functionality of users, visitors and administrator are given bellow.

5.2.1 User functions

Any register user can write blog post, delete and update his/her post. He/she can also write comment to others posts. They can upload tutorial, download tutorial, write tutorial, delete or update own tutorial. He/she can download lecture, see marks of different examinations and get notice from teacher.

5.2.2 Visitor functions

Any visitor can read our content like blog post, text tutorial, watch video tutorial, can see all projects which has showcased already.

5.2.3 Administrator functions

An administration can delete any unrelated post or tutorial, can block any user.

5.3 Registration

There are two types of registration provided by our system.

- Registration as a teacher
- Registration as a student

5.3.1 Registration as a teacher

To get more access in our web based e-learning and teacher assistant system user as a teacher have to registration with appropriate information. By this information he/she can identify themselves and can access in different part of service in our system like tutorial, blog, project showcasing, teacher assistant and so on.

For registration as a teacher, he or she has to give his/her name, institute, department, email address, user name, and password and profile picture. Here is the picture of registration form for teacher.

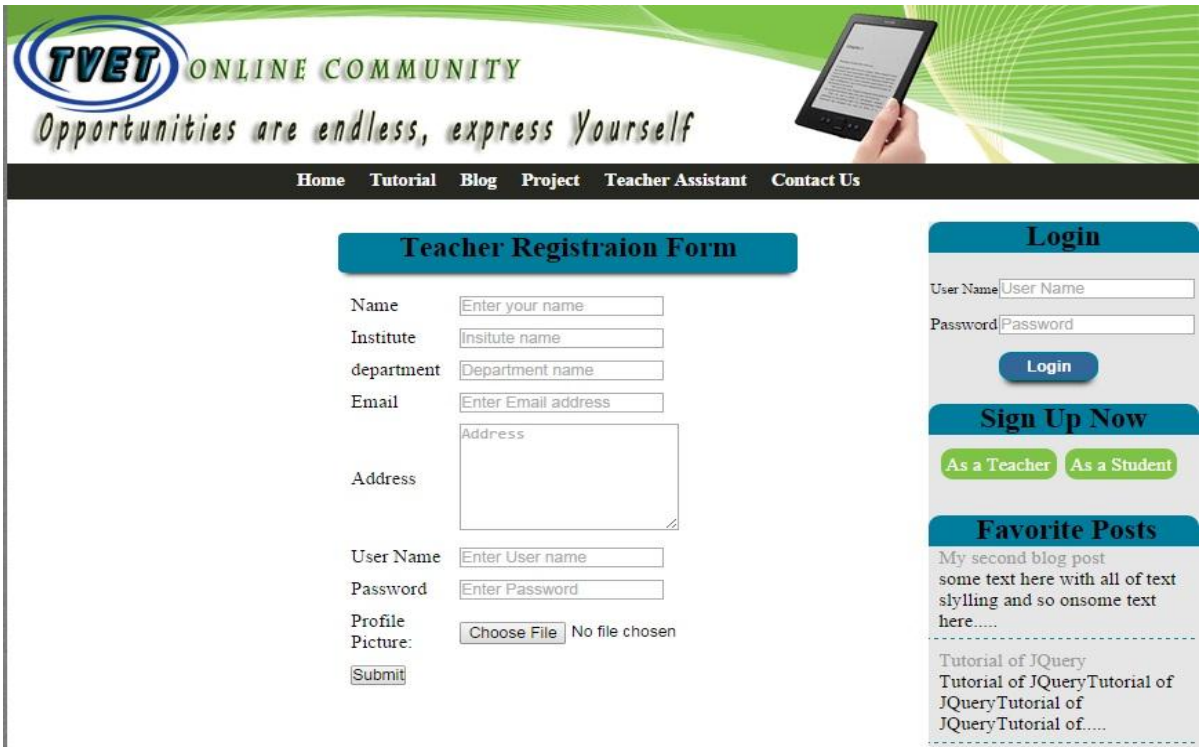

Figure: Snapshot of registration form for teacher

5.3.2 Registration as a student

To get more access in our web based e-learning and teacher assistant system user as a student have to registration with appropriate information. By this information he/she can identify themselves and can access in different part of service in our system like tutorial, blog, project showcasing, teacher assistant and so on.

For registration as student, he or she has to give his/her name, Roll no, semester, institute, department, email address, user name, and password and profile picture. Here is the picture of registration form for student.

Figure: Snapshot of registration form for student

5.4 Data validation in browser

Every field is required here. If anyone tries to do registration without this information he can't, our system will not allow him/her. He will get some error message that what information he is missing. By this way the system guide user as a teacher to put right information what the system desire from users.

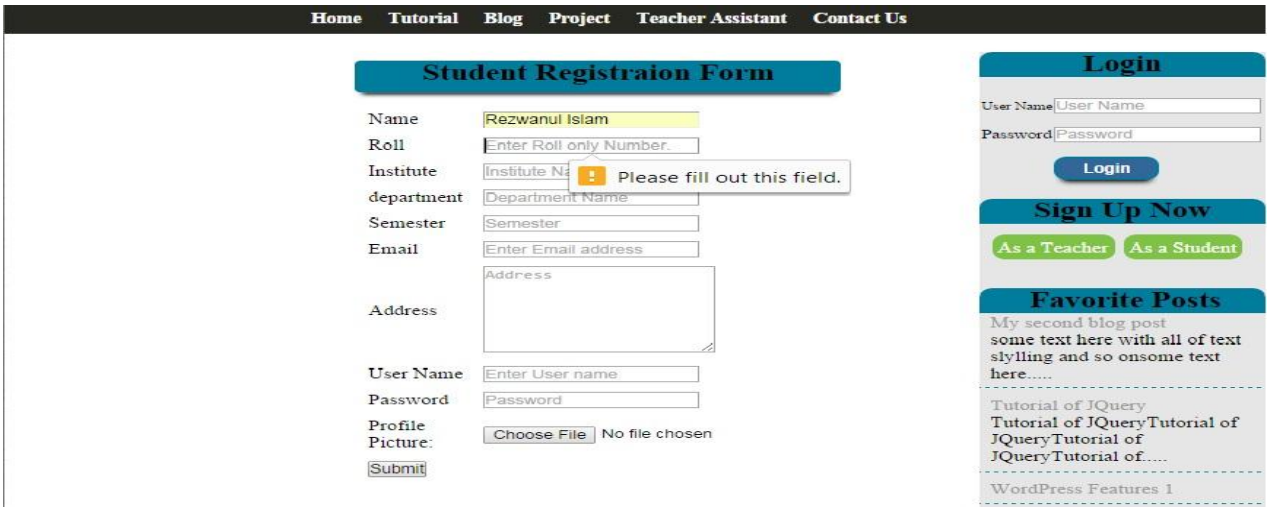

Figure: Snapshot of browser site data validation

5.5 Data validation in server side

Server side validation is the most important part of our project. Without server side validation a web based system does not work properly, especially when we insert data in the database from user interface. We have data validation in our server side. If anyone submit without our guided data then server will give some error message with user guide. All of server side validations are written by PHP code. If browser side validation fail then server side validation works to prevent unauthentic data insertion into database.

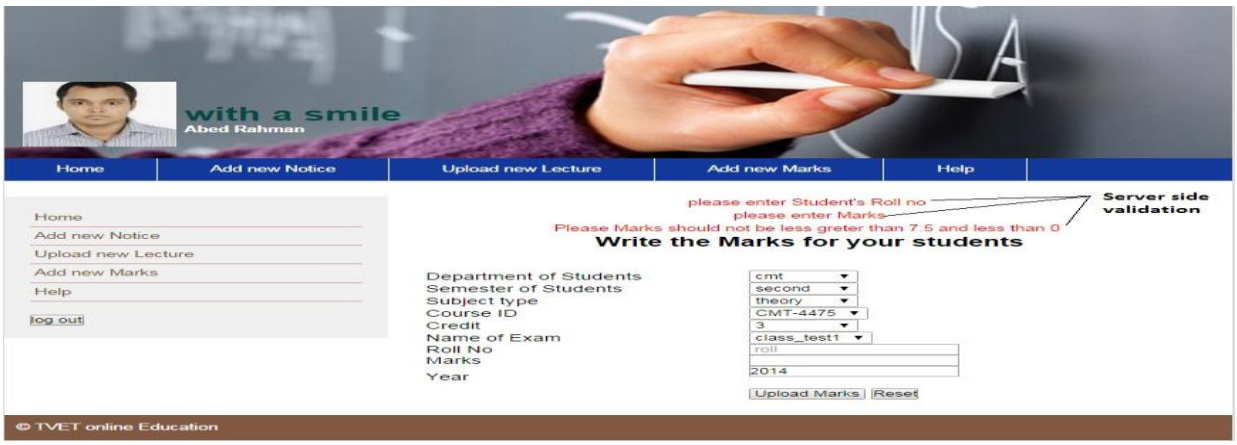

Figure: Snapshot of server side validation

5.6 Register users

When a register user login he/she can see his/her all posts, all tutorials, and notice if any notice is published for him or her from teacher assistant system. They can also see their profile with all information when register. If they want to modify they can do it.
Here is the picture that what a user can see when they login.

Figure: Snapshot of after login interface

5.7 Blog

In our blog part users can read other's blog posts in educational aspect. They can make discussion with comments and share knowledge to each other.

Figure: Snapshot of blog page

In blog part of our project register users can write blog post, write comment to others post's and delete, update and their posts. All blog posts data saved in our database table named "blog_posts". There is a primary key field named postID, and also a foreign key field named user_id, others field like postTitle, postCont, postdate contain description of the posts.
If a register user login and read any post they can see the comment box and can write comment. The picture of logged in user with comment section are given below.

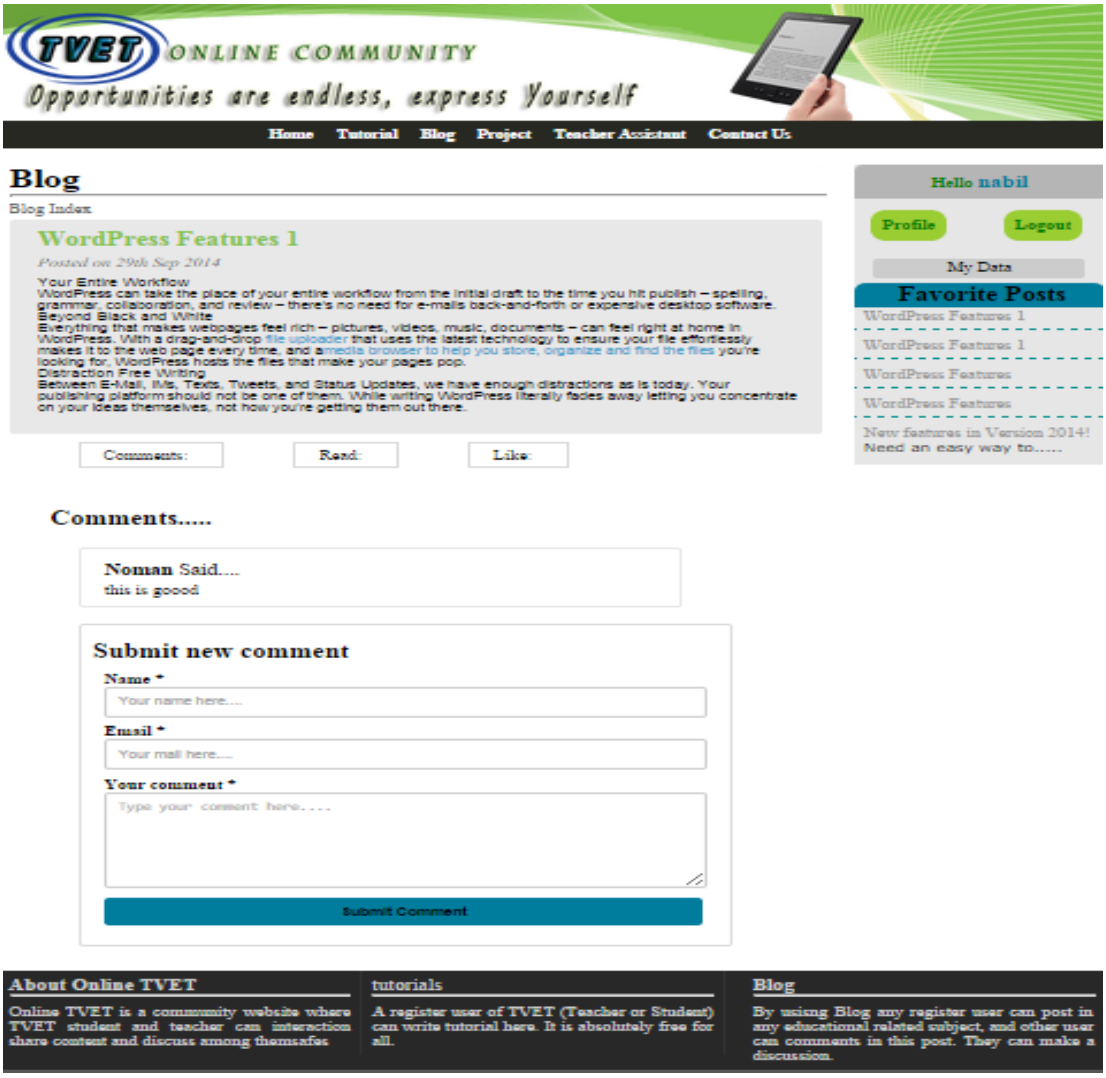

Figure: Snapshot of comment system of blog

But if the users are not registered or not logged in then they cannot see the comment write section to write comment. A message will remind him/her that he/she is not logged in or not register user, and also show a link to register or login.

Figure: Snapshot of blog (for unregistered user)

5.8 Tutorial

In Tutorial part register user can write text tutorial and upload video tutorial and download other's tutorials. They can also update or delete their own tutorials. In our data base there is a table named "tutorials" contain the all tutorial data. There is a field named tutorial_id with primary key and there is a field foreign key named user_id. Other field contain the all description of the tutorial.

Figure: Snapshot of teacher profile page before logging in

But if the user not logged in or not register then he or she can just read tutorials.

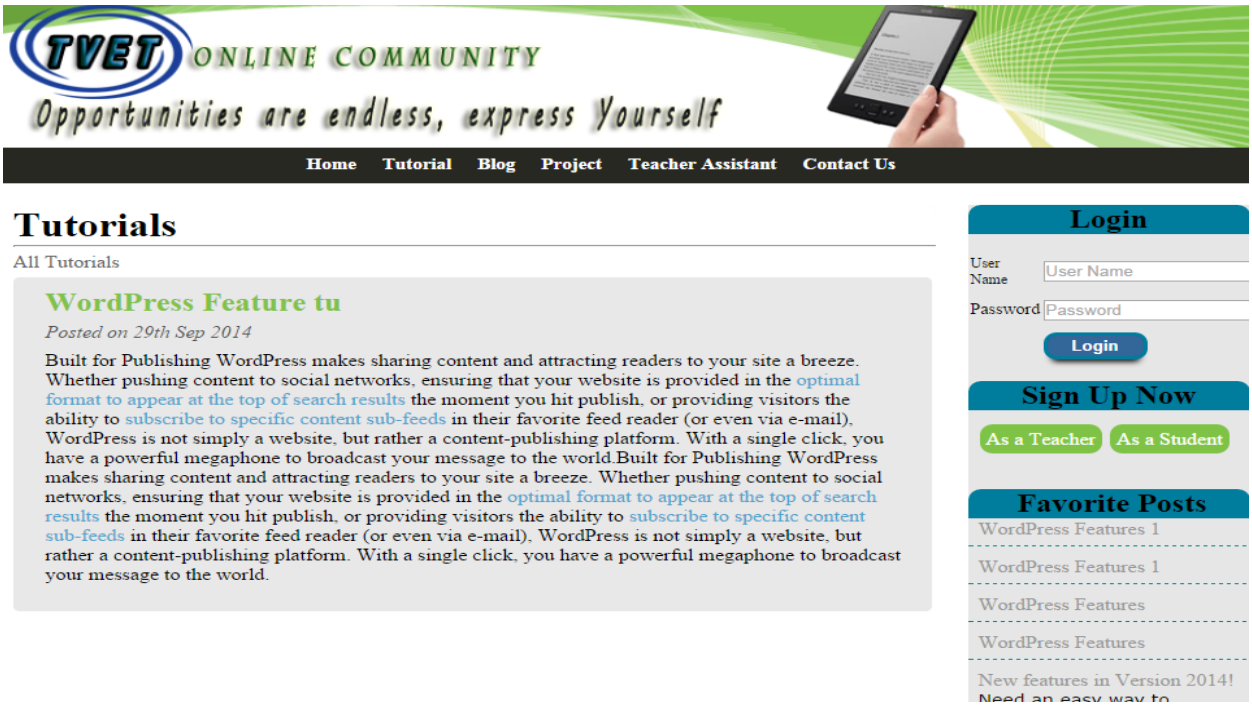

Figure: Snapshot of tutorial (unregistered users)

5.9 Teacher assistant

Teacher assistant is the most important part of our system. There are many tasks performed by teachers and students. In this area there are two types of users.

- Teacher user
- Student user

Figure: Snapshot of teacher profile page before logging in

In our system only one log in form for login as a teacher or student but after log in there are two types of profile called student profile and teacher profile page.

5.9.1 Teacher profile page

In the teacher profile page user can look his or her full name, profile picture and other important links according to their organizational authentication. Teacher profile page provide some links which are very important for teacher student activities in the teaching learning system. Some main facilities and links are given below.

- User profile
- Notice
- Lecture
- Marks
- Manage assignments
- Helps

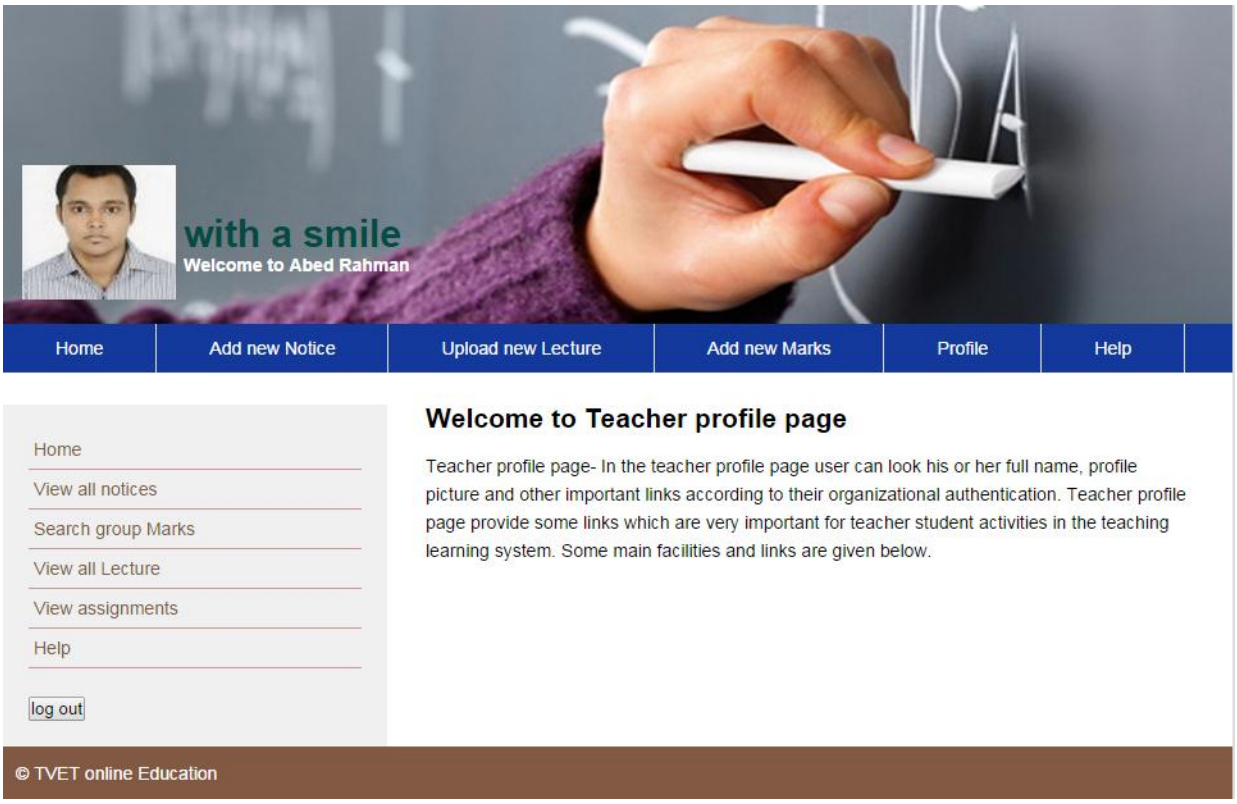

Figure: Snapshot of teacher profile page after logging in

5.9.1.1 User profile

Here teacher user can see the total organizational information. They can change their profile also. Every teacher has unique identity. There user_id, username are unique from other users and this user_id and username help to maintain the session works.

5.9.1.2 Notices

As a teacher user they can only give the notice for their specific group of students like a teacher is a teacher of computer department in Dhaka polytechnic institute and he or she can give Notices only for this institute's student groups. A teacher can take one or more subjects in different departments so he or she can also give the notices on his or her respective department's students or other department's students.

Notice has notice_id which is unique and each notice is given for a specific semester students which are already registered user in our system. A specific semester students can view notices which are given by respective teacher of this students group.

In the notice are there are some functionalities that are very much important. These are

- Add new notice
- View notices
- Edit notice
- Delete notice

Add new notice: There is a form for adding new notice for specific semester students and course. Here a teacher should enter some essential information for making a new notice like, *Course ID, Department of Student, Semester of Students, Notice Title and Description*. These types of information are help to specify the specific group of students from the TVET institute. In this form we use the server site validations which are help to prevent the unauthenticated data insertion to database.

In our database there is a table named notices for storing and retrieving the notice information for teacher user and student user.

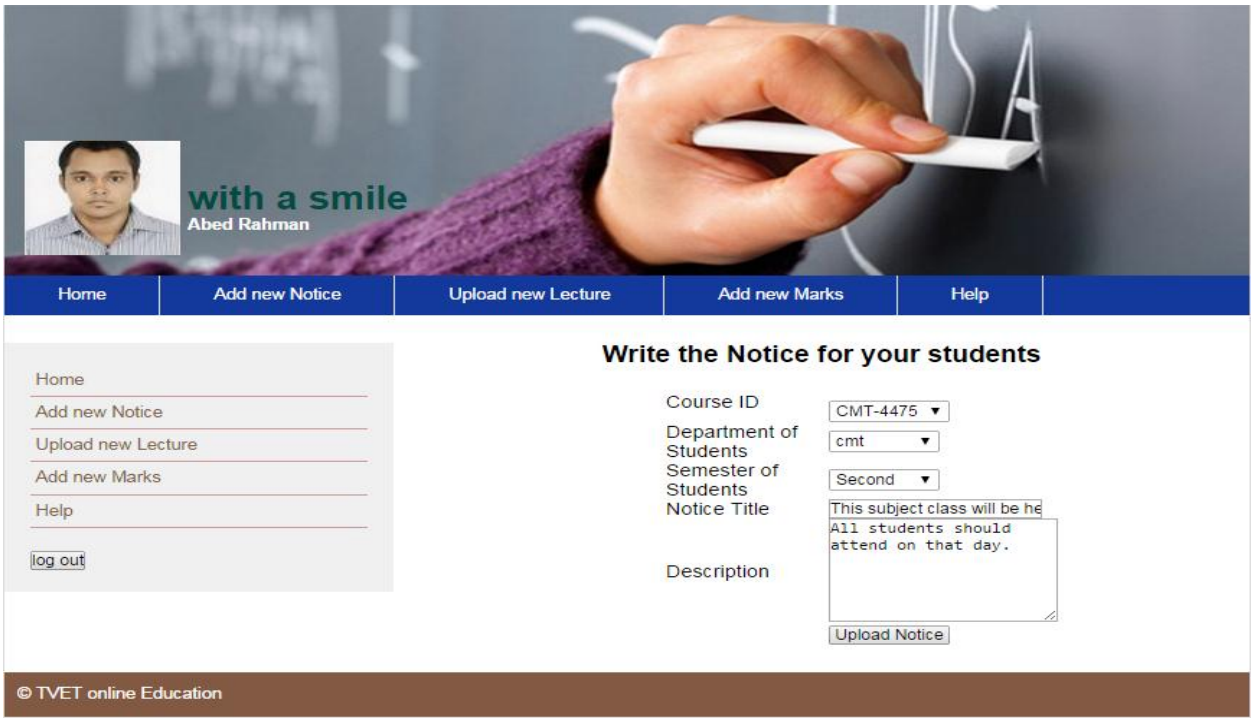

Figure: Snapshot of add new notice page

View notice: a teacher user can view all notices in the tabular format which are given or created by him or her. He or she can see some information like *Notice no, Course ID, Notice Title, Student Institute, Student Department, Student Semester and Notice Date* for each unique Notice. These notices are viewed according to *Notice_id* from the Notices table of this system data base.

There are two important functionalities in this page such as the *delete* and *edit* notice. Teacher can chose the option if needed to update or delete the notices from database.

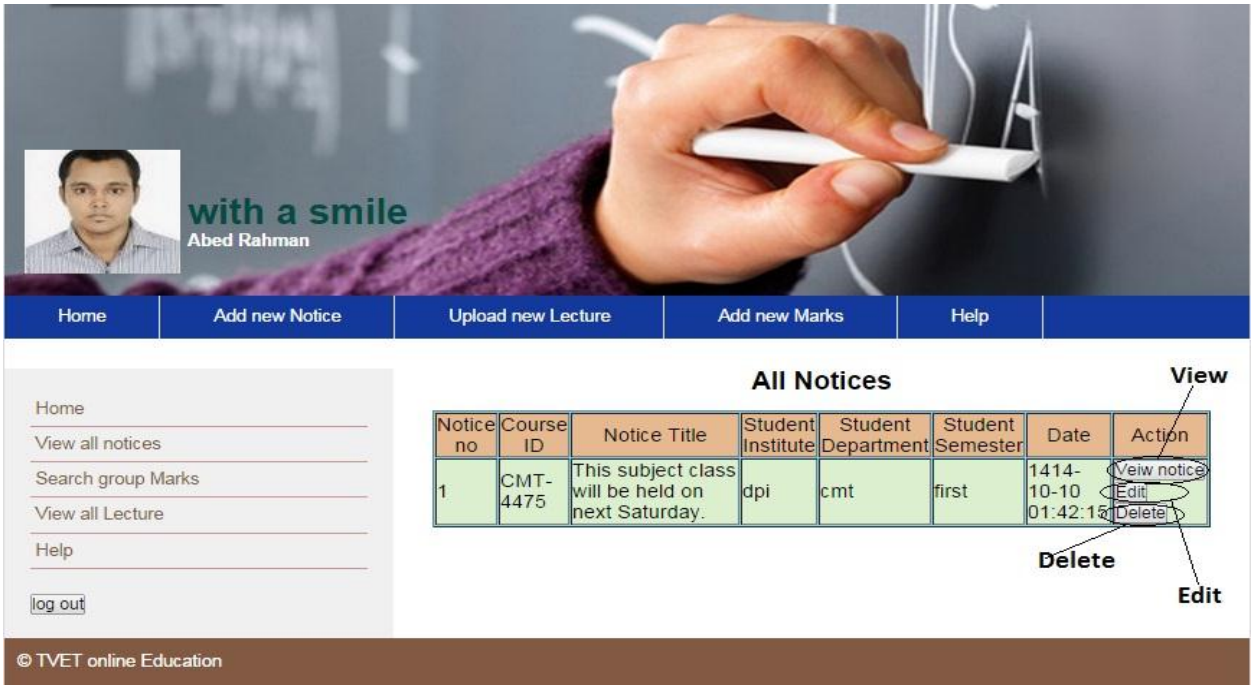

Figure: Snapshot of notice list page with edit and delete facilities

Edit notice: A teacher user can edit or update the information of specific notice. In this page we also use the server site validation by using PHP. Teacher can edit all the fields of the notice information.

Delete notice: A teacher user can delete the information of specific notice. In this page we also use the server site validation by using PHP. Teacher can delete notice information from notice table of our system database.

5.9.1.3 Lecture

In teaching learning system the popular term is lecture. Every teacher makes their lecture according to the level of students. Some time they provide their lecture to the students. Now a day's teacher provides soft copy of their lecture. So in our system a teacher can upload their lecture copy to his or her specific group of students. Lecture section has some functionality like –

- Add new lecture
- Edit lecture
- Delete lecture

Add new lecture: There is a form for adding new Lecture for specific semester students and course. Here a teacher should enter some essential information for making a new lecture like, *Department of Students, Semester of Students Course ID, Lecture Topic, Description, Reference, Lecture content* with upload button. These types of information are help to specify the specific group of students from the TVET institute. In this form we use the server site validations by using PHP which are help to prevent the unauthenticated data insertion to database.In our database there is a table named Lecture with some important fields like, lecture_id, course_id, lecture_topic, description, reference, stu_institute, stu_department, stu_semester, files, lecture_date, teacher_idfor storing and retrieving the lecture information for teacher user and student user. Some information is stored into database from the outside of this form like, student institute, lecture date, teacher id. This information is collected from the session variable and query outputs which are provide more accuracy for adding new lecture.

Here the lecture contents or files are store in the specific folder in our system.

View lecture: a teacher user can view all lectures which are created by him or her. He or she can see some information like *Lecture no, Course ID, Lecture Title, Student Institute, Student Department, Student Semester and Lecture date view content* for each unique lecture. These lectures are viewed according to *lecture_id* from the Lectures table of this system data base.

There are two important functionalities in this page such as the *delete* and *edit* lecture. Teacher can chose the option if needed to update or delete the lectures from database.

Edit lecture: A teacher user can edit or update the information of specific lecture. In this page we also use the server site validation by using PHP code. Teacher can edit or update all the fields of the lecture information.

Delete lecture: A teacher user can delete the information of specific lecture. In this page we also use the server site validation by using PHP code. Teacher can delete lecture information from lecture table of our system database.

5.9.1.4 Marks

In teaching learning system to evaluate the student teacher have to arrange test and need to manage marks. Every teacher gives marks according to the test performance of students. Now a day's teacher provides soft copy of student's marks to the specific group of student. So In our system a teacher can upload student's performance copy to the selected group of students. Marks section has some functionality like –

- Add new marks
- Edit marks
- Delete marks

Add new marks: There is a form for adding new marks for specific semester students and specific course. Here a teacher should enter some essential information for giving new marks like, *Department of Students, Semester of Students, Subject type, Course ID, Credit, Name of Exam, Roll No, Marks and Year*with upload reset buttons. These types of information are help to specify the specific group of students from the TVET institute for distributing marks. In this form we use the server site validations by using PHP which are help to prevent the unauthenticated data insertion to database.

In our database there is a table named Marks with some important fields like, *marks_id, teacher_id, ,stu_institute, stu_department, stu_semester, roll, year, subject_type, course_id , credit, class_test1, class_test2, class_test3, class_test4, attendance, final, date_time, status* for storing and retrieving the marks information for teacher user and student user.

Some information is stored into database from the outside of this form like, student institute, date, teacher id. This information is collected from the session variable and query outputs which are provide more accuracy for adding new marks.

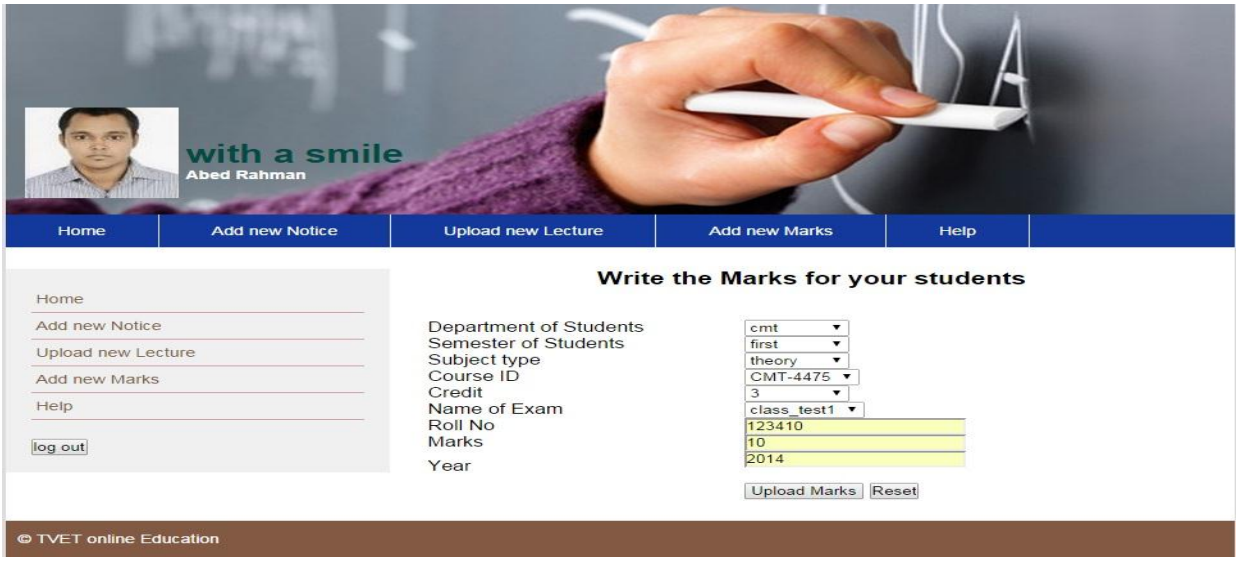

Figure: Snapshot of marks entry page

View marks: a teacher user can view all marks which are created by him or her. He or she can see some information like *Student name, Roll, Subject type, Course ID, Credit, Class test1, class test2,Class test3, class test4, Attendance, final and remarks* for each unique . These marks are viewed according to *student department, semester and course code* from the marks table of this system database.
There are two important functionalities in this page such as the *delete* and *edit* marks. Teacher can chose the option if needed to update or delete the marks from database.

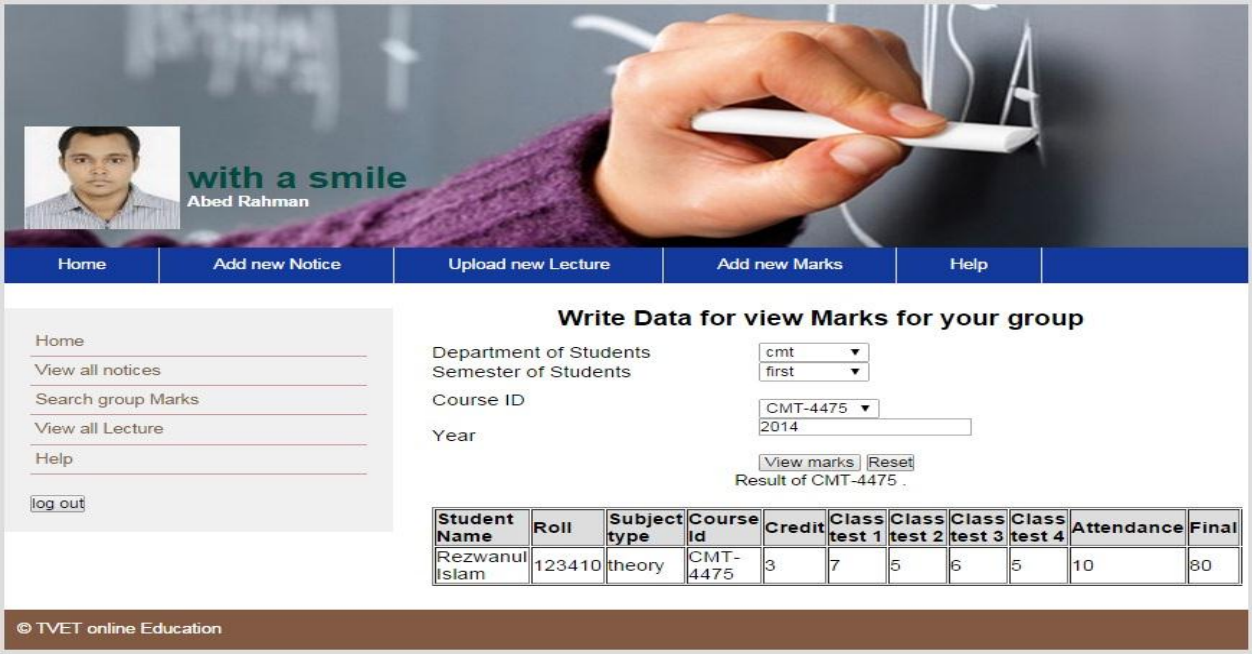

Figure: Snapshot of specific subject's marks page

Edit marks: A teacher user can edit or update the information of specific course marks. In this page we also use the server site validation by using PHP code. Teacher can edit or update all the fields of the marks information.

Delete marks: A teacher user can delete the information of specific marks. In this page we also use the server site validation by using PHP code. Teacher can delete marks information from marks table of our system database.

5.9.1.5 Manage assignment

A teacher can manage the student's submitted assignments. They can view specific student's assignment and also give feedback to the specific student. They can download student's uploaded files. A teacher can give feedback to the specific group of student about their assignment guidelines.

5.9.1.6 Helps

Helps link uses for gathering knowledge about the use of teacher assistant part of this system. Also help a teacher user by giving some instructions like, how to add new notice, lecture and marks? How to view notice, lecture and marks? How to edit notice, lecture and marks? How to delete notice, lecture and marks from lecture, notice and marks pages?

5.9.2 Student profile page

In the student profile page user can look his or her full name, profile picture and other important links according to their organizational authentication. Teacher profile page provide some links which are very important for student's activities in the teaching learning system. Some main facilities and links are given below.

- User profile
- Submit assignment
- View notice
- View lecture
- View marks
- Helps

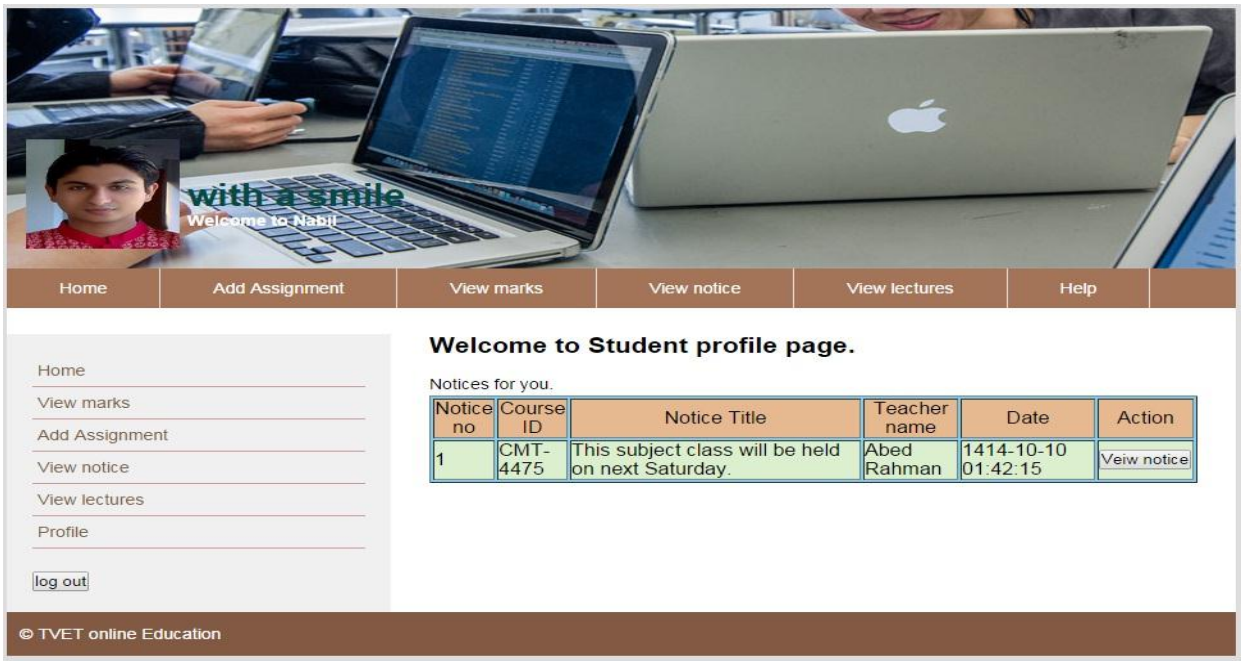

Figure: Snapshot of student profile page with notices

5.9.2.1 User profile

Here student user can see the total organizational information. They can change their profile also. Every student has unique identity. There user_id, username are unique from other user and this user_id and username help to maintain the session works.

5.9.2.2 Submit assignment

By using our system student can add or submit their assignment with uploading files to their specific course teacher. Teacher can view their assignment and give feedback to the student. These facilities can reduce the time and educational cost. Teacher also can manage the assignment properly.

5.9.2.3 View notice

A student user can view all marks which are created by him or her respective teachers for respective courses. He or she can see his or her notices which are given by his or her teachers. *Notice no, Course ID, Notice Title, Student Institute, Student Department, Student Semester and Notice Date* for each unique student. These marks are viewed according to *student roll number and course code* from the marks table of this system database.

Figure: Snapshot of detail information of a notice

5.9.2.4 View lecture

A student user can view all lectures which are created by him or her respective teachers for respective courses. He or she can see some information like *Lecture no, Course ID, Lecture Title, Student Department, Student Semester and Lecture date view content* for each unique lecture. These lectures are viewed according to *lecture_id* and *teacher_id* and log in student from the Lectures table of this system database.

5.9.2.5 View marks

A student user can view his all marks which are created by his or her respective teachers for respective courses. He or she can see some information like *Student name, Roll, Subject type, Course ID, Credit, Class test1, class test2,Class test3, class test4, Attendance, final and remarks*

for each unique course . These marks are viewed according to *student's department, semester and course code and his roll number* from the marks table of this system database.

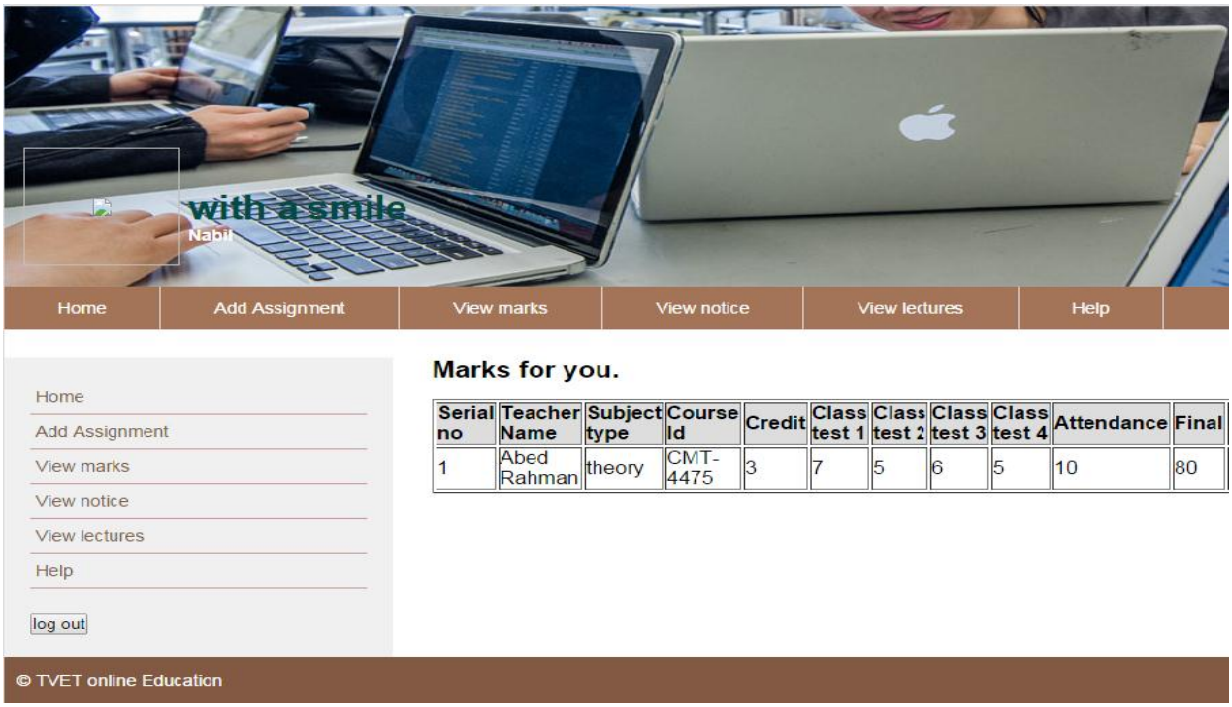

Figure: Snapshot of specific student's marks

5.9.2.6 Helps

Helps link uses for gathering knowledge about the use of teacher assistant part of this system. Also help a student user by giving some instructions like, how to view notice, lecture and marks from lecture, notice and marks pages?

5.10 Project showcasing

In our country there is no single website about project showcasing system. There are no any single opportunities to share the skill based knowledge or project knowledge to others to inspire or influence to learn skill based education. Real life project knowledge helps to develop a student's creativity.

In our system students can share their final project reports and other essential contents which are help to develop the student's skill based knowledge and increase the innovation power of individual. Teacher also share the skill based knowledge to the student. They can give a better guideline to their student and also motivate the students.

Here a register user can add new project details with relevant documents and other operations. Opportunities of project showcasing are given bellow.

- Add project
- View own project details
- Update & delete own project details
- Feedback to visitors

5.10.1 Add project

The registered users of our system can get opportunity to add their project details whatever he has done before. They can share their guideline and suggestion and uniqueness about their project.

5.10.2 View own project details

Every registered user can view their submitted project's detail. They can read all projects by selecting different categories.

5.10.3 Update & delete own project details

Every user can update or edit their submitted project details as a registered user. They can also delete their projects from the database of our system.

5.10.4 Feedback to visitors

Feedback is very essential part for evaluating any output of a system. A user also can suggest and comment for their visitors. Visitors also can comment for any project.

Conclusion

For our system we have completed paper work and survey the TVET present system analysis. We have collected data from TVET students and teachers from government and nongovernment polytechnic institutes like Dhaka polytechnic Institute, National polytechnic institute, department of TVE in IUT and other institutions in Bangladesh. We have seen from our survey report there are many contents are too much needy for our TVET system. We have designed and developed our whole system including different types of module like tutorial, blog, chat and teacher assistant system which is completely web based. We have also done some basic works for creating teacher assistant application for android platform of smartphone.

Our future works will be defined by different works like publishing our system live in online with an appropriate domain name for giving opportunity to all of our TVET system users, establishing the teacher assistant application with cloud computing facility and a strong administration for managing our system and enhancement of new facilities for TVET system which will help the TVET users properly and purposefully.

References-

Web References

http://www.wikipedia.org/
http://www.nctb.gov.bd/
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http://www.iutoic-dhaka.edu/
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Appendix

Database

We have developed a database named "onlinetvet" for our web based e-learning and teacher assistant system for our TVET system of Bangladesh. There are many tables in this database with different fields and relationships.

- ✓ All tables for our database
- ✓ Admin table
- ✓ Users table
- ✓ Blog_ posts table
- ✓ Tutorials table
- ✓ Comment table
- ✓ Courses table
- ✓ Institute info table
- ✓ Lecture table
- ✓ Marks table
- ✓ Notice table
- ✓ Project table

All tables for our database

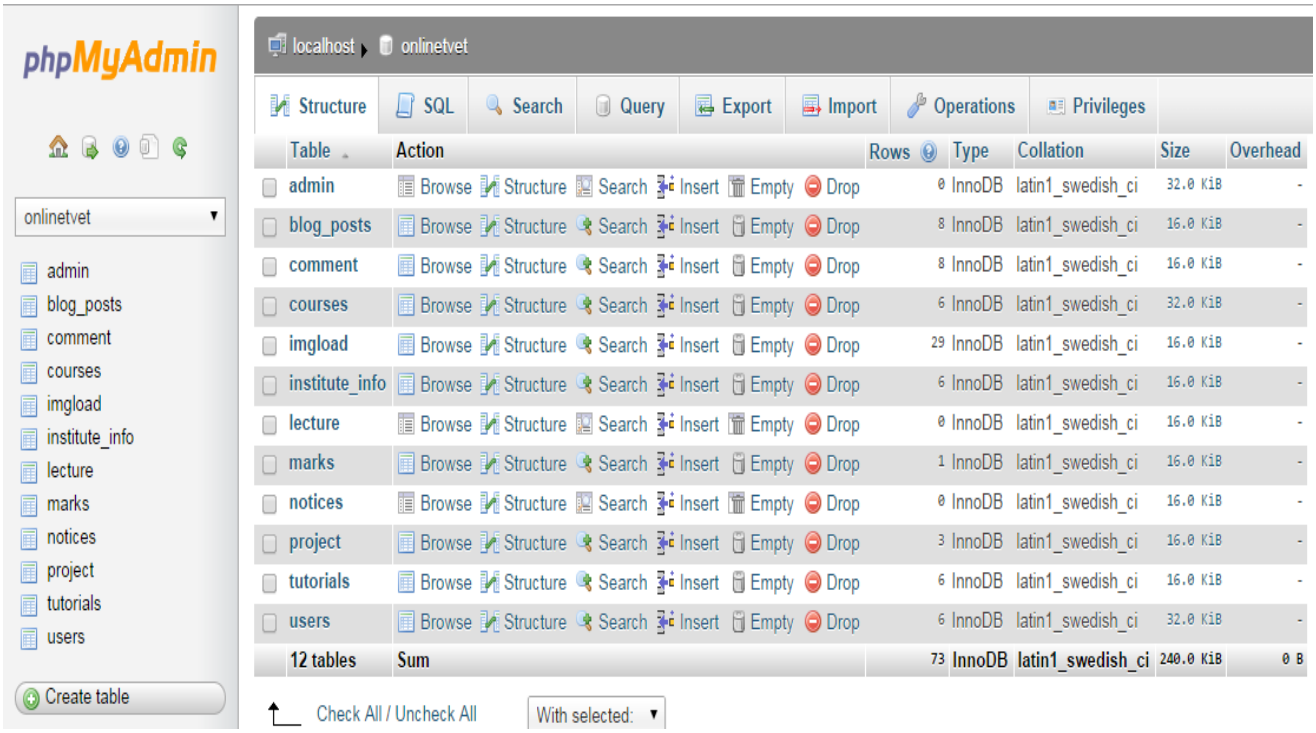


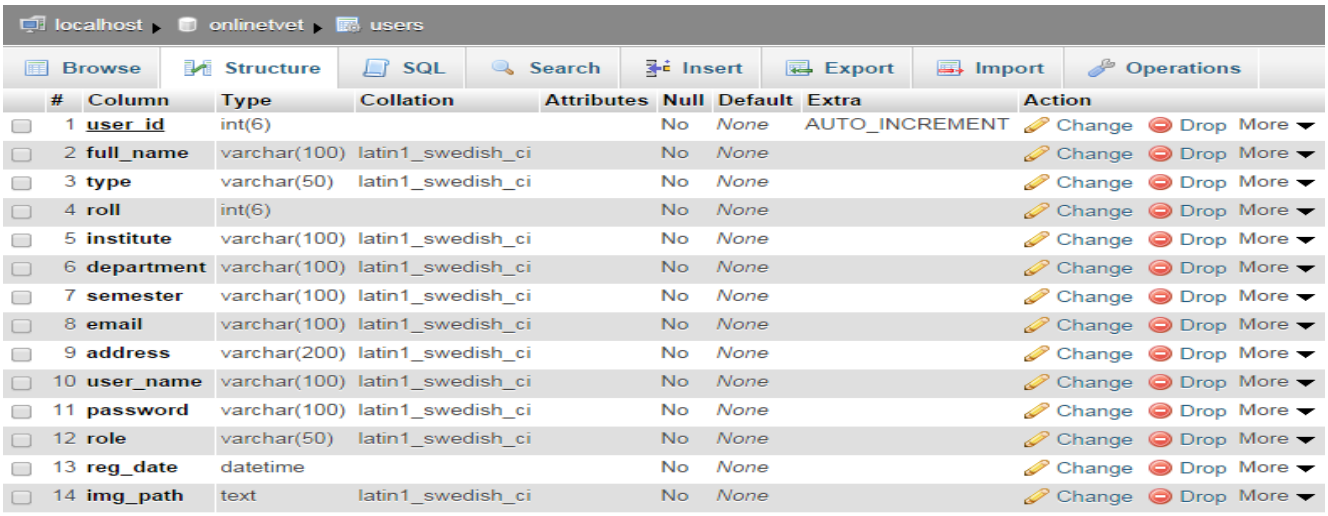
Figure: Snapshot of all tables for our database

Admin table

#	Column	Type	Collation	Attributes	Null	Default	Extra	Action
1	id	int(11)			No	None	AUTO_INCREMENT	Change Drop More
2	username	varchar(100)	latin1_swedish_ci		Yes	NULL		Change Drop More
3	password	varchar(100)	latin1_swedish_ci		Yes	NULL		Change Drop More
4	last_log_date	date			Yes	NULL		Change Drop More
5	email	varchar(100)	latin1_swedish_ci		Yes	NULL		Change Drop More

Figure: Snapshot of admin table

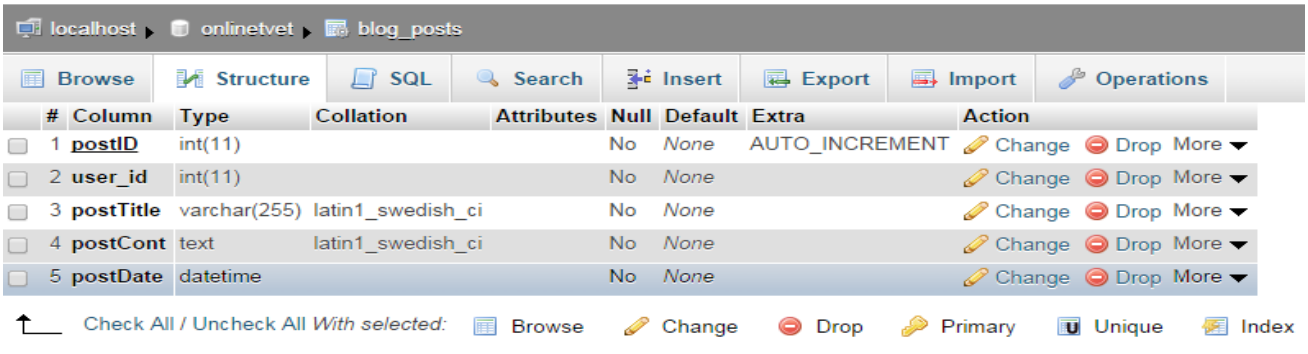
Users table



#	Column	Type	Collation	Attributes	Null	Default	Extra	Action
1	user_id	int(6)			No	None	AUTO_INCREMENT	Change Drop More
2	full_name	varchar(100)	latin1_swedish_ci		No	None		Change Drop More
3	type	varchar(50)	latin1_swedish_ci		No	None		Change Drop More
4	roll	int(6)			No	None		Change Drop More
5	institute	varchar(100)	latin1_swedish_ci		No	None		Change Drop More
6	department	varchar(100)	latin1_swedish_ci		No	None		Change Drop More
7	semester	varchar(100)	latin1_swedish_ci		No	None		Change Drop More
8	email	varchar(100)	latin1_swedish_ci		No	None		Change Drop More
9	address	varchar(200)	latin1_swedish_ci		No	None		Change Drop More
10	user_name	varchar(100)	latin1_swedish_ci		No	None		Change Drop More
11	password	varchar(100)	latin1_swedish_ci		No	None		Change Drop More
12	role	varchar(50)	latin1_swedish_ci		No	None		Change Drop More
13	reg_date	datetime			No	None		Change Drop More
14	img_path	text	latin1_swedish_ci		No	None		Change Drop More

Figure: Snapshot of users table

Blog_posts table

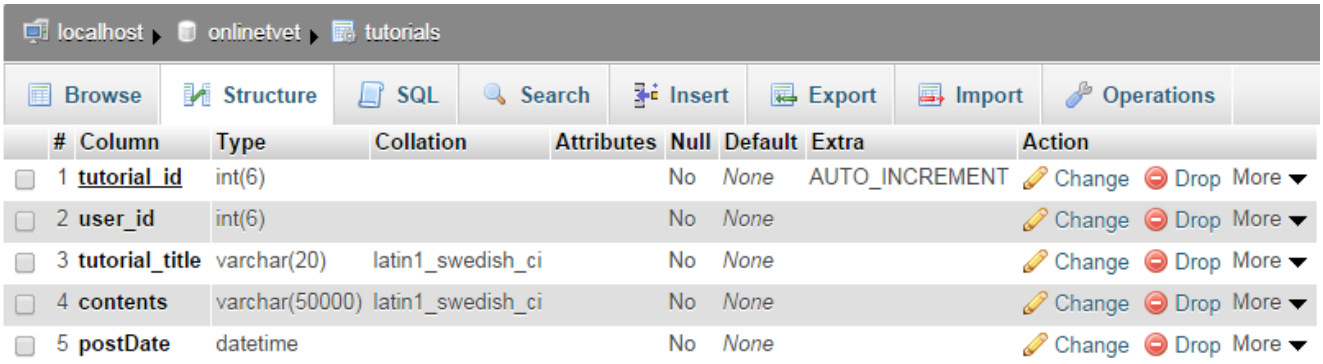


#	Column	Type	Collation	Attributes	Null	Default	Extra	Action
1	postID	int(11)			No	None	AUTO_INCREMENT	Change Drop More
2	user_id	int(11)			No	None		Change Drop More
3	postTitle	varchar(255)	latin1_swedish_ci		No	None		Change Drop More
4	postCont	text	latin1_swedish_ci		No	None		Change Drop More
5	postDate	datetime			No	None		Change Drop More

Check All / Uncheck All *With selected:* Browse Change Drop Primary Unique Index

Figure: Snapshot ofblog_posts table

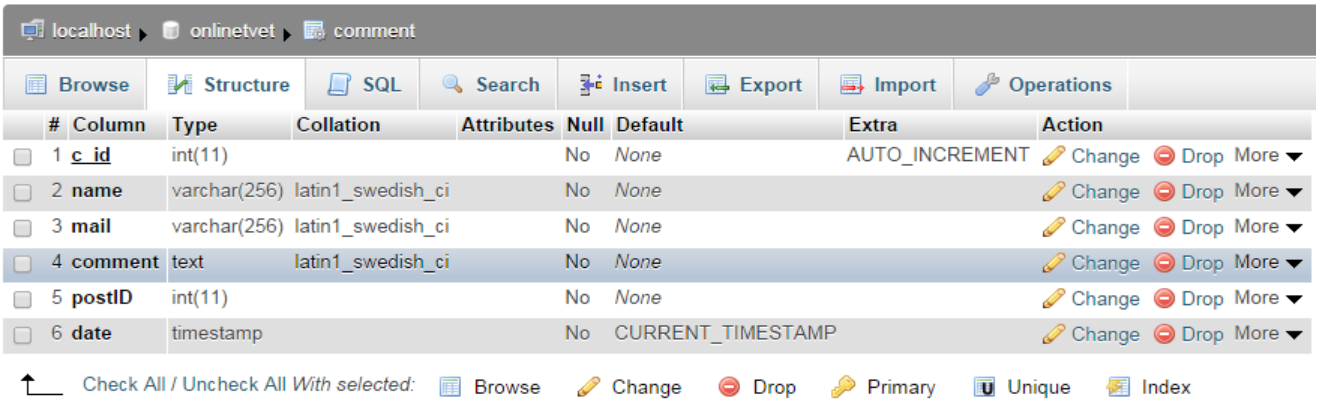
Tutorials table



#	Column	Type	Collation	Attributes	Null	Default	Extra	Action
1	tutorial_id	int(6)			No	None	AUTO_INCREMENT	Change Drop More
2	user_id	int(6)			No	None		Change Drop More
3	tutorial_title	varchar(20)	latin1_swedish_ci		No	None		Change Drop More
4	contents	varchar(50000)	latin1_swedish_ci		No	None		Change Drop More
5	postDate	datetime			No	None		Change Drop More

Figure: Snapshot of tutorials table

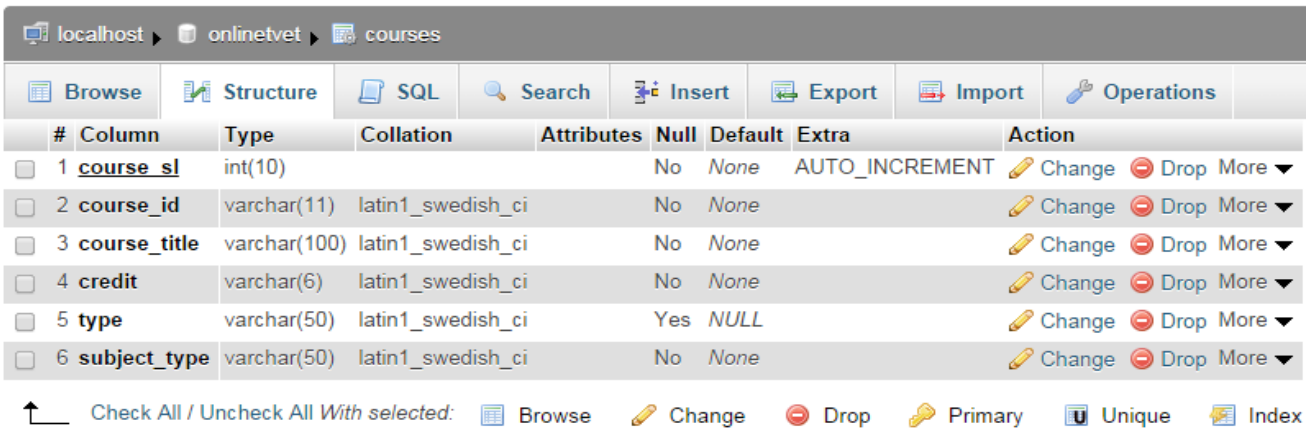
Comment table



#	Column	Type	Collation	Attributes	Null	Default	Extra	Action
1	c_id	int(11)			No	None	AUTO_INCREMENT	Change Drop More
2	name	varchar(256)	latin1_swedish_ci		No	None		Change Drop More
3	mail	varchar(256)	latin1_swedish_ci		No	None		Change Drop More
4	comment	text	latin1_swedish_ci		No	None		Change Drop More
5	postID	int(11)			No	None		Change Drop More
6	date	timestamp			No	CURRENT_TIMESTAMP		Change Drop More

Figure: Snapshot of comment table

Courses table



#	Column	Type	Collation	Attributes	Null	Default	Extra	Action
1	course_sl	int(10)			No	None	AUTO_INCREMENT	Change Drop More
2	course_id	varchar(11)	latin1_swedish_ci		No	None		Change Drop More
3	course_title	varchar(100)	latin1_swedish_ci		No	None		Change Drop More
4	credit	varchar(6)	latin1_swedish_ci		No	None		Change Drop More
5	type	varchar(50)	latin1_swedish_ci		Yes	NULL		Change Drop More
6	subject_type	varchar(50)	latin1_swedish_ci		No	None		Change Drop More

Figure: Snapshot of courses table

Institute information table

localhost ▸ onlinetvet ▸ institute_info

Browse | Structure | SQL | Search | Insert | Export | Import | Operations

#	Column	Type	Collation	Attributes	Null	Default	Extra	Action
1	institute_id	int(6)			No	None	AUTO_INCREMENT	Change Drop More
2	institute_name	varchar(50)	latin1_swedish_ci		No	None		Change Drop More
3	department	varchar(50)	latin1_swedish_ci		No	None		Change Drop More
4	students	varchar(50)	latin1_swedish_ci		No	None		Change Drop More
5	teachers	varchar(50)	latin1_swedish_ci		No	None		Change Drop More
6	staff	varchar(50)	latin1_swedish_ci		No	None		Change Drop More
7	shift	varchar(2)	latin1_swedish_ci		No	None		Change Drop More

Figure: Snapshot of institute_info table

Lecture table

#	Column	Type	Collation	Attributes	Null	Default	Extra	Action
1	lecture_id	int(6)			No	None	AUTO_INCREMENT	Change Drop More
2	course_id	varchar(50)	latin1_swedish_ci		No	None		Change Drop More
3	lecture_topic	varchar(200)	latin1_swedish_ci		No	None		Change Drop More
4	description	varchar(200)	latin1_swedish_ci		No	None		Change Drop More
5	reference	varchar(200)	latin1_swedish_ci		No	None		Change Drop More
6	stu_institute	varchar(200)	latin1_swedish_ci		No	None		Change Drop More
7	stu_department	varchar(100)	latin1_swedish_ci		No	None		Change Drop More
8	stu_semester	varchar(100)	latin1_swedish_ci		No	None		Change Drop More
9	files	varchar(200)	latin1_swedish_ci		No	None		Change Drop More
10	lecture_date	datetime			No	None		Change Drop More
11	teacher_id	int(6)			No	None		Change Drop More

Figure: Snapshot of lecture table

Marks table

localhost ▸ onlinetvet ▸ marks

Browse | Structure | SQL | Search | Insert | Export | Import | Operations

#	Column	Type	Collation	Attributes	Null	Default	Extra	Action
1	marks_id	int(10)			No	None	AUTO_INCREMENT	Change Drop More
2	teacher_id	int(6)			No	None		Change Drop More
3	stu_institute	varchar(200)	latin1_swedish_ci		No	None		Change Drop More
4	stu_department	varchar(200)	latin1_swedish_ci		No	None		Change Drop More
5	stu_semester	varchar(11)	latin1_swedish_ci		No	None		Change Drop More
6	class_test1	varchar(50)	latin1_swedish_ci		No	None		Change Drop More
7	class_test2	varchar(50)	latin1_swedish_ci		No	None		Change Drop More
8	class_test3	varchar(50)	latin1_swedish_ci		No	None		Change Drop More
9	class_test4	varchar(50)	latin1_swedish_ci		No	None		Change Drop More
10	attendance	varchar(50)	latin1_swedish_ci		No	None		Change Drop More
11	final	varchar(50)	latin1_swedish_ci		No	None		Change Drop More
12	course_id	varchar(100)	latin1_swedish_ci		No	None		Change Drop More
13	credit	varchar(50)	latin1_swedish_ci		No	None		Change Drop More
14	subject_type	varchar(50)	latin1_swedish_ci		No	None		Change Drop More
15	roll	varchar(500)	latin1_swedish_ci		No	None		Change Drop More
16	year	varchar(20)	latin1_swedish_ci		No	None		Change Drop More
17	date_time	datetime			No	None		Change Drop More
18	status	varchar(100)	latin1_swedish_ci		No	None		Change Drop More

Figure: Snapshot of marks table

Notice table

#	Column	Type	Collation	Attributes	Null	Default	Extra	Action
1	notice_id	int(6)			No	None	AUTO_INCREMENT	Change Drop More
2	course_id	varchar(50)	latin1_swedish_ci		No	None		Change Drop More
3	stu_institute	varchar(100)	latin1_swedish_ci		No	None		Change Drop More
4	stu_department	varchar(50)	latin1_swedish_ci		No	None		Change Drop More
5	stu_semester	varchar(50)	latin1_swedish_ci		No	None		Change Drop More
6	notice_title	varchar(100)	latin1_swedish_ci		No	None		Change Drop More
7	description	varchar(300)	latin1_swedish_ci		No	None		Change Drop More
8	teacher_id	varchar(6)	latin1_swedish_ci		No	None		Change Drop More
9	date_time	datetime			No	None		Change Drop More

Figure: Snapshot of notice table

Project table

#	Column	Type	Collation	Attributes	Null	Default	Extra	Action
1	notice_id	int(6)			No	None	AUTO_INCREMENT	Change Drop More
2	course_id	varchar(50)	latin1_swedish_ci		No	None		Change Drop More
3	stu_institute	varchar(100)	latin1_swedish_ci		No	None		Change Drop More
4	stu_department	varchar(50)	latin1_swedish_ci		No	None		Change Drop More
5	stu_semester	varchar(50)	latin1_swedish_ci		No	None		Change Drop More
6	notice_title	varchar(100)	latin1_swedish_ci		No	None		Change Drop More
7	description	varchar(300)	latin1_swedish_ci		No	None		Change Drop More
8	teacher_id	varchar(6)	latin1_swedish_ci		No	None		Change Drop More
9	date_time	datetime			No	None		Change Drop More

Figure: Snapshot of project table

THE END